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Message of the President of the United States and accompanying documents, to the two Houses of Congress at the commencement of the third session of the Fortieth Congress, Report of the Commissioner of the General Land Office, 1868

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Recommended Citation

H.R. Exec. Doc. No. 1, 40th Cong., 3rd Sess., (1868)

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REPORT

OF THE

COMMISSIONER OF THE GENERAL LAND OFFICE.

DEPARTMENT OF THE INTERIOR,
General Land Office, November 5, 1868.

SIR: Pursuant to the resolution adopted February 28, 1855, by the Senate of the United States, the following is presented as an abstract of the annual report of this office for the fiscal year ending June 30, 1868:

1. The disposal of public lands by ordinary cash sales, by pre-emptions, homestead entries, bounty land warrant locations, college scrip, railroad and swamp selections, amounted to 6,655,742 $\frac{5.0}{100}$ acres. The cash receipts under various heads amounted to \$1,632,745 90.

2. An outline is given of the surveying system extending from the Atlantic to the Pacific, the public domain being intersected by 20 base lines and 23 principal meridians.

3. The characteristics of the public lands in Michigan shown, with the quantity remaining undisposed of.

4. Like information in regard to Wisconsin.

5. The results of land operations indicated in the region embraced by Ohio, Indiana, and Illinois, in which the proprietary interests of the United States have nearly all been disposed of.

6. The public land States on the Gulf of Mexico, viz., Florida, Alabama, Mississippi, and Louisiana, particularly described in regard to their peculiarities of soil, products, and resources, the quantity of public land undisposed of in each of them being stated.

7. The advantages of soil and resources shown in regard to each of the political communities flanking the right bank of the Mississippi to the northern line of Louisiana, viz., of Minnesota, Iowa, Missouri, and Arkansas, the area of public lands undisposed of in each of these States being shown.

8. Similar statements made in regard to Dakota, Nebraska, and Kansas, lying east of the Rocky mountains.

9. The Territories traversed by the Rocky mountains, described as to soil, resources, the area of public land in each being given, with the quantity surveyed, and that unsurveyed, referring to them in the following order: Montana, Wyoming, Colorado, and New Mexico. Recommendations submitted for the extension of the land system to the new Territory of Wyoming.

10. Next are described the advantages in soil and resources of the Territories and States between the Rocky mountains and the Sierra Nevada, viz., Idaho, Nevada, Utah, and Arizona, the area of public land undisposed of in each of them being shown, as also the quantity surveyed and that unsurveyed.

11. The States and Territories on the Pacific ocean described in regard to their several peculiarities and value in soil and production, the quan-

tity of public land undisposed of in each of them being shown, with the area surveyed and unsurveyed, beginning with California, and extending to Oregon and Washington Territory.

12. Views presented in regard to Alaska, with recommendation of the extension to that territory of our land machinery.

13. Sketch given of the leading measures prescribed by law for the disposal of the public lands.

14. Satisfactory exhibit submitted in regard to the accounts of receivers of public moneys and disbursing agents. Recommendation suggested that the statutory provision interdicting the employés of the General Land Office from purchasing public land be extended to the officers of the several districts of local land administration.

15. The pre-emption policy considered, and its value and importance to the country shown. Amendment suggested to make the system still more effective.

16. Homestead measure discussed; its importance shown, and ruling presented on various important points which have arisen.

17. The donation claims in the State of Oregon and in Washington Territory. Progress shown in regard to the consummation of individual title.

18. Town-site law considered. Regulations adopted in regard to cases arising under the acts of 1864, 1865, 1867, and 1868.

19. Exhibit furnished in regard to internal improvement grants, general and special.

20. Aggregate of the grants for support of schools, universities, and colleges shown, with the area stated that will be conceded for this purpose under existing principles of legislation.

21. The policy of Congress shown in making grants for military and naval services from the days of the Revolution to the present time aggregate quantity given for such services.

22. An exhibit made in regard to military reservations; power of the executive to make such shown; legislation recommended to authorize the sale of such as may be finally abandoned, and are useless to the government.

23. History of the proceedings ordered for the establishment astronomically of the boundary lines between Nebraska and Colorado, between Nebraska and Wyoming, and between Nevada, Utah, and Arizona; also in regard to the establishment of the northern boundary of New Mexico under special authority of law.

24. Details presented in regard to the late geological survey in Nebraska under act of March 2, 1867.

25. The measures shown for the extension of such explorations west of Nebraska into Colorado and Wyoming, under act of July 20, 1868.

26. General considerations presented in regard to geological and mineral interests, with recommendations that authority of law be given for the creation of a suitable edifice as a receptacle for minerals and other illustrations of the wealth of the country.

27. Laws and regulations shown in regard to the survey of islands, meandered lakes and rivers.

28. Questions discussed at length in regard to riparian interests, and the rights of parties in that relation considered. The rulings of the court and the department in reference to such interests fully presented.

29. Progress shown in regard to swamp grants; areas of selections placed and indemnity conceded; area shown which has passed to the several States under the acts of Congress of 1849 and 1850.

30. Irrigation; particulars shown, and suggestions made in regard to this important subject.

31. Mining law of 1866 considered, and the rulings shown in several important points which have arisen in the administration of the statute in different mining localities.

32. Remarks on the railway system of the United States; extent of grants made by Congress in aid of the same; details presented in regard to the continental lines; quantity stated which will pass under existing grants.

33. Area of the national domain shown; the public acts referred to by which it has reached its present immense proportions; expansion of the territorial limits of the republic, and its relations to Asiatic trade considered.

34. The report is accompanied by tabular statements showing in detail operations under the various laws for the disposal of the public lands.

35. Estimates submitted for the service.

36. The report is accompanied by annual returns of the surveyors general of field operations in the several surveying districts; also by maps illustrative of the progress of surveys, and of other public interests.

Respectfully submitted:

JOS. S. WILSON,
Commissioner.

Hon. O. H. BROWNING,
Secretary of the Interior.

DEPARTMENT OF THE INTERIOR,
General Land Office, November 5, 1868.

SIR: The operations of this branch of the service during the last fiscal year have been co-extensive with all the public land States and Territories in which the land system has been inaugurated, embracing the States bounded by the great lakes on our northern frontier, the three immediately south of them, those fronting on the Gulf of Mexico, the tier of political communities flanking the right bank of the Mississippi from our northern to our southern limits, the States and Territories west of these in the plains, and traversed by the Rocky mountains, and those fronting on the Pacific ocean. The jurisdiction of the department has also been exercised in regard to claims of parties in the older States representing agricultural college grants, bounty land warrants, Indian scrip, and other elements of title granted pursuant to law. The disposal of the public lands, by ordinary cash sales, pre-emptions, homestead entries, locations of military warrants, college scrip, selections in aid of the reclamation of inundated lands, has been for the fiscal year ending 30th June, 1868, as follows:

	Acres.
Cash sales	914, 941. 33
Aggregate of military bounty land warrant locations...	512, 533. 42
Total quantity by homestead entries under acts of 1862, 1864, and 1866	2, 328, 923. 25
In the same period there were approved as swamp "in place" to several States, as grantees, under the act of September 28, 1850, 145,628.89 acres, and selected as swamp indemnity, 113,568.96 acres, making a total of swamp lands, or their equivalents, confirmed to States, of.....	259, 197. 85

	Acres.
In the same fiscal year titles under railroad grants have been vested in certain States for the quantity of.....	697, 257.5
Agricultural and mechanic college land scrip, issued under act of 1862, has been located by the assignees of certain non-land holding States, equal to	1, 942, 889.0
Making a total of public lands disposed of during the fiscal year ending 30th June, 1868, of.....	6, 655, 742.5

The *cash* receipts during the same period for ordinary sales and pre-emptions, including a small quantity of military scrip received as money for the \$10 homestead payments; for commissions on homesteads; for fees in the locating of agricultural college scrip, for same in the locating of military warrants, for fees in pre-emption cases, on donations on railroad selections, and on certified transcripts under the acts of 1861 and 1864, make an aggregate received during the year terminating the 30th of June, 1868, of \$1,632,745 90.

In order to a proper understanding of the manner in which the boundaries of tracts of the public land are ascertained and established, it is deemed necessary to present the following

OUTLINE OF THE RECTANGULAR SURVEYING SYSTEM.

The public lands are first surveyed into rectangular tracts, according to the true meridian, noting the variation of the magnetic needle. Those tracts are called townships, each of six miles square, having reference to an established principal base line on a true parallel of latitude, and to longitude styled principal meridian. Any series of contiguous townships, north or south of each other, constitute a range; the townships counting from the base, either north or south, and the range from the principal meridian, either east or west. Each township is subdivided into 36 sections of one mile square, or 640 acres. The diagram herewith shows the mode of surveying the township lines from the initial point or intersection of the principal base with the principal meridian, astronomically ascertained with reference to parallel of latitude and degree of longitude.

In establishing and surveying a base line from the initial point east and west, quarter section, section and township corners are established every 40, 80, and 480 chains, respectively, which are for sections and townships lying north of the base, and not for those situated south.

In surveying the principal meridian north and south of the initial point, similar corners are established, which are common for township lying immediately east or west. Standard parallel or correction lines are run east and west from the principal meridian with similar character of corners, as on the principal base and meridian, and constitute special bases for township lines lying north thereof, the correction lines being run and marked at every four townships, or 24 miles north of the base and at every five townships, or 30 miles south of the same.

Guide meridians are surveyed at distances of every eight ranges of townships, or 48 miles east and west of the principal meridian; the guides north of the principal base starting either from it or from standard parallels. They are closed by meridional lines on other standard parallels immediately north, while those lying south of the principal bases start in the first instance from the first standard parallel south and are closed by meridional lines on the principal base. Then the

guides begin on the second standard parallel south, and close on the first standard parallel south, again starting from the third standard parallel south, and closing on the second standard parallel south, and so on. The closing corners on the principal base and standard parallel are established at points of convergency of the meridians, which occasion a double set of corners on the principal base and correction, or standard parallels, styled "standard corners" and "closing corners." This process requires off-setting of the guide meridians to the extent of the convergency of the meridians on each of the standard parallels and bases.

The principal base, principal meridian, standard parallels, and guide meridians, constitute a frame-work of the rectangular system of public surveys. Within these limits any errors are avoided which otherwise would result from adhering to the surveys made as the law directs, to the true meridian, in consequence of the convergency of meridians and of measurement over uneven surfaces.

The surveys of the standard lines are made with instruments operating independently of the magnetic needle, the magnetic being noted solely to show the true variation. These lines divide the sphere of field operations into parallelograms of 48 by 24 miles north of the principal base, and 48 by 30 miles south, the convergency of the meridians in the former instance being greater than in the latter.

The parallelograms formed by meridians and parallels are in their turn subdivided into townships, and the latter ultimately into sections with an ordinary but perfectly adjusted compass. These parallelograms also serve to connect distant surveys from those progressing regularly from the initial point, if first required, for the convenience of remote settlements or other considerations.

The township lines start from the standard corners, pre-established on the principal base and standard or correction parallels, and are surveyed to the extent required within each parallelogram. On those lines quarter section, section, and township corners are fixed to govern the subdivisive work of the townships into 36 sections.

The sections of one mile square are the smallest tracts, the boundaries of which the law requires to be actually surveyed. Their minor subdivisions, represented in dotted lines on the accompanying diagram, are not surveyed and marked in the field. They are defined by law, and the surveyors general in protracting township plats from the field-notes of sections merely designate them in red ink, the lines being imaginary, connecting opposite quarter section corners in each section from south to north, and from east to west, thereby dividing sections into four quarter sections of 160 acres each, and these in their turn into quarter-quarter sections of 40 acre tracts, by imaginary lines, starting from the equidistant points between the section and quarter section corners to similar points on the opposite sides of the section.

Each section containing 640 acres, subdivided into legal subdivisions, affords forty different descriptions, susceptible of being disposed of to purchasers, from 640 acre tracts to 40 acre parcels.

This convenient mode of subdividing sections with a view to economy and to facilitate sales of small tracts, although not actually marked on the ground by metes and bounds, yet under laws of Congress are susceptible of demarkation by any surveyor in the different States and Territories, in accordance with the field-notes of the original survey made by United States officers.

The rectangular system has been in operation for upwards of eighty years. Its advantages over the trigonometrical method consist in its

economy, simplicity in the process of transfer, and brevity of description in deeding the premises by patents, and in the convenience of reference of the most minute legal subdivision to the corners and lines of sections, townships of given principal base and meridians, affording unerring means for the restoration of lines and marks when destroyed by time or accident.

Since the inauguration of the system it has undergone modification in regard to the establishment of standard lines and initial points, the system of parallels or correction lines, as also of guide meridians having been instituted, contributing much towards the completeness of the system. There are at present permanently established twenty principal bases, and twenty-three principal meridians, controlling the public survey in the land States and Territories, with the exception of Alaska, Wyoming, and Indian country. The public surveys in some districts are governed by one principal base and principal meridian, as in Arkansas, Missouri, Iowa, partly in western Minnesota, and eastern Dakota, where the 5th principal meridian and principal base have the initial point in Arkansas, and yet controlling all the surveys in those political divisions. In California there are three different initial points, necessitated by abrupt mountains throughout the State.

The latest established principal base and meridian are in Montana which regulate the surveys in that Territory. It is reported by the surveyor general as being "on the summit of a limestone hill about 800 feet high, about 12 miles southwest of the junction of the three forks of the Missouri river," instead of Beaver Head Rock, as suggested to him in 1867, the latter having been found by actual examination less suitable.

The lines of public surveys over level ground are measured with four-pole chain of sixty-six feet in length, 80 chains constituting one lineal mile, but with two-pole where the features of the country are broken and hilly. The lines thus chained are marked through timber land by chops on line trees on each side, and in the absence of such trees those standing nearest the survey on both sides are blazed diagonally towards the line run. Trees standing at the precise spot where legal corners are required are made available. If no such trees are there then the corners are perpetuated by posts or stones, with inscriptions, and the positions of the same are indicated by witness trees or mounds, the angular bearings and distances from the corner being ascertained and described in the field-notes. The lines intersecting navigable streams, the areas of which are excluded from sale, require the establishment of meander corner posts, the course and distances on meandered navigable streams governing the calculation from which true contents of fractional lots are computed and expressed on township plats. Township corner posts, or stones common to four townships, are set diagonally, properly marked with six notches on each of the four angles set to the cardinal points of the compass; and mile posts on township lines are marked with as many notches on them as they are miles distant from the township corners respectively; the four sides of the township and section posts, which are common to four townships or sections, are marked with the corresponding number of sections. See subjoined diagrams in the appendices.

The principal meridian, base, standard, and guides having been first measured and marked, and the corner boundaries thereon established, the process of surveying and marking the exterior lines of townships north and south of the base, and east and west of the meridian, within those standard lines, is shown on diagrams herewith.

With papers accompanying this report will be found form of a surveying contract and bond into which a United States surveyor general enter

with a deputy surveyor, after being commissioned, for the survey of either standards, townships, or subdivisions. The contract specifies the localities where surveys are to be made, duration of the time within which the work is to be returned, the price of survey per lineal mile, including all contingent expenses to be borne by the deputy surveyor, who is required to execute the work in his own proper person, subcontracting being illegal.

RE-ESTABLISHING THE LINES OF PUBLIC SURVEYS.

The original corners when they can be found must stand under the statute as the true corners they were intended to represent, even though not exactly where strict professional care might have placed them in the first instance. Missing corners must be re-established in the identical localities they originally occupied. When the spot cannot be determined by the existing landmarks in the field, resort must be had to the field-notes of the original survey. The law provides that the length of the lines, as stated in the original field-notes, shall be considered as the true lengths, and the distances between corners set down in those notes constitute proper data from which to determine the true locality of a missing corner; hence the rule that all such should be restored at distances proportionate to the original measurements between existing original landmarks.

LAWS AND RULES GOVERNING THE SUBDIVISION OF SECTIONS OF PUBLIC LANDS.

Information is frequently called for in reference to the rules prevailing in the surveys and subdivisions. The acts of Congress approved May 10, 1800, section 3, vide United States Statutes, vol. 2, page 73, and February 11, 1805, same vol., pages 313 and 314, regulate the mode of proceeding.

Although the statute of 1805 does not require actual running and marking the interior lines of a section by the government surveyors, it prescribes certain principles upon which the division lines may be ascertained and the lands sold by legal subdivisions, as laid down on township plats by surveyors general.

The subdivision of a quarter section provided for by section 1, act of Congress approved April 24, 1820, Statutes, vol. 3, page 566, is as follows :

And in every case of the division of a quarter section, the line for the division thereof shall run north and south, and corners and contents of half-quarter sections which may thereafter be sold shall be ascertained in the manner and on the principles directed and prescribed by the second section of an act entitled "An act concerning the mode of surveying the public lands of the United States," passed on the eleventh day of February, eighteen hundred and five; and fractional sections containing one hundred and sixty acres or upwards shall in like manner, as nearly as practicable be subdivided into half-quarter sections, under such rules and regulations as may be prescribed by the Secretary of the Treasury.

In pursuance of said foregoing act of Congress, the Secretary of the Treasury, then having jurisdiction, directed the subdivision of fractional sections into half-quarters by north and south or east and west lines, so as to preserve the most compact and convenient forms, together with the quantity contained in each subdivision.

The act of Congress approved April 5, 1832, Statutes, vol. 4, page 503, provides for the subdivision of a half-quarter thus :

And in every case of a division of a half-quarter section, the line for the division thereof shall run east and west, and the corners and contents of quarter-quarter sections which may thereafter be sold shall be ascertained as nearly as may be in the manner and on the principles directed and prescribed by the second section of an act entitled "An act concerning the mode of surveying the public lands of the United States," passed on the eleventh day of

February, eighteen hundred and five, and fractional sections containing fewer or more than one hundred and sixty acres shall in like manner, as nearly as may be practicable, be subdivided into quarter-quarter sections, under such rules and regulations as may be prescribed by the Secretary of the Treasury.

In accordance with these legal provisions, the Secretary of the Treasury in 1834 directed the subdivision of sections into quarter-quarter sections as follows:

In all cases where the quantity of the fractional section, or the portion thereof remaining unsold, and liable to be subdivided under the act of 5th April, 1832, admits of the sale of one or more quarter sections, you will subdivide such quarter sections into quarter-quarter sections, and they will be described by the registers as quarter-quarter sections.

Fractional sections containing less than 160 acres, after the subdivision into as many quarter-quarter sections as it is susceptible of; may be subdivided into lots, each containing the quantity of a quarter-quarter, by so laying down the line of subdivision that they shall be 20 chains wide; the distances are to be marked on the plat of subdivision, which must show the areas of the quarter-quarters and residuary fractions.

The aforesaid legal provisions govern the methods employed for the survey and calculation of areas of the fractional sections on the north and west of townships, such surveys representing the proper boundaries, contents, and subdivisions of the several sections, half sections, quarter sections, half-quarter sections, quarter-quarter sections, and fractions designated by special numbers.

It is now proposed to show the progress made in the extension of the lines of surveys, and in the disposal of the lands in the different regions of the national territory extending from the Floridian peninsula on the Atlantic to the Pacific, and to begin with the frontier States, bounded by Lakes Superior, Huron, and Michigan, and first with the State of

MICHIGAN.

Michigan originally formed part of the region ceded to the United States by the State of Virginia, described as the territory northwest of the Ohio. The cession embraced the country now within the limits of Ohio, Indiana, Illinois, Michigan, Wisconsin, and the eastern part of Minnesota, having an aggregate area of 213,000 square miles. Michigan was first erected into a Territory by the act of January 11, 1805, and admitted as a State by act of January 26, 1837; Statutes, vol. 5, page 144. It is separated on the north and east from the dominion of Canada by Lake Superior, river St. Marie, Lake Huron, St. Clair river, Lake St. Clair and Detroit river, having Ohio and Indiana on the south, and Lake Michigan and the State of Wisconsin on the west, embracing an area of 56,451 square miles, or 36,128,640 acres. The State is divided into two peninsulas, northern and southern, separated by the straits of Mackinaw, uniting Lakes Huron and Michigan. The northern peninsula in its greatest length is 316 miles, and from 30 to 120 wide, embracing two-fifths of the whole area of the State, or 22,580 square miles. This peninsula presents a striking contrast in soil and surface to the southern, the latter being generally level or undulating, and very fertile, the former rugged and in certain portions even mountainous, the streams abounding in rapids and waterfalls, rendering the scenery very picturesque and beautiful. The climate of the northern peninsula is rigorous, and the soil sterile, fully compensated, however, by the extensive deposits of copper and iron. The eastern portion is less rugged than the western, where mountains attain an altitude of nearly 2,000 feet.

The central portion of this peninsula is rolling table land, for the most part well timbered with white pine, spruce, hemlock, birch, oak, aspen

maple, ash, and elm, abounding in rich deposits of copper, extending from Lake Superior at Keweenaw Point to the western borders of Michigan. Minerals also exist on Isle Royale, (in the northwestern part of Lake Superior, 45 miles north of Keweenaw Point,) which embraces an area of 230 square miles. These localities, together with Ontonagon and Portage lake, constitute the principal mining regions in Michigan, the shipments of copper alone from Portage lake, Keweenaw, and Ontonagon, from 1845 to 1865 inclusive, amounting to 76,107 tons. In 1865 these mines produced 9,971 tons; in 1866, about 7,500; while the yield of 1867 will not probably exceed 5,060 tons. The diminution in the product is not attributable to any failure of the mines, but to the scarcity and consequent high price of labor, which, in one instance, led to a suspension of operations. The vast deposits of iron ore in this State are almost exclusively in Marquette county, the Jackson, Cleveland, and Lake Superior mines being the principal ones. The yield of the iron mines from 1855 to 1862 was 414,136 tons; in 1863 it was 273,000 tons of ore; in 1866, 296,872 tons of ore, and 18,437 tons of pig iron; while in 1867 it amounted to 469,320 tons of ore, valued at \$2,345,600, and 30,911 tons pig iron, valued at \$1,130,120, being an increase of 172,448 tons of ore and 12,474 tons of pig iron over the product of 1866.

Lake Superior, washing the northern shores of this peninsula, and the largest expanse of fresh water on the globe, embraces an area of 23,000 square miles, with a coast line of 1,500 miles. The southern peninsula includes three-fifths of the entire area of Michigan, being 275 miles from north to south, and 175 on the southern boundary from Lake Erie to Lake Michigan, its greatest width being 200 miles between Lakes Huron and Michigan. This peninsula, so interesting in its agricultural and economical aspects, has the greater portion of the population and improvements. It is generally level, rising gradually from the lakes on the east and west to a vast undulating plain in the interior, covered for the most part with various kinds of oak, black and white walnut, sugar maple, elm, linden, hickory, ash, bass-wood, locust, dogwood, poplar, beech, aspen, chestnut, cedar, tamarack, and paw-paw, while pine is found in great abundance in nearly all parts of the northern half of the peninsula. A small portion of the area is prairie; a considerable portion, however, is termed "oak openings," which are beautiful and fertile natural lawns, dotted over with scattering trees and free from undergrowth.

The divide between the waters flowing east and west is 300 feet above the level of the lakes and 1,000 above the level of the sea. The climate is varied and less rigorous than in the vicinity of the lakes. The great fertility of the soil is everywhere attested by a luxuriant flora and by crops of cereals, fruits, and vegetables. The wheat yield of Michigan in 1866 was 14,740,639 bushels, being an average of 13.8 bushels per acre, valued at \$37,588,630, while the crops for 1867 and 1868 are reported at a larger average than in 1866. The culture of Indian corn in the southern part of the State is entirely successful. The crop for 1866 was 16,118,680 bushels, being an average yield of 32 bushels to an acre, and valued at \$13,217,318. The hay crop of 1863 was valued at \$15,000,000, and that of 1866 was 1,218,959 tons, valued at \$16,760,686. The potato crop of 1866 amounted to 5,037,298 bushels, an average acre yield of 110 bushels, valued at \$2,820,877. Rye, oats, barley, buckwheat, and tobacco are also cultivated extensively.

Southern Michigan promises to become one of the greatest apple-growing regions of the Union. Peaches are raised successfully on the shores of Lake Michigan, while pears, plums, cherries, blackberries, raspberries, strawberries, and quinces are grown throughout the State.

Along the shore of Lake Michigan, in the valleys of the St. Joseph, Grand, Kalamazoo, and Detroit rivers, including the islands, as well as on the shore of Lake Erie, vine culture has given proof that these localities are well adapted to the grape, and past results from this branch of industry give promise of great increase.

The saline regions of Michigan are principally in Saginaw, Bay, and Kent counties, East Saginaw being the most important. The quantity of salt produced in the Saginaw valley in 1865 was 530,000 barrels; in 1866, 407,997; and in 1867, 474,721 barrels.

The lumber trade is a most important interest. In 1867 the timber sawed was equal to 1,400,000,000 feet. The principal markets for lumber on the Lake Michigan shore are Chicago and Milwaukee, while from the Saginaw valley extensive shipments are made to Toledo, Cleveland, and Buffalo. The coal region of Michigan is near the centre of the southern peninsula, covering an area of 12,000 square miles. The coal is bituminous and of good quality; mainly used for manufacturing purposes.

Gypsum also exists in great abundance, principally near Grand Rapids and Tawas bay.

Wool-growing is a leading interest, the crop in 1867 being estimated at 10,500,000 pounds, while the aggregate value of live stock was \$56,077,373.

Detroit, the largest and most important city in the State, having a population of 75,000, is situated on the west bank of Detroit river, six miles below the outlet of Lake St. Clair. It possesses one of the finest harbors in the world, and is the terminus of 12 lines of steamers, among which are daily lines to all the more important ports on the northern lakes, viz., Buffalo, Cleveland, Toledo, Sandusky, Ogdensburg, and other points. The city is also an important railroad centre, connecting with the principal points of the State and affording direct communication with the east, west, and south. In January, 1868, the total value of real and personal property in Detroit amounted to \$88,014,237. At the same date the capital invested in manufactures was \$18,360,000, the amount invested in the manufacture of lumber being \$6,500,000; iron, \$4,500,000; leather, \$1,200,000; furniture, \$1,000,000; tobacco, \$900,000; malt and malt liquors, \$800,000; cars, \$500,000; and newspapers, \$380,000.

Lansing, the political capital of Michigan, has a population of 5,000.

Among the other cities which have grown into importance in the State are Grand Rapids, East Saginaw, Adrian, Saginaw, Ann Arbor, Ypsilanti, Jackson, Kalamazoo, Marshall, Monroe, Pontiac, Flint, Marquette, Port Huron, Sault St. Marie, and Tecumseh. Land offices are established at Detroit, Ionia, East Saginaw, Traverse City, and Marquette, where district officers are ready to receive applications for the entry of public land under the several laws of Congress; the area yet to be disposed of in Michigan being equal to 4,614,078 acres.

WISCONSIN.

The State next west of Michigan, and which has Lakes Superior and Michigan for boundaries, is Wisconsin, part of the territory northwest of the Ohio, which was organized into a Territory by act of April 20, 1836, and admitted into the Union as a State by resolution of March 3, 1847.

The State, embracing an area of 53,924 square miles, or 34,511,360 acres, has on the north Lake Superior and the State of Michigan, on the

east Lake Michigan, on the south Illinois, and on the west Iowa and Minnesota. Wisconsin enjoys extraordinary facilities for marine transportation, having on the east a coast line on Lake Michigan of 200 miles, and on the north 120 on Lake Superior. The Mississippi river flows along the western border 400 miles, navigable throughout, receiving as tributaries the Wisconsin, Black, Chippewa, and St. Croix, all large streams; the St. Croix navigable for 60 miles, and the Chippewa as high up as the falls. The lakes and the Mississippi are connected by a canal, uniting the navigable waters of the Fox and Wisconsin rivers, through which vessels may pass during high water. The other streams are the Rock river in the southern part, flowing into Illinois and uniting with the Mississippi near Rock island; the St. Louis, Bois Brulé, Bad, and Montreal discharge their waters into Lake Superior; the Menomonee, Pishtego, Oconto, Pensaukee, and Fox, with its tributary, the Wolf, run into Green bay; and the Sheboygan, Manitowoc, and Milwaukee empty into Lake Michigan. The largest lake in the State is Lake Winnebago, 28 miles long and 10 wide. The other principal lakes are Pepin, St. Croix, Green, Geneva, Pewaugan, Pewaukee, and Kaskoneong.

The surface of Wisconsin is generally high and rolling. The soil of the southern part of the State, and particularly the southeastern portion, is deep, rich, and productive; the northern, with thinner soil, often abounding in minerals and well adapted to grazing.

The most important mineral product is lead, which occurs in the southwestern part of the State as a carbonate and galena or sulphuret, the latter largely predominating. Iron ores occur in large quantities. Copper is found associated with zinc. Plumbago and gypsum exist in considerable quantities, and agates and carnelians have been found on the lake shores and in the trap rocks. Large deposits of peat and shell marl occur in the marshes and former beds of lakes, also clay suitable for brick and the coarser wares. Limestone occurs in great abundance, and is susceptible of high and beautiful polish. Handsome varieties of marble exist in the northeastern part of the State.

In the northern half of the State the pine, balsam, hemlock, and other coniferous trees are found in vast forests, the white pine assuming the largest proportions. The other principal forest trees are the oak, cedar, tamarack, hickory, ash, elm, poplar, sycamore, sugar maple, birch, basswood, and aspen. The region situated between the prairie on the south and the forests on the north is covered with oak openings, being trees scattered here and there over a lawn-like surface, forming a most pleasing feature in the landscape of that region.

The northern part of the State forms a portion of the great lumber region, that trade having assumed immense proportions.

Wisconsin is pre-eminently an agricultural and grazing region. The agricultural statistics of the State evince the great fertility of the soil, and the adaptation of soil and climate to the production of great quantities and large yields of wheat, rye, oats, corn, barley, buckwheat, potatoes, hay, flax, clover, and grasses, which constitute the principal field crops, while the products of the orchard and garden are equally satisfactory.

The increase in population is rapid, now estimated at 1,000,000, while the wealth and internal improvements in the State have been steadily progressing. In 1868 the actual value of real and personal property was \$400,000,000.

The railroad interests are assuming extensive proportions. There are nearly 2,000 miles of railroad, representing a capital of \$40,161,533. The several lines traverse the richest and most improved portions of the State, and are being rapidly pushed to completion.

Milwaukee, with 90,000 inhabitants, the most populous and important commercial and manufacturing city in the State, is situated on the western shore of Lake Michigan, at the mouth of Milwaukee river, 90 miles north of Chicago, and 75 east of Madison. It has one of the finest harbors on the northern lakes. This beautiful city is the centre of trade in the richest and most extensive agricultural district in the United States, and for many years has been classed as one of the largest primary wheat markets in the world. Wisconsin, Minnesota, and a large portion of Iowa constitute the richest wheat-growing districts on the globe, abounding likewise in other great sources of wealth.

During the year 1867, Milwaukee afforded a market for produce amounting to \$45,000,000, and during the same period 91,924 tons of general merchandise were received at that port from the east, exclusive of coarse freight, such as coal, salt, and plaster. An official report places the mercantile business of the city for the year ending June 30, 1867, at \$110,675,000. The value of real and personal city property at the present time is \$39,204,542. The taxes for all purposes, including State, county, and school, do not exceed one and a half per cent. The capital-invested in manufactures in the city amounts to \$19,273,877. The amount invested in beef and pork packing is \$4,103,877. An extensive net-work of railroads radiates from Milwaukee, traversing the most thickly settled portions of the State. In addition to this system it has a regular line of propellers running to all the principal ports on the northern lakes, and a daily line of steamships crossing Lake Michigan between Milwaukee and Grand Haven during nine months of the year.

Madison, the seat of the State government, is beautifully situated on a peninsula, between the third and fourth lakes of the chain, called the Four Lakes, in the midst of a rich agricultural region, and contains about 12,000 inhabitants. It enjoys fine facilities of railroad communication with all parts of the State.

There are 60 towns and villages in the State having a population of 1,000 and over, and 22 towns with a population of upwards of 3,000. Racine, Kenosha, Fond du Lac, Oshkosh, Janesville, Beloit, Green Bay, and Watertown are all thriving business cities, containing a population respectively of from 8,000 to 14,000.

The whole area of the State has been surveyed and the surveying machinery withdrawn. The original evidences of surveys are now in the custody of the State authorities at Madison. There are land offices established at Menasha, Stevens's Point, La Crosse, Bayfield, Eau Claire, and Falls of St. Croix, where district offices are established for the reception of applications for the entry of public lands, the amount yet to be disposed of in the State being 9,258,627 acres.

OHIO, INDIANA, AND ILLINOIS.

The political divisions immediately south of those on the great lakes and in which the land system was inaugurated in the early history of our country, are the great States of Ohio, Indiana, and Illinois; in these however, the title of the general government to the soil has been practically extinguished, only a few scattered tracts remaining unappropriated. In the massive commercial and industrial prosperity of these magnificent States we see some of the tangible material results of our beneficent land policy. Three quarters of a century ago they were unbroken regions excepting a few feeble disconnected pioneer settlements. Now they constitute the home of an enlightened civilization based upon popular freedom and intelligence, amply endowed with agencies, moral, intellectual and physical, essential to the growth of a great people.

The areas of these States are as follows:

	Square miles.	Acres.
Ohio	39, 964	25, 576, 960
Indiana.....	33, 809	21, 637, 760
Illinois	55, 410	35, 462, 400
	<u>129, 183</u>	<u>82, 677, 120</u>

This surface exceeds by nearly 10,000 square miles that of the British islands, and by 22,000 square miles that of Prussia. It is more than half the extent of either the French empire or Germany. If these members of the republic, like the States of Europe, were isolated by physical and historical causes, they would develop into a powerful and commanding nation. Happily for the cause of humanity all their organic tendencies are towards complete fusion with the mass of American civilization.

Extending from east to west 542 miles, with an extreme breadth of 388 miles, they exhibit a similarity of climate, soil, and production, with, however, a pleasing variety of local character. The outlying hills of the Allegheny mountain system break the surface of eastern and southeastern Ohio by rugged and abrupt ridges of considerable height, yet gradually subsiding into the gently undulating surface of western Ohio and Indiana, and finally into the broad level prairies of Illinois. A ridge of highlands, forming a plateau from 600 to 1,000 feet above the ocean level, constitute the watershed between Lake Erie and the Ohio. This ridge disappears near the border of Indiana, and the general elevation of the country sinks towards the Mississippi, finding its minimum in the extreme southern angle of Illinois, about 340 feet above the sea level. The southern declivities of this descending plateau are longer than the northern, as is evidenced by the general greater length of the affluents of the Mississippi.

The mineral resources of these States are very extensive. The Allegheny basin covers some 12,000 square miles of Ohio, while the great central basin occupies 7,700 square miles in Indiana, and 44,000 square miles in Illinois, making an aggregate workable coal area of 63,700 square miles, about two and a half times the known workable area of the whole world outside of the United States. Extensive deposits of lead have long been worked in northern Illinois, while iron is mined in increasing quantities in widely varied localities. They represent a material product and a dynamic force daily expanding into a complete industrial system, and involving a motive power ten times greater than that of Great Britain, whose aggregate steam power now surpasses the entire muscular force of the human race, and whose manufactures crowd every mart of the world's commerce.

The soil of these States is abundantly prolific and capable of varied production, from the heaviest cereals to the most delicate fruits and fibres. The census report of 1860 shows that 33,963,951 acres, or about two-fifths of their surface, were improved, and that 23,808,471 acres of unimproved lands were enclosed in farms, the whole representing a cash value of \$1,543,797,897. An area of 25,904,428 acres, about equal to the State of Ohio, was "wild land" yet unenclosed and in wilderness. The value of agricultural implements was \$45,232,201. It is scarcely to be doubted that these aggregates, representing the value of farms and farming implements, have at least doubled since the last census, and now amount to considerably over three thousand millions of dollars.

The aggregates of live stock in 1860 were as follows: horses, mules, and asses, 1,784,385; horned cattle, 4,288,837; sheep, 5,307,075; swine,

7,853,071; representing a cash value of \$194,741,583, which had increased in 1865 to \$336,110,883, and in 1866 to \$345,331,485, in spite of the demand caused by the late civil war.

The production of cereals, including wheat, rye, corn, oats, barley, and buckwheat, according to the census of 1860, amounted to 360,330,386 bushels. During the same year were produced 39,971,221 pounds of tobacco, 15,145,812 pounds of wool, 290,541 bushels of potatoes, 3,961,482 tons of hay, 91,902,364 pounds of butter, 24,073,245 pounds of cheese, 5,021,464 pounds of maple sugar, 8,150,182 gallons of maple and sorghum molasses, and 4,030,893 pounds of honey. The value of orchard products was \$4,314,574, of market garden products \$1,830,693, of slaughtered animals, \$39,582,582; aggregates which have since enormously increased. In 1865 the production of cereals had expanded to 506,267,937 bushels, of tobacco to 53,346,769 pounds, and of hay to 5,392,794 tons, with a greater or less increase in the other agricultural staples.

These figures are very partial exponents of the industrial prosperity of these splendid States. Their agricultural enterprise is now directed to the production of the more delicate and costly fruits, and to the gratification of intellectual and æsthetic tastes as well as to the physical necessities of life. This opens a wider scope of production and a higher range of values, both intrinsic and commercial.

The more advanced generalizations of science are constantly embodied in improved processes of culture and ornamentation. This increased efficiency is largely the result of the establishment of agricultural colleges and publications, the literary character and circulation of which have been remarkably enhanced within a few years.

The manufacturing interests of these States in 1860 were represented by 20,714 establishments, using raw material valued at \$132,501,659, paying \$36,259,245 to 119,775 operatives, male and female. The annual product of this industrial movement was \$222,075,503, showing a net profit of over 50 per cent. upon the capital invested, which amounted to \$102,302,987.

No general statistics of these States have been published since 1860, but it is beyond doubt that the various branches of industrial enterprise have expanded in a ratio transcending even the wonderful advance of agriculture. The intelligent public mind of these States has already appreciated the necessity of a varied industry to the complete development of their resources. With a mechanical genius fully equal to the most favored portions of the country they will not be satisfied with any monopoly of industry by any section of the Union. With manufacturing facilities of the first order they will not consent to the restriction of their enterprise to the production of raw material for elaboration in the higher processes of art elsewhere, either in foreign countries or in older portions of the United States; hence we may reasonably conclude that in manufactures, as in agriculture, these States will occupy a commanding position.

Their commercial facilities are admirable; on the north the chain of great lakes giving them a direct navigation to the Atlantic, while the Mississippi and its affluents furnish them an outlet to the Gulf of Mexico, and communication with foreign countries.

These advantages of a lake and river navigation amounting to nearly 20,000 miles are supplemented by artificial agencies of immense efficiency and importance, embracing 1,376 miles of canals, costing over \$25,000,000, and 10,000 miles of railroad, embracing a capital of over \$300,000,000, being about one-fourth of the entire length of railroad communication in the country.

The actual movement of commerce is indicated by no general statistics, but a glance at a few prominent commercial centres will reveal an aggregate sufficiently astonishing. Chicago, in Illinois, which 30 years ago was a small settlement around Fort Dearborn, near the south end of Lake Michigan, is now the largest of the interior cities of the Union. Its population, 300,000, is exceeded only by New York, Philadelphia, Brooklyn, and Baltimore. The cash value of its real estate is \$350,000,000, and of its personal property \$150,000,000. It has \$60,000,000 invested in manufactures, embracing all processes from the elementary manipulation of the raw material to the most delicate creations of the fine arts. It is the terminus of twelve trunk lines of railroad, with as many more dependent branches, and witnesses the arrival or departure of a train once in every 10 minutes in each 24 hours. Its position commands the entire length of the basin of the northern lakes, while it stands in intimate relation to the expansive internal communication furnished by the Mississippi river system. It is the largest grain market in the world, its aggregate receipts and shipments for the year ending July 1, 1868, embracing 100,069,727 bushels of cereals, and 3,565,831 barrels of flour. Its facilities for this trade are shown in eighteen enormous elevator warehouses, with an aggregate capacity of storage for 10,680,000 bushels of grain. Its shipments of lumber amounted to 1,401,635,124 feet, besides 217,433,288 lath and 927,969,775 shingles. The receipts and shipments of hogs were 2,916,851, of cattle 517,361, of beef 84,261 barrels, of pork 178,851 barrels, of lard 27,241,225 pounds, of tallow 7,168,427 pounds, of cut meats 82,325,522 pounds, of hides 51,261,165 pounds, of wool 22,512,716 pounds, and of lead 15,399,021 pounds. The tonnage owned in Chicago the past year amounted to 289,765 of lake vessels alone. The entries and clearances in 1864 embraced 4,338,770 tons, an aggregate which has very greatly increased. Among its facilities for trade may be mentioned the fact that it has 30 miles of dockage, and, as already intimated, may be regarded as the greatest lumber, grain, and meat market on the globe.

The city of Chicago, by a novel and gigantic enterprise, is supplied with pure water by a tunnel under Lake Michigan, one of the most extraordinary engineering feats on record. With a growth in population unparalleled in history, and with an indomitable spirit of enterprise, this young city promises to become one of the leading centres controlling the commerce of the world. Its position on the interoceanic lines of railroad communication will make it the recipient of immense trade from Asia and Europe by way of New York and San Francisco. Its future cannot be estimated by anything in our past experience.

Cincinnati, the second city in the region under consideration, on the Ohio river and in the southwest corner of the State of Ohio, was founded near the close of the last century, and now numbers a population of 250,000. This city, long the commercial mart of the West, would present a remarkable growth and development but for the still more wonderful progress of Chicago. Its advance in industrial and commercial relations has been rapid and steady. Its total of imports for the year ending August 31, 1864, was \$389,790,537, an increase of \$245,601,324 over the previous year; the exports were \$239,079,825, or a total movement of \$484,681,149, embracing merchandise, cotton, tobacco, distilled liquors, groceries, hardware, live-stock, boots and shoes, leather, flour, grain, and hay. Its manufactures are on a very extensive scale, embracing the elaboration of the raw material in all the processes of the useful and elegant arts. It is to be regretted that we have no later statistics than those of 1864; such data, doubtless, would present great advances upon the above figures.

Indianapolis, the capital and metropolis of Indiana, situated near the centre of the State, on the national road, was selected as the site of the State capital in 1820, in the midst of a dense forest extending at least 40 miles in every direction. Its population in 1840 was 2,692; in 1850, 8,090; in 1860, 18,611; in 1865, 35,000; and is now probably not far short of 50,000. It is a prominent railroad centre, and the seat of an extensive system of manufactures and commerce.

Cleveland, on Lake Erie, at the mouth of Cuyahogà river, is another celebrated commercial and manufacturing city in Ohio, as exhibited in the following statistics for the present year, communicated in a very interesting report just received from the Mayor, from which it will be seen that the population is 85,284; value of real estate, \$52,000,000; of personal estate, \$29,676,500; value of lake commerce, \$175,936,590; railroad commerce, \$684,976,136; canal commerce, \$4,144,600; total, \$865,057,326; entered and cleared vessels, 9,840—tonnage, 3,070,984; lake vessels owned, 202—tons, 44,874; canal boats, 177—tonnage, 9,195; capital invested in manufactures, \$13,000,000; annual value produced, \$44,000,000. The coal trade involves a capital of \$3,000,000, and shows a receipt of 669,000 tons, of which 334,000 tons were forwarded, and the remainder consumed. Of iron ore 290,957 tons were received, and 249,728 tons forwarded; and of pig iron 90,000 tons were received, of which 35,000 were exported, the remainder being manufactured. In the petroleum trade \$3,000,000 were invested, the operations during the year involving the receipt and shipment of 754,000 barrels of crude oil, and 996,600 of refined oil. The lumber trade, with a capital of \$1,000,000, shows the import and export of 145,874,000 feet, 128,685,500 shingles, 73,352,000 lath, and 18,000,000 staves.

Toledo, on Lake Erie, at the mouth of Maumee river, reported in 1860 a population of 13,768, which has since expanded to 30,000. The transactions of the grain commission houses in the year 1867 amounted to nearly \$20,000,000; those of grocery and general merchandise establishments to over \$5,000,000. The improvements in building during the same year included 128 stores and 1,322 dwellings, erected at a cost of \$2,267,200.

Columbus, Dayton, Sandusky, Zanesville, Steubenville, and Springfield, in Ohio; Madison, Jeffersonville, Evansville, and Terre Haute in Indiana; and Peoria, Quincy, Galena, and Cairo, in Illinois, are prominent local centres of industrial and commercial activity, rapidly growing into large cities. The appliances and facilities of an advanced civilization are being extended through the rural localities of the country, presenting a wonderful picture of social prosperity and development.

The population of these States in 1840 was 2,681,516; in 1850, 3,820,592; and in 1860, 5,401,880. By reliable estimates it is now stated at 7,250,000. In a very able letter to this office, dated August 29, 1868, Charles G. Nazro, esq., President of the Boston Board of Trade, estimated the daily value of labor in Massachusetts at \$2,000,000, including the original production of raw material and the additional values conferred by the processes of manufacture. In the same ratio to population, Ohio, Indiana, and Illinois would present a daily product of industry amounting to \$11,000,000, or \$3,300,000,000 per annum. The market value of industrial products in these States, however, is doubtless less than that of Massachusetts, yet it will not perhaps be an extravagant estimate to place the annual product of industry at \$2,500,000,000.

The moral and intellectual forces governing this mass of physical prosperity are partly represented by educational and religious statistics: the latter, as reported in the census tables of 1860, present 10,567

churches, accommodating 3,812,335 hearers, and valued at \$23,944,846, aggregates which have probably nearly doubled in eight years. The educational statistics in 1860 present 5,059 public and private libraries, containing 1,502,122 volumes; eighty colleges and universities, with 523 teachers, 9,828 students, and an aggregate income of \$381,747; academies and seminaries 603, teachers 1,964, pupils 90,211, annual income \$621,353; public schools 26,835, teachers 33,933, pupils 1,316,656, annual income \$5,434,104; total number of educational establishments 27,418, teachers 36,420, pupils 1,415,695, annual income \$6,437,204.

These aggregates have been very greatly enlarged since the last census, and all branches of educational enterprise have increased and improved in efficiency and have elevated the standards of mental culture. The educational reports of Indiana for 1866 show that provision was made by law for the education of 559,778 persons, of whom 402,802 were in actual attendance upon the public schools, taught by 9,433 experienced teachers. These aggregates exhibit a general advance of nearly fifty per cent. At this rate the educational establishments of these three States may be estimated at nearly 40,000, with about 50,000 teachers and 2,000,000 pupils, and an annual income but little short of \$10,000,000. Educational facilities are thus provided for at least thirty per cent. of the population. With such noble instrumentalities for Christian advancement and intellectual culture in those branches of learning best adapted to the demands of an industrial people, it cannot be doubted that the opulent resources of these thrifty States will not only be well developed, but that they will be ultimately consecrated to the highest ends of civilization, to the general prosperity of our common country, and the cause of humanity.

FLORIDA.

In advancing southward and east of the Mississippi, the regions of the public domain are within the limits of the States fronting on the Gulf of Mexico, and conspicuously on the Atlantic side is the State of Florida, the southernmost political division of the Union, which is between latitudes $24^{\circ} 30'$ and 31° north and longitudes 80° and $87^{\circ} 45'$ west from Greenwich. Its length is 380 miles from north to south, the peninsula averaging in width 100 miles, while its greatest breadth on the north is 345 miles. This State has on the north, Alabama and Georgia, on the east and south, the Atlantic ocean, and on the west the Gulf of Mexico and Perdido river. Florida has an area of 59,268 square miles or 37,931,520 acres. This region of country, ceded to the United States by treaty concluded in 1819 with Spain, was organized as a Territory March 30, 1822, and admitted into the Union as a State March 3, 1845. The surface of Florida is generally level, the most elevated part not attaining an altitude of more than 300 feet above the level of the ocean. A large portion of the southern extremity of the peninsula is covered by everglades, a vast body of fresh water from 30 to 50 miles wide, and from five to ten feet deep, extending from the southern part of Lake Okeechobee to Cape Sable, 90 miles in length, uniting the lake with the Gulf of Mexico. This extensive sheet of water is studded over with numerous islands, some covered with luxuriant growth of shrubbery, grass, and vines, others with a dense growth of pines and palmettoes. The intervening waters are covered with tall saw-grass, shooting up from the shallow bottom of the lake and not unfrequently growing ten feet above the surface. Lilies and other aquatic plants bearing flowers of every variety and hue are interspersed among the tall flexible green grass,

presenting most pleasing contrasts, greatly increased by the luxuriant foliage fringing the shores of the numerous islands on the surface of the everglades. North of these the peninsula is more elevated, and in the interior attains an altitude of 150 to 300 feet, gradually declining towards the coast. The country between the Suwannee river and the Chatahoochee is still more elevated and undulating, while the western portion is comparatively level. The southern portion of the peninsula contains large districts of pine barrens, prairies and hummocks, while the northern part abounds in extensive forests. The soils are generally sandy, with the exception of the hummocks, which consist of a mixture of clay and sand. These exist throughout the State, varying in extent from a few acres to several thousand. The high hummock is chiefly timbered with live, red and water oaks, dogwood, mahogany, and pine, and when cleared constitutes good agricultural land. Low hummock, producing substantially the same species of flora, is subject to overflow, but when drained is regarded as preferable for the culture of sugar.

The rich alluvions bordering the streams, and known as savannas, are subject to inundation, and are also deemed valuable for the production of sugar and rice, the low savannas, like the prairies of the more elevated portions, being covered with luxuriant growth of grass and flowers. The prairies afford excellent pasture and grazing, proving a remunerative branch of industry, as stock flourish on the nutritious grasses throughout the year. In Florida, although embracing six degrees of latitude, there is no very marked difference of temperature between the north and south. The maximum temperature in summer is generally about 85° Fahrenheit, and in winter 45°, the evenness of its temperature surpassing the favorite climate of Italy. In those portions of the State remote from swamps or morasses it is healthy, and many invalids, especially those with pulmonary complaints, resort to Florida from all parts of the United States.

The clearing and settlement of hummocks is generally attended with the development of more or less malaria; yet, after cultivation for a few years, this evil is overcome.

The great fertility of the soil is everywhere evinced by the luxuriant crops produced, including those of temperate and torrid zones, the latter predominating. Sea Island cotton has been found to succeed in most parts of the peninsula, with a productiveness rivalling the best portions of the coast of Georgia and South Carolina, while the sugar cane thrives even better than in Louisiana or Texas, owing to the absence of frosts which occur late in the season in those States. The area in Florida suitable for the culture of this staple is amply sufficient to supply the demands of the United States. The sandy soil along the sea coast is well adapted to the cultivation of the Cuba tobacco. Silk culture must eventually become a leading branch of industry in Florida, since every species of mulberry grows profusely in this latitude as far south as 27°, and experiments in the production of silk have been highly satisfactory.

Indigo was formerly the principal staple of this region, and with the exception of sugar is one of the most certain and profitable crops, generally admitting two cuttings annually. It is found growing wild throughout the pine regions, and in old fields where a century ago it had been cultivated. Although Florida lies south of the great corn-growing region, yet good crops have been produced in this State. The yam and sweet potato thrive well and grow to a very large size, while the Irish potato is successfully raised when planted in the winter; all garden vegetables being cultivated as profitably as in other States. Fruits in every variety and of excellent flavor, including peaches, apricots, nectarines

oranges, lemons, pomegranates, guava, citron, limes, and grapes, thrive luxuriantly, and experiments in the culture of cocoanut, pine-apple, banana, olive, tamarind, and other tropical fruits have proved entirely successful; arrow-root, Sisal and New Zealand hemp, have likewise proved valuable crops. It is reported that a large number of the islands or keys extending along the southern coast of Florida for more than 200 miles are as well suited to the culture of tropical fruits as the Bahama islands. Experiments in the culture of pine apples have been made on Key Largo since 1859, one gentleman* on that island is said to raise 10,000 dozen annually, together with other tropical productions. Many settlers are now being attracted to Florida with a view of cultivating oranges and other fruits for northern markets. The principal forest trees of this State, some of which are eminently adapted for ship-building, are live-oak, mahogany, magnolia, pine, cedar, and cypress. Mangrove, box-wood, mastic, satinwood, crabwood, and *lignum vitæ*, abound on the keys, and generally in the southern part of the State.

The various lagoons, bayous, lakes, and rivers, extending into the interior from every direction, afford an extensive inland navigation, to which have been added, in late years, a system of railroads designed to connect all important points in the State.

Florida has over 1,000 miles of coast line, the most important harbors on the Atlantic being at St. Augustine and Fernandina; and on the Gulf, at Pensacola, (where the United States navy yard is established,) Appalachicola, St. Marks, Cedar Keys, Tampa, Charlotte, and Key West. Jacksonville, beautifully situated on the St. John's river, and Tallahassee, the capital of the State, are rapidly becoming thrifty and important places.

This part of the national territory being so near the West India islands, must, as the resources of Florida are developed, lead to important commercial relations with those islands.

Cuba, the largest of these, having 13 cities, 8 towns, and over 1,000 villages, lies directly south of Cape Sable, from which it is 120 miles, the distance between Key West and Havana being 100 miles. This island, justly called the "Queen of the Antilles," is situated midway between our southern coast and the island of St. Domingo, occupying a commanding position with reference to the Gulf of Mexico and the West India seas, and having a coast line of 2,000 miles. Its greatest length is 793 miles, in width it is 127, and with the Isle of Pines, together with a few other islets, embraces an area of 47,228 square miles, being nearly as large as Vermont and Kentucky. In proportion to the population, which is estimated at 1,050,000, Cuba has the largest foreign commerce of any community on the globe. Since 1850 the yearly exports and imports have been about the same, varying from \$27,000,000 to \$32,000,000, notwithstanding the restrictions on trade. The island is traversed longitudinally by a range of mountains attaining an altitude in some places of 8,000 feet; its general surface, however, is undulating. The soil, for the most part, is of a rich alluvial mould, peculiarly adapted to a large variety of products, such as sugar, coffee, tobacco, rice, and Indian corn, cotton, cocoa, indigo, cassava, and numerous valuable fruits, embracing oranges, bananas, melons, limes, figs, and plantains, which find ready sale, especially in the United States, with which at least one-third of the Cuban commerce is carried on.

Sugar and rum are manufactured extensively, and a large amount of money is invested in the preparation of coffee and tobacco, the latter commanding the highest price in every market.

* Collector at Key West in letter dated September 29, 1868.

Havana, the political capital and principal seaport, is situated on a superior land-locked harbor. Matanzas, 60 miles west of this, is a prosperous commercial city, while Puerto Principe and Santiago de Cuba have magnificent harbors, the latter place being noted for its exportation of copper, the principal mineral found in Cuba.*

St. Domingo is the second in size and richness of the West India islands, and Jamaica, the third in area, is only 90 miles from the coast of Cuba.

The important position Florida holds to these great islands in the Caribbean sea is such as to afford facilities for active commercial intercommunication, creating incentives to settlement in that part of our country, not only in regard to the competition excited in controlling the rich and valuable staples of the country, but also from the trade that will spring up between Florida and these islands, which are so near at hand and with which it should be our policy to cultivate the most intimate and friendly relations.

In Florida the area over which public surveys have not yet been extended is 11,300,000 acres, the area undisposed of being 17,424,438, which may be entered, under the provisions of law, on application at the consolidated land office at Tallahassee, where district land offices are located.

ALABAMA.

The next Gulf State, adjoining Florida on the west, is the State of Alabama, which is situated between Georgia and Florida, on the east, and Mississippi on the west, with Tennessee on the north and Florida and the Gulf of Mexico on the south, extending, for the most part, between the 31st and 35th parallels of north latitude, but with an additional narrow strip of land which extends between Mississippi and Florida southward to the Gulf of Mexico, affording the State a sea-coast of 60 miles.

The area of Alabama is 50,722 square miles, or 32,462,080 acres. Separated from Mississippi and made a distinct Territory in 1817, it was admitted as a State of the Union in 1819.

The Blue Ridge range of mountains extends into the northern part of the State, which it traverses from east to west, although without any great elevation, and from this hilly region the surface slopes to the south, having the character of a vast plain with only gentle undulations, the more southern portion being quite level and but little higher than the sea.

There are numerous navigable streams. The Tennessee river enters the State in its northeastern corner, and, making a circular sweep to the south, passes out at the opposite side and empties into the Ohio at Paducah, Kentucky, being separated by the Blue Ridge mountain range from the other rivers of the State, all of which, following the declivity of the surface south of that range, flow ultimately to the Gulf of Mexico. Nearly the whole surface of the State is drained by the Mobile river, which is formed by the union of two streams, the Alabama and Tombigbee, and flows into Mobile bay, a magnificent body of water 30 miles in length and 3 to 18 miles broad, and which admits vessels drawing 21 to 22 feet water over the bar at its main entrance, the Alabama being formed by the union of the Coosa and Tallapoosa, and the Tombigbee by

* In regard to our relations, commercial and otherwise, with Cuba, *vide* letter dated April 5, 1823. American State Papers, Foreign Relations, vol. 5, p. 408, from Hon. John Quincy Adams, as Secretary of State, to our Minister at Madrid; and letter dated December 1, 1823, from Hon. Edward Everett, as Secretary of State, to the British Minister.

that of the Tombigbee proper, from Mississippi, and the Black Warrior, flowing from northern Alabama. In addition to these are the Cahawba, Chattahoochee, Choctawhatchee, Conecuh, Perdido, and other rivers.

In 1819, the date of its admission into the Union, the population of Alabama was 127,901. In 1860 the population had increased to 964,201. Since the close of the war it has been estimated at 1,250,000. The State has advanced with equal rapidity in other respects. During the 10 years ending in 1860 statistics show an increase of 50 per cent. in the amount of land brought under cultivation, and nearly 200 per cent. in the value of farms and farming implements, with like increase in other values.

Montgomery, situated on the left bank of the Alabama, which is navigable to that point at all seasons of the year, is the capital of the State, with a population of about 10,000. It has important railroad connections, and is largely engaged in the shipment of cotton.

Mobile, on the river of that name, a finely improved city of about 30,000 inhabitants, first established on its present site in 1711, is, as a cotton market, second only to New Orleans, and has a very extensive foreign and domestic commerce.

There are numerous other towns, as the principal of which may be mentioned Tuscaloosa, Wetumpka, Huntsville, Marion, Talladega, Florence, Athens, and Jacksonville.

Alabama, with more than 1,500 miles of steamboat navigation, has an extensive railroad system projected, of which in 1860 there were 743 miles completed and in operation.

The agricultural advantages of the State are great, its soil, though varied, being generally fertile and productive of the most valuable staples. The winters are mild, while the breezes from the Gulf moderate the heat of summer. Cotton and Indian corn are the chief products, the cotton crop in 1860 having exceeded that of any other State except Mississippi. The northern districts are favorable to the other grains, wheat, rye, and oats being produced in large quantities, and also to stock-raising, having great advantages as a grazing region. Rice and the sugar-cane are successfully cultivated on the bottom lands in the south. Tobacco is also raised, the crop in 1860 having been 221,284 pounds.

The State is very rich in mineral wealth. The supply of coal and iron is inexhaustible, while there are also valuable deposits of lead, manganese, red and other ochres, marble and granite, and in some parts gold has been found, although not in quantities to make mining profitable.

Owing to the superior inducements presented by agricultural pursuits, manufacturing is engaged in only to a comparatively limited extent, but from the statistics of 1860 it appears there was a capital of \$9,098,181 invested in that pursuit, which yielded a profit of nearly 30 per cent. In view of the recent change in the labor system, a rapid expansion is expected in this branch of business, for which the State has great advantages.

Alabama has an extensive commerce with foreign nations and the other States of the Union, which must increase with the development of its immense mineral and other resources.

This State presents great inducements to immigration, and cannot fail to increase rapidly in population from that source. It appears that during the fiscal year ending on the 30th June, 1868, there were added to the productive area of the State from the public domain, by entries under the homestead law, 1,646 farms, containing an aggregate of 124,085 acres, and there remained undisposed of at that date about 6,790,000 acres of public lands, which have been surveyed and are subject to entry under the provisions of the homestead law of 21st June, 1866.

MISSISSIPPI.

The third Gulf State, and immediately adjoining Alabama on the west is Mississippi, which embraces an area of 47,156 square miles, or 30,179,840 acres, nearly all of which originally belonged to the State of Georgia. By act of Congress of 1798 a part of the present State of Mississippi, with a portion of what is now Alabama, extending north of the 31st parallel, was organized as Mississippi Territory, with the consent of Georgia; and the remainder of that part of Alabama and Mississippi extending north from the 31st to the 35th parallel, having been surrendered by Georgia in 1802, was added to the Territory of Mississippi in 1804. That part lying south of the 31st parallel and west of the Perdido river, and originally included in the Louisiana acquisition, was added in 1811. Alabama was separated from Mississippi and made a Territory in March 1817, and the latter was admitted as a State of the Union in December following.

The State of Mississippi thus established lies between the 31st and 35th degrees of north latitude, except a narrow strip extending further south to the Gulf of Mexico, giving the State a shore-line on the coast of about 88 miles, and is bounded on the north by Tennessee, south by Louisiana and Arkansas. There are no mountains within its limits, yet its surface is in great part undulating and diversified by numerous ranges of hills, besides some eminences called "bluffs," which terminate abruptly on a level plain or river bank. Streams are numerous, and nearly all parts of the State are intersected with navigable rivers. The western border is washed by the waters of the Mississippi for over 500 miles by its circuitous channel, or 300 by a straight line. The rivers Homochitto and Big Black, and the Yazoo with its tributaries, the Yallahusha and Tallahatchee, and the Sunflower branch of the Mississippi, flow through the western part of the State and empty into the Mississippi river, while in the eastern part are the Tombigbee, the Pascagoula formed by the union of the Chickahawba and Leaf, and the Pearl, the two latter flowing to the Gulf of Mexico, with other streams in all parts of the State.

The advance of the State has been rapid. The population, which in 1800 was 8,850, had increased in 1860 to 791,305, and has been estimated since the war at 900,000. Corresponding progress has been made in agriculture, and for the 10 years ending in 1860 the increase of acres reduced to cultivation was 60 per cent., while the value of farms and agricultural implements during the same period increased 200 per cent. with like improvements in other respects.

Jackson is the capital of the State, situated on the right bank of Pearl river, with a population of about 4,000. Before the war from 30,000 to 40,000 bales of cotton were shipped annually. Vicksburg and Natchez, on the Mississippi, are also important places in the cotton trade. In addition to its facilities of water transportation, there were in 1860 872 miles of railroad already completed and in operation in the State.

Mississippi has the greatest advantages for agricultural pursuits. The soil, in general, is highly fertile, while the extensive bottom lands along the river courses are so to a very extraordinary degree. The climate is temperate and equable. Tobacco and indigo were at an early period the chief products, but of late years the production of cotton has been the principal pursuit, amounting in 1860 to nearly one-fourth the entire product of the Union. Sugar is produced in the southern and wheat and other grains in the northern districts. The crop of tobacco in 1860 was 127,736 pounds. Among fruits there is an abundance of plums, peaches

and figs, with oranges in the southern part of the State. From the pre-eminent agricultural advantages of Mississippi, comparatively little attention has been paid to manufacturing, but the statistics of 1860 show a capital of \$4,384,492 employed in manufactures, with a profit of nearly 40 per cent., and a rapid advance is anticipated in this branch of industry.

The neighboring ports of New Orleans and Mobile are chiefly employed for external commerce, and for internal trade the State has excellent facilities in its many navigable streams, and its railroads, which in 1860, as before indicated, had been brought into operation to such extent as to serve the purpose of rapid and general intercommunication.

To immigrants Mississippi offers the inducement of a fine, salubrious climate, a prolific soil adapted to the production of the most valuable crops, particularly the great staple, cotton, with the business and other advantages incident to a long settled, populous community.

During the fiscal year ending the 30th June, 1868, there were added to the productive area of the State, by homestead entries from the public domain, 1,602 farms, containing an aggregate of 102,824 acres, and there still remained undisposed of at that date about 4,800,000 acres of public land, which has been surveyed and invites settlement under the provisions of the homestead law of June 21, 1866.

LOUISIANA.

The furthest west of the public land States on the Gulf of Mexico is Louisiana.

By the secret treaty of October 1, 1800, at St. Ildefonso, the ancient province of Louisiana was retroceded to France, and three years later Napoleon, as First Consul of the French republic, ceded the same to the United States. The act of Congress, dated March 26, 1804, formed the territory of Orleans out of the cession, and by the act of 8th April, 1812, said territory became the State of Louisiana, its limits having been enlarged by the act of 14th April, 1812, so as to extend on the east to Pearl river, the boundary between Louisiana and Mississippi. By these acts the limits of the State were established, having Arkansas on the north, Mississippi on the east, Texas on the west, and the Gulf of Mexico on the south, embracing an area of 26,461,440 acres, which is divided into parishes, with an estimated population of 1,000,000.

There are numerous rivers and lakes, several of the former furnishing important commercial facilities. The Mississippi and its tributaries embracing a water communication of nearly 17,000 miles, constitute the great channel by which trade will be carried on, affording easy and speedy transportation for the rich products of millions of acres, and the return of the wealth and luxuries of other portions of the Union, and of Europe and the East.

The numerous lakes of the State are extremely beautiful, their waters generally deep and clear, abounding in varieties of fish, while their shores, as well as the banks of the rivers, are covered with trees of every kind, from some of which tar and turpentine are extensively manufactured, and others are unsurpassed for ship-building. Most of these trees have large vines, especially of grape, growing around them in luxuriant profusion. In the lower portions of the State there are fertile prairies covered with fine grass, which never require enriching, and yield excellent crops of wheat, barley, Indian corn, flax, hemp, tobacco, rice, and sugar, the latter having been introduced by the Jesuits in 1751. Some of these give two crops annually. Cotton thrives in all parts.

of the State; and the culture of fruit and garden vegetables is not surpassed either in quality or quantity, care only being requisite in selecting the soil for these productions, as it is generally too rich. Indigo has been cultivated successfully, and two cuttings a year is not an uncommon yield. Silk can be manufactured extensively, and the growth of finer varieties of the mulberry tree renders it very probable that no distant day the attention of capitalists will develop this branch of industry. The mineral resources of Louisiana are by no means insignificant, recent discoveries indicating that the appliance of modern methods of exploitation will yield an ample reward. The railroad system of Louisiana is not extensive, the numerous rivers furnishing excellent facilities for internal communication, but the trade of Texas must eventually demand the completion of the New Orleans and Opelousas great western route, the outlay for which will be speedily returned from a region of remarkable fertility and immense products rapidly filling up with farmers and stock-raisers. Several railroads, however, have been commenced, which will contribute largely to the business interests of this richly endowed State. Towards the success of these the general government has made liberal grants of public lands of which there are about 6,500,000 acres yet undisposed of.

The system of jurisprudence in Louisiana is worthy of notice, as being different from that adopted in other States, where the English common law prevails. In this State it is founded on the French and Roman law, the Code Napoleon, and the Institutes of Justinian.

Among the principal cities of Louisiana is Baton Rouge, the political capital of the State, which is beautifully situated on the eastern bank of the Mississippi river, 130 miles above New Orleans, and is regarded as one of the most healthy places in the south. It is the centre of a rich farming country, occupying a conspicuous place in the approaching era of commercial greatness.

Shreveport, on the west bank of Red river, 700 miles above New Orleans, is a very flourishing town, and the shipping place of eastern Texas. It is an important point in the midst of an extensive cotton region, through which it is proposed to establish the Vicksburg, Shreveport, and Texas railroad.

New Orleans, owing to its being built on a bend of the Mississippi, is called the Crescent city. Under the French rule it was the seat of government, and is now the largest city of the southwest, having in 1860 a population of 168,675. The city is well laid out, most of the dwellings having spacious gardens beautifully decorated with flowers and ornamental trees. The future of this city, occupying as it does an important position on the continent, must soon be one of great wealth and commercial prosperity, especially when the undeveloped and inexhaustible resources of the entire region bordering the Mississippi find exit through its markets to distant ports of the world, with a valuable return trade.

Whatever obstacles may have existed heretofore, its local and general advantages are such as yet to give it, and the State of which it is the commercial capital, commanding relations with other portions of the Union and with foreign states.

In presenting the advantages in the several localities of the public domain and the results there of the land system, it is now proposed to refer to the tier of States flanking the right bank of the Mississippi, beginning on our northern frontier with—

MINNESOTA.

This State, the 19th admitted under the federal Constitution, derives its name from the principal of the many tributaries of the Mississippi found within its border. The name, a compound Dakota word, signifies, according to the best authorities, "sky-tinted water," the accuracy of description being illustrated by the calm, pellucid waters of its countless lakes and streams.

Its lakes are numbered by thousands, and, scattered in groups or chains over nearly the whole surface of the State, form an immense system of natural reservoirs, which not only serve to feed the sources of the numerous streams, but to supply the atmosphere and soil during the hot summer months with ever-recurring circles of exhalation and rain. Linked as many are by a common stream successively passing from one to another, they also form a singular navigation, by which the most remote parts of the country are accessible. Many are 20 or 30 miles in extent, the largest being Namekin lake, on the British border, Mille Lacs, Red lake, Leech, and Cass.

Occupying the elevated plateau of North America, and the most elevated surface between the Gulf of Mexico and the Arctic sea, Minnesota forms the watershed of the three great basins of North America. The sources of the Red River of the North and of the Mississippi are nearly in the centre of the State, and separated only by a scarcely perceptible rise of land, the one emptying into Winnepeg lake and thence into Hudson's bay on the north, and the other, pursuing an opposite course, losing itself in the broad expanse of the Gulf of Mexico. The Hauteurs des Terres, or Highlands, are the nearest approach to mountains in the State, and form the dividing ridge between the basins of the Saint Lawrence and the Mississippi. The great body of the country alternates between river bottoms and high rolling prairies. The Highlands or Superior district comprises an area of about 20,000 square miles, and is an elevated region, covered with a compact forest growth, principally of pine and spruce. The hills are generally sandy and sterile, but in the valleys the soil is alluvial and rich. The Red River valley is a level plain, comparatively woodless except along the margins of streams, and with a rich, retentive soil. The Mississippi valley is a prairie region with an undulating surface, thoroughly drained by numerous streams and lakes, and dotted with groves and belts of timber, principally oak; its soil a warm, dark, calcareous sandy loam.

In all the material resources necessary to the development of a rich and prosperous State Minnesota is most amply endowed, and bids fair, as well from its geographical position as from other influences, to hold a commanding position. Its varied scenery is made up from rich rolling prairie, extensive forests, lofty bluffs, and waterscapes of intermingling lakes and streams. Minnesota is already ranking high among the first of agricultural regions, and advancing towards a position among our manufacturing States.

Extending from 43° 30' to 49° north latitude, its climate is but slightly varied, Saint Paul having a temperature during the whole year equal to that of central New York, and in summer corresponding with that of Philadelphia, yet with cool and refreshing nights. The position and topography of the country protect the fields from the devastations of drought, at the same time that its dry atmosphere and warm, rich soil, its luxuriant and vigorous vegetation, and the rapid evolutions of temperature, protect it from frost on the one hand, and the ravages of insects and disease on the other. The effect of this symmetrical union of cli-

matic conditions is to make Minnesota one of the best wheat-producing States of the Union, both as to quality and quantity of the grain.

In 1860 the whole number of farms in the State was 18,081, the value of which was estimated to be \$18,967,454, and the total valuation of agricultural products for that year was \$6,748,707. The total appraised valuation of all taxable property was \$36,753,408; so that the products of agriculture alone gave a gross return of 18 per cent. upon the whole taxable basis.

In 1866 the number of acres under cultivation was estimated at 790,000; the tilled area in wheat, 520,000. The exports of wheat were 9,267,153 bushels. The total value of live-stock January 1, 1866, was \$15,400,659.

The past season has been one of the most favorable to the agriculturist since the settlement of the State. All the cereal crops are excellent while the average yield of wheat is variously estimated at from 20 to 25 bushels per acre. The product of potatoes, flax, hops, and tobacco has been much greater than during any previous year, while it is also clearly established that wool-growing is destined to form an important feature of the productions of the State, the climate being peculiarly adapted to that purpose.

Minnesota contains an area of about 83,531 square miles, or 53,459,840 acres, of which 24,023,425 acres have been surveyed and 29,436,415 remain unsurveyed, 17,925,840 have been disposed of, and 35,534,000 yet remain open to settlement. The population on the 1st July, 1868, was, according to the most reliable estimates, 440,000. During 1866 the immigration to the State exceeded 50,000, and during 1867 the immigration north of Saint Paul amounted to nearly or quite 40,000. The assessed value of real property for 1867 was \$55,155,000, and of personal property \$25,333,000. Its principal cities are Saint Paul, Red Wing, Saint Anthony, Stillwater, Mankato, Saint Cloud, and Minneapolis. Saint Paul, the capital, is situated on the east bank of the Mississippi, and at the head of navigation, 2,140 miles from its mouth. Its population is about 20,000, and the assessed valuation \$3,112,179. Its wholesale trade is large and rapidly increasing, and it is estimated that the amount of sales during 1868 will reach \$12,000,000. The length of the boating season averages 228 days.

Minnesota possesses a most ample and effective water-power. The falls and rapids of Saint Anthony alone, with a total descent of 64 feet, have an available hydraulic capacity, according to an eminent engineer, 120,000 horse-power, greater than the whole motive power, steam and water, employed in textile manufactures in England in 1850. Except the Minnesota river, nearly every tributary of the Mississippi, in its rapid and broken descent to the main stream, affords valuable mill sites.

The most important of manufactures is now pine lumber, of which in 1867 there were scaled in the Mississippi above Saint Paul 149,562,200 feet, and from the Saint Croix river 113,867,502, showing an aggregate of 263,429,702 feet. Fully 200,000,000 feet are annually manufactured or fitted to run in the log to a southern market within 30 miles of Saint Paul. Flour, whiskey, leather, bricks, and miscellaneous articles of wood, as barrels, sash, doors, blinds, railroad ties, and hoop-poles, are also among the material articles of manufacture.

In the mineral ranges of Lake Superior, as well as in more central portions of the State, the deposits of iron, coal, copper, and lead, known to exist to a greater or less extent, are yet undeveloped, and their future bearing upon the material interests of the State is therefore a matter

conjecture. With the greater facilities now at hand, their development may be looked upon as an immediate work.

In 1865 attention was directed to discoveries of gold and silver northwest of Lake Superior, in the vicinity of Lake Vermillion. The islands in the lake indicate distinctly volcanic action, one of them being an extinct crater. The prevalent rocks are described as talcose slate "traversed by numerous veins of quartz from an inch to five feet wide, some of which contain beautiful crystals of iron pyrites." These quartz veins were ascertained in 1865-'66 to be auriferous, and specimens forwarded to the mint at Philadelphia were found to contain \$23 63 of gold and \$4 42 of silver per ton. Other assays in New York exhibited results from \$10 to \$35 per ton, while a ton recently reduced at Saint Paul is said to have yielded between \$400 and \$500. In Carlton county gold has also been found, but not enough has been done to test the quality or show whether the quartz is rich enough to pay for mining.

Superior slate exists in abundance near the Saint Louis falls, limestone, of fine quality in many of the central counties forming, in the valleys of the Minnesota and Mississippi, the basis of most of the bluffs; while in Brown county an excellent potters' clay is found in beds 10 feet thick, from which two potteries are now manufacturing ware. A very notable mineral is also the famous red clay or "pipe-stone," found chiefly in the Couteau des Prairies, from which the Indians manufactured pipes, and which is now being applied to many economic purposes.

Not the least important of the indigenous raw material of Minnesota is the salt from the numerous springs of the Red River valley—the beginning of the immense salines which stretch westward along the international boundary to the Rocky mountains. These large reservoirs of salt are destined to form a considerable source of wealth, the immense consumption of this article in the northwest, in the packing of beef and pork and other purposes, rendering it of great value.

There are at present 1,701 miles of railroad projected in the State, 552 of which were completed prior to July, 1868. The Northern Pacific, not yet definitely located, but designed to connect the upper waters of Lake Superior with the Pacific coast at Puget sound, is undoubtedly destined to have a most important bearing upon the future interests of the State, as one of the great connecting lines between the east and the west, and as developing a new outlet by the way of Lake Superior for her own products.

The munificent land grants with which Congress have endowed her complete system of railroads secure to the State, in the opinion of her most eminent statesmen, all the internal improvements that will be needed for the present generation; and as these are rapidly pushed to completion, her facilities for transportation will be fully adequate to the wants of her energetic and enterprising citizens.

Proceeding southward from Minnesota, the next State reached is

IOWA.

The territorial position of this flourishing State is unsurpassed and scarcely equalled in its advantages for commerce and industry. Extending from the Mississippi to the Missouri, 300 miles, with a breadth of 208, it covers an area of 55,045 square miles, or 35,228,800 acres. Lying on the main path of interoceanic railway communication, it will witness the transit of the great masses of trade which will soon pass between western Europe and eastern Asia, a fact which its own admirable facilities for domestic commerce will soon turn to great advantage.

The State presents a surface sufficiently undulating for drainage, but nowhere rises into mountains. In some cases along the Mississippi the bluffs appear in considerable abruptness, but generally the land is in graceful slopes, alternately swelling and sinking to the line of horizon. In many cases these are crowned with heavy oak forests, while in other instances the beautifully rounded summits have a carpet of green, dotted with clumps of trees, baffling the utmost imitative skill of the landscape gardener. Upon these slopes and their intervening alluvions are located flourishing towns and cities, the way stations of the splendid tide of Mississippi commerce. Back from the great rivers the traveller meets with immense prairies, covering, perhaps, three-fourths of the surface of Iowa. These in a state of nature are beautified with a profusion and variety of delicate wild flowers and grasses, and skirted, along the streams with belts of heavy timber.

The soil of the State, especially in the southern part, is remarkably well adapted to the growth of cereals, presenting a very desirable combination of organic with earthy and saline matter, and based upon calcareous and magnesian rocks. The prairie is generally underlaid by the devonian and carboniferous formations, affording by their decomposition the most desirable inorganic elements, which, in combination with accumulations of animal and vegetable matter, dating back through ages, affords a productive surface found only in the choice of upland plains. No soil, perhaps, affords greater nutriment to woody fibre, as is attested by the rapid growth of forest timber since the repression of the annual prairie fires. It is estimated that timber in Iowa is growing much faster than its consumption through the influence of an extensive tree planting enterprise and careful economy in the use of fuel. The rapid growth of woody fibre has been attributed by chemists to the immense accumulations of potassa and its combinations, caused by annual prairie fires. Fruit trees grow rapidly and bear early.

The climate of the State, extending as it does through three degrees of latitude, presents some variations, but it is free from unhealthy extremes. Its general character is a salubrious dryness, which greatly alleviates the extremes of winter cold and summer heat. The sweep of prairie plains facilitates a free circulation near the surface, removing malaria and conducing to general health, both of animal and vegetable organic life. The advance of civilization and its consequent changes, and the extension of fruit culture, will tend to remove such general and local causes as produce disease, and thus improve the sanitary condition of the country. The experience of the community has already detected and, to a great extent, neutralized those minor difficulties which embarrassed early settlement.

By the State census of 1867 the number of enclosed acres is shown to be 8,263,174, of which 1,057,331 were set in wheat, harvesting 14,635,520 bushels, and averaging, in an unproductive wheat year, 14 bushels per acre. The oat crop on 504,362 acres amounted to 15,861,494 bushels. The corn crop of 56,928,938 bushels occupied 1,992,396 acres. Of rye and barley 1,690,570 bushels were harvested from 83,617 acres. From 25,796 acres 2,094,557 gallons of sorghum molasses, and 14,697 pounds of sugar were made. From 536,896 acres sown in Hungarian and tame grasses, 596,701 tons of hay were made, besides 823,153 tons of wild grass from an area not stated. Of grass seed 107,532 bushels were raised, while the yield from 92,883 acres planted in potatoes was 2,879,960 bushels.

Fruit culture is represented by 1,075,177 trees in full bearing, and

3,629,789 not yet producing fruit, indicating a very great enlargement and productiveness within the next year or two. Of grapes 549,179 pounds were raised and 29,495 gallons of wine manufactured. Of tobacco 385,000 pounds, and of hops 48,653 pounds were reported; 48,774 acres were planted in timber. From 85,727 hives of bees 896,745 pounds of honey, and 36,266 pounds of beeswax were received.

The aggregates of live-stock embrace 447,092 horses, mules, and asses; 1,282,728 cattle, including 326,559 cows, yielding 19,192,727 pounds of butter, and 1,403,864 pounds of cheese. Of sheep 1,708,958 yielded 5,323,385 pounds of wool. In 1867, 663,063 rods of hedging were planted, being an excess of 331,322 rods over that set out in 1866. Of mineral productions, 2,483,010 bushels of coal, of 80 pounds each, were marketed. Other minerals to the value of \$320,820 were produced, including lead, zinc, and copper, which were frequently found associated with silver. The western coal field occupies an area of 25,000 square miles, in deposits sufficiently convenient and accessible. ^

Manufacturing industry during 1867 presents an aggregate product valued at \$15,957,599. Agricultural implements, machinery, and wagons were returned at \$11,362,402. The annual assessment covers 28,773,400 acres of land, the value of real estate being \$189,966,359, total, \$256,517,184; these aggregates exhibiting a remarkable expansion in all kinds of industrial enterprise.

Iowa possesses first-class facilities for commercial pursuits, being washed on the east and west by the Mississippi and Missouri, while the interior of the State is penetrated by several affluents of these rivers, affording superior internal navigation, reaching her business and producing localities. But these advantages are more than doubled by her 1,152 miles of finished railroad, with a capital of about \$35,000,000. Besides these, other lines have been projected, and some are in process of construction. The educational returns show 62 colleges, academies, and universities, being an increase of 21 in three years, with 3,951 students, an increase of 1,614 in the same period. Notwithstanding the State census makes no mention of public schools or churches, it is well understood that in religious as well as in educational enterprises Iowa occupies a prominent position.

The population is estimated at not less than 1,000,000. The militia enrolled in 1867 numbered 125,646; the number of dwellings the same year was 155,758, and 13,503 foreigners were naturalized. The above statistics, compared with former ones, exhibit an expansion in social organization and individual welfare that would excite astonishment but for the presence of similar phenomena in other States founded upon our public domain. Doubtless the forthcoming decennial census of 1870 will reveal still more remarkable results.

Des Moines, the capital of Iowa, is situated at the head of steam navigation on the river of that name. It is a thriving city of nearly 10,000 inhabitants, with railroad connection to Omaha on the west and Chicago on the east, placing it on the main line of interoceanic railway travel. It is surrounded by an excellent agricultural and mineral country, and amply endowed with literary and scientific institutions. It will become one of the most beautiful western capitals.

Dubuque, with a population of 24,000, in the heart of the lead regions, has established still more productive industries and commercial operations, showing an annual aggregate of trade for 1867 of \$16,000,000. From 15 lumber yards 31,000,000 feet of lumber were shipped. The export trade embraced also 91,000 barrels flour, 2,000,000 bushels of wheat, 16,000,000 pounds pork, and 23,000 live hogs. The product of

its manufactures for the same year was \$3,194,000. There are two lines of street railway, 19 churches, 61 public schools, with 3,000 scholars, and an ample endowment of private schools.

Davenport, with a population of 20,000, has \$1,000,000 employed in manufacturing, and is favored with extensive railway connections.

Iowa City, the former capital, is the seat of the State university, and possesses remarkable facilities for manufacturing purposes.

There are yet undisposed of in Iowa 2,902,528.06 acres of public land.

MISSOURI.

The next State south, bordering on the Mississippi, is Missouri, occupying a central position in the Union, and enjoying many advantages as an industrial and commercial community. Its length is 318 miles; width, 280; area, 65,350 square miles, equal to 41,824,000 acres. Its eastern border is washed by the Mississippi for 500 miles, while the Missouri, after skirting its northwestern boundary for 250 miles, strikes a direct course of 400 miles through the heart of Missouri, with affluents affording 500 miles additional navigation, and covering the State with a net work of internal communication, together with excellent water power for manufacturing purposes. Perennial springs abound, securing the inestimable boon of pure water. Some of these, especially in Howard, Cooper, and neighboring counties, are highly charged with saline elements. The proximity of abundant supplies of wood and coal, promises, in these localities, the development of a salt production sufficient to meet the demands of the whole continent. Sulphur, chalybeate, petroleum, and other springs abound. Bryce's spring, on the Mangua, discharges 10,927,872 cubic feet of water per diem; drives a large flour-mill, and then flows away in a stream 42 yards wide.

If a line be drawn from Hannibal to the southwest corner of the State, nearly all the country to the northwest of it will be found to be prairie, while the remainder of the State is almost entirely heavily timbered land. Large tracts of forest land border the streams on the prairie side, and long arms of prairie reach down through the timbered region. Pine, walnut, cherry, ash, maple, birch, hickory, oak, linden, cottonwood, sycamore, and other varieties of trees, exist in great abundance, growing very large. Sycamores, 130 feet high and 43 feet in girth; oaks, 100 feet high and 29 feet in circumference; cypresses, 130 feet high and 29 feet round; and walnuts, 110 feet high and 30 feet in circumference, are not uncommon in several localities. The grandeur and varied beauty of the Missouri forests have become proverbial, while their utilitarian value swells beyond computation. Better timber is wasted in opening farms than is imported from other States for building and other purposes. The geology of Missouri presents an almost complete geological cabinet from the azoic to the quaternary deposits. Porphyry, granite, greenstone, and trap rocks; also, limestone and marble of excellent quality afford an abundance of building materials, while clay, well adapted to the manufacture of brick and earthenware, is generally diffused. Fire rock is also extensively found with limestone, yielding hydraulic cement. The workable coal area of Missouri was stated by Daddow and Bannan at 21,000 square miles. The State board of geological survey, however, estimate the area at 26,887 square miles, exclusive of outlying and local deposits, promising an annual supply of 100,000,000 tons for at least 1,300 years to come. The specular oxide of iron is one of the most abundant and valuable ores in the State. Iron Mountain presents a mass of this ore, nearly pure, 200 feet high, and

covering 500 acres, the quantity above the surface being estimated at 230,000,000 tons, while every foot of depth below the surface, to an unknown extent, will yield a product estimated at 3,000,000 tons. The specular and magnetic ores of great purity are found in large veins injected through the porphyry at Shepherd's mountain. Silicious specular oxide of iron exists in large quantities at Pilot Knob. Hematites of good quality are also discovered in large deposits in the magnesian limestone, while bog ore is extensive in swamps. It is estimated that within a few miles of Pilot Knob and Iron Mountain 1,000,000 tons per annum can be profitably manufactured for the next 200 years. Lead deposits are also richer than has been supposed. New deposits of copper have been discovered, and sulphuret of zinc is found, especially in the mountain limestone. Cobalt, nickel, manganese, silver, and gold, have also been developed in considerable quantities. These facts indicate a store of mineral wealth which must soon form the basis of an extensive mining industry.

The soil of Missouri presents a great variety and excellence, capable of a remarkably varied agriculture, thus involving one of the vital elements of social prosperity. The characteristic differences of prairie and timber land disappear with culture and are found ultimately to assimilate in the most important elements. Cereal productions will ever constitute a prominent branch of agriculture on account of the deep stores of fertility in the soil, which a more thorough cultivation has already partially indicated.

The climate of Missouri with its high temperatures also ripens the more delicate fruits, which find a genial matrix in the soil. The grape thrives with especial luxuriance and richness. The great western staple, maize, grows in this State with wonderful thrift, while wheat, rye, barley, oats, hemp, and other crops are produced in larger volume than is required for home consumption, and furnish a heavy mass of exports. The capacities of Missouri in this, as well as in other branches of industry, can by no means be judged from the past. The civil strife which lately waged with such fierceness desolated her fields and shattered her agriculture. But, as the seething elements settle into quietude, the reorganizing forces of society are again at work, imparting new energy to industrial enterprise. No general statistics since the census reports of 1860 have been published, and it is not deemed necessary to repeat here my criticisms of last year upon the very flattering results presented in the previous ten years. It is known that an immense agricultural population is now in process of immigration to this beautiful State, from whose intelligent culture we may expect satisfactory results in the future. Stock, especially sheep, raising is very profitable and presents an opening for much more extensive enterprise than hitherto exhibited. The abundance of corn as shown above enables us to anticipate great aggregates in pork, and there is no reason why Missouri should be behind-hand in the quantity or quality of her animal products, such as butter, cheese, and honey. The manufactures of Missouri at the last decennial census did not exhibit the rate of advancement shown by her sister States of the west, yet with an improved labor system there is no reason to doubt that her splendid manufacturing facilities will be developed, and upon a widely varied industry a substantial social prosperity may be built up. Her southwestern springs alone furnish a million horsepower, an insignificant aggregate in comparison with that of her network of rivers and creeks.

The commercial facilities of Missouri are of the first order; the system of railroad communication, now in process of rapid expansion, will soon

permeate all parts of the State, and her commerce, already of great extent and value, will experience an indefinite enlargement.

The educational endowment of Missouri is excellent and constantly improving. In 1864 the State had 11 colleges, besides a number of first-class seminaries.

Her church accommodations, as shown by the census of 1860, gave one church to every 750 of the population, and represented a cash value of \$4,509,767, aggregates which have largely increased notwithstanding the desolations of war.

Jefferson City, the capital, is situated on the Missouri upon an elevated site, commanding a fine view of the river and surrounding country. It is the centre of a high social intelligence and refinement, being well supplied with religious and literary institutions. Its population is about 5,000.

St. Louis, with a population of 250,000, which is constantly increasing, covers a space seven miles long by three in width; streets nearest the river follow its meanderings, but in the newer portions of the city they are arranged on the rectangular plan. It is one of the great commercial and industrial cities of the interior, amply stocked with enterprise and rich in the results of intelligent labor. It has a commanding interest in the commerce of the Mississippi river system and of a massive railroad communication.

In the State of Missouri there are 1,483,715.22 acres of public land subject to disposal under the law. District land offices may be found at Booneville, Ironton, and Springfield.

ARKANSAS.

Advancing south, the next political division is Arkansas, which is the most northerly of the States west of the Mississippi, possessing characteristics of soil, chorography and products peculiar to the southern States.

It is bounded on the north by Missouri, on the east by the St. Francis and Mississippi rivers, on the south by Louisiana and Texas, and on the west by the latter State and the Indian territory.

Arkansas was originally part of the Louisiana purchase in 1803 from the French republic, giving us uninterrupted dominion over the Mississippi to its mouth in the Gulf of Mexico; of this territory it remained a part until 1812, when the present State of Louisiana was admitted into the Union. Afterwards it became part of Missouri Territory and so remained until 1821, when Missouri was admitted, and Arkansas, as a separate Territory, was organized with its present limits. In June, 1836, a State constitution was formed at Little Rock and Arkansas erected into a State. Its surface may be described as follows:

The valley of the Mississippi and St. Francis rivers is a low marshy plain, interspersed with bayous and lagoons, and to a considerable extent subject to periodical overflow. The valley of the White river is adapted to the cultivation of cereals, vegetables, and fruits of the north-western States, and for the herding of sheep and cattle. The valley of the Arkansas is covered with a dense forest for 40 miles west of the Mississippi. Further westward lies an extremely fertile, well-watered country, occasionally mountainous and at other times level, being one of the most productive regions on the continent for the culture of corn, cotton and tobacco. It possesses also great mineral wealth in the bituminous coal and ores of iron, zinc, and silver-bearing galena. In the valley of the Ouachita, in the northwest, are the celebrated Hot Springs, and sev-

eral saline springs from which a very superior quality of salt is obtained. The soil of this valley is exceedingly fertile, whilst its physical features are very beautiful and inviting. The valley of the Red river, the great cotton country of the southwest, is also well adapted to the culture of the sugar cane. Finally, the Grand Prairie, 90 miles long and 30 broad, between the Arkansas and White rivers, an elevated table-land, is of inconsiderable fertility, being the only exception to the productiveness of all parts of the State.

Arkansas has advantages of inland navigation not inferior to those of any other State, its many navigable streams being the best possible lines of transit for the produce of the interior to the great natural highway on its eastern boundary, whereby excellent markets can readily be reached.

The St. Francis, running through the northeastern portion of the State from the Mississippi line to a short distance above Helena, is a broad, shallow river, expanding in width in places to from 5 to 25 miles, being in favorable seasons navigable for 150 miles from its mouth.

White river is navigable for small steamers as far up as Batesville, 260 miles, while one of its northern tributaries, the Big Black, is navigable during the greater part of the year for 100 miles above its mouth.

The Arkansas river, next to the Missouri the largest tributary of the Mississippi, extends diagonally through the central portion of the State from northwest to southeast, its whole length being 2,000 miles. It is navigable for its entire course through the State, and remarkably free from snags and driftwood.

The Ouachita rises in the western part, south of the Arkansas, flowing in a direction parallel with that river, and is navigable for 350 miles. Its chief tributaries are the Little Missouri, Sabine, Saline, Moro, Bayou Bartholomew, and Bayou Bœuf. The Red river runs through the southwestern corner of Arkansas, and, being a large, navigable stream, affords excellent commercial facilities.

The principal mountains are the Ozark and Masserne. The Ozark commence near Little Rock, stretching in a northwesterly direction beyond the State limits, seldom rising to an elevation beyond 1,500 to 2,000 feet. The Masserne range lies south of the Arkansas, the rocks composing these mountains being so barren that the gray sandstone of which they are constituted forms the prevailing color of the landscape.

In addition to the numerous navigable streams of Arkansas it is proposed to still further increase the availability of resources by a complete system of railroads connecting the principal towns with the commercial centres of the country. Parts of these roads are already completed and others in course of construction, while the immigration constantly increasing under the encouragement of a condition of peace and prosperity will offer inducements to capitalists to prosecute the building of other roads already projected. The principal railroads are the Cairo and Fulton, Memphis and Little Rock, and Little Rock and Fort Smith, for which provision is made by act of February 9, 1853, the two last named forming the route through the State of the projected Atlantic and Pacific railway, the establishment of which is proposed from the western boundary of Arkansas through the valley of the Canadian river, thence along the 35th parallel to the Colorado of the West, thence to San Diego and San Francisco, and for which route great advantages are claimed on account of the fertility of the soil and favorable climatic location, exempting it from wintry storms at times interfering with travel on more northern routes.

The products of Arkansas are classed with those of agriculture, manu-

factures, the forests, and the mines. Of the first the variety is great embracing the hardy growth of the northern and western, and the tropical plants and fruits of the south in the eastern and southern sections. The principal of these are wheat, rye, oats, sweet and Irish potatoes, maize, peas, beans, butter, cheese, wool, slaughtered animals, honey, beeswax, tobacco, cotton, hay, and garden and orchard products of great number and value.

The manufactures are confined to flour, meal, leather, and lumber of many kinds and excellent quality, obtained from the magnificent and inexhaustible forests of the State, the superior water-power of the upper streams inviting great augmentation of the manufacturing interests.

The mineral wealth lies in vast beds of anthracite, cannel and bituminous coal, iron, lead, manganese, gypsum, zinc, salt, and building-stone, the lead ore containing silver in quantities to defray the expenses of working; the zinc product ranking next to that of New Jersey, and the gypsum greater in quantity than in all the other States of the Union.

The Hot springs are situated on a creek of the same name which empties into the Ouachita, six miles distant in a southern direction, and 60 miles southwest of Little Rock, in Hot Springs county. These springs issue from a beautiful ridge of novaculite, and are remarkable for their number, the high temperature of the waters, and their mineral solutions. Their waters are considered of great value in the treatment of disease, and hence their popularity as a resort for invalids.

The present population of Arkansas is estimated at 500,000. The area of the State is 52,198 square miles, or 33,406,720 acres, of which the United States still holds for disposal over 11,000,000 acres.

DAKOTA.

Of the States and Territories of the plains, and those traversed by the Rocky mountains, beginning on the north, the first is Dakota, which is one of the most northerly of our Territories, and although its surface has been reduced by recent legislation, is yet an extensive region, embracing six and a half degrees of latitude and very nearly eight of longitude, with an extreme length of 414 miles, and breadth 360, its area being 150,931.45 square miles, or 96,596,128 acres. This surface includes a small fraction containing 2,765 square miles, or 1,769,600 acres, west of Wyoming, which in the formation of the latter was detached from Dakota proper.

This Territory has on the north the British possessions, on the south Nebraska, on the east Minnesota and Iowa, and on the west Wyoming and Montana.

By the provisions of the act of Congress approved July 25, 1868, that portion of Dakota formerly embraced within the following described limits has been organized into the Territory of Wyoming, viz: commencing at the intersection of the 27th meridian of longitude west from Washington with the 45th degree of north latitude, and running thence west to the 34th meridian of west longitude, thence south to the 41st degree of north latitude, thence east to the 27th meridian of west longitude, and thence north to the place of beginning.

The surface of Dakota is mostly elevated, but not mountainous. Traversing the eastern portion for several hundred miles is a plateau called the Couteau des Prairies, having an average elevation of 1,500 feet above the sea, with a breadth of from 15 to 20 miles, while a similar table of less height, the Couteau du Missouri, extends from the southeastern to the northwestern portion, and westward nearly to the Missouri river. The basin of the Red River of the North and that portion east of the Dakota

river is covered with grassy plains, with but slight irregularities to break the uniformity of its appearance. The remaining portion of the Territory, mostly west of the Missouri river, consists of high rolling prairies. The soil of the eastern and southern part is excellent and adapted to the pursuits of agriculture. In the valleys of the Red and other rivers the various kinds of cereals and vegetables are raised in abundance. Stock-raising is also favored to a very high degree, peculiar advantages being presented for the growth of wool, as natural meadows with excellent pasturage abound, with a plentiful supply of water.

The western and northwestern portion of the Territory is adapted to both tillage and grazing, the latter more especially; but the southwestern part is less valuable, owing to the existence of the "Mauvaises terres," or "Bad lands." The soil upon the elevated grounds between the Missouri and Dakota rivers is thin and gravelly, generally unfitting it for agriculture and grazing.

The climate in the south part is mild and healthy, while in the north, during the winter, it is severe. The principal rivers of Dakota are the Red River of the North and the Missouri, the latter traversing the central portion of the Territory; and having numerous tributaries, affords to a large extent means of drainage and navigation during the stages of high water to its western confines. The principal of its affluents in the west are the Little Missouri, Big Knife, Grand, Big Cheyenne or Good, and White Earth rivers, and in the east the Dakota, Vermillion, and Big Sioux.

The face of the country, especially in the eastern limits, is agreeably diversified with a large number of lakes, the principal of which are Devil's, Tchanchicanah, Skunk, Poinsett, Abert, Traverse, and Big Stone, the last two being partly in Minnesota. Nearly the whole of the eastern and one-half of the southern boundary are formed by natural bodies of water—the Red River of the North, in connection with Lakes Traverse and Big Stone, almost the entire line between Dakota and Minnesota, the Big Sioux from Iowa, and the Missouri from Nebraska.

The Black Hills, situated in the southwestern part, contain gold, silver, iron, copper, and coal, while some discoveries of the precious metals have been made during the past year, causing a considerable tide of emigration in that direction. Large forests of pine also exist in this locality adapted to building purposes. In the southeastern portion, in the neighborhood of the Big Sioux river, coal is said to exist in considerable quantities, while good building-stone, limestone, and clay for brick-making, are found in the south. In the northern portion, in the region of Devil's lake, rich deposits of salt exist.

The principal white settlements are in the eastern and southern parts but there is quite an extensive settlement on the Pembina and Red river, in the northeast portion.

There are also from 25,000 to 30,000 Indians in the Territory, but their numbers are gradually decreasing from emigration and other causes. The population during the last year has increased 10,000.

The principal towns are Yankton and Vermillion, on the Missouri, the former the capital and seat of the surveyor general's office of this department, and the latter the location of the register and receiver's office.

During the last year surveys of the public land have been completed south of the parallel of 43° 30' north latitude, and north of the Missouri river, with the exception of the subdivision of a few townships and fractional townships adjoining the Yankton Indian reservation.

Besides this, the 11th standard parallel has been extended west from the Red River of the North to the 7th guide meridian, and the latter

north to the 16th standard parallel or international boundary. The 15th standard parallel has likewise been extended from the Red River of the North west to the south west corner of township 161 north, range 55 west; also the 16th standard parallel from the Red river to the line between ranges 56 and 57 west, amounting in all to 206 miles. All the township and range lines north of the 15th standard parallel, and between the Red River of the North, have been established, and the line has been run between ranges 56 and 57 west, amounting to 186 miles.

Besides this, thirty-four whole and fractional townships have been subdivided into sections, equal to over 1,900 miles, embracing 701,996 acres.

These, with the surveys previously reported of 178 townships, or 2,829,774 acres, make an aggregate of 3,531,770 acres surveyed in the Territory from the beginning of the system to the end of the fiscal year, June 30, 1868, the surveying department having kept pace with the service by the preparation of maps and field-notes.

Under the appropriation for the year ending June 30, 1869, engagements have been entered into for subdivisive surveys of those townships upon which the settlements in the region of the Pembina and the Red River of the North are situated, on the east side of the Missouri river, north of the parallel of latitude $43^{\circ} 30'$ and adjoining the Yankton Indian reservation, south of said parallel. Owing to the rapid increase of population the necessity for extending the public surveys in this Territory is increasing, and in order to meet the demand the surveyor general submits an estimate of the sum of \$25,000 for the fiscal year ending June 30, 1870, which, for more urgent demands in the district, was reduced to \$15,000.

The quantity of public lands in the Territory to be disposed of on the 30th June last amounted to 90,986,449.52 acres.

NEBRASKA.

In passing southward from Dakota the first political organization reached is Nebraska, being north of Kansas, west of Iowa, and between latitudes 40° and 43° north and longitudes 94° and 104° west from Greenwich. It is divided into 53 counties, with an estimated population of 100,000. The principal river is the Platte, rising in the Black Hills of Idaho, traversing the State eastward, and emptying into the Missouri river.

The Platte receives on the north the Loup Fork and Elkhorn, with numerous minor streams, none of any importance, flowing into it from the south; yet that side of the river is well watered by the streams in that region flowing into Kansas, the principal ones being the Big and Little Blue and the Republican rivers.

The Platte is wide, rapid, and shallow. The valley along its banks is remarkable for richness, the portion west from Omaha, for 200 miles, having a width from eight to ten miles, with a soil of exuberant fertility; at what is known as the Grand Island settlement the soil is peculiarly rich; the winters usually mild, with very little snow, the stock subsisting principally out of doors, few farmers having even temporary sheds for shelter; the stock feed upon the dried grasses of the prairie in preference to hay. But little rain falls, the valley being irrigated by the annual rise of the river. Timber exists on the islands of the river and on the banks of the streams throughout the State.

The surface of the State consists mostly of prairies gently undulating or broken into low hills, and gradually rising from the Missouri, west-

ward to the mountains. The agricultural region embraces a tract of 30,000 square miles, lying directly west of the Missouri and having a width of 150 miles; along the Platte, however, it extends 300 miles. These lands are remarkable for fertility and ease of culture. This region is divided into bottom and prairie lands. The soil of the latter is deep, dark, vegetable mould, slightly impregnated with lime. The native grass grows in close bunches and constitutes a favorite and nutritious food for wild and domestic animals. The bottoms along the river banks have a rich, alluvial soil, those of the Missouri consisting of a sand basis, highly fertilized by the river. Wheat, corn, oats, sorghum, and all vegetables, flourish well, and below 42° latitude sweet potatoes are easily cultivated. The plum, grape, raspberry, strawberry, gooseberry, and other berries are found wild, the first two in great abundance; tobacco also finds a congenial soil and climate. The prairies are immense pasture grounds, the grass of the lower surface making excellent hay.

The atmosphere is dry and pure, the salubrity of the climate very invigorating, and the seasons equable. The prairie breezes temper the heat of summer, and the nights are always cool. High winds prevail in the spring and occasionally throughout the year.

In 1866 the yield of Indian corn was 2,095,000 bushels; wheat, 258,000 bushels; rye, 2,300 bushels; oats, 450,000 bushels; barley, 8,000 bushels; buckwheat, 6,400 bushels; potatoes, 120,000 bushels; tobacco, 1,500 pounds, and hay, 29,700 tons.

The estimate of live-stock in the State was, of horses, 13,600, valued at \$1,173,000; mules, 1,300, value \$150,000; sheep, 20,800, value \$75,200; cows, 23,400, worth \$806,000; other cattle, 67,500, value \$1,764,000; and hogs, 47,000, value \$386,000.

Like the adjoining State of Kansas, Nebraska is to a great extent treeless. As stated above, timber is found principally along the streams, the trees being cottonwood, oak, black walnut, elm, and butternut.

In the southern portion, near the Blue rivers, limestone of good quality exists, and in some places sandstone underlies the soil.

Alum has been discovered, and coal is found in various places, but generally the veins prove too thin for cheap fuel. Salt springs also exist, and are capable not only of meeting the necessity for domestic use, but also supply a surplus for exportation. Further remarks on the resources of this State are elsewhere presented in this report under the head of "Geological Survey of Nebraska."

The scarcity of fuel and good water power have retarded manufacturing interests in this State, agriculture and stock-raising engaging the attention of the people. The school system, similar to that of Ohio, is in a flourishing condition.

Omaha is the principal city and the initial point of the great Union Pacific railroad, which traverses the State along the valley of the Platte, and is now nearly completed to Salt Lake City in Utah, the population of the city being estimated at 20,000. It stands on a plain of 50 feet above the river, bounded by low ridges. The other important towns are Florence, Bellevue, and La Platte on the Missouri, north of the Platte river, and Lincoln, the capital of the State, Kenosha, Plattsmouth, Nebraska City, and Brownville, south of that river. The trade from the eastern States to Colorado, Utah, Montana, and other of the western Territories, has been by way of the Platte valley, and contributed much to the growth of Nebraska. The Union Pacific railroad follows the same general direction, and already its effects upon the State are visible; the population has doubled within a few years, the lands being rapidly disposed of for settlement, while Omaha, from its connection

with the road, will soon become the Chicago of the west. Sixteen million three hundred and eighteen thousand nine hundred and five acres have been surveyed, leaving 32,317,895 acres yet unsurveyed; 41,624,000 acres still remain in the State undisposed of, and are subject to entry on application at the district land offices, which are located at Omaha, Brownville, Nebraska City, and Dakota City.

KANSAS.

The region south of Nebraska comprises the State of Kansas, which was organized as a Territory by act of Congress in May, 1854, and admitted into the Union as a State in January, 1861. Kansas lies west of the Missouri, between the 37° and 40° of latitude, and the 94° and 102° of longitude. The total population of the State, which is divided into 80 counties, was, in 1860, 107,206, while at the present time it is estimated at 440,000, being about five persons to the square mile.

The settled portion of the State is divided into farms, embracing 2,500,000 acres, of which 700,000 are improved, the value of which is estimated at \$13,000,000, and that of farming implements and machinery at \$1,000,000. The Kansas, the principal river, is formed by the confluence of the Republican and Smoky Hill Forks, which rise in the Rocky mountains, and flow the former southeast, and the latter almost due east, uniting at Fort Riley; it continues thence east to the Missouri river, being navigable to Fort Riley. These streams water the northwest, western, and eastern portions, while the southwest, south, and southeast have the Osage, Neosho, Arkansas, and their branches; of these the Arkansas is the longest, rising in the Rocky mountains of Colorado, coursing east through three-fourths of the State, and then turning southeast and crossing the southern boundary into the Indian territory. With the exception of the Kansas none of the streams are navigable, having generally broad shallow channels.

The eastern part of the State contains rich prairies, hills covered with grass, and valleys of great fertility, with timber chiefly along the streams; lumber for building purposes is principally obtained from Chicago and St. Louis. The chief timber in the State is cottonwood, which grows to a very large size, and is extensively used in the manufacture of rough lumber, joists, rafters, scantling, and fence boards. It is of very rapid growth and often planted for shade and ornament, having a dense and shining foliage. The black walnut is the next most important wood in Kansas, and is used for all purposes from furniture to fence rails, growing large and straight and very abundant near the larger streams. There are several varieties of oak, but the tree is here not common, and its growth retarded by prairie fires. In the western part of the State hickory and ash are found, the latter growing quite large and straight. The soft maple is being cultivated to a great extent, and is the most luxuriant and beautiful of the ornamental trees.

Fruits in a wild condition are numerous, particularly plums, paw-paws, gooseberries, and wild grapes. In the western part the plums are said to be very fine, growing in clusters like large open bunches of grapes. The apple and peach also flourish luxuriantly, fine young orchards existing throughout the settled portions of the community. Grapes are also easily cultivated, and at no distant day will become a staple product.

Hedge growing has become a matter of much interest to the settlers, and is regarded as so important that the State legislature have passed an enactment for its encouragement. The Osage orange is the only tree grown in the State for this purpose. It flourishes best south of the 40th

degree of latitude, yet matured hedges are found in all the settled parts of the State.

The soil of the eastern portion is rich and deep, consisting of a black loam with an occasional mixture of sand; the base of many of the bluffs and bottoms of the rivers is composed of limestone constantly decomposing and adding to the productiveness of the soil. The climate partakes of the southern temperature, the winters being short and with little snow. During the first months of the year the weather undergoes sudden changes with high winds. Later the rainy season begins, generally lasting a month, and seldom passing the middle of June, little rain falling in the summer and autumn.

The soil of western Kansas, following the course of the Smoky Hill Fork, is strong, sandy loam, thin in some places, yet in others several feet thick; it seems destitute of lime. In the country east of Salina, the only stone is limestone. West of this place is the buffalo grass region, the grass growing in small tufts like timothy, yet finer and more delicate in the blade. It is the most nutritious grass that grows, supplying sufficient food in winter and summer both for beef cattle and sheep. The valley of the Smoky Hill Fork is one of the most picturesque and fertile regions of the State. The Union Pacific railroad, eastern division, follows this stream. Towns and settlements are rapidly springing up along the road and river, two thousand settlers having entered this valley since the laying of the tracks, within a year.

The valley of the Neosho river, regarded as the most fertile in the State, extends some distance back from the banks of the river and along the same in a southeast direction from near Fort Riley to the southern boundary of Kansas. It is the best wheat land of the State; as much as 40 bushels per acre have been obtained, the extreme productiveness being attributed to the washings of the immense deposits of gypsum on the headwaters of the river.

The southern portion, including the Osage purchase, is peculiarly adapted to stock-growing, which is becoming a source of wealth.

One of the most important features of Kansas is its magnesian limestone or permean rock. In the absence of timber this rock supplies a great want of the State. The stone first makes its appearance in the neighborhood of Lawrence, 40 miles from the eastern boundary; the quality here, however, being inferior, the strata thin, and the color unattractive. Twenty miles further west the quality is greatly improved, underlying the whole surface of the country. At Manhattan, a town at the mouth of the Big Blue, it is surpassingly beautiful, of a very light, delicate, and lively color, and is so abundant and easily quarried that it is cheaper as a building material than either brick or wood. The peculiarity of the rock is that in the native quarry it is so soft that it may be cut with an axe or saw and fashioned with ease, yet when exposed to the atmosphere it becomes almost as hard and indestructible as marble. This peculiarity has brought it into great use as a building stone, and many handsome edifices in the towns of the interior are constructed of it. The color varies from that of diluted milk to the yellow of cream.

No coal has yet been mined in Kansas, except in a few places in the southeastern counties, the measure being a continuation of the coal field of northeastern Missouri and southern Iowa, and extending over nearly one-third of the State, or 27,000 square miles.

Salt springs and marshes abound in the western part of the State, and enough salt can be made therefrom to supply the entire country west of the Mississippi. Gypsum abounds, and is equal to the Nova Scotia in quality. Alum exists, and iron ore is abundant in the western part, but

is not available for want of fuel. The principal agricultural products for 1866 were as follows: Indian corn, 6,530,000 bushels; wheat, 260,000 bushels; rye, 4,500 bushels; oats, 200,000 bushels; barley, 7,000 bushels; buckwheat, 20,000 bushels; potatoes, 244,000 bushels; tobacco, 22,000 pounds; hay, 123,000 tons. Of live-stock there were cows, 82,000, valued at \$2,635,000; horses, 38,900, value \$2,600,000; mules, 2,800, value \$230,000; sheep, 108,200, value \$355,000; other cattle, 139,400, value \$3,250,000, and hogs, 127,800, value \$1,030,000.

Popular education is receiving great attention and encouragement. There are nearly 900 school districts, over 1,100 teachers, and about 32,000 pupils. In 1867, nearly \$120,000 were expended for salaries of teachers; the school-houses being valued at \$350,000 aside from the select schools, academies, colleges, and universities existing without State or national assistance. In connection with the public school system are three higher State institutions, viz: the State Normal School, Agricultural College, and State University.

Of the cities and towns of Kansas, Leavenworth is perhaps the largest situated on the banks of the Missouri, and partially environed by gradually rising heights.

It is a commercial city, containing an estimated population of 33,000. The buildings are generally brick, and are neat and comfortable, while surrounding the city are many elegant residences. It is the terminus of the Lawrence branch Union Pacific railway, eastern division, and upon the completion of the contemplated bridge across the Missouri, will become one of the leading commercial cities of the west.

Lawrence, lying on both banks of the Kansas, 30 miles southwest of Leavenworth, is the oldest town in the State. The population, estimated at 14,000, is rapidly increasing, it being the outlet for the trade of southern Kansas. The manufacture of furniture, agricultural implements and woollen goods, is extensively carried on.

Atchison, on the Missouri, and near the north line of the State, is a thriving town, with a population of 10,000 or 12,000, it being the starting point of the central branch of the Union Pacific railroad. Topeka, on the south bank of the Kansas, is the seat of government. Manhattan, at the mouth of the Big Blue river, was originally founded by a colony from Cincinnati. The first action of the party was to select a spot for the school-house, and take measures for its immediate erection, an illustration of the *quo animo* of the American people in this respect. The town and its surroundings constitute one of the most beautiful spots in Kansas. The buildings are principally of the permean limestone elsewhere referred to in this article.

Fine water power exists both on the Kansas and the Big Blue, sufficient to move a large amount of machinery, so that in time the town may become one of manufacturing importance.

Junction City, Solomon City, and Salina, situated along the Pacific railway, are all thriving places.

By the construction of the eastern division Union Pacific railroad, communication with the interior of the State has been opened. This road starts from Kansas City on the Missouri, following the course of the Kansas to Fort Riley, thence along the Smoky Hill Fork to the western limit of the State. The road is in complete running order to Pond Creek station, eight miles from the west boundary, and is already doing a very remunerative business. Should the object of the company to make this a through route via New Mexico, Arizona, and southern California to the Pacific, be attained, the wealth and population of Kansas will be greatly augmented. Besides this principal railroad the central branch

of the Union Pacific has been built from Atchison due west 100 miles; and a branch road from Lawrence to Leavenworth, a distance of 30 miles. The Missouri river railroad extends along a part of the eastern boundary of the State. Other roads under construction along the valleys of the Neosho and Osage rivers will soon bring an extensive and exceedingly productive region into ready communication with the commercial centres of the Union. The total area of Kansas is 52,043,520 acres, of which 23,906,087 acres have been surveyed and 28,137,433 are unsurveyed; 9,247,930.16 acres, including school grants, have been disposed of by the government, leaving a remainder of 42,795,589.84 acres now for sale or entry under the generous land laws of the nation. The district land offices are at Topeka, Humboldt, and Junction City.

POLITICAL DIVISIONS TRAVERSED BY THE ROCKY MOUNTAINS AND SPURS OF THE SAME.

MONTANA, the fifth, in point of size, of the divisions of the United States, is bounded on the north by the British possessions, on the east by Dakota, on the south mainly by Wyoming, and on the west by Idaho. The Territory embraces an area of 143,776 square miles, or 92,016,640 acres.

The Rocky mountains and their numerous spurs and ranges, 200 miles in width in the northwestern part of Montana, extend through the western part of the Territory a distance of 320 miles, constituting its principal geographical and topographical features. The main range of these mountains diverges into a number of spurs or chains, the Bitter Root being the highest and most westerly. The other principal ranges are the Wind River, Belt, Big Horn, Cœur d'Alene, and Rocky, while the Highwood, Snow, Judith, Little Belt, Bear's Paw, and Little Rocky mountains are spurs or chains of less importance.

Of the geology of Montana comparatively little is yet known.

Many of the peaks in these ranges, covered with perpetual snow, are supposed to attain an altitude of from 2,000 to 14,000 feet above the level of the sea. The eastern part of the Territory consists chiefly of rolling and elevated table lands, while the western is mountainous, interspersed with beautiful valleys. Montana is pre-eminently well watered. The portion of the country east of the main range of the Rocky mountains is drained by the Missouri and Yellowstone, and their tributaries, running eastward, uniting with the Mississippi and flowing into the Gulf of Mexico, while the Clarke's Fork and Kootenay rivers and their tributaries drain the part west of the main range of the Rocky mountains, and flow into the Columbia, thus finding their way to the Pacific. The Missouri is formed by the junction of the Madison, Jefferson, and Gallatin rivers near Gallatin City, draining the whole southwestern portion of Montana, and flowing in a general northeastern direction to within a short distance below Fort Benton, near latitude 48°, receiving as tributaries from the northwest, Dearborn, Sun, Teton, and Marias rivers, and from the south Smith's river. From this point the Missouri runs in an eastern direction, leaving the Territory near latitude 48°, and receiving as tributaries the Arrow, Judith, Muscleshell, and Milk rivers. Yellowstone river has its source in Yellowstone lake, in Wyoming, longitude 116° west from Greenwich, flowing north a distance of 125 miles, thence northeast, watering the whole southern part of Montana, and receiving as tributaries from the south Clarke's Fork, Pryor's Fork, Big Horn, Rosebud, Tongue, and Powder rivers, uniting with the Missouri near the eastern boundary of the Territory.

West of the main range of the Rocky mountains the Missoula, Hell Gate, and Big Blackfoot rivers, running northwest, unite and form the Bitter Root river, which, with Flathead river, forms Clarke's Fork of the Columbia. The Missouri is navigable to Fort Benton, a distance of over 300 miles within the Territory. In consequence of continued Indian hostilities and the absence of settlements the Yellowstone river has not been sufficiently explored to determine the extent of its navigability.

Western Montana is divided by the several mountain ranges into a series of basins, and the numerous spurs shooting off in almost all directions subdivide these basins into beautiful valleys and terrace banks.

This portion contains nearly all the towns and settlements, the greater part of the lands at present available for agricultural purposes, as well as almost all the rich mineral deposits known to exist in Montana.

The basin on the western slope of the Rocky mountains, embracing the extreme western portion of Montana, is 250 miles long and 75 wide, being drained by the Clarke's Fork of the Columbia and its affluents. This extensive basin, presenting some of the grandest alpine scenery anywhere to be met with, contains a large extent of fine agricultural lands in the valleys of the Bitter Root, St. Mary's Fork, Big Blackfoot, Hell Gate, Flathead, and Tobacco rivers, capable of producing abundant harvests of wheat, rye, barley, potatoes, fruits, and vegetables grown at the same latitudes in other localities. It contains some of the best timber in Montana, and as a grazing region the foot-hills and terrace lands will compare favorably with any section of the country. Flathead, the only lake of any considerable size in the Territory, is situated in this basin near its eastern border, and is 35 miles long by 15 in width, surrounded on all sides by valuable agricultural and grazing lands.

The climate of Montana is as diversified as its surface. In the more protected valleys, and particularly in the southern part, it is pleasant and salubrious, snow seldom falling and stock grazing continuing throughout the year. On the more elevated lands it is colder. At the higher altitudes the temperature is like that of the New England States.

Gold was first discovered in this part of our country in 1832, on Gold creek, a branch of the Hell Gate, but no mining was done until the autumn of 1861; yet, by the latter part of the year 1862 there were 1,000 miners in Montana, nearly all of whom were engaged in the placer or gulch mines at the head of Big Hole, in the extreme southwestern portion of the Territory. The first quartz mill erected in Montana was in the beginning of 1863, at Bannock, in the southwest, on an affluent of Beaver Head river, one of the principal tributaries of the Jefferson. This mill was run by water power and had six stamps, each of 400 pounds. In the fall of 1864 the first steam-power quartz mills were put in operation. The gold-bearing regions of Montana are principally on the tributaries of the Hell Gate, Big Blackfoot, Madison, Jefferson, including those of the Beaver Head and other waters, and the Missouri from the junction of the Three Forks to the mouth of Smith's or Deep river, with the affluents of that stream, and on the branches of the Yellowstone, east of Helena, around Yellowstone City. According to the assessors' returns to July 1, 1868, the number of quartz mills in Montana is 36, about one-third of which have been in operation, erected at an original cost of \$1,110,000. The gold product has been variously estimated by different parties, and the data at command are yet too meager to justify in this report a positive statement. Mr. J. Ross Browne, special commissioner for the collection of mining statistics, in his report in 1867, estimated the total product from the Ter-

ritory from 1862 to 1867, both inclusive, at \$64,500,000; while Mr. W. S. Keys, a resident mining engineer, computes the aggregate product at \$72,100,000. The value of this product referred to in our report of last year rested on the estimate found in a report for 1866, by Mr. Taylor.

The returns of the county assessors show there are three assayers and refiners of gold and silver in Montana, and that during the year ending June 30, 1868, the value of gold and silver refined and run into bars amounted to \$8,640,000. In this region gold quartz may be looked for in the vicinity of rich placers, and at present the principal quartz mines are in the neighborhood of Bannock, Helena, Virginia City, Highland, and Argenta, all of which were once noted for their rich placers.

Montana is isolated by its distance from the thickly settled portion of the Union, with no present means of transportation except by way of Columbia river from the Pacific and the Missouri from the east. These are circumstances which render the transportation of supplies and the requisite machinery for the operation of quartz or vein mining quite expensive, thus retarding the development of the resources of a rich mineral region.

The completion of the Union Pacific railway, north of Great Salt Lake, will, however, place Montana within 250 miles of cheap and ready transportation, and almost in direct communication with the Atlantic and Pacific coasts.

Embarrassments incident to inadequate machinery and inexperience in the early history of mining in this region have been succeeded by skilfully constructed machinery under the direction of science, so that mining in the Territory has now become an established and profitable pursuit.

The early settlers attracted to Montana by the rich deposits in the placers migrated from one locality to another as the deposits became exhausted. This transition state has been followed by present settlements possessing all the elements of civilization. Courts have been established for the administration of justice, churches erected, and schools opened in almost every community.

As the placers became exhausted attention was energetically directed to trade, the Territory now possessing a flourishing agricultural community, having nearly 250,000 acres under cultivation.

The mineral deposits are not confined to gold; silver exists generally in conjunction with gold and copper, although separate rich mines of silver ore have been discovered. It is found principally on Flint and Silver Bow creeks, affluents of Hell Gate river, near Virginia City; on Adder and Ram's Horn gulches, affluents of Stinking Water river; on Ten-mile creek, in the vicinity of Helena; and on Rattlesnake creek, a tributary of Beaver Head river.

Copper has been discovered on Beaver creek, near Jefferson City, on a branch of Silver Bow creek, near Butte City, and the source of Muscleshell river, and in small quantities in nearly all the mining districts. The deposits of copper ore are usually in connection with gold and silver, over both of which it largely predominates in the localities mentioned.

In the distribution of gold, silver, and copper, in this Territory, there does not appear to be any prominent segregation. The phenomenon of double veins, as they are termed, is of frequent occurrence, one bearing galenas, oxides, and carbonates of lead, comprising the pure smelting ores, and the other vein producing silver glance, stephanite, dark and light ruby silver.

Coal has been found near Bannock, Helena, Virginia City, and Deer Lodge City, on the head-waters of Big Blackfoot, and in several

places on Muscleshell, Yellowstone, and Missouri rivers. All these deposits are bituminous, and, so far as known, do not exceed four feet in thickness. Lignite, or brown coal, exists in great quantities on the Yellowstone and Missouri, and on the head-waters of the Teton and Maria rivers, tributaries of the Missouri from the north. Iron, lead, mica, gypsum, plumbago, arsenic, antimony, tellurium, tin, and cinnabar, are reported to have been met with, but we have no reliable information to the extent of their occurrence.

Limestone, slate, and granite, suitable for building material, together with the clays and sands for brick making, are found in abundance over the Territory.

Hot springs and geysers are found in numerous localities, but principally at the head-waters of the Madison. Many of these are of high temperature, while some possess medicinal properties.

Timber grows generally along the streams and on the foot-hills and mountains, consisting chiefly of fir, pine, and cedar. The pine on the mountain slopes, and especially on the Pacific side, is large; that found on higher altitudes is less in size and of inferior quality. Fir and spruce occur on the mountain sides, in the valleys and cañons, often attaining gigantic proportions, especially in the northern part of the Territory.

Along the streams poplars, aspens, balsam, alders, and willows predominate, but pine, fir, and spruce constitute the principal building materials.

The surveyor general estimates that one third of the entire area of Montana, or 30,672,213 acres, is susceptible of profitable cultivation with the aid of irrigation, the soil being rich and only requiring moisture to render it productive. Wheat, rye, oats, barley, and other grains have been cultivated with success, the average yield being as large as in many other portions of the country, while the garden vegetables, such as beets, turnips, potatoes, parsnips, and onions, have likewise given profitable returns. Experience has demonstrated the fact that upon the application of improved irrigating agencies nearly every variety of fruit, vegetable and grain can be as successfully raised here as in any of the eastern States.

According to the records of the territorial auditor the assessed value of manufacturing establishments, as returned by the county assessor for the year ending July 1, 1868, is \$643,000, while the values of manufactures are returned at \$7,795,000.

The population of Montana has been estimated at 38,875. There are thirty-seven towns in the Territory, and the assessed value of real and personal property is given as \$9,400,000.

Helena, situated on both sides of Last Chance gulch, is the largest town in Montana and contains seven thousand inhabitants. It is handsomely laid out close under the foot of the mountains on the western border of the beautiful valley of Prickly Pear and Ten-mile creeks. It is nearly circular in form and fifteen miles in diameter, and is regarded as the second most important mining district. Virginia City, the capital in Madison county, and containing a number of costly stone buildings is on Alder gulch, the richest placer in the Territory, at an altitude of 5,481 feet above the level of the sea, covering an area of 579 acres with a population of three thousand. It is 275 miles south of Fort Benton at the head of navigation on the Missouri, and 300 miles north of the line of the Union Pacific railroad. The assessed value of the real and personal property up to July 1, 1868, was \$1,625,028, and in Madison county \$2,600,000. The town contains three banks, twenty-nine stores, seven hotels, fourteen saloons, a Masonic hall, and other

buildings. Nevada, Central, and Summit City, are mining towns of considerable importance and in close proximity to Virginia City. Gallatin City, near the three forks of the Missouri, Langford City, Stevensville, Sterling, Silver City, and Argenta, are also places of interest.

The surveying system was inaugurated in Montana in 1867.

The initial point is on the summit of a limestone hill 800 feet high, 12 miles southwest of the junction of the three forks of the Missouri. During the last fiscal year there have been 250 miles of standard lines extended, 215 miles of exterior or township, and 479 miles of subdivisional lines surveyed, including an aggregate area of 183,847 acres. The subdivisional surveys are in the vicinity of Helena and southeast of that locality on Willow and Crow creeks, affluents of the Missouri from the west, all in Jefferson county.

During the next fiscal year it is proposed to extend the exterior and subdivisional lines in the valleys of the Madison and the East and West Gallatin rivers, to include settlements. Also to extend the base line west through Deer Lodge and Beaver Head counties to the foot of the Bitter Root, and to establish the standard lines west to Deer Lodge, and into the valley of Hell Gate river, in order to facilitate the survey of mineral claims recognized by statute.

For this service the surveyor general has estimated \$51,534, but in view of more urgent demands in other surveying districts the sum of \$25,000 is submitted by this office. Pursuant to the act of March 2, 1867, a district land office has been established at Helena where there are officers ready to receive applications for obtaining ultimate titles in this Territory, in which the aggregate area to be disposed of is 86,904,569 acres.

WYOMING.

Next south of Montana is the new Territory of Wyoming, which received its organization by act of Congress approved July 25, 1868.

Prior to that date it was a part of Dakota, to which it was attached by act of May 26, 1864, having formerly been included within the limits of Idaho, and still earlier within the boundaries of the great "Nebraska Territory."

Its limits are described as commencing at the intersection of the 27th meridian of longitude west from Washington with the 45th degree of north latitude, and running thence westward to the 34th meridian of west longitude, south to the 41st degree of north latitude, east to the 27th meridian of west longitude, and thence north to the place of beginning.

It is bounded on the east by Dakota and Nebraska, on the south by Colorado and Utah, on the west by Utah, Idaho, and a section of country still attached to Dakota, and on the north by Montana.

Its area is 97,883 square miles, or 62,645,120 acres, being nearly three times as large as Maine, and almost twice as large as Pennsylvania or New York.

Fourteen months ago this Territory did not contain a thousand white inhabitants exclusive of the military, but its present civilized population is estimated at 40,000, which the tide of immigration is constantly augmenting as increased facilities for transportation are established and the resources and many advantages of the country become known.

This part of the public domain in the past had derived importance from the fact of the great route of travel from the Atlantic to the Pacific States passing through its borders, the South Pass, a national roadway between the Wind river and the Sweetwater mountains of the great Rocky range, lying within its limits on the west, with the valley of the

Platte on the east, and the Laramie plains extending through the centre together constituting a natural highway for emigrant and freight train and for the public mails.

This route, however, passes through one of the least inviting portions of the Territory, creating less favorable impressions as to the character of the country than the facts warrant, which are dissipated by a more thorough knowledge of many fertile well-watered plains and valuable mineral deposits.

The extension of the Union Pacific railroad 300 miles from the eastern boundary of Wyoming and its early completion across its entire limits 450 miles, have awakened an interest in regard to the resources of the Territory within the past few months, with a more thorough investigation into their value and extent, opening a new and productive field to the enterprising miner and agriculturist.

In the southeastern portion of the Territory, between the Laramie plains or table lands and the eastern boundary, south of the North Fork of Platte river and north of the Union Pacific railroad, lies one of the richest iron regions within our borders.

Mountains of brown hematite, assaying 90 per cent., are reported on the Chugwater, about 35 miles north of Cheyenne City.

South of the railroad, extending into Colorado, are inexhaustible supplies of red hematite that will assay from 40 to 60 per cent. of metal. The demand for mining and other machinery in the surrounding country, and the requirements of the railroads, will insure the extensive working of this iron field, and reveal its great value and importance.

It is said that the Union Pacific Railroad Company intends establishing rolling mills, at an early day, at some point contiguous to both the iron and coal deposits.

The vast region of country known as the Laramie plains, with the surrounding hills and mountains, extending from the Black Hills westward to the Wasatch mountains, is an immense field of bituminous coal of excellent quality. It is estimated by geologists who have recently conducted careful investigations here, that these coal beds cover an area of 30,000 square miles, or more than one third of the entire Territory.

At Carbon Station, 650 miles west of Omaha, and between Laramie City and Benton, about 100 tons per day of superior semi-bituminous coal are now being mined, the railroad engineers pronouncing it of better quality than that formerly brought from Boone, Iowa, by way of Omaha.

The country in the vicinity of the Black Hills is believed to be rich in ores of gold and silver, but has been so little explored that nothing entirely reliable in regard to the same is known; this being the fact also as to many other mountainous regions of the Territory, where, reasoning from analogy, it is supposed these metals will be abundantly found.

Gold is known to exist on the Powder and Big Horn rivers, but has not yet been discovered in quantities sufficient to encourage mining. In the Sweetwater country gold quartz is found of excellent quality. of a hard, vitreous nature, free from base metals, the ledges being well defined.

Placer mining is carried on with profit in this vicinity, but only to a very limited extent, the want being sensibly felt of suitable machinery for the reduction of the richer quartz.

The northeastern section of Wyoming is said to be very rich in depos-

its of gold and silver; also the central portion, of which, however, little is positively known.

In the southeastern section, on the Big Laramie river, discoveries of gold have recently been made to an extent creating great excitement in the vicinity.

In the neighborhood of the South Pass, surrounded by one of the most fertile sections of our mountain territory, containing an abundance of wood and water, lies a gold region of great extent and value. The metal there was first discovered in June, 1867, and in such paying quantities as to attract attention from emigrant miners. The mines in this locality having proved even more valuable than was anticipated, the town of South Pass City has been laid out.

New and valuable discoveries of the precious ore are occurring daily, the residents anticipating that the developments of another year will establish this as one of the richest gold countries east of the Sierra Nevada. There is one six-stamp mill now in operation at South Pass City, and two other mills, one of 10 stamps and the other of 20 to be ready for work in a few weeks.

The gold lodes of this region are generally very prolific, one company having gathered \$13,000 from 100 tons of quartz, after milling; another of \$12,000, another \$10,000, and one of \$8,000; the average yield being from \$80 to \$100 per ton.

Besides the quartz mines, there are numerous valuable gulch washings and placer diggings in this vicinity, which for several months past have averaged a yield of \$25 to \$30 per day to each man, and there are no indications of an early exhaustion of the supply; while new gulches and diggings are constantly being discovered, yielding from \$15 to \$20 per day to each man. One of the recently discovered placer deposits within Rock Creek gulch is supposed to extend eight to ten miles, and offers profitable employment to a large number of miners.

Numerous farmers and ranch-men have taken up claims in the country surrounding these mines and in the Wind River, Pine Creek, Sweet-Water, and Popo-Agie valleys, with a view to supplying the requirements of the miners; the enterprise having been successful and profitable beyond the most sanguine expectations, resulting from the fertility of the soil, the fine pasturage, unsurpassed facilities for irrigation, and remunerative market.

Many valuable copper and galena lodes, with fair percentage of silver, have been discovered in the Black Hills, in which range an excellent quality of limestone is also abundant.

Forests abound in many parts, especially in the central and north-eastern and on the Black Hills or Laramie mountains, which derive their more popular name from their dark appearance in the distance, caused by the extreme density of the growth of trees, which are of large size, principally evergreens, and considered excellent timber.

The Douglas spruce, which is here abundant, is unexcelled for building and railroad purposes.

At the headwaters of the Yellowstone and the western tributaries of the Big Horn is a volcanic region, abounding in hot and sulphur springs and fissures, emitting sulphurous fumes, and sometimes sheets of flame.

The waters of Poison Spring creek, emptying into the Platte, are said to be destructive to animal life, containing an arsenious solution.

The vicinity of Medicine Bow creek is very fertile, delightfully salubrious, well timbered and watered, abounding in game, which is also the fact as to most of the country adjoining other tributaries of the Platte,

both in the Laramie plains and northward toward the central portion of the Territory; but the country on the North Fork itself, though destitute of vegetation, abounds in iron.

The vicinity of Bitter creek is barren and uninviting, containing no vegetation, the surface of the earth being covered with an immense deposit of soda and potassa alkalies, bivalvular shells, and other débris of similar nature, giving it the appearance of the deserted bed of an inland sea.

The Laramie plains are unsurpassed for grazing purposes by any section of our country, having a rich, black soil, covered with nutritious grasses.

Fine grazing lands abound elsewhere throughout the Territory, except in the alkaline, sulphur, and iron regions, previously described, and the high mountains; these pastures are, also, well adapted to cultivation through the aid of irrigation, which can be conveniently introduced and which would impart fertility to lands now considered valueless.

The principal settlements in Wyoming are situated on the line of the Pacific railroad, each having received its first impetus from being temporarily the terminus of the road.

Cheyenne City is on a plain, 18 miles from the Black Hills, 60 miles west of the eastern boundary of the Territory, 20 miles north of the Colorado line, and at the railroad crossing of Crow creek, which is a branch of Lodge Pole creek. Its population is now over 3,000, and increasing.

The railroad company are here erecting fine buildings, a machine shop 200 by 250 feet on the ground, with an engine house which will hold 20 engines. These buildings are of sandstone, found 116 miles west of the place, of fine quality and well adapted to building, being soft and easily cut when first quarried, but hardening upon exposure to the sun and air.

Fort D. A. Russell, the principal military depot of supplies in the Territory, is two and a half miles from this town, up Crow creek.

Laramie City is 56 miles west of Cheyenne, at the railroad crossing of Big Laramie river, and contains several large railroad buildings, fine dwellings and warehouses, with a population of 1,500.

Fort Sanders is one and a half mile east of this town, on the railroad.

Wyoming City is 17 miles west of Laramie City, at the railroad crossing of the junction of Big and Little Laramie rivers, and has a population of five or six hundred.

The ties for the railroad are floated down the Laramie rivers to this point, where they are caught in booms.

There are several fine banks of coal in this vicinity.

The next important station westward is Benton City, 186 miles west of Cheyenne, on a plain having at this time neither vegetation nor water, the latter being brought to the town from the Platte river at Fort Fred Steele, two miles east on the railroad.

This is one of the principal railroad depots in the Territory, having rich beds of coal in its vicinity.

Eighteen miles west is the settlement known as Rawling's Springs, on a fertile plain, well watered, and containing abundance of coal.

After leaving this place, proceeding westward, there is a waste destitute of vegetation, containing no water except Bitter creek and its tributaries, until reaching the valley of Green river. At the junction of that stream with Bitter creek is located the town of Green River, principally of adobe buildings, having a population of 3,000.

The climate of this Territory is extremely pleasant and salubrious.

being neither excessively hot in summer, nor very cold in winter. The air is dry and rarefied, owing to the great elevation of the face of the country; Cheyenne City, 517 miles west of Omaha City, being 5,095 feet higher than that city, and Laramie City being 8,262 feet above tide-water level, estimated to be the highest railroad pass in the world.

It is supposed that the purity and salubriousness of the atmosphere, the mildness of the climate, and the presence of many medicinal springs, of great value and variety, will render this table-land country a resort for invalids equal in popularity to any part of southern Europe.

The next season will probably add several thousands to the population of this new Territory, and the attention of Congress is respectfully invited to the necessity for its early establishment as a surveying district, with the appointment of a surveyor general, as well as a register and a receiver; in fact, the general extension over its limits of the United States land system, as the United States have now the whole area, embracing 62,645,120 acres, to be disposed of under that system.

COLORADO.

South of Wyoming is the Territory of Colorado, which is chiefly an elevated, mountainous country, rich in ores of gold, silver, copper, iron, with deposits of coal of excellent quality, besides possessing lands unsurpassed for grazing and agriculture.

It embraces over 104,500 square miles, nearly 13 times as large as the State of Massachusetts. It has on the north Nebraska and Wyoming, on the west Utah, on the south New Mexico and Indian territory, and on the east Kansas and Nebraska.

Its territorial organization was authorized by act of March 2, 1861, the portion east of the Rocky mountains having been taken principally from Kansas and Nebraska, that lying west of the mountains from Utah, and one degree of latitude on the south from New Mexico.

The various surface divisions of Colorado are severally called the plains, the valleys, the parks, and the mountains. The plains embrace the section east of the Sierra Madre, being elevated, rolling prairie, rising gradually from the eastern boundary to the mountains westward, being well watered by the South Platte and Arkansas rivers and their tributaries. The soil is fertile, being covered with rich nutritious grasses, upon which cattle pasture the year round, as the dryness of the atmosphere in late summer and autumn converts the grass into a natural hay upon the stalk, which possesses all the nutrition of the original growth. Vast herds of buffalo and numerous other graminivorous animals roam over these plains, existing upon their grasses, and experiments show that domestic animals thrive as well upon the indigenous herbage.

The section of the plains lying near the South Platte, in the north-eastern part, is an iron region abounding in red hematite ore. Magnetic and hematite ores are also found in sections of the mountain country, as in the vicinity of the Golden Gate in Jefferson county, and it is conjectured that the mining and manufacture of this metal will soon be extensive in Colorado, furnishing machinery for mills and mines, implements for agriculture and lumber trade, and rails for iron roads.

In the vicinity of the eastern foot-hills of the mountains are the principal outcroppings of the great coal-beds, the strata varying from 5 to 30 feet thick, stated by geologists to underlie a large portion of the plains, sometimes extending eastward nearly to the Nebraska and Kansas line. This coal is generally of the variety known as lignite, of excellent quality for household economy as well as for manufactures and for railroads;

the mines being already extensively worked in Boulder, Jefferson, Arapahoe, and Douglas counties, but increased facilities for transportation are required to develop this branch of the mineral wealth. A large vein of albertite coal, the stratum being from 10 to 20 feet in thickness, has recently been discovered on White river in Summit county, and there are evidences of its extending 60 miles in one direction and 25 in another. It resembles cannelite, burning with great readiness and intense heat and is estimated to contain 50 to 60 gallons of oil to the ton.

In the southern part of the plains are numerous Mexican settlers, principally engaged in cattle herding and agriculture, being aided in the latter by irrigation, for which there are excellent facilities, and the result of its employment is abundant and certain crops.

The portion of Colorado known as the valley, being the country at the base of the foot-hills of the Rocky mountains, embraces three sevenths of the Territory, or about 30,000,000 of acres, of which one sixth can be cultivated, while the rest is available for pasturage. Its climate resembles that of the more eastern States of the same latitude, except that it is much dryer, the mean temperature of Denver and St. Louis being similar.

The average yearly precipitation of water in the valley is 20 inches falling principally in the rainy season of May, June, and July, and in the snows of winter. For two months in the year, therefore, irrigation is an absolute necessity for abundant crops, and the farmer in selecting his lands does so with a view to the convenience with which this artificial means of supplying the requisite water can be introduced. The construction of acequias or irrigating canals is performed chiefly with the plough and scraper, attended with but small expense, the certain abundance of the resulting crops more than repaying the extra outlay. Acequias 3 miles long, having a fall of four feet per mile, watering 20,000 acres, have been constructed, each adjoining proprietor contributing his share toward their construction and maintenance.

The soil of the valley rests on calcareous rock, but is made up in a great measure of the washings from the granite mountains above, and possesses elements of great fertility. On the borders of the streams its composition is sand, ashes, and decomposed vegetable matter; on the plateau between it is sand, gravel, and friable clay.

The average yield of wheat in this section is 25 bushels to the acre favored localities having yielded 80 bushels of wheat, also 100 bushels of oats to the acre; barley being still more prolific and the favorite crop. Over 150 bushels of corn in the ear have been gathered from an acre, the yearly produce of the Territory in this staple being more than 600,000 bushels.

Fruits and vegetables of the varieties most popular for purposes of domestic economy are cultivated here with great success; 500 bushels of potatoes to the acre, cabbages weighing 30 pounds, and turnips 15 pounds having been grown on these lands in the heart of what was formerly known as the Great American desert.

The present most important resource of the valley is its superior pasture, which has been estimated to cover 25,000 acres. The native grasses are rich and nutritious, growing principally during the rainy season and ripening into hay on the stalk, upon which the cattle will pasture and thrive during the entire winter when it is uncovered with snow. It is estimated that herding is as cheap and profitable here as in any section of our country.

The parks of Colorado are elevated bowls in the mountain country, having the appearance of beds of inland seas upheaved and emptied

their waters by volcanic agency. They present to the eye scenery magnificent beyond description made up of far-reaching forests, fertile meadows, and beautiful streams, surrounded by the lofty peaks of the great Rocky range.

The principal of these parks are the North Park at the head-waters of the north fork of the Platte, Middle Park situated at one of the chief sources of the Colorado river, South Park in the heart of the developed gold and silver country, Huerfano Park on the river of the same name, and the grand San Luis Park in the southern part of Colorado, having an area of 18,000 square miles watered by 35 streams, 16 of them emptying into the Rio Grande del Norte, which flows through its southern limits, and 19 into the San Luis lake, extending 60 miles from north to south in the centre of the park and apparently without an outlet. This park is remarkable for its natural scenery, the grandeur of its forests, the fertility of the soil, the purity of its waters, and the vast deposits of peat in the vicinity of San Luis lake. It contains a population of 25,000, or nearly one fourth of that of the whole Territory. The inhabitants are principally of Mexican descent and are chiefly occupied in herding and agriculture.

The mountain country of Colorado embraces the greater part of its mineral wealth, and much of the vast forest estimated to cover five-sevenths of the entire Territory, the trees being varieties of evergreens, making excellent lumber, the current price being \$35 per 1,000 feet, the milling of this lumber, as well as timber for the mines and for other purposes, being an important and very profitable manufacturing interest.

The developed gold and silver region commences in Boulder and Summit counties, between the 105th and 106th meridians of west longitude from Greenwich, near the 40th parallel of latitude, extending in a south-westerly direction through the Territory, spreading east to west from 30 to 60 miles. Gold, silver, copper, and other valuable minerals are also found in other sections.

The mining industry is principally employed in the gold quartz or lode and in the gulch mining. Quartz mining is confined principally to two districts, the one stretching along the eastern slope of the mountains from the headwaters of North Boulder to Clear Creek in Gilpin county, and the other confined to the head-waters of the South Platte. Lodes of great value abound in other districts, but mills are wanting for reduction of the ore. The gulch or placer mines are distributed through the auriferous region wherever the streams have washed the precious metal comparatively free from surrounding dross, the average yield of the best of these mines being from \$16 to \$20 per day to each man, and that of others from \$10 to \$12.

The mining interests of Colorado having gone through the periods of excitement at first discovery, great inflation and fever of speculation, followed by corresponding reactionary depression, are now assuming a healthy condition and constantly increasing in importance. New and improved processes of milling, desulphurization and purification are economizing the waste of gold and lessening the cost of reduction, while labor, provisions, and materials are becoming cheaper. Recent experiments have demonstrated the richer quartz to yield \$150 per ton at an expense of from \$12 to \$15 in the process of reduction. The division of the mining for ores and their reduction into separate branches of industry is found to be to the interest of both miners and mill-owners.

There have been already surveyed in Colorado 3,166,702 acres, leaving unsurveyed 63,713,298, making a total of 66,880,000, of which there are still to be disposed of under the United States land system 62,814,255 acres.

In order to enable agricultural settlers to acquire titles, and miners to have their rights determined, and that the requirements of all acts be met in satisfaction of the railroad grant, it is necessary that there should be from time to time reasonable extensions of the lines of public surveys, and with this view an estimate is submitted for the next fiscal year on a basis as economical as the expenses of the same will allow.

NEW MEXICO.

In succession the next Territory is New Mexico, embracing an area of 121,201 square miles, or 77,568,640 acres, being situated between latitudes $31^{\circ} 20'$ and 37° north, and longitudes 103° and 109° west from Greenwich, having an average length from north to south of 352 miles with a width of 332 miles. This Territory has for its northern boundary Colorado, on the east the Indian territory and Texas, on the south the Mexican state of Chihuahua, and on the west Arizona, the latter set off from New Mexico by act of Congress of March 3, 1863.

The principal rivers are the Rio Grande and the Pecos, the former running entirely across New Mexico from north to south, and the latter, taking its rise in the mountains east of Santa Fé, flows in a southerly direction, leaving the Territory near the southeast corner. The north-eastern portion is drained by the Canadian river, an affluent of the Arkansas, and the western by the San Juan and Gila rivers, branches of the Colorado of the West.

Ranges of the Rocky mountains, occasionally lost in table lands and rising again further on as short sierras or isolated peaks, traverse the country in a northerly and southerly direction. From the most easterly of these ranges extend vast plains, like terraces, sloping gradually toward the Mississippi. Through these plains the rivers and streams have, during long periods of time, worn channels and furrowed out valleys often of picturesque beauty and great fertility. The valleys of the Rio Grande and Pecos are also of this character, the former a longitudinal valley generally about twenty miles in width, flanked on the east and west by mountain chains, those south of Santa Fé having a height of 6,000 to 8,000 feet above the level of the sea, and in the more northern regions snow-capped peaks rise to the height of 10,000 to 12,000 feet presenting some of the grandest scenery on the continent.

West of the Rio Grande is a country of table lands or *mesas* intersected by broad valleys. These mesas, remains of the former level, often stand out apart from each other, bearing great resemblance to gigantic fortresses and castles, and here and there among them rises the peak of an extinct volcano. In the southwestern portion of the Territory there is a range of lofty mountains extending far into Arizona, among which are the head-waters of the Mimbres and Gila rivers, the former running southward into Chihuahua and the latter flowing westward into the Colorado.

Hot springs and mineral springs are found in almost every section of the country; at Las Vegas, near Taos, Ojo Caliente, Jemez, near Fort McRae and Seldon, near the Mimbres river, and at many other points.

The Hot spring near the Mimbres, seventeen miles from Fort Bayard is of very high temperature. The water of this spring is highly charged with lime, has some iron and salt, though neither abundant enough to render the water when cold unpalatable. The lime which the water has held in solution by an excess of carbonic acid and by the heat, has been precipitated around the spring in such quantity as to form a mound 25 feet higher than the surrounding plain. A mile beyond the Hot spring

is an abundance of clear cold water, and on either side of the road leading to Fort Bayard the scenery is of the most charming description. The curative qualities of many of these springs have long been known, and they will not fail to become places of general resort for invalids when a railroad shall afford convenient facilities for reaching them.

The climate of New Mexico is remarkably salubrious, the atmosphere being light, dry, and electric, with a low measure of humidity when rain is not actually falling. The most interesting proof of the wonderful purity of the rarefied and arid atmosphere is its effects upon animal substances. Hunters travel hundreds of miles, kill game, and for days and weeks the meat without salting remains well preserved. The preservation of the different varieties of grass is another proof of the aridity of the atmosphere. A small measure of humidity would destroy their nutritive qualities. The annual fall of rain varies from 10 to 30 inches according to locality.

Observations made at Santa Fé and extending over six years show the mean temperature during the spring months to be 49.7° , in summer 70.4° , autumn 50.6° , and in winter 31.6° , the average for the year being 50.6° , or nearly the same as in New York city.

Throughout New Mexico the mountains are clothed with forests of pine, fir, spruce, and cedar, and in high altitudes the aspen is found in great abundance. The foot-hills and occasionally the mesas are covered with piñon intermixed with cedar. Considerable tracts of cottonwood, sycamore, hackberry, and willow are found upon the borders of the streams, and in their vicinity in the southern part of the country walnut and oak are occasionally found.

Grass abounds in every portion of the Territory, and even in the forests grows luxuriantly the entire year. At great altitudes this grass is, in winter-time, covered with snow, though not deadened to the ground, for as soon as the snow melts it affords excellent grazing. Upon the mesas and through the valleys grows the justly celebrated gama grass, which, cured as it stands, affords abundant food for flocks and herds throughout the winter. As a pastoral region New Mexico possesses eminent advantages, the grazing not being destroyed by the cold storms and rains of the countries further north, nor scorched and stunted by the burning heats of the south. The range is so extensive that flocks can move over a different pasturage every day. In cold weather they range toward the south and during inclement storms seek the shelter of some neighboring cañon. Having ample room and air, the flocks are not subject to the diseases incident to those localities where the extreme cold of the winter renders it necessary to crowd them together. The facility and cheapness of raising sheep and goats applies equally well to the raising of horses and cattle, and when fully protected from Indian depredations, and convenient transportation is afforded to the markets of the east by the construction of railroads, the hills and mountains will be literally covered with flocks and herds.

The lands in the valleys of the rivers are very fertile and can be successfully cultivated, though the cultivation is mainly carried on by means of irrigation. Although considerable labor and expense are at first incurred in making the canals and ditches, the crops are more certain than where entire dependence is placed upon the fall of rain for the amount of moisture required, and the land enriched by the detritus made up of decayed vegetation, and rich mould from the mountains, distributed by the running water, never wears out. Lands in the vicinity of Santa Fé have been under annual cultivation for more than 200 years, and still produce excellent crops without ever having been enriched or restored by other means.

Previous to the occupation of the country by the Americans, agriculture was confined to the production of wheat, corn, beans, oats, barley, and in some localities in the north, potatoes. Under American agriculture, however, nearly all kinds of fruits and garden vegetables have been introduced, growing luxuriantly, and are of excellent size and flavor. Peaches, apples, apricots, grapes, and in the southern part quinces, pomegranates and figs, can be grown as well as in any part of the world. The grape most cultivated in New Mexico is of delicious flavor, the wine from it being equal to the best Burgundy.

Valuable minerals are found in every portion of New Mexico. In numerous localities may now be seen shafts and drifts, the work of former generations, and the only monuments left of their energy, activity, and industry, while the almost daily discovery of new lodes of gold and silver bearing quartz and auriferous placers indicate that mining operations in the future will be as productive as in the past.

During the last year considerable progress has been made in the development of the mining interests. It is estimated that between 2,000 and 3,000 miners are now engaged in the Moreno district. Owing, however, to the want of water but a small portion of the ground known to be rich in gold can be worked. This difficulty will soon be obviated, as a ditch forty miles long is in process of construction, which will divert to the mines the waters of the Rio Colorado, an affluent of the Rio Grande. The completion of this enterprise will afford sufficient supply of water for the full development of this mining district, and a very large yield of gold is confidently anticipated. The gold product from these and other mines has been considerable during the year, but there being no assay office or other special agency for the refining or purchase of the gold, no reliable statistics of the amount produced can be obtained.

There has recently been received at this office a specimen of ore consisting of a silicious deposit of exceedingly loose texture, through which are interspersed fibres of pure gold, some of which exceed two inches in length. It is claimed that an assay of a specimen of this ore in which no gold was visible to the eye, yielded at the rate of \$19,000 to the ton. The locality in which this specimen was obtained is on the head-waters of Ute creek, a branch of Cimarron river, and the existence of the deposit was hitherto unsuspected.

Rich deposits of copper exist in many parts of the Territory. A number of mines have been worked for nearly a century, the present product finding a ready market in the States at prices equal to that of the best Russia copper.

Iron and coal have been found in inexhaustible quantities and of the best quality. Cinnabar and zinc also exist in some localities, though no mines of the same have as yet been worked.

Extensive surveys have been made by the engineers of the Union Pacific railroad, eastern division, from a point on the main line of their road near the western boundary of Kansas, through Colorado, New Mexico, Arizona, and California. It is claimed by the projectors that this route, on account of the favorable climate, light grades, alignment and distance, has advantages over others between the Atlantic and Pacific. The company propose to construct one branch of their road in the direction of Santa Fé.

The public surveys during the past year have been of limited extent. The second correction line south has been extended to the Pecos river, and a number of townships in the valley of the Rio Hondo have been surveyed and subdivided, also several townships in the valley of the Rio Mimbres. No applications for the survey of private claims have been made during the year.

The surveyor general recommends that provision be made by additional legislation for the early settlement of claims to land under Spanish and Mexican grants, as controversies are arising between new settlers and claimants under these unadjusted titles, thus checking the development of the resources of the Territory. This office concurs in the recommendation, referring to suggestions in the matter presented in the last annual report.

The surveyor general submits an estimate of appropriation of \$30,234 for public surveys in New Mexico during the next fiscal year, which sum, in consideration of the exigencies in other surveying districts, has been reduced by this office to \$10,000. The reduction was made in view of the fact that there exists no present demand for obtaining title to the public lands in New Mexico, none having been as yet disposed of since the year 1855, when the surveys were inaugurated, since which time nearly 3,000,000 acres have been surveyed.

Under treaty recently concluded with the Navajo Indians, the reservation at the Bosque Redondo on the Pecos river has been abandoned and the Indians settled upon a reservation upon the San Juan. The ratification of this treaty will throw open to settlement the country on the San Juan east of the reservation, and should the order setting apart the Bosque Redondo reservation be rescinded, that portion of the valley of the Pecos may also be opened to settlement.

The surveyor general has called attention to the great benefits likely to be derived from a geological survey of New Mexico. It is well known that nearly all the mountain ranges are mineral-bearing, yet a scientific survey is required to mark out with certainty the localities in which mining operations can be profitably conducted.

Under the authority of the act of Congress approved March 2, 1867, a contract has been entered into by this office for the survey of the northern boundary of New Mexico, and by advice from the parties now in the field we learn that the survey has reached the valley of the Rio Grande, and there is every prospect of an early completion of the work.

IDAHO.

Returning to the region of our northern boundary adjacent to Montana, the next organization there existing is Idaho.

The present surface of Idaho first formed part of the Territory of Oregon, as organized by act of August 14, 1848, vol. 9, p. 323. That part of Idaho lying north of 46° of north latitude was afterwards included within the Territory of Washington, by act of March 2, 1853, (Statutes, vol. 10, p. 172,) and the portion south of that degree constituted a portion of the Territory of Washington, pursuant to the statute of February 14, 1859, vol. 11, p. 384.

On the 3d March, 1863, Idaho was organized as a separate jurisdiction, with limits since diminished by act of May 26, 1864, by the organization of Montana of its then existing limits, and by attaching the southern portion to Dakota, (vol. 13, pages 85 and 92,) thus reducing the area of Idaho to 90,932 square miles. Finally this was further reduced in the organization of Wyoming by the act of July 28, 1868, so that its present surface is 86,294 square miles, or 55,228,160 acres, bounded on the east by Montana, Wyoming, and that portion of Dakota west of Wyoming, on the south by Utah and Nevada, on the west by Oregon and Washington, and on the north by British Columbia. Idaho forms part of the basin of the Columbia, and is drained by Snake river, and by Clarke's Fork of the Columbia river and their tributaries. Its greatest length from north to

south is 410 miles, its width on the southern boundary being 257 miles, with a northern boundary of 40 miles. The climate, on account of its high northern latitude and elevation from 2,000 to 5,000 feet above the level of the sea, is colder during the winter than in Utah and Nevada on the south. The severe cold is, however, confined to the uplands and mountains, where snows fall to considerable depth. On the uplands and lower ranges of mountains, however, the winters are generally less severe than in northern Iowa, Wisconsin, or central Minnesota, the air being much dryer than east of the Mississippi, and an equal degree of low temperature of the atmosphere is less uncomfortable in the mountains of Idaho than in the eastern States.

The sheltered valleys of the St. Joseph, Clearwater, Payette, Boise, and some other streams have comparatively mild climate, horses, cattle, and sheep being able to subsist at all seasons upon the natural pasturage existing there, as it does in nearly every other valley in the Territory.

During summer and autumn the atmosphere is most delightful, the days being warm but not sultry, and the nights refreshingly cool. The annual average of heat and cold in the western part of the Territory is much the same as in central Illinois, Indiana, Ohio, and in southern Pennsylvania, while the eastern portion more nearly resembles the climate of northern Massachusetts, southern Vermont, and New Hampshire.

In reference to the precipitation of moisture or annual rain fall, Idaho belongs to the extensive range in the United States, designated as the dry region or dry plains, having the Sierra Nevada and Cascade mountains for its western boundary, and for its eastern limit an irregular and defined line near the 97th or 100th degree of longitude west of Greenwich, extending from the northern to the southern boundary of the United States, embracing Dakota, Montana, Idaho, and the eastern part of Washington Territory on the north; Arizona, New Mexico, and western Texas on the south, the western parts of Kansas and Nebraska, the whole of Colorado, Utah, and Nevada, and the eastern part of Oregon in the interior. Throughout this whole expanse of territory the quantity of water annually falling in rain, although varying considerably in different localities, hardly exceeds, perhaps it does not equal in any of the fertile and tillable valleys one-fourth the rain fall of the Atlantic States; and if the comparison is made with the lower valley of the Mississippi, or the Pacific coast of Oregon and Washington Territory, the disproportion will be greater.

About the source of the Clearwater, the Salmon, the Boise, and Snake rivers on the Bitter Root and Rocky mountains, the amount of rain and snow falling in the course of the year is very considerable, sufficient to furnish constant supply of water to the channels of these streams, while in western Idaho, in the lower valleys of the rivers the quantity is considerably less, and the climate as to humidity partaking of the character of eastern Oregon, the State of Nevada, and southwestern Arizona. Throughout the whole of the region characterized as "dry," it may be remarked that while agriculture is practicable, and is sometimes attended with satisfactory results without the aid of irrigation, permanent and general success can alone be secured by moisture artificially supplied.

The valleys of Idaho have soils of the most fertile character, and with irrigation as a stimulus to their productiveness, yield abundant crops of wheat, oats, barley, and the fruits and vegetables common to that latitude. The valleys of the Clearwater, Salmon, Payette, and Boise are large and well situated, and the facilities for irrigation generally fair, with an adequate supply of water. An extensive and beautiful valley is found on Wood river, in the southern part of the Territory, and the

bottom lands of the Weiser, the St. Joseph, and Cœur d'Alène are of excellent quality, the valleys being sheltered from winds and cold. Bottom lands of considerable extent are found on the shores of Lakes Cœur d'Alène and Pend d'Oreille in the northern part of the Territory, and numerous but small and productive valleys on the several tributaries of the rivers bearing the same names flowing into those lakes.

Snake river the principal affluent of the Columbia from the south, rises in the Bitter Root mountains, near Frémont's peak, in Wyoming Territory, about longitude 110° west from Greenwich, passing 450 miles through southern Idaho in a westerly serpentine course, when it turns abruptly to the north, forming the western boundary for a distance of over 150 miles, receiving as tributaries the Boise, Salmon, Clearwater, Nevada, McArthur's rivers, and numerous other small streams in Idaho and the Owyhee, Malheur, Burnt, Grande Ronde, and Powder rivers in Oregon, coming from the west, and finally flowing west into Washington Territory, uniting with the Columbia river, receiving as an affluent the Palouse river, in Washington Territory, flowing from the north. Snake river is navigable to Lewiston at the mouth of Clearwater river. A steamer was built on the river near Fort Boise, but navigation above Lewiston, owing to the swiftness of the current, is difficult, and sometimes dangerous.

The Shoshone falls, on Snake river, near the 115° of longitude, are two hundred yards wide, rivalling the great falls of Niagara, and forming one of the leading and striking objects of natural scenery in this Territory.

Few Territories are more copiously watered than Idaho. The highest ranges of the Rocky and Bitter Root mountains, lying on the eastern border of the Territory, are covered with snow most of the year, which, melting and descending to the valleys below, supplies the channels of the streams leading to the Columbia, and these are so numerous as to intersect every portion of this region.

The greater part of the valleys of Idaho are still unoccupied, although small settlements exist in most of them. As to the amount of irrigable land, the information is yet too meagre to enable us to determine the extent with accuracy.

The climate is admirably adapted to sheep and wool growing, which may be successfully conducted. Water power is abundant, and the largest manufacturing establishments can be maintained to advantage in manufacturing woollen goods or iron, of which ores of superior quality exist convenient to vast deposits of excellent coal.

When it is considered that the mineral deposits of Idaho are of sufficient importance to employ the energies and capital of a very large population for two generations to come, the advantages to accrue in the future from its water power, excellent iron ore and extensive coal beds, cannot fail to be appreciated.

On account of the heavy charges for freight upon every variety of iron machinery carried from the eastern States to the region of country west of the Rocky mountains, and the great amount required in all extensive mining regions, there is no branch of industry which is likely to yield larger returns for capital invested and properly directed energies than the manufacture of iron in its various stages and forms in that great range of country between the Sierras and Rocky mountains. Perhaps no locality possesses greater advantages in that respect than southern Idaho.

Snake river will furnish water power sufficient for all practical purposes, the neighboring mountains affording a supply of timber, coal

and iron ore of excellent quality, and in quantities sufficient to meet every demand.

The time is not far distant when railroad communication will connect this locality with Salt Lake City, also San Francisco and the mining communities between these points on the one side, and the Columbia river and Puget sound on the other. Although the quantity of irrigable land bears small proportion to the whole surface of the Territory, yet it should be remembered that in the oldest and best agricultural States the amount of cultivated soil is but a fraction of the whole. The statement may be made with safety, therefore, that 3,000,000 acres of land, properly irrigated and of a quality such as is usually found in the arable valleys of the mining States and Territories of the west, would, with good husbandry, produce at least as much grain, fruits, and vegetables, as were raised in the State of New York in 1860, according to the census reports. Whether that amount of land exists in Idaho, where irrigation is practicable with adequate supply of water, cannot at present be determined, but it is believed that the aggregate quantity is but little short of that stated, while its grazing facilities are ample for the support of a much larger number of horses, cattle, and sheep, than were found in 1860 in any of the original thirteen States. When these facts are considered, it will not be doubted that Idaho can support in comfort and prosperity, independent of her mines of the precious metals, a population of several millions of inhabitants.

Gold was first discovered in 1852, on the Pend d'Oreille river, although the first mining operations were in 1860, on the south fork of Clearwater river. The principal mines in Idaho are in the Boise basin, the Owyhee mines in the southwest, between the Owyhee and Snake rivers, the Salmon River mines and those on the south fork of the Clearwater. The product of the mines in 1864 was \$6,474,080; in 1865, \$6,581,440; in 1866, \$8,023,680; while the product in 1867 was about \$6,500,000. Many of the placer mines have become exhausted, while on the other hand the annual products of the vein mines have increased. Nearly all the quartz mines in the Territory are gold and silver bearing. The development of the quartz, or vein mines, will continue to be retarded until ready and cheap means of transportation are opened with the eastern States. We are not in possession of information sufficiently reliable to give a correct idea of the agricultural and mechanical products of Idaho.

Its present population is estimated at 25,000. Boise City, the capital, on the north bank of Boise river, 50 miles from its mouth, and 390 miles from Great Salt Lake City, is a thriving business place of 2,000 inhabitants.

Idaho City, 30 miles northeast of the capital, in a rich mining district, has a population of 3,000. Lewiston, at the head of navigation on Snake river, and 350 miles east of Portland, Oregon, contains a population of 2,000, and conducts an active trade with the interior, east and west. Pioneer City has a population of 2,000, and Silver City 1,600. Since our annual report of 1867, there have been 89 miles of standard, 618 miles of exterior, and 807 miles of subdivisional lines surveyed in Idaho, including an area of 255,111 acres, the subdivisional surveys being in the valley of Boise river.

During the next official year it is proposed to extend the public lines so as to include actual settlements, and to extend the exterior and standard lines to the mineral localities, in order to afford the necessary basis for the survey of mineral claims under the mining act of July 26, 1866, and for this purpose the surveyor general has estimated \$40,140,

which, in consideration of more urgent demands in other surveying districts, has been reduced to \$20,000.

The whole area of Idaho, covering 55,228,160 acres, is yet to be disposed of.

The surveying system to this end was inaugurated in 1867, the initial point being near $43^{\circ} 36'$ north latitude, and $116^{\circ} 8'$ longitude west from Greenwich, on a rocky butte 19 miles from Boise City in a south-westerly direction.

Pursuant to the acts of June 27 and July 26, 1866, two district land offices have been established—one at Boise City and the other at Lewiston—where there are local land officers prepared to receive applications for obtaining ultimate titles.

NEVADA.

Lying south of Idaho and extending westward is Nevada, one of the largest States in the Union, extending from north to south 483 miles, and east to west 323, containing an area of 112,090 square miles, or 71,737,600 acres. This State, forming a part of the great elevated plain lying between the Sierra Nevada and the Rocky mountains, has a general altitude of 4,000 feet above the level of the sea. This plateau is traversed by many ranges of mountains, having, for the most part, a northerly and southerly course, which, rising from 2,000 to 8,000 feet above the general level of the country, are separated from each other by valleys varying in width from 5 to 20 miles. There is remarkable uniformity in this alternation of mountains and valleys, although the valleys frequently spread out into broad plains, sometimes interspersed with buttes and rugged hills. The Sierra Nevadas, along the western and southwestern borders of the State, have an altitude of from 7,000 to 13,000 feet, and are covered with heavy forests, while the ranges in the interior of the State are sparsely timbered. The mountains are often intersected by ravines crossing their summits, forming passes with slopes so gradual as to materially lessen the difficulties in constructing wagon roads and railroads across them; some of these ravines are watered by streams flowing throughout the year, rendering feasible the irrigation of the strips of arable land which frequently, at the points where the cañons open into the valley, expand into tracts of sufficient extent for gardens and small farms. These lands, being enriched by the disintegrated rock and clay precipitated by descending currents, are exceedingly productive. The streams are often fringed with a growth of cottonwood, birch, and willow, generally small and of little use except as fuel. The valleys sometimes extend over a hundred miles without interruption, except an occasional butte or projecting spur, and frequently enlarge into vast plains, or unite with other valleys having nearly the same altitude; the entire system, owing to the level surface of dry compact sand, affording peculiar facilities for the construction of railroads.

While many rivers descend into the valleys there are few of any considerable size, owing doubtless to the fact that the mountain streams begin to diminish upon reaching the plains, and are soon lost in the porous soil. Where there is sufficient water to cause a stream to run through a valley above the surface, tracts of alluvial bottom occur at intervals, constituting good lands for ploughing or for meadows, the area of these tracts being usually governed by the size of the water-courses. Reese river, Umashaw, Carson, Paradise, and Franklin valleys are of this character. In many of these much of the soil abounds in elements of fertility and could be easily tilled, yet is unavailable because of aridity

and absence of the means of irrigation, difficulties which will disappear with the increase of an industrial population.

The open plains as well as the valleys are generally destitute of timber, except where they are watered by considerable streams, such as the Carson, Walker, Humboldt, and Truckee rivers, along which cottonwood and a few copses of willow are to be found.

The hill and mountain sides are covered with nutritious grasses, upon which the cattle thrive until the beginning of winter, when they resort to the plains and feed upon the sage, which bears a small black seed affording excellent food; stock requiring no prepared feed during the winter, and are suitable for beef the year round.

The rivers of Nevada, rising from springs or snow banks in the mountains, have no outlet to the sea, with the exception of some inconsiderable streams in the north and in the southeast corner, near the Colorado, and generally end in lakes and sinks or are absorbed by the earth. The principal rivers are the Humboldt, Walker, Carson, and Franklin, each ending in lakes bearing the same names, while the Truckee, flowing from Lake Tahoe, one-third of which is in Nevada, expands into Pyramid lake. Humboldt river, the largest in Nevada, takes a westerly course for 250 miles, then deflecting to the south it flows 50 miles farther, falling into Humboldt lake. This river, with an average width of 40 yards and depth of four feet, has a moderate current and is, at ordinary stages, fordable at many places. There is a narrow belt of alluvion along its immediate banks, expanding at some points into grassy bottoms of considerable extent. The Truckee, Carson, and Walker rivers do not, except in size, differ materially from the Humboldt. In Franklin, Degroot, and various other valleys there are small lakes and ponds, the waters of which are in some cases fresh and pellucid, while in others they are more or less impure. Surrounding these ponds, usually shallow, there are often considerable tracts of good agricultural and grazing land.

Lake Tahoe has a depth of over 1,500 feet, and, though more than 6,000 feet above the sea, never freezes, the temperature of the water remaining at nearly the same point throughout the year. This lake, as well as Pyramid, abounding in trout of large size and excellent flavor, is surrounded by mountains rising abruptly from its shores to a great height, and covered with snow eight months in the year. These mountains are clothed with vast forests of pine, spruce, and fir. Walker lake, like Pyramid, has an elevation of about 4,000 feet, and is flanked on both sides by rugged mountains and hills extremely arid and barren, being almost entirely destitute of wood, grass, or water. The other lakes have usually low flat shores, and the water of most of them is brackish or alkaline. The surface of some of the plains and valleys, consisting of stiff clay almost impervious to water, and being quite level or slightly basin-shaped, are, during the rainy season, converted into shallow lakes, often not more than a foot or two in depth. The name of mud lakes is commonly applied to them, owing to their miry condition, and they are generally impassable for teams or horsemen. On drying up a variety of salts of an alkaline nature are deposited, and the name of alkali flats is given them. There are numerous springs throughout Nevada, some occurring singly, but frequently hundreds are found grouped within an area of a few acres. While the waters of some of them are pure and cold, others are of various temperatures, ranging from 50° to 204°, the latter being the boiling point at this elevation. Many of these springs are strongly impregnated with minerals, and are resorted to by Indians for their reputed medicinal properties. There are also numerous salt beds which, like the alkali flats, are confined to the valleys and plains occupying the points of greatest

depression, and usually bordering or surrounded by alkali lands. They are doubtless derived from the evaporation of former inland seas and salt lakes. A large quantity of this salt is used in the mills and reduction works, and extensively ground for table purposes.

The Colorado river, formed by the union of Grand and Green rivers, in Colorado, is, with one exception, the largest river west of the Rocky mountains, and traverses an area of 300,000 square miles, constituting the southeastern boundary of Nevada for 75 miles below the head of navigation to Fort Yuma, 425 miles below which point it finds an outlet to the Pacific ocean through the Gulf of California. In 1857 and 1858 an engineer, under the direction of the War Department, explored this river, and in an elaborate report of the expedition especial notice is made of the fact that the Colorado affords an economical avenue for the transportation of supplies to the various military posts established in New Mexico and Utah, thus saving many miles of travel and presenting an easy access to a portion of the public domain hitherto deemed comparatively valueless, owing to the supposed sterility of the soil, the hostility of numerous Indian tribes, and other difficulties of communication incident to a region abounding in varied and peculiar natural obstructions. This important fact respecting the navigability of the river having been fully established, the question of the prosperity of this region is only one of time, especially since the extraordinary and accidental discovery of the unequalled and extensive mineral character of Nevada. The mining interest of the State continues to prosper. In some localities the yield has fully met the most sanguine expectations of the pioneer parties through whose industry and indefatigable energy new districts are constantly being developed as rich in precious metals. The world-renowned Comstock lode still yields nearly as much as at any former period, though the leading mines upon the lode have now reached such a great depth that the expense of raising ores to the surface and of draining the mines by means of steam pumps absorbs a very large percentage of the production; the yield in 1866, for example, being \$16,000,000, while the cost attending mining operations was \$15,500,000, leaving a net profit of but \$500,000. By an act of Congress, approved July 25, 1866, the right of way was granted to Mr. Adolph Sutro to construct a mining and draining tunnel intersecting the Comstock lode at a depth of 2,000 feet below the surface. The experience of mining districts in other countries fully justifies the impression that extraordinary benefits would accrue from the completion of this difficult work, by means of which a thorough ventilation of the mines would be secured and the immense expense of pumping be avoided, while the ores and debris from a number of mines could, by means of drifts connecting with the main tunnel, be removed at a comparatively small cost, thus leaving a larger margin for profit than the present method will allow. It has been estimated that the completion of the Sutro tunnel would increase the production of the mines upon the Comstock lode annually from \$16,000,000 to \$25,000,000, or even \$30,000,000. If this expectation be realized the United States will become the principal silver-producing country of the world, and, beyond a doubt, the problem, so interesting and profound in all its details, respecting the value and importance of this entire section of country to the federal Union, in her career of unequalled greatness, and the speedy development of her vast treasures, will be solved.

So rapid and unexpected have been the advances in obtaining information of a region but recently regarded as a barren waste of unprofitable desert, that we are led to expect that the remarkable results and advan-

tages already secured bear only a small ratio to those which are yet to be developed. We have also the decisive advantage of an outlet from the silver mines of Nevada to the Pacific ocean by means of the Colorado river, opening before us the prospect of controlling and regulating traffic with the eastern hemisphere, where silver has ever been deemed more desirable than gold, thus rendering the United States, as elsewhere more particularly shown, a leading competitor for, if not the mistress of, this valuable and extensive trade.

Notwithstanding the elevation of Nevada above the level of the sea the climate is comparatively mild, the summers not warmer than east of the Rocky mountains, and the winters less severe than in New England, but little snow falling except on the mountain ranges. In the northern and western part of the State there are slight rain falls from April to October, while occasional showers occur in the southern and eastern portions during the summer months. Considerable quantities of arable land exist at the bases of the mountain ranges, along the rivers, and upon the borders of the lakes. These lands, generally alluvial, are of great fertility, and where there is sufficient water for irrigation superior crops of wheat, barley, oats, hay, potatoes, and other vegetables, demonstrate the highly prolific character of the soil, and that by drainage and protection from overflow a large area would be rendered valuable for agriculture, and afford abundant fields of rich grasses.

Carson City is the capital of the State, and Virginia City, Aurora, Geneva, Austin, and Belmont are important towns.

During the last fiscal year the surveys have been confined principally to the establishment of standard and township lines in those portions of the State most desirable for agriculture, and where the largest settlements are located. The survey of the Humboldt and Reese rivers guide meridians has rendered it practicable to extend the township and subdivisional surveys to those portions of the valleys of these rivers most valuable for settlements without awaiting the gradual extension of the public lines.

The surveys during the present fiscal year will be prosecuted where lands are demanded for actual settlement, and along the route of the Pacific railroad, which is in operation as far as the Big Bend of the Truckee river, and is progressing eastward from that point at the rate of about two miles per day. As there is no grading to impede the progress of the work, this rapid rate of construction will no doubt be maintained until the mountains west of Salt lake are reached, and even this portion will probably be ready for the rails by the time the track reaches the mountains. With the increasing railroad facilities settlements are rapidly advancing and villages are springing into existence as if by magic giving every evidence of thrifty enterprise.

By the act of Congress, approved June 8, 1868, "to provide for giving effect to the various grants of public lands to the State of Nevada," a new principle as to that State has been introduced into our land system. By the first section of that act Nevada "is authorized to select the alternate even-numbered sections within the limits of any railroad grant in said State in satisfaction, in whole or in part, of the several grants made in the acts of Congress," approved March 2, 1861, "organizing the Territory of Nevada," March 21, 1864, "admitting the State of Nevada into the Union," and July 4, 1866, "concerning lands granted to Nevada." The grants referred to in the foregoing acts of Congress are the following. The 500,000 acre grant under the 8th section of the act of September 4, 1841, for internal improvements, appropriated "by the constitution of Nevada to educational purposes," and confirmed by the 1st section of the

act of Congress approved July 4, 1866, the agricultural college grant of 90,000 acres, being 30,000 acres for each senator and representative in Congress, by act of July 2, 1862, and supplements thereto, and diverted by the 3d section of said act of July 4, 1866, "from the teaching of agriculture and the mechanic arts to that of the theory and practice of mining," the grant of 72 sections for a seminary of learning, the concession of 20 sections for State prison, and 20 sections for public buildings, of indemnity in other lands where the 16th and 36th sections in each township have been sold or otherwise disposed of.

It was stipulated in the provisos of this first section of the act "that this privilege shall not extend to lands upon which there may be rightful claims under the pre-emption or homestead laws, and that lands may be selected, the minimum price of which is \$2 50 per acre; each acre selected shall be taken by the State in satisfaction of two acres, the minimum price of which is \$1 25 per acre," and that the lands granted in the 8th and 9th sections of said act of March 2, 1864, admitting Nevada into the Union, being donations for public buildings and State prison, "shall be selected within four years from the passage of the act of June 8, 1868," and the period for the selection of said lands is thereby so extended. The 2d section of said act refers to the agricultural law of July 2, 1862, and its supplements, and provides that selections "shall be made in the same manner and of the same character of lands as may be selected in satisfaction of the other grants referred to in the first section of the act." But this act does not authorize the selection of lands valuable for mines of gold, silver, quicksilver, or copper. It thus appears that agricultural college selections, which, by the original act of July 2, 1862, and supplements thereto, were restricted to lands which had been offered at public sale, and thus made subject to *ordinary private entry*, may now, under the provisions of this section of the law, be made by the State of Nevada, of unoffered lands. Instructions have accordingly been despatched under date of August 25, 1868, to the district land officers at Carson City, Nevada, to give effect to the provisions of this act of July 8, 1868. There are yet undisposed of in Nevada 67,085,697 acres.

UTAH.

The next political division on the east is Utah. This Territory, which is bounded on the north by Idaho and Wyoming, on the east by Colorado, south by Arizona, and west by Nevada, embraces an area of 84,476 square miles, or 54,065,075 acres, being as large as the whole of New England and nearly twice the area of the State of Tennessee. It was formed out of the public domain acquired from Mexico by treaty of 1848, and was organized by statute approved September 9, 1850. Its limits were subsequently reduced by act of March 2, 1861, creating the Territory of Nevada, and by the laws of July 14, 1862, and May 5, 1866, each adding one degree of longitude to Nevada; it was further diminished by the act of 25th July, 1868, which detached from Utah a tract north of the 41st and east of the 111th degree of longitude from Greenwich, and made said tract a part of the new Territory of Wyoming. The Wasatch mountains intersect it from northeast to southwest, dividing it into two unequal parts; that west of the range being the smaller, and included within the "Great Basin," the eastern division forming part of the basin drained by the Colorado of the West. The general elevation of its valleys and lakes is from 4,000 to 6,000 feet above the level of the sea. The mountain ranges, traversing its surface, rise from 2,000 to 7,000 feet above the adjacent valleys, the highest peaks being

covered with snow throughout the year. West of the Wasatch mountains there are many saline and fresh-water lakes, without any visible outlet, fed by rivers and streams formed by the melting of the mountain snow. The largest of these is Great Salt lake, in the northwestern part of the Territory, 100 miles in length from southeast to northwest, and 50 miles wide. Its waters are the purest natural brine anywhere to be found, and are so salt that no fish can live in them, holding in solution 25 per cent. of common salt. It is fed by the Weber, the Bear, the Jordan, and other rivers rising in the Wasatch mountains. The surface is diversified with several islands.

Lake Utah lies 45 miles south from Great Salt lake. It is about 3 miles long and 10 wide, of pure fresh water, abounding in fish, principally speckled trout of great size and exquisite flavor. Numerous streams empty into it, some of which are considerable rivers, as the Timpanagos, Provo, and Spanish Fork. The outlet of the lake is through the river Jordan, flowing into Great Salt lake, and forms the connecting strait between these waters. Other lakes, as Sevier, Little Salt and Fish lake, exist further to the south, and Preuss on the western boundary, all lying west of the Wasatch mountains. This section of the Territory partakes of the character of the "Great Interior Basin," being an alternation of mountain ranges and intervening sandy plains, its rivers either emptying into lakes having no visible outlet to the sea, or being absorbed by the thirsty sands. The plains are generally sterile for want of moisture, except in the narrow valleys bordering on the rivers in the neighborhood of springs, and along the bases of the mountains, in the narrow belts watered by the mountain streams before they sink into the sand. The rivers of the Great Basin are comparatively few, and seldom of great length. Their volume of water is usually small, sometimes flowing above ground, at others hid beneath the sand. East of the Wasatch the country is an extensive elevated plain, drained by the Green and the Grand rivers and their many tributaries. Although more copiously watered than the western part, the streams of this portion generally course their way through deep cañons, mountain gorges or between the ranges of precipitous hills, and, with exceptions here and there, fail to form valleys of tillable lands. These exceptions are found on the Colorado, after the junction of the Green and the Grand, on the Rio San Juan, an eastern tributary of the Colorado, and on many of the smaller affluents of the Green, forming in the aggregate a considerable amount of irrigable land, though small when compared with the large scope of country drained by these streams within the limits of Utah. Nearly the whole of this region, however, is excellent grazing land, particularly adapted to wool-growing, and large flocks of sheep of the finest eastern breeds are kept here, and are said to thrive well, and to have rendered this branch of industry a complete success. The valleys yield an abundant supply of pasturage during the winter, and when the snow disappears from the mountains the flocks find ample support on the indigenous bunch grass, which bears its seed in summer, furnishing forage equal, it is said, in its nutritive qualities to oats or corn. In Utah, as in other of the mountain regions, there are numerous springs, cold, warm, and hot. Some discharge a strong brine, others are sulphurous, and some chalybeate. The waters of many of these springs are equal in their medicinal qualities to the most celebrated springs of the eastern States. For summer bathing the water of Great Salt lake is pronounced by competent judges superior to that of the ocean, being a stronger brine, and remarkably pure, clear, and transparent. The climate of Utah, like that of much of the territory west of the 100th

meridian, may be denominated dry, the rain-fall being much less than in the Mississippi valley, or on the Atlantic or Pacific coast. Between April and October rain seldom falls, irrigation being necessary to successful farming. From October to April showers are frequent and often heavy, and an abundant snow-fall occurs in the mountains, the melting of which during the following spring and summer furnishes an unfailing supply of water feeding the streams and lakes. In the valleys the winters are mild, and with little snow. If severe weather occasionally occurs it is of short duration, and is neither so cold nor so long continued as in Iowa, northern Illinois, in New York, or the New England States. In the mountains the cold is more severe, but is seldom of long continuance. In summer the days are warm and the nights cool. Spring opens about the first of May, and cold weather in the valleys rarely sets in before November or December. Spring and autumn, although mild, are subject to frequent changes.

This Territory was first settled in 1847 by the Mormons. These settlers have founded thriving towns and villages, and opened flourishing farms and ranches. With systematic perseverance and energy they have undertaken the work of irrigation, which has been crowned with success. By individual effort, by the combined efforts of adjoining occupants, or by the aid of the whole community residing in a particular locality, the work of cutting and building canals and reservoirs has been prosecuted until a network of irrigating canals extends through the whole line of settlements, and the fruitful waters of the lakes, and of the streams that pour down the mountains, are carried over farms into gardens, towns, and villages. The soil of the valleys is chiefly formed from the disintegration of the feldspar rock, mixed with the detritus of the limestone, of which the mountains are principally composed, and is therefore of the very highest fertility, and under the stimulus of constant moisture in the proper quantity, such as irrigation alone can supply, produces astonishing crops, such as cannot be realized upon the most productive lands where artificial irrigation is not practiced. Wheat, oats, and barley are raised in this way in large quantities in Utah, and 50 and 60 bushels to the acre is represented as a common crop; over 90 bushels of wheat having been raised upon a single acre, and $3\frac{1}{2}$ acres of land in the vicinity of Great Salt lake produced 180 bushels of wheat from a single bushel of seed. Wheat, barley, and oats succeed equally well, but the nights as a general thing are too cool for corn, except in the southwestern part in the valley of the Rio Virgen, where corn, sorghum, and cotton thrive remarkably well, and are raised in large quantities. Potatoes, hops, garden vegetables, melons of all kinds, strawberries, raspberries, currants, gooseberries, apples, pears, plums, cherries, peaches, apricots, and other fruits are successful, large quantities of dried peaches being sent to the mining regions of Idaho, Montana, and elsewhere.

The success attending the efforts of the Mormon emigrants in Utah establishes the fact of the productiveness of the mountain valleys of the west, their adaptation to the cultivation of grains, vegetables, and fruits, the profitableness of husbandry in the mining regions, the feasibility of an extensive system of irrigation being introduced by a community of industrious settlers without the aid of a heavy capital, and the great advantage of settling these new Territories by colonies united together for the purpose of mutual protection.

The first settlement in Utah was made by 143 Mormons, who laid out the city of Great Salt Lake in 1847. They were soon followed by others in equally large numbers; each new settlement at a remote point was made by a small colony of from 50 to 150 persons, embracing a due pro-

portion of mechanics of the various handicrafts called for in a new settlement. By that policy they have, in a great degree, escaped the inconveniences encountered by other pioneers, having been remarkably exempt from Indian difficulties, and having achieved success in material development. The settlements extend along the western base of the Wasatch mountains, from the northern to the southern boundary, for a distance of more than 300 miles, and wherever along this alluvial belt sufficient water can be obtained for irrigation farms are opened, canals are dug to convey the water that it may be properly distributed, and the business of farming successfully prosecuted. This belt varies in width at different points, sometimes expanding to 8 and 10 miles, as along the Jordan, in the vicinity of Salt Lake City, and at others contracting to a mile or less, the amount of arable land depending in a great measure upon the supply of water. The great want of the Territory is water. As the chief reliance for this during the summer is upon the melting of the mountain snow, it is found only at the bases of mountains of sufficient elevation to rise to the snow line. But many of the mountains of Utah rise but a few hundred feet above the valleys and are but seldom covered with snow, and the water furnished from this source in such cases is unimportant. Whether the supply can be greatly increased by artesian wells is a matter not yet sufficiently tested, but from the number of springs found in the Territory, both hot and cold, as well as from its geological formation, there is reason to believe that efforts in that direction will prove successful in many localities. It is supposed that the increased vegetation and shade brought about by the cultivation now in progress will produce an increased quantity of rain, it being even contended that such a result has been already attained, and that the moisture of recent years is considerably greater than at the commencement of the settlements.

As a circumstance lending countenance to this theory, the fact is mentioned that at all seasons of the year, even in midsummer, showers are frequent on the mountains, following the belts of timber in every direction, while the treeless plains lying at their bases, less than a score of miles distant, are dry and parched. Mountains of greater altitude are constantly covered with snow, and these circumstances of the existence of snow on the highest peaks, and the occurrence of frequent showers on the less elevated and wooded ranges, are claimed as evidence of sufficient moisture in the atmosphere, and that the dryness of the plains is dependent alone upon causes affecting its precipitation.

It may be accepted as true that, from the sinking of artesian wells, the construction of a more extensive system of canals and reservoirs, and tapping the numerous smaller lakes lying high up among the mountains, as well as from an augmented amount of moisture due to increasing vegetation and shade, the available supply of water in Utah will increase from year to year and lead to a gradual enlargement of its arable area. The most important settlements east of the Wasatch range are perhaps those on the Rio Virgen and the Colorado, near the southern boundary, where large crops of cotton of excellent quality are successfully cultivated. Other settlements exist on the head-waters of the Green river, where grazing and wool-growing are largely conducted.

Extensive forests of pine and fir are on the mountains. The river bottoms produce willow, box-elder, birch, cottonwood, spruce, and dwarf ash. Hard wood is deficient, but large plantations have been made of it by the Mormon settlers, which are represented as growing finely, promising an adequate supply in the future.

There are already in this new Territory three cotton mills for the manufacture of cotton raised in the southern settlements into cotton yarns,

one mill for the manufacture of woollen goods, about 100 flouring mills, and probably half that number of saw-mills, besides establishments for the manufacture of agricultural implements, boots and shoes, steam engines, leather, dye-stuffs, furniture, cutlery, hardware, jewelry, and brushes. There are also distilleries and breweries, where beer is made from wild hops. Iron ore and coal are abundant; several furnaces are in operation. Experiments in raising flax, the mulberry tree, and the silk-worm have proved successful.

Great Salt Lake City, the capital of the Territory, is situated in the valley of the Jordan, west of the Wasatch range, 15 miles south of Great Salt lake. It is regularly laid out into blocks of 10 acres each, and these into lots of one acre and a quarter each, on which stands the residence of the proprietor, surrounded by fruit and ornamental trees, and having a vegetable garden. Only in the business portion of the city are the lots further subdivided. The streets are 128 feet wide, and running brooks brought from the neighboring mountain course their way down the paved gutters of each, supplying water for household purposes, irrigating the trees and gardens and imparting coolness and freshness in summer.

The city occupies an area of nine square miles. Every block is surrounded with beautiful shade trees, and every residence has its orchard of apple, peach, apricot, plum, and cherry trees, and the whole site has the appearance of one continued orchard. Its population is 18,000. It is one of the most beautifully laid-out cities, and its central location between the Mississippi and the Pacific ocean, being on the line of the Pacific railroad, with its many other advantages, will secure a rapid increase to its population, and at no distant day swell the number to 100,000. There are probabilities of the city becoming the radiating point of other railroads; one leading down the valley of Snake river to the Columbia, thence to Portland, to Puget sound, and the Pacific ocean; another through Utah and Arizona to the Gulf of California or San Diego bay. Other important towns have been laid out in the Territory. Ogden City, on the Weber river, east of Great Salt lake, and Provo, on a river of the same name, in Utah valley, each contain a population of about 3,000. Brigham, Springville, Manti, and Washington, each containing about 1,000, with others nearly equally large, are found in the valleys skirting the Wasatch range to the southern boundary. Each has its irrigated gardens, its flourishing young orchards, and its beautiful shade trees.

Valuable tracts, either for grazing or farming purposes, remain unoccupied. Among the advantages of a settlement here, aside from centrality of position, may be mentioned the existence of flouring mills, manufacturing establishments, shops, stores, and markets in every important locality, with supplies of horses, mules, and improved breeds of cattle, sheep and hogs, thus furnishing many facilities to emigrants not found in less populous sections.

The population of this Territory in 1850 was 11,380, and in 1860 it had increased to 40,273, while at the present time it is estimated at 120,000.

In 1866 the crops produced in this Territory are reported in acres as follows: wheat, 51,932; barley, 14,639; oats, 4,816; corn, 7,218; sorghum, 1,831; potatoes, 4,311; carrots, 797; beets, 367; cotton, 276; meadowland, 36,853; apples, 693; peaches, 1,029; grapes, 108; and currants, 150.

The crop of wheat for 1867 amounted to 47,561 acres; barley, 6,289; oats, 1,847; corn, 7,920; sorghum, 1,817; potatoes, 6,225; carrots, 387; beets, 284; cotton, 166; meadow, 29,876; apples, 906; peaches, 1,011; and currants, 195.

In 1866 the average yield per acre was, wheat, 22 bushels; barley, 28

bushels; oats, 32 bushels; corn, 24 bushels; potatoes, 122 bushels; carrots, 431 bushels; beets, 367 bushels; cotton, 80 pounds; apples, 5 bushels; peaches, 303 bushels; grapes, 806 pounds; currants, 77 bushels and gooseberries, 420 bushels. The average yield of the crops in 1867 was less than that of 1866, the crops having been more or less damaged by the grasshoppers. There is also a falling off in the amount of grain planted in 1867, which is attributed to Indian hostilities in the southern part of the Territory. The value of the products of 1866 is estimated at \$4,500,000, while that of 1867 is put down at \$3,300,000. In 1867 there were 93,799 acres irrigated here. The number of acres in cultivation in 1866 was 134,000, supposed to be about one third of the land susceptible of irrigation.

The estimated value of the real and personal property in Utah is \$12,000,000.

The amount of capital invested in manufactures is estimated as follows: Woollen mills, \$200,000; cotton mills, \$100,000; lumber trade, \$400,000; flouring mills, \$700,000; leather, \$200,000; alcohol, \$30,000. There are 137 cities and towns in the Territory, eight of which have a population exceeding 3,000 each.

The Union Pacific railroad, now in course of construction from the east and west, will traverse the Territory north of Great Salt Lake City, uniting by rail the Atlantic and Pacific oceans, and connecting with the railroad system of the United States.

Surveying operations were inaugurated in Utah in the year 1855 and continued to 1857. During that time 2,425,239 acres were surveyed. In the fiscal year ending June 30, 1867, an area of 92,637 acres was surveyed, as authorized by the act of May 5, 1854, (Statutes, vol. 13, p. 63), such area being vacated Indian reservations, increasing the quantity of surveyed lands in the Territory to 2,517,912 acres. The act of Congress approved July 16, 1868, erects Utah into a surveying district, and also provides for the establishment of a district land office for the disposal of the public domain. The Secretary of the Interior under said act has directed that the surveyor general's office, and also that of the register and receiver, shall be located at Great Salt Lake City. No lands have been disposed of as yet in Utah, there having been no land district created by law prior to said act of 1868. The newly appointed surveyor general has been instructed to obtain possession of the original evidences of surveys in the custody of the surveyor general at Denver, Colorado, to whose surveying district Utah was formerly attached. Instructions have been given by this office to the surveyor general to make arrangements for making contracts to the extent of the means—\$20,000—appropriated by the act of July 20, 1868; the region of surveying operations including actual settlements.

It is expected that before the close of the next fiscal year the Union Pacific railroad will be completed through Utah, and in order that selections may be made of the lands inuring to the railroad company under congressional enactment it will be necessary to extend the public lines within the limits of the grant. For this purpose, as well as the extension of standard and township lines, to facilitate the survey of mineral tracts in various portions of this surveying district, the sum of \$10,000 has been estimated during the fiscal year ending June 30, 1870.

ARIZONA.

The next Territory on the south is Arizona, carved out of the domain acquired from Mexico by the treaties of 1848 and 1853. It was organized by the act of February 24, 1863, having Sonora, a Mexican

state, on the south, the Territory of New Mexico on the east, Utah on the north, and on the west the States of California and Nevada. As originally organized it embraced an area of 126,141 square miles, but by the law of May 5, 1866, a portion of it in the northwest was added to Nevada, decreasing the area of Arizona to 113,916 square miles, or 72,906,240 acres—a surface nearly three times as large as the State of New York, and larger than the four States of New York, Pennsylvania, New Jersey, and Maryland. The Colorado of the West, flowing in a southwesterly direction, forms 250 miles of its western boundary, and with Little Colorado, Bill Williams Fork, and Gila river drain the whole of this Territory. The Gila river rises in the mountains of New Mexico, and flowing westward 450 miles to the Colorado, receives as tributaries from the north the Rio Natroso, Rio Prieto, Rio Bonito, San Carlos, Rio Salado, and Massayampa rivers, and from the south the Rio San Pedro and Santa Cruz and Rio de Sanz. The Little Colorado river, an affluent of the Colorado of the West, rises in the White mountains of eastern Arizona, about the 34th parallel of latitude, flowing northwestwardly 400 miles, receiving the waters of Zuni river, the Rio Puerco of the West, and numerous smaller streams.

Bill Williams Fork has its source in the Aquarius mountains, in the northwestern part of the Territory, and flowing south unites with the Rio Santa Marie, running thence from their junction west to the Colorado.

The Colorado of the West, elsewhere referred to in this report, is the largest stream with one exception flowing into the Pacific ocean. The basin of this remarkable river, embracing 3,000 square miles, includes the southwestern part of Wyoming, the western portion of Colorado and New Mexico, the eastern part of Utah, southern Nevada, the whole of Arizona, and southeastern California. Like the Nile of Egypt, it is subject to an annual overflow, caused, however, by the melting snow on the mountain ranges in its course; its waters, after rising from 20 to 50 feet above the ordinary level, fertilizing numerous valleys found on its banks, and furnishing facilities for an extensive system of irrigation, and for reclaiming and rendering productive millions of acres of land now inarable. A part of its course is through deep cañons and mountain clefts with no arable soil. At other points the mountains recede from the river and the valley expands into wide bottoms, embracing many thousand acres of fertile soil, and capable of being greatly enlarged by a proper system of canals for conducting the water to lands not now reached by the annual floods. The Colorado desert on both sides of the river, in California and Arizona, embracing several million acres, being much lower than the bed of the river, is susceptible of irrigation, by which means at least six millions of acres of the highest fertility might be added to the productive area of our domain.

The great valley of the Colorado lies between the Chocolate and Monument mountains, and is over one hundred miles in length, with an average width of six miles. The fertile valley of the Mohave Indians lies north of the Mohave range. Between that range on the north and the Black Cañon, the Cottonwood, and Eldorado valley, the Colorado has not been sufficiently explored to furnish information of much value. A large valley producing excellent grass lies between the Black mountains and the Cerbeat range east of the river. These valleys are partially watered by the annual overflow of the river, and vast belts of land now useless, standing back from the river to the mountains, might be fertilized by irrigation.

The Mogollon and Aztec mountains traverse the central portion of the Territory in a northeast and southwesterly direction.

The San Francisco and Bill Williams mountains lie further to the north and west, while the Pinaleon and Chi-ri-ca-hui ranges are situated in the south and east. Numerous spurs and ranges branch off in every direction, constituting the interior an elevated mountain plain through which the rivers cut their way often in deep and rugged gorges and precipitous cañons.

While the timber of Arizona is neither so valuable nor abundant as that west of the Cascade and Sierras, it is represented as being in the aggregate fully sufficient to meet the demands for fuel, mining purposes, and building material for at least the present generation or until forests are reared; and although in some localities it is deficient in quality and quantity, in others it is excellent and abundant. In the vicinity of the San Francisco mountain an extensive forest of heavy timber exists covering an area 100 miles square, the Douglas spruce and several varieties of pine and cedar attaining a height of 200 feet and with four feet diameter.

The "Black Forest" on the head-waters of Bill Williams fork covers a large area with timber of superior quality.

Valuable forests of pine and cedar of vast extent cover the Mogollon and Pinaleon mountains, while the head-waters of the Rio Verde, Rio Salado, and Gila rivers each afford a large area of fine timber land. In addition to the varieties of timber already noted, the ash, elm, larch, sycamore, walnut, nut pine, and mesquite are found, principally in the valleys, affording a large supply of building material and fuel of good quality.

One of the finest regions in Arizona is that of the valley of the Santa Cruz, west of San Pedro, extending into the Mexican State of Sonora on the south, being 100 miles in length, following the windings of the river. This valley is wider than San Pedro, the soil equally fertile, and the timber quite as abundant and valuable. Both these streams afford constant supply of water, while the hills and mountains on either side are covered with luxuriant growth of nutritious grass, green throughout the year.

Large quantities of excellent land are on the Gila, San Carlos, Salado, Bill Williams fork, San Francisco, Little Colorado, and its tributary streams.

Much of this is good arable land and all excellent for grazing.

It is estimated that there are at least 5,000,000 acres in this Territory susceptible of irrigation, while the grazing lands are estimated at 55,000,000 acres, the residue, 12,906,304 acres, covered in part by permanent bodies of water or consisting of an inarable plain and rough and broken mountains.

The portion of our domain constituting Arizona and New Mexico was first visited, half a century after the discovery of the continent by Columbus, by Spanish explorers, and at the close of the 16th century the Jesuits had established missions and settlements in almost all the fertile valley of this portion of the continent. By the middle of the 17th century the whole region had been explored, and at the beginning of the 18th century the valley of the Santa Cruz, San Pedro, Colorado, Gila, Salinas, and Rio Verde, constituted a prosperous agricultural and mining region.

Throughout this whole extent of country the remains of former cultivation and evidences of civilization are to be found, ruins of ancient cities and cathedrals existing in many places, while traces of former irrigating canals occur in every direction, extending even into the densest part of the forest. These ruins attest the wealth and civilization of the Spanish settlers. They are represented as having cultivated

luxuriant crops of wheat, corn, beans, and melons, with various kinds of vegetables, and in many parts grapes and fruits of the semi-tropical regions, and as owning immense herds of horses, cattle, and sheep. Over 150 years ago civilization held sway over this region of the Apaches; beautiful villages and prosperous and happy homes dotted every valley. Settlements exist along the Colorado as high up as Callville, the head of navigation, a distance of 250 miles above Fort Yuma, in the valley of the Gila, Rio Santa Cruz, San Pedro, and along the international boundary. Prescott, containing 1,000 inhabitants, the present capital of the Territory, is situated in the interior at an altitude of 6,000 feet above the level of the sea. The central portion of this Territory is an elevated region; the winters are somewhat severe, yet the soil is rich, and, notwithstanding the early frosts, fine crops are produced; vegetables of nearly every kind grow luxuriantly.

During the summer months the heat is not oppressive, while the nights throughout the whole of Arizona are cool and refreshing at all seasons. In the southwestern part, along the Colorado and Gila, the heat of summer is intense, labor being suspended during the warm season except at high altitudes.

Snow seldom falls over a few inches in southern Arizona except at high altitudes.

The country comprises much larger agricultural extent than is generally supposed, while as a grazing country it has many peculiar advantages. The north and northeastern portions of Arizona, occupied by Indians, are comparatively unexplored. In the central, southern, and southeastern sections there are many beautiful valleys extending over miles of arable land of extraordinary fertility, producing wheat, barley, oats, tobacco, and beans; fruits, vegetables, cotton, and the sugar cane flourishing in the southern part, while the adjoining hills and mountain sides yield an abundant supply of nutritious grasses constituting some of the finest grazing lands in the United States. The remains of former civilization attest the fact that the grape can be grown here in great perfection, while the mulberry may also be raised in like luxuriance to southern California, the climate for silk culture being not less favorable than in that State. Vine culture and silk culture will yet be leading and important interests in this region. Agriculture must ever be an important and lucrative branch of industry there.

In point of mineral wealth Arizona may be considered as ranking among the first political divisions of the Union. Gold is found in almost every portion of the Territory, many of the mines being as attractive as any on the Pacific slope. Rich deposits of silver are also found in almost all portions of Arizona. The total yield of the gold and silver mines in 1867 is estimated at \$500,000, only about 500 persons having been engaged in mining. Besides these rich deposits, iron, principally as carbonates and oxides, occurs in many places. Tin, gypsum, nickel, platinum, cinnabar, and copper, have been discovered, while deposits of salt and coal of good quality occur in several places. Notwithstanding the existence of vast deposits of the various kinds of minerals, circumstances have retarded the settlement and development of the resources of Arizona.

The cause of great influx of immigration attracted to the Pacific coast, to Nevada, Idaho, Montana, and Colorado, was the rich mineral deposits formed in the placer mines, which could be worked with little skill and capital, yielding at the same time large returns. Arizona does not present such placer attractions, the mineral deposits being for the most part in veins or quartz mines, presenting inducements only to such

enterprise as is guided by skill, science, and capital, and to such a better field is anywhere to be found.

The Territory possesses no coast-line except the Colorado so far as it flows along the western border; as yet it is without railroads or other ready and cheap means of communication and transportation to the interior. Hence to a great extent the introduction of proper machinery is wanting for the development of the rich mines. In most instances such machinery brought here has been for the working of gold-bearing quartz lodes, while in many instances gold, silver, and copper are found in combination. Another cause retarding the prosperity of the Territory is found in the fact that it has been the theatre of Indian hostilities which, in early times, laid in ruins the flourishing Spanish settlements that existed there over 100 years ago. When these difficulties shall have been removed we may look with confidence for a settlement and development of the resources of Arizona.

The initial point of surveys in the country was established in 1866 at the mouth of Salt river, or Rio Salinas, an affluent of Gila river from the north, and 144 miles of exterior lines run, but Indian outbreaks suspended the field work.

By act of March 2, 1867, Arizona was attached to the surveying district of California, and during the last fiscal year the surveyor general has contracted for surveys east of the initial point in the valleys of the Rio Santa Cruz, Salinas, and Gila river to the extent of \$22,500, but returns not having been received we are not advised of the extent of surveys executed during the last fiscal year. Authority is given by act of 2d March, 1867, for a district office at Prescott. The quantity of public land to be disposed of is 72,906,304 acres.

CALIFORNIA.

Adjacent to the Territory just described is the State of California bounded on the north by Oregon, on the south by Lower California, on the east by Nevada and Arizona, and on the west by the Pacific, possessing a sea-coast line of 970 miles, extending through more than nine degrees of latitude, and embracing an area of 188,981 square miles, or 120,947,840 acres. There have been surveyed 30,408,426 acres of that surface from the introduction of the land system in the State up to and including the fiscal year ending June 30, 1868.

It is estimated that 40,000,000 acres are arable, 35,000,000 suitable for grazing, with 10,000,000 of arid surface, of which 9,000,000 may be irrigated and rendered productive, while at least 5,000,000 of tule, or overflowed lands, may be reclaimed, increasing the aggregate productive area of the State to 89,000,000 acres.

The lakes, rivers, bays, and other permanent bodies of water, are supposed to cover about 5,000,000 acres; the residue, being nearly 26,000,000 acres, consists of rugged, and, for the most part, heavily timbered mountains. In the aggregate this highly interesting country, embracing every kind of soil and climate, yields all the products of the temperate, and many of the semi-tropical and tropical regions.

Then, too, its world-renowned mineral wealth has not been overrated, neither in extent nor in variety of deposits. Its surface is rugged and broken, interspersed with hills, mountains, beautiful valleys, the Sierras constituting the prominent geographical and topographical features of the State.

The Coast range, which extends from the Columbia river through Oregon, and, as its name implies, traverses the western border of the State as far south as latitude 35°, passing through a tract of country

averaging 40 miles in width, while the Sierra Nevada range, which becomes the Cascades of Oregon and Washington, extends along the eastern border of the State as far south as latitude 35°. In that latitude the Sierras and Coast Range unite, forming what is known as the San Bernardino mountains, extending to the southern part of Upper California.

The Coast and Sierra Nevada constitute the principal series of mountains on the slope, differing remarkably from each other in their geological construction and conformation.

The Sierra Nevadas, forming two nearly straight lines of culminating peaks, extending from Mount Shasta, near the north boundary, in a southerly direction, a distance of about 500 miles, cover a region in width from 70 to 100 miles. The series of peaks in this grand mountain range attain an altitude of from 2,000 to 15,000 feet above the level of the ocean, towering high up into the regions of perpetual snow.

The remarkable continuity in the direction of the Sierra is nowhere to be observed in the Coast Range, the latter not being distinguished by any one line of dominant peaks, but forming one broad belt of mountains 40 miles wide, each mountain in the series appearing to be the result of peculiar local volcanic causes, the mineral composition widely different in the high mountains in close proximity.

Each of these grand divisions of mountain ranges embraces numerous separate groups and spurs of various altitudes, occupying an area of vast extent. In these mountains the eye beholds almost every variety of Alpine scenery; where, too, on every hand, the stupendous forces of the volcano and earthquake, of the crushing ponderous glaciers, and of the resistless flood, have each left unmistakable evidences of their power. The great central valley situated between the Sierra Nevada and Coast mountains, which unite near Mount Shasta, and again on the south near Tejon Pass, is 350 miles long, and 80 miles at the greatest width, this valley embracing one-third of the rich agricultural lands in the State.

It is watered from the north by the Sacramento, from the south by the San Joaquin, which unite and flow into the bay of San Francisco, forming the chief commercial arteries of the State, and affording ready and rapid means of transportation between the coast and all parts of the great valley.

It is singular that although California has nearly a thousand miles of sea coast, more than double that of any other State in the Union, it has only one navigable river, the Salinas, flowing into the ocean.

The great gold region is chiefly on the western slope of the Sierra Nevadas, in Mariposa, Tuolumne, Calaveras, Amador, El Dorado, Placer, Nevada, Sierra, Plumas, Yuba, and Butte counties, although the precious metal may be found in many localities in the San Bernardino range in the southern part of the State; also in the northern, in the vicinity of Mount Shasta, as well as in many parts of the Mount Diablo and Coast mountains, but generally the mines in these last mentioned localities are regarded as inconsiderable in comparison with the central gold-bearing region of the Sierras.

The immense deposits of gold scattered over so large an extent exist in every variety of location, and hence deep and shallow placer, tunnel, river, hydraulic, and vein or quartz mining are resorted to in collecting the treasure.

The returns of the county assessors for 1866 show 310 quartz mills in the State, while the present number is estimated at 500, running over 5,000 stamps, having been erected at a cost exceeding ten millions of dollars.

In 1848 about \$10,000,000 in value were taken from the mines, the

amount in 1853 having been increased to \$65,000,000, the largest yield of any one previous year.

The total yield of the mines in California from 1848 to 1866, is estimated at \$809,800,000; the yield of the State in 1866 being \$26,500,000 while that of 1867 has been estimated at \$25,000,000, increasing the aggregate yield of the mines of California alone, from 1848 to 1867, \$900,000,000. From these estimates it will appear that from the date of the gold discoveries of 1848, in this State, to 1853, the amount of ore taken was largely on the increase, from \$10,000,000 to \$65,000,000, while since that time the amount has decreased to an annual yield of about \$25,000,000 the product of 1867. This decrease is of course not all traceable to an exhaustion of the great rock deposits, the diminution in yield being entirely attributable to the failure to a great extent of the placers, while on the other hand all agree that the product of the quartz mines has steadily on the increase, their successful operation being regarded as just commenced.

Mining has now become a fixed pursuit, and is regulated by science, skill, and capital. Twenty years have elapsed since the discovery of gold in this region. The total product of the mines of the State, up to the close of 1867, is set down, as hereinbefore indicated, at \$900,000,000 and they are now yielding over 37 per cent. of the whole annual gold product of the world, and 10 per cent. more than Australia.

In 1866 there were 6,128 miles of mining ditch in the State, besides 617 irrigating ditches, watering 37,813 acres, costing, in the aggregate \$16,000,000. But the vast deposits of mineral found in the State are not confined to gold alone. Silver exists in considerable quantities mainly in conjunction with gold in the Sierra Nevadas, in Calaveras, El Dorado, and Shasta counties, and upon the island of Santa Catalina on the coast near the southern part of the State, where it occurs in large quantities as an argentiferous galena. It is understood that there are 22 mills and reduction establishments in California, some of them of large capacity, engaged in working silver ore. We have no reliable information in regard to the annual silver product of these mines, but are warranted in regarding it as an important and growing interest. Large deposits of iron ore, copper, borax, salt, and sulphur, are found in many parts of the State. Quicksilver exists in different places in the State, but only four mines have been worked to any extent. The product of these quicksilver mines for 1867 was 44,386 flasks, or 3,397,500 pounds. Of this 10,000 flasks were exported to China, and like amount to Mexico, 3,800 flasks to South America, leaving 15,533 flasks, or 1,253,274 pounds to be consumed in California and adjoining States and Territories.

Coal has been discovered in numerous localities, but only two mines are reported to us as having been successfully worked thus far, these being situated in the Mount Diablo range, near the San Joaquin river, in Contra Costa county. The amount of coal shipped from these mines in 1866 was 63,350 tons; in 1867, 109,490 tons. It is reported to be of good quality. Lead, tin, and zinc exist in many places, while some of the more rare and valuable minerals are met with, such as the agate, topaz, carnelian, and diamond. California, however, is not dependent upon precious and useful metals alone for her future wealth, prosperity, and greatness. Her unparalleled mineral wealth is not more remarkable than the mildness of the climate, compared with countries of equal altitude, combined with extraordinary fertility of the soil and marvelous beauty of scenery.

Wheat can be raised here with as great ease and profit as in any part

tion of the country. The crop for 1865 was estimated at 11,579,127 bushels; for 1866, at 14,080,752 bushels; and for 1867, at 15,000,000 bushels, while that of 1868, it is supposed, will largely exceed that of any previous year. The exports of wheat for 1867 to various ports of the world, principally to Great Britain, amounted to 7,765,475 bushels. There are 90 water-power and 67 steam flouring mills in the State, carrying 346 run of stone capable of producing per day 15,000 barrels of flour, the total cost of construction being \$3,000,000. In 1866 there were 74 steam and 65 water-power flouring mills, with 299 run of stone. During the year 1866 there were 324,353 barrels of flour exported, valued at \$1,870,000, and in 1867 the exports amounted to 519,309 barrels, valued at \$3,200,000.

Oats succeed admirably, the average crop being 30 bushels per acre. The crop of 1866 was 48,583 acres, yielding 1,864,379 bushels; in 1867 it was 2,000,000 bushels, nearly all of which was required for home consumption. In addition to this large quantities are cut green, and cured like hay. Barley is one of the most certain crops grown in this region. The yield is 32 bushels per acre. The crop of 1866 was equal to 11,605,992 bushels; that of 1867 amounting to 10,000,000 bushels, of which 142,150 bushels were exported.

The potato crop of 1866, all kinds, was 1,993,068 bushels; that of 1867 being 2,000,000 bushels. The potato, in all parts of the State, is of mammoth growth.

On account of the dryness of the climate during the summer months, and the cool nights, rye, buckwheat, and Indian corn have not been so generally successful, nor has the culture of tobacco, tea, and cotton been extensive; yet it is believed when the country shall have been thoroughly irrigated all these important staples will succeed. Chicory and mustard seed grow luxuriantly with little cost or labor. Apples, pears, peaches, plums, cherries, nectarines, and quinces, grow with entire success in every part of the State, while in the south oranges, lemons, bananas, almonds, olives, pomegranates, and white walnuts are raised in great perfection.

All kinds of berries are produced in abundance in every part of California. Strawberries appear in the San Francisco markets every month in the year. Raspberries and blackberries last about four months, beginning in June. It has been estimated that in consequence of the high price of labor and transportation one-half of the fruits of the State are not taken to market. Large quantities of the various kinds of fruits are dried in recent years, which will soon become an important interest. The value of dried fruits cured annually is estimated at \$500,000, and that of the preserved and pickled fruits and vegetables at \$650,000. It is conceded that all fruits and vegetables grown here attain dimensions greater than in almost any other country; nor do these mammoth proportions render the fruit less delicious. The diseases and insects destructive of varieties of fruits and vegetables in the States east of the Mississippi river are almost unknown in this region.

Vine culture is destined to become one of the leading branches of industry, it having already assumed prominence, placing California in this respect far in advance of any other State, and with fair prospect of rivalling the great grape-growing regions of Europe. The peculiarity of climate and remarkable fertility of the soil seem especially adapted to the culture of the grape and the manufacture of the various kinds of wine.

The localities best adapted to vine culture are along the Coast Range, principally in Sonoma and Napa counties, north of the San Francisco

bay, where the white and red wines, hock, claret, Sauterne, and other varieties are found.

In the southern part of the State, principally in the vicinity of Los Angeles, the port, white, and other varieties of sweet wines are produced, and on the foot-hills of the Sierra Nevadas, including the great gold-bearing region—Tuolumne, Butte, El Dorado, Calaveras, Amador, and other counties—dry wines are made, such as port, Teneriffe, Madeira sherry, and other varieties. There may be found in cultivation all varieties of grapes produced in the United States, besides many of the finer varieties grown in Europe, but by far the largest portion now in cultivation consists of the native grape found near Los Angeles.

The California wines have a peculiar flavor, although they resemble those of Spain, Greece, and Cape Constantia rather than of France, Italy, Germany, or those produced in other parts of this country. Thus far attention has been paid to the imitation of foreign wines, and it is believed that until producers endeavor to produce new kinds of wines the excellence with which nature has enriched the grape of this peculiar climate will not be fully realized.

The vintage of 1866 amounted to 2,500,000 gallons of wine, with 150,000 gallons of brandy; that of 1867 is estimated at from 3,500,000 to over 4,000,000 gallons of wine and 4,000,000 gallons of brandy, while the product of the crop of 1868, it is expected, will be largely in excess of any previous years. These estimates do not include the vast quantities of raisins cured every year. The number of vines now growing in the State has been estimated at 40,000,000, covering 45,000 acres, averaging 900 vines per acre.

The grapes seldom mildew or become storm-stripped, which is often the cause of the failure of crops. Vines planted on the foot-hills and higher altitudes have proved most successful.

The returns of the county assessors show other crops of 1866, as follows: rye, 34,093 bushels; corn, 749,201 bushels; buckwheat, 9,823 bushels; peas, 91,350 bushels; peanuts, 181,850 bushels; beans, 242,213 bushels; castor beans, 35,600 bushels; onions, 53,786 bushels; and sweet potatoes, 158,465 bushels; hay, 358,584 tons; beets, 13,251 tons; turnips, 25,619 tons; hops, 200,912 pounds; tobacco, 63,017 pounds; honey, 382,492 pounds. The same returns indicate the number of fruit trees in cultivation to be: apple trees, 1,694,986; peach, 1,088,038; pear, 482,477; plum, 234,280; cherry, 53,249; quince, 42,345; apricot, 68,315; fig, 47,847; lemon, 3,029; orange, 11,284; olive, 12,881; prune, 3,692; almond, 28,640; and walnut, 17,271; also 283,975 gooseberry bushes; 1,551,081 raspberry, and 21,975,550 strawberry vines.

An experience of 12 years has demonstrated the fact that silk culture is an entire success. The mulberry tree flourishes here with a luxuriance known to no other locality. The number in cultivation in 1866 was 14,395, growing in every section of the State. The white cocoon worm of Japan and the yellow of China have proved well adapted to the climate of California. The dryness of the atmosphere, its freedom from explosive electricity during the season of feeding and hatching the worms and securing the cocoons, thriftiness, and the almost entire absence of all insects, are circumstances rendering California quite as favorable for the prosecution of this pleasant, important, and profitable branch of industry as any other silk-growing country.

The cocoons of the State are larger than those of other silk-producing countries. Extensive orders for healthy eggs are constantly being received from France, Italy, and Mexico, a fact likely to retard the immediate manufacture of silk here, as the disposal of eggs to supply foreign

demands is found to be more remunerative than the manufacture of the fabric. We are not in possession of reliable data as to the present extent of this branch of industry, but in 1866 there were 296 pounds of silk cocoons produced, and the product of 1867 is said to have been much larger. Two large silk factories are in operation. Premiums are offered by the State for mulberry trees planted and for cocoons, in order to encourage silk culture and make it a fixed branch of industry.

Owing to the high wages, all kinds of labor-saving machinery are being employed in the various branches of industry. Extensive importations of the various kinds of machinery are annually made in addition to the vast amount manufactured in the State.

Grazing has become a very important interest. It is estimated there are about 600,000 head of cattle, many of them being of imported stock, while the number of horses exceeds 200,000. In 1866 there were 189,907 horses, 21,310 mules, 1,969 asses, 150,195 cows, 78,305 calves, 14,150 oxen, and 188,352 cattle in the State. There are 1,200 dairies in the State, with each from 50 to 150 cows. The stock is mostly a cross of the imported and Mexican. The production of butter for 1867 amounted to 6,000,000 pounds, in addition to 3,000,000 pounds of cheese. The imports of both these articles for that year were less than one-half of 1866. The product of 1866 was 4,449,835 pounds of butter and 2,110,058 pounds of cheese.

With the exception of Australia, California is the finest sheep and wool-growing region of the globe. The mildness of the climate is such as to afford excellent pasture during the whole year. Sheep here are kept with trifling cost and little care—thrive well, yielding large returns for the capital invested. Much attention has been paid to the improvement of the stock. The quality of the wool is about half merino. There were 2,000,000 sheep in the State in 1867, and the wool product for that year is estimated at 9,000,000 pounds, while in 1866 the product was 5,184,826 pounds. At the present time the number of sheep is over 3,000,000 head, to 1,346,749 in 1866. There are extensive cotton and woollen factories, consuming annually a large amount of the wool grown in the State, as well as that imported from other countries. Prior to 1859 the entire wool clip was shipped abroad.

There are but two cotton factories in the State, which consumed in 1866 110,000 pounds of cotton, and in 1867 the amount exceeded 140,000 pounds. Both these factories were put in operation since 1865. The cotton crop has only amounted to a few bales annually. That used in these factories is shipped from the Atlantic coast, Mexico, the Society islands, and other foreign ports.

The flora of this great region, while in many instances bearing general resemblance to corresponding types and *genera* found elsewhere, is here marked with strong individual peculiarities, presenting in some instances examples entirely original. The reason of this is found, perhaps, in the fact that this most interesting region is bounded by the ocean on the west, while the lofty mountains and depressed plains and deserts separate it, on the south and east, from other regions, so that the flora found here is purely indigenous and its condition normal. It is a curious fact, worthy of note, that experiments have demonstrated that in many of the *genera* found here their peculiarities have become so inherent that, although planted under the most favorable circumstances, in foreign localities they do not thrive, while, in other instances, some species grow luxuriantly in foreign soils and climates. On the other hand, it is no less remarkable that there is scarcely a species that may not be grown in some part of this vast country with some degree of perfection and in the open air.

Nowhere within such a space is the range so broad within which the products of the vegetable kingdom are capable of arriving at so early and such great perfection. In this respect California may well be said to embrace all the climatic zones. There are here only about 1,800 different species of the flora which have been collected and known to science of these five per cent. are new to science and 11 per cent. new to California.

In the State at from 10,000 to 11,000 feet above the level of the sea the forest growth ceases. The number of varieties of forest trees here does not exceed 50, exclusive of the shrubs north of the latitude of Golden Gate.

The mammoth or big trees, the largest species of flora known in the world, consist of several groves and some isolated trees, being found on the western slope of the Sierra Nevadas, between latitude $35^{\circ} 30'$ and $38^{\circ} 30'$, three groves being in Mariposa county, one in Calaveras, one in Tuolumne; and the isolated trees scattered over Tulare county. The largest of these remarkable giants of the forest attained a height of 450 feet, having a diameter of about 40 feet. The next species in point of size, yet ranking first in commercial value, are the California redwood and sugar pine, the former found exclusively on the coast between latitude 36° and 40° , in the foggy regions underlaid with metamorphic sandstone, while the latter is in northern California, often at high altitudes. Both of these species frequently attain a height of 300 feet.

The arbor vitae grows in the San Diego mountains, and the Douglas spruce in the Sierra Nevada, attaining a height of 300 feet.

The yellow pine found in Russian River valley grows 225 feet in height and ten feet in diameter, while the California white cedar, in the northern part of the State, and Sabine pine, in the southern, attain a height of 150 feet. Besides these, there are five other species which grow 100 feet high, eight varieties 75 feet, and a large number of less proportion. There are larger varieties of grasses here, but few suitable for hay.

Wild flowers grow in the greatest profusion and with remarkable luxuriance. Most of the species found differ from the same genera in other countries. Each month brings forth its own variety, the largest portion of the species being deficient in fragrant properties.

The lumbering trade stands foremost among other leading interests. During the year 1866 there were in operation in the State 180 steam and 160 water-power saw-mills. Since that time the number has been largely increased. In 1866, the product of the lumber trade was 188,938,644 feet of lumber, and 38,427,000 shingles, and during the year 1867, the amount of lumber cut was near 200,000,000 feet. The amount of lumber shipped to San Francisco in 1866 amounted to 85,000,000 feet of pine, 500,000,000 feet of redwood lumber, 22,000,000 laths, and 25,000,000 shingles, besides considerable quantities of spruce and cedar lumber.

The receipts for 1867 are estimated much larger than for 1866, but less than is estimated for the present year. The commercial metropolis of California is San Francisco, containing a population of 150,000 situated upon a narrow peninsula between a bay bearing the same name and the Pacific ocean, fronting upon the former, which is a spacious inland sea connected with the ocean by the Golden Gate, being studded with islands and surrounded by undulating hills, covered with the richest and most varied herbage, beyond which are seen the magnificent summits of the Mount Diablo and Coast ranges of mountains overlooking the lower hills, the bay and the city. The bay of San Francisco is one of the most beautiful and commodious harbors in the world, and would afford safe

anchorage within its waters for the combined navies of Europe and America.

Other important cities are Sacramento, the capital of the State, with a population of 17,500; San José, 7,000; Oakland, 7,000; Stockton, 5,000; Benicia, 4,000; Los Angeles, 4,000; Vallejo, 3,000; Santa Cruz, 2,500; Nevada City, 2,000; Placerville, 2,000; Petaluma, 1,500; and Napa, 1,200.

The population of California in 1850 was 92,597; in 1860 it was increased to 305,439, while according to semi-official enumeration in 1867, it stood at 550,000, and may now be stated at 600,000.

The first railroad in the State went into operation January 1, 1856; there are now about 615 miles in operation, with a number of roads projected and in course of construction.

The exports of treasure and merchandise for 1867 are estimated as follows:

Merchandise \$22,465,903; treasure \$41,676,492. In 1866, the export of treasure was \$44,364,394, and of merchandise \$17,303,018.

The manufactures of the State are estimated at \$30,000,000 per annum. The value of a few of the leading staples of the State produced in 1866, including wheat, barley, oats, hay, butter, cheese, wool, wine, potatoes, peanuts, and beans, is estimated at \$27,913,818, over \$400,000 more than the estimated value of the gold product for that year.

The assessed value of real and personal property here, in 1866, was \$200,764,135; for 1867 it was put down at \$221,000,000.

Within the limits of this land of treasure, in soil and metals, the United States have about 104,500,000 acres subject to disposal, in quantities in from 40-acre tracts, in legal subdivisions, to any extent which individual interest may desire.

OREGON.

Next north of California is the State of Oregon, having a surface of 95,274 square miles, or 60,975,360 acres, equal to the aggregate area of Arkansas, Mississippi, and Alabama. Since the last annual report the lines of survey have been run over 1,113,802 acres, increasing the surveyed area of the State to 7,258,438 acres.

The surveys in the past fiscal year have been principally in the north-eastern part of Oregon, on both sides of the Blue mountains. They have also been extended in the Klamath Lake country and north along the eastern slope of the Cascades; also, in Coquille, Smith's, Yaquina, and Salitz River valleys; the greater portion of the Willamette valley having already been surveyed.

The larger part of this valley, valuable for agriculture, is the broad rolling prairie on both sides of the Willamette, that river traversing the centre of the valley, in a serpentine course, 125 miles, the valley having an area of 2,000,000 acres.

The river is skirted with an almost unbroken line of forest, from one-eighth to a half mile in width, consisting of fir, ash, maple, cottonwood, and alder, affording an adequate supply of timber. The banks of the river are elevated in many places, presenting beautiful sites for cities, where already there are a number of flourishing towns and villages. The soil of this valley is very rich and deep, bedded upon foundation of clay and hard gravel, so well adapted to the preservation of the elements of fertility.

With even moderate expenditure of labor this beautiful valley will grow successfully the field, orchard, and garden products common to the temperate regions, such as wheat, rye, oats, barley, maize, hay, buckwheat, potatoes, broom corn, sorghum, peas, and beans; of the garden, turnips, squashes, onions, carrots, cabbages, melons, tomatoes, parsnips, cucumbers, gourds; and of the orchard, peaches, apples, pears, plums, cherries, apricots, quinces, and the several kinds of berries—many of these of mammoth growth are of superior quality and flavor, and in their yield equal the richest countries of the globe.

These plains are bordered by mixed prairie and woodland, hills and valleys extending up to the foot hills of the mountains, comprising an area equal to that of the plains. A large proportion of this hilly country is farming land, but its main characteristic is grazing, and in that respect it will become one of the finest regions on the Pacific.

The Umpqua valley embraces an area of 900,000 acres, the general characteristics and products being the same as the hill country of the Willamette.

The Rogue River valley is rather larger in area than the Umpqua. Agricultural pursuits are conducted in this valley with more science, skill, and success than in any portion of the State. Every variety of crop here succeeds, it being better protected from the summer sea breezes than the Umpqua, and hence all fruits and vegetables mature earlier than in the Willamette. Grape culture in this region has received attention, and experiments have demonstrated the adaptation of the climate over a large surface to this important branch of industry. Some of the most valuable varieties of the grape have produced quantities of wine favorably comparing with the product of any locality.

That portion of the State bordering on the Columbia, between the Cascades and the Blue mountains, embracing the valley of the Deschutes, John Day's, Umatilla, and Walla-Walla rivers, comprises fine agricultural territory, yet broken and uneven with cañons, benches, and table lands the hills being clothed with luxuriant growths of excellent grass. The agricultural portion of this region is found to be superior, producing large yields of small grains, fruits, and vegetables of superior varieties. This locality has advantages as to market and business, on account of its contiguity to the navigable waters of the Columbia on the east and south to the mining regions. The productions are similar to those of other parts of the State. Two million acres have been surveyed in this region.

The Klamath Lake country and the southern part of Oregon, including the valley of the Owyhee, comprise varieties of surface and soil with some fine agricultural territory, yet for the most part is a grazing country. The valleys and plains are principally prairie, producing good growth of grass, while the uplands and mountain ridges, traversing the country in almost all directions, produce juniper and pine timber.

There are but few settlements in this locality in consequence of the hostility of the Indians. Hence its excellent capacity has never been fully tested.

The surveys in this region embrace 240,000 acres at the lower end of Klamath lake, and in the valley of Sprague river 275,000 acres.

The northeastern portion of the State from the mouth of the Owyhee to the Oregon-Washington line, and between the Snake river and Blue mountains, embraces the valleys of Malheur, Powder, Burnt, and Grand Ronde rivers.

The Grand Ronde valley, nearly circular in form, is of many miles in extent; the soil rich, and a large portion available for agriculture.

Fir, hemlock, and pine are on the northern and western rim of the valley, in quantities sufficient for all time for economical purposes. Eighty-five thousand acres have been surveyed on the Grand Ronde and its tributaries. In the Powder River valley may be found extensive agricultural plains, while the spurs of the Blue mountains to the west afford ample timber supply.

The products of these valleys are like those of other portions of Oregon, although it is reported that maize, melons, and most varieties of garden products succeed better here than in other parts of the State.

Besides the valleys mentioned and many others of less extent, there is, in this region, a broken country of hills, ridges, table lands, and long spurs running eastward from the Blue mountains to the Snake river, which here flows through deep cañons—the ridges and spurs forming divides between the several streams. In this section, the timber along the water-courses is cottonwood, yet pine and juniper are found on the mountain spurs and ridges.

The Coast Range extends from the Columbia south to San Francisco, and is covered with immense quantities of the sugar, white, yellow, and nut pine; also, with the red, black, yellow, noble and western balsam fir, myrtle, and other varieties, all of extraordinary size and symmetrical form, producing some of the finest timber, for most purposes, to be found in any country.

Looking eastward, the next are the Cascades, extending through Washington, Oregon, and California—in the last-named known as the Sierra Nevada. This range, like the Coast mountains, is covered in most places with immense forests of gigantic timber. The Blue mountains form the range occupying, with its numerous spurs, the whole of northeastern Oregon and the southwestern part of Washington, the spurs forming the divides between the streams flowing into Snake river.

The Umpqua mountains constitute the divide between the waters of the Umpqua and those of Rogue river, whilst the Calapooia range separates the Willamette and Umpqua rivers, flowing into the Pacific. The Siskiyou mountains extend from east to west.

All of these mountains are covered with forests having dense undergrowth of hazel, elder, alder, dogwood, myrtle, ash, maple, and willow, together with other products and grasses, all bearing evidence of the moisture and great fertility of the soil.

The hill country generally occupies a position between the great plains on both sides of the rivers and the mountain ranges. Above this lie immense and often impenetrable forests coextensive with the mountain ranges, and in some localities encroaching upon the lower lands of the hills and valleys.

There are large tracts in the vicinity of the snow-capped peaks, along the most elevated dividing ridges, and deep, rugged cañons in the mountain ranges which remain uninhabited. But distributed through other portions of these vast ranges of forests and mountain land are immense level tracts fit for cultivation. On some of the streams large valleys and plains occur, while upon the smaller creeks and branches are wide benches, valley coves, basins, and table land, covering often hundreds and even thousands of acres which will be found accessible and become the localities of prosperous farms yielding large returns.

The soil and climate of the agricultural portion of Oregon are well adapted to the culture of all the cereals, fruits and vegetables found in northern latitudes. The staple products are wheat, rye, oats, barley, potatoes, apples, peaches, plums, pears, cherries, and all kinds of the

smaller fruits and vegetables. Experiments in the culture of tobacco, hemp, hops, and onions have been eminently successful.

The present area of the State under cultivation is 400,000 acres. The yield of wheat in 1867 was 3,500,000 bushels; oats, 2,000,000 bushels; corn, 80,000 bushels; rye, 5,000 bushels; tobacco, 90,000 pounds; hay, 60,000 tons; potatoes, 300,000 barrels; onions, 100,000 bushels. Large quantities of wheat and flour are annually exported, generally to San Francisco. A number of flouring mills are in the State, some among the finest in the country.

The grazing among the most prominent interests has assumed large proportions. The amount of live stock in the State in 1867 was estimated at 90,000 horses, 3,000 mules, 1,600,000 beef cattle, 150,000 hogs, and 375,000 sheep.

The wool clip of 1866 was valued at \$300,000, and the product of the dairy was estimated at 2,000,000 pounds butter, and of cheese 75,000 pounds. The annual export of apples was 250,000 bushels.

The mineral resources of the State are not fully developed, and although not so great as those of the surrounding members, the veins are yet extensive and valuable, the deposits distributed throughout the State consisting of gold, silver, iron, copper, lead, and coal, or lignite. The most important interest here yet discovered is the vast deposit of iron ore, the principal mine being in the vicinity of St. Helens, in the northwestern part of Oregon. Placer gold mines have been successfully worked for the past 17 years in the southwestern portion west of the Cascades, and in the streams in the Blue mountains in the northeast, from which several millions have been taken. Gold-bearing quartz lodes have been discovered in different localities, but no decisive effort has been made for their development. The placers, like those of other localities, become exhausted, and others are discovered and worked, so that it is probable that this kind of mining will be carried on for some time to come. The present annual gold product is not much in excess of \$2,000,000.

Gypsum and granite are found in several localities, and salt springs of large capacity.

The population may not at this time exceed 100,000.

Salem, the capital, with 4,000 inhabitants, is beautifully situated on the east bank of the Willamette river.

Portland, the most important city in Oregon, and rapidly increasing in wealth and prosperity, is advantageously situated on the west bank of the Willamette, 12 miles from its mouth, containing a population of 8,000 or 10,000.

The other places of importance on the Willamette river are Oswego, Oregon City, Corvallis, Albany, and Eugene City, each containing from 1,000 to 3,000 inhabitants. On the Columbia river, Astoria, Dalles, and Umatilla are places of note, and contain populations of from 1,000 to 2,500.

The quantity of land which has been disposed of by the government is 6,457,346 acres, leaving the title still in the United States to 52,518,014 acres, of which over 809,000 acres have been surveyed. There is a fine field in this noble State for well-directed enterprise and industry in agricultural and grazing pursuits.

It is proposed during the next fiscal year to extend the surveys along the Oregon central military road, to facilitate the selection of tracts inuring to the company under congressional grant; also in the northeastern portion of the State, east of the Blue mountains, so as to include settlements and facilitate mineral survey under the mining act of July 26, 1866.

The surveying department has estimated \$49,400 for the Oregon surveys, but in view of the requirements of other districts this office has reduced the estimate to \$40,000.

Three land offices are established in this State, at Oregon City, Roseburg, and Le Grande, for the reception of applications to obtain title to the public lands in this growing State of the Union, which is destined to occupy important relations in agricultural, in mineral, and in timber wealth, and in a commercial point of view to the trade of the east.

WASHINGTON.

Immediately adjacent to the State last described is situated the Territory of Washington, the northern line of which constitutes a part of the boundary between the United States and the British possessions.

This remote political member of the Union, north of the State of Oregon, south of the 49° latitude, bounded on the west by the Pacific ocean and east by Idaho, embraces an area of 44,796,160 acres, of which, since the beginning of operations to the 30th of June, 1868, there have been surveyed 4,451,472 acres. The returns since the last annual report include surveys of 571,434.20 acres.

The lines extended during the last fiscal year have been mainly east of the Cascade range of mountains in the southern part of the Territory, on the Columbia river, near the Great Bend, and in the valley of the Yakama river, an affluent of the Columbia from the west, the surveys being north and east of the Yakama Indian reservation.

The Cascade range of mountains extending through the Territory from north to south divides it into two unequal parts, materially differing from each other in topography, climate, soil, and natural productions.

The Columbia river and its numerous tributaries water the portion of the Territory east of the Cascade range, those tributaries often flowing through cañons with perpendicular walls in height from 500 to 2,000 feet.

The northeastern portion of the Territory north of Spokane river, including the great basin of the Columbia, embracing an area of 40,000 square miles, has a general altitude of from 1,000 to 2,000 feet above the level of the ocean, and is surrounded on all sides by mountains.

The formation is basaltic, generally irregular, covered with soil of varied depth, of light grayish yellow, in many localities strongly impregnated with alkaline matter, which crystallizes upon the surface by evaporation during the dry season, remaining as an efflorescence.

The soil is so light as to be often moved by the atmospheric currents, but supports a heavy growth of bunch grass, and will produce the cereals in abundance where moisture is retained long enough to mature them.

The country south of this and east of the Cascades is one vast unbroken prairie, save the upper slopes of the mountains, which are in general densely covered with evergreens, the margins of streams being fringed with such timber as the cottonwood, alder, willow, ash, and other varieties.

The surface is high, rolling, and irregular, in many places bearing evidence of powerful glacial action. Wherever this has taken place the process of decomposition has not yet supplied the loss of the earlier soil, hence the appearance of bunch grass less vigorous in its growth, and the bunches at greater intervals than in those localities where no such action has taken place, while the vegetation is found more luxuriant and abundant upon the immense heaps of soil which, for many miles, have been scraped from the underlying rocks, and carried for a considerable distance by the force of the moving sea of ice, and deposited in great ridges, often 400 feet high and a mile or more in length, resembling, in

the distance, huge oblong stacks of hay. East of the Cascades the country is generally unoccupied, settlements being limited to the several excellent valleys, as the Walla-Walla, Columbia, Colville, and Palouse.

In all these valleys, except Palouse, there is a considerable quantity of land surveyed, which is admirably adapted to stock raising, and destined to feed countless flocks of sheep, horses, and cattle, and the climate being more arid and elevated than that west of the Cascades, is even better adapted to sheep and wool-growing than the western portion of the Territory. The country between the Cascade range and the Columbia river is high and rolling, interspersed with fertile valleys. Large tracts of arable land are found in the valley of the Yakama river; and the Satass, Topenish, Atahnam, Nahchuss, and Simcoe rivers, tributaries draining an area of nearly 5,000 square miles, or about equal to that of the States of Connecticut and Delaware, present an inviting field to the agriculturist and stock raiser.

The climate of the eastern portion of Washington Territory is generally clear and cold in winter, dry and hot in summer, and in temperature not unlike southern Ohio and Pennsylvania, as shown by meteorological observations, although this region is much further north than those States.

The valley of the Columbia is chiefly a grazing region. The bunch grass, which everywhere exists in this part of the country in the greatest abundance, is rich and nutritious above all other grasses, retaining its nutritive qualities long after being dried up by the heat and drought. This peculiar species of vegetation affords sustenance to thousands of horses, sheep, and other cattle, and is justly called the glory of the vegetable kingdom in that region.

The productions of this immense range of country include wheat, oats, barley, maize, potatoes, melons, with fruits and vegetables of the temperate zone. The crops are abundant and of excellent quality in those localities where sufficient moisture is retained in the soil, during the dry season, to mature vegetation.

During the last year there were shipped down the Columbia to different ports large quantities of wheat and flour, the growth and manufacture of the few hundred people now in the valley of the Walla-Walla river, where the foot hills of the Blue mountains are found sufficiently moist for cultivation, yielding abundant returns for the labor of the husbandman.

East of the Cascades, and throughout the great plains of the Columbia, the winters are generally clear and cold, the snow, which falls early in the season, covering the ground until spring. As spring showers are not generally considerable, the summer and early autumn are dry. The formation being basaltic, the melting snows and early spring rains pervade the loose soil, sinking into the deep perpendicular fissures of the basalt, leaving the surface dry during part of the summer and autumn. It is in consequence of this formation of the country that springs and small streams, so often met with in other formations where the strata horizontal, are rare.

The annual freshets in the Columbia river and some of its largest affluents are attributable more to the melting snows than the spring rains, and hence those freshets generally occur about the middle of June. North of the Spokane river, in the hilly country, the climate is delightful, showers of rain occurring until the middle of July.

The western portion of the Territory, extending from the summit of the Cascades to the Pacific ocean, is divided into three basins, the Columbia, Chehalis, and Puget sound, embracing an aggregate area of 28,000 square miles.

The valley of Puget sound includes an extent of 12,000 square miles, the soil along the water courses being very fertile.

The straits of San Juan de Fuca constitute a fine entrance from the ocean, and Puget sound extends inland 180 miles. Those straits have a continuous line of sea coast 1,600 miles, free from obstruction, with water deep enough for the largest shipping, constituting one of the most remarkable series of straits, inlets, channels, bays, canals, and harbors to be found anywhere in the United States, or perhaps in the world. This basin, with an area of 12,000 square miles, embraces land valuable for agricultural and grazing purposes, nearly every portion of which affords the readiest facilities for transportation. There are also bordering upon Puget sound and Admiralty Inlet extensive forests of timber, suitable for ship-building and all domestic purposes. The quality of lumber in this locality is rapidly growing in favor on all parts of the Pacific coast. This region, in view of its fine agricultural and grazing capacity, valuable timber, and fine navigable waters, is destined to command an extensive commerce. Even at this time trade is important, results showing that 1,143 vessels of all grades arrived there during the past year, of which 222 were engaged in foreign trade.

The bottoms along the Columbia are generally high and broken, but the soil, being a mixture of clay and loam, is well adapted to the production of grasses. The river bottoms are low and generally subject to overflow at the annual rise of the Columbia. The basin of the Chehalis river embraces 2,000 square miles, and is one of the finest bodies of land in the Territory, the most of which has been surveyed. In this region, indeed, are found some of the most prosperous settlements.

Little is known of the country between the Olympic mountains north of Gray's Harbor, except that it is an elevated region between 20 and 30 miles wide, heavily timbered, watered by numerous fine streams rising in the mountains, and flowing directly to the ocean. Some of these streams afford the finest salmon on the Pacific coast. The fisheries of this Territory are destined to become of great importance. Salmon, cod, halibut, and other fish of the finest kind are taken from its coast, and in quantities to meet the demands of a most extensive trade.

The two seasons of this region are wet and dry, the latter continuing from November to May, and the former from May to November. The presence of southerly winds during the winter months materially modifies the climate, giving it higher temperature as compared with other portions of this continent.

In the valley of Puget sound there is only a difference of 24 degrees between the mean temperature in summer and in winter.

At Portland, Maine, the average temperature during the year is seven degrees colder than at a point in this Territory four degrees further north of that latitude.

In the past 12 years snow has fallen but in one instance to the depth of two feet west of the Cascades.

The principal places in this part of the Union are Olympia, the capital, Vancouver, Steilacoom and Seattle, the population of the Territory being estimated at 20,000, but is now much more on the increase than at any previous period. The real and personal property is valued at \$10,000,000, or \$500 for each man, woman, and child in the Territory.

Coal of excellent quality, in large quantities, is found in several localities and at accessible depths.

The leading exports of eastern Washington are live-stock, gold, wheat and flour; while those of western Washington are lumber, coal, piles, and spars.

The principal productive industries are agriculture, stock raising,

milling, ship-building, gold and coal mining, in each of which large returns are yielded to all well directed enterprises.

At the close of last fiscal year there were 41,565,717 acres of public lands undisposed of in this Territory.

It is proposed to extend the public lines in the valleys of the Columbia, Chehalis, Cowlitz, Willapah, Yakama, and Colville, for the purpose of accommodating actual settlements therein, and to that end the sum of over \$50,000 has been estimated by the surveyor general, yet reduced by this office to \$15,000.

ALASKA.

Proceeding five and a half degrees northward over British Columbia we reach Alaska, our new territory on the northwest coast of this continent, acquired from Russia by the treaty of March 30, 1867. It is known in our own legislation as Alaska, though in the Russian language the name is pronounced Alyaska.

By virtue of an act of Congress approved July 27, 1868, the laws of the United States relating to customs, commerce and navigation, were extended over that region, and provision made for the collection of national revenue.

In order that settlers, present and prospective, may enjoy privileges similar to those conceded to our people elsewhere in the public domain, it is recommended that the public land system be extended by Congress to that distant part of the republic. Through a want of full information, grave errors and misapprehensions have existed in regard to this Territory. It was assumed that as it occupied so high a latitude it had a climate so inhospitable and soil so ungenerous as to preclude the hope of support to a population accustomed to the comforts of the elder communities of the Union and to the amenities of civilization.

A few very obvious geographical facts may dissipate prejudice arising from the supposed extremely inhospitable character of the country in view of its high latitude. Its limits are $54^{\circ} 40'$ and 71° . The Scandinavian peninsula of Norway and Sweden extends from $55^{\circ} 20'$ to $71^{\circ} 12'$ with an area of 293,334 square miles, supporting a population of 6,000,000, or 20 to the square mile. In the absence of any contradictory facts we would be authorized, from the geographical relations subsisting between the two regions, to conclude that one can support a population fully as dense as the other. If so, Alaska with its 577,300 square miles will maintain a population nearly double that of the aforesaid peninsula. Scotland, extending from $54^{\circ} 38'$ to $58^{\circ} 40'$, almost the entire geographical zone of Alaska, upon an area of 31,324 square miles supported in ample comfort a population of 3,061,251 according to the census reports of 1861, or about 100 to the square mile. Both Scotland and Scandinavia are the homes of advanced civilizations, whence time and again have gone forth formidable forces, military, diplomatic, and commercial, to shape the destinies of Europe. Scotland enjoys a far more genial climate than that of Sweden and Norway, within the same latitude, from the fact that it feels the warming influence of the Gulf Stream, from which the Scandinavian peninsula is cut off by the intervening British islands.

The same advantage inures to Alaska from an analogous current of warm equatorial waters called by the Japanese *Kuro Sivo*, or Black Stream, and by navigators generally the Japan Current. This Pacific Gulf Stream flows through the China sea, opposite the island of Nippon: a branch called the Kamschatka Current runs through Behring's straits: whilst the main current, trending nearly northeast, strikes the North

American coast about midway between Vancouver and Sitka islands. The narrowness of Behring's straits admits of but feeble and so far imperceptible reactionary currents, and these necessarily deflected westward by the projecting Aleutian islands. Hence the ameliorating influence of the Japan current upon our coast climates is almost without abatement or discount.

These facts are re-enforced by the later developments of American climatology; the meteorological observations of the Russian authorities for a long term of years having been placed in the hands of Mr. Blodget, the American climatologist, he has been enabled to demonstrate the conclusion previously reached by analogy, that the northward deflection of isothermal lines upon the western coast of North America is fully equal to that of the European coast. Testimonies from reliable, intelligent, and scientific observers might be multiplied to sustain by actual facts these deductions of science.

These facts, then, give ground for the additional presumption, contradicted by no established facts, that Alaska assimilates more closely to Scotland than to the Scandinavian peninsula in its physical conditions, indicating very strongly its capacity, at least on the parallels south of 60°, to sustain a population of equal density. The probability is, on the whole, that several millions of people may in the progress of time and march of improvement yet find comfortable support upon this territory when once our American civilization in its main features shall have been there domesticated.

Recent reports of travel and the authentic statements of American officials have established the fact that the climate and soil of the lower portion of the Territory will admit of a very considerable agricultural production. It is not pretended that this comparative fertility of soil or mildness of climate extends to those northern regions approaching the frigid zone. There are, however, data from which it may be shown that the southeastern portion, separating British America from the Pacific ocean, the region in the vicinity of Prince William sound and Cook river, the peninsula of Alaska and most of the Aleutian and other islands, especially Baranof, Prince of Wales, Tchitchagof, Admiralty, Oonalaska, and Kodiak, contain lands sufficiently adapted to agriculture to support a large population, and a climate which would favorably compare with that of some of the most densely populated portions of Scotland or Sweden and Norway. It is not probable that the agricultural products of Alaska will soon attain such importance as to furnish any surplus for export, but the other resources of the country are likely to attract thither a population sufficiently large to place a premium upon such fruits, vegetables, and grains, as can there be successfully cultivated. In that view the land interests must attain to no inconsiderable magnitude, causing the disposal to settlers of such lands as are suitable for cultivation.

The quantity of arable territory in Alaska which can be disposed of to actual settlers under the land system of the United States has already been estimated, by high authority, at 20,000 square miles, or 12,800,000 acres, with the probability of exceeding rather than falling short of this estimate. This will secure, under the pre-emption and homestead laws, homes for more than 150,000 families, with profitable exclusive occupation in cultivating the soil. Besides these agricultural lands to be disposed of by the government, there will necessarily be many town and harbor sites, upon lands otherwise valueless, for the accommodation of the commercial and fishing interests, together with the large mineral tracts, known to exist in Alaska, possessing great wealth of ores of gold, silver, copper, iron, and coal.

The policy of the fur and fishing monopolies, which have so long maintained supreme control over this region under the Russian government, has been to discourage other branches of occupation and enterprise, for fear of diverting labor from the pursuits in which they were interested. This fact will readily afford reason not only for neglect of the mines, but for the uncultivated condition of the country, further than was necessary in raising the few vegetable products absolutely required for consumption as food by fishermen and trappers.

Even within the short period during which the American flag has floated over the country, inviting thither the enterprise, energy, and industry of our miners and other pioneers, results have been reached which serve to sustain the assertions of travellers and scientific explorers as to the value of its minerals and the capacity of much of the soil for the subsistence of a large population.

The reports of travellers agree as to the existence of extensive deposits of gold in the interior of Alaska, and in the early part of the past season miners were reported as realizing from two to seven dollars per day in the manipulation of mere placer detritus in the vicinity of the Stikine river. From the specimens obtained, it was current on the seacoast that these washings were but the indications of the existence of vast beds of ore in the further hills and mountains. The interest in these promises of wealth has been on the increase throughout the past year, and the influx of miners from the Pacific States has been constantly augmenting, while emigrants are said to have left the eastern States for the gold regions of Alaska, who have heretofore withstood the inducements presented by the mines of the Rocky mountains and the Sierra Nevada.

Prominent among the mineral deposits of Alaska are extensive beds of coal of excellent quality, generally bituminous, but often of the purest anthracite. These beds are found in many of the islands and near the seacoast on the main land, in close proximity to excellent harbors, thus promising our commerce convenient and inexhaustible coaling deposits in the North Pacific, an advantage which is magnified in view of the unequalled fisheries and the importance of the fur trade of that great region. Considering the ease with which the coal will be conveyed from the mines to the harbors on the coast, it is probable that it will soon become an important article of export.

Silver, copper, and iron, in considerable quantities, have been discovered in Alaska, but the mines of these metals have not yet been worked to any great extent. It is stated by some geologists that this is one of the most promising fields for iron on the continent, while superior copper ore is known to exist there in abundance.

The fisheries of the Territory are acknowledged to be the finest in the world; the supply of salmon, herring, halibut, and codfish, is apparently unlimited. Sturgeon, whitefish, and pike, abound in the rivers, while in the adjacent seas the whale-fishery is said to be attended with better success than in any other portion of the globe. In 1857, of the six or seven hundred American whalers of all descriptions, at least one-half embracing most of the larger craft, were employed in the North Pacific.

Although the fisheries were not absolutely closed to our countrymen by the Russian government prior to our acquisition of the territory and its adjacent waters, yet these efforts were crippled and this important industry circumscribed by the disadvantages under which they labored in consequence of, first, the denial of all right to construct curing and drying establishments on the coast or to find shelter in any Russian port, compelling them to go to San Francisco for shelter, for facilities in drying and curing their fish; and, second, of their liability of being deprived,

under the treaty of 1832, of even their limited privileges in these waters. But since their transfer to American sovereignty the free use of both land and sea, affording unaccustomed facilities for their labors, has attracted a large number of our fishermen. It may now be confidently assumed that these Alaska fisheries will soon rise to great importance, especially to our export trade.

The cod fisheries of the country are particularly promising. A large and valuable bank has been developed near Oonalaska, the fish being unsurpassed in size, richness, and delicacy, with superior facilities for drying on the island. Other extensive banks exist at different points in adjoining waters, and it is expected that these interests will soon gather a population rivalling that of Newfoundland and the Atlantic coast of Cape Cod.

The herring and halibut fisheries are large and important; but the salmon fishery is unrivalled in any part of the world, promising results of incalculable value. The salmon here are unequalled in flavor, size, and abundance. They frequent all the rivers emptying into the Pacific ocean, at certain seasons of the year perishing in such immense quantities from overcrowding as literally to defy description. The salmon of Alaska, unrivalled in other parts of the world, are found to improve in delicacy of flavor and texture on approaching the northern rivers.

The fur trade of the country has been heretofore the main source of its wealth and its most attractive industry. The profits of the late Russian Fur Company were enormous, even under a wasteful and injudicious system of operations. On the islands north of the Aleutian chain, it is reported that the Russian Fur Company have annually taken seal skins valued at \$540,000, an aggregate which, it is supposed, will expand to \$1,000,000 per annum, on the same hunting ground, under the auspices of American enterprise.

The Aleutian and other more southern islands, as well as the coast of the main land, are also frequented by immense numbers of seal. Here, also, may be obtained large quantities of the more valuable furs, such as the sea-otter, black fox, silver fox, sable, and ermine, promising great reward of persistent industry. In addition to those already enumerated, many other valuable furred animals abound in Alaska, making their pursuit very profitable at present prices. Of these, mention may be made of the beaver, lynx, marten, river or land otter, muskrat, mole, wolf, ursine seal, reindeer, and the black, brown, grizzly, and polar bears. The beaver is valuable, not only for its fur, but for its yielding the medicine called *castoreum*, a recognized remedy and a staple of commerce. Official Russian tables exhibit the collection of this article of *materia medica* to the amount of 7,122 sacks in the period of seven years, from the islands and shores of Alaska.

Among the staple products of this country it appears that ivory has been extensively collected for several years by the late Russian possessors. In the period of seven years the yield is stated to have been 1,490 *poods* of 36 pounds each. This ivory is valuable, and finds a ready sale for various manufactures.

Recent explorations have developed the existence in the vicinity of Kotzebue sound and the mouth of the Yukon of extensive deposits of fossil ivory, the same as that obtained in Siberia, of equal if not superior value and more easy of access. It is presumed that further research will reveal a supply of this material in the country sufficient to form the basis of a large commerce, as well as an extensive local manufacture, giving profitable employment to American capital and labor.

The forests of our new Territory are reported as being really magnificent, covering the lower hills and uplands with dense masses of pine, spruce, fir, hemlock, cedar, and other valuable timber, principally varieties of evergreens. Some of the trees attain a height of 150 feet, with diameter of over eight feet. Trees 100 feet high are mentioned by travellers as of frequent occurrence.

In connection with the fisheries, with the prospect of an extensive local commerce, and of increased facilities for trade with trans-Pacific nations calling into requisition the fine harbors, bays, and navigable streams of this country, these forests assume no inconsiderable importance for purposes of ship-building. Nay, it would not be unreasonable to augur that some of these now untenanted shores will eventually be settled with busy shipwrights, and resound with the bustle of this noble industry. The proximity of the splendid primeval forests of timber will afford great facilities for ship-building.

The hemlock-spruce, one of the varieties of trees which here abound, is especially valuable from the large quantities of tannic acid contained in its bark, an article extensively used in the arts and sciences, and in the manufacture of leather.

In some of the southern and eastern localities, such as Prince William sound, Garden island, in latitude $60^{\circ} 21'$, and at Sitka on Baranof island, the forests approach very near to the shore, whereas north of the peninsula of Alaska proper this proximity is found only at the heads of bays and sounds. Forests abound in the interior, and extend even within a short distance of the Arctic ocean. In certain localities, such as on the peninsula of Alaska, Kodiak and Oonalaska islands, and, in fact, most of the islands of the Aleutian group, there are but few trees, but their place is supplied by a superior quality of grass, quite adapted to the purpose of grazing. It is supposed that these localities would pasture large herds of cattle and sheep, and that the herding of these animals might thereby be made quite a profitable occupation, as they would require but very little housing during the entire year, the atmosphere of the north Pacific excluding many of the diseases so troublesome in different portions of our more southern territory. The name of Alaska itself signifies *the continent* or *great land*, and as such it must present a variety of climates, productions, soil, and local aspects. It is, of course, to be understood that the advantages and productiveness of the country before enumerated are not to be found in the bleak regions of the northern coast. It is, however, clear that in the southern parts they exist to an extent far greater than has been supposed. The principal rivers of Alaska are the Stikine, the outlet of one of the most valuable sections of British Columbia, Liard or Tumagain river, the Colville, the Finlay, Cook's river or inlet, the Alna or Copper river, the Knijek, the Sushitan, the Kouskovim, the Inland river, and the great Kwichpak or Yukon river, the Mississippi of the north, navigable for five or six months in the year for 500 miles from the ocean. The ice on the Yukon is reported as breaking about the 25th of May, and as not closing until late in the autumn. It is said that steam navigation on this river would render the transportation of the produce of the Hudson bay region to market at San Francisco a profitable enterprise, at the rate of 10 cents per pound, whereas it now costs at the rate of at least \$1 overland to St. Paul, Minnesota. In this view the advantages yet to accrue to our Pacific ports from the national acquisition of this Territory open a new era for their commerce, and explain the earnestness with which prominent and enterprising citizens of the Pacific States, together with the leading statesmen of the age, urged with so much zeal the consummation of our late treaty with Russia.

The other rivers mentioned are navigable for hundreds of miles from the ocean, as well as many of their tributaries, thus offering the best possible outlet for the animal, vegetable, and mineral products of the country through which they flow.

The natives of Alaska are separated by distinctive characters, modes of life and governmental institutions into 24 tribal organizations, presenting many marks of separate nationality.

Of the Kodiak language there are fifteen dialects, viz: Kodiak, Chugach, Alaska, Algemut, Koshkovimpta, Kolmakovsk, Nooniovsk, (like Kodiak,) Magmutow, Argumutow, Asiagmutow, Ingelikow, and Ingalitow, Chukeh, inhabitants of St. Lawrence and Kuyoakansk.

Of the Aleutian language there are two dialects, viz: Lisievsk and Adrianovski.

Of the Koloshinsk language there are three dialects, viz: Iakutatsk, Stitkinski, and Kaygansk.

Besides the above there are four dialects not reducible to any general head, viz: Uhalensk, Mudnovsk, Kenaisk, and Kolchansk.

The southern and eastern tribes are represented as savage, warlike, and cruel, like the aborigines of the older portions of the Union. To the northward, however, they present more peaceful attributes; and on the peninsula and adjoining islands, as well as in the country north and eastward, they are remarkably docile—not even possessing or knowing the use of warlike weapons. As a reason for this it is supposed that there were two distinct original races: one, the Indian, coming from the south and east; the other, the Mongolian, coming from the north and west, over Behring straits, by way of the Aleutian islands across the ocean from Japan; and that where the increase of population caused the inhabited territory of each to approach the other, admixture of race occurred, and the varied and graded present population is the result.

The natives were well managed and kept in perfect subjection by the Russians, through the operation of wise and judicious laws and regulations faithfully enforced. By pursuing the same policy towards these people, it is reasonable to suppose that Americans will have no difficulty in preserving the same amicable relations with them, and in inducing them to subserve our hunting and fishing interests, or even commerce and manufactures.

The total area of Alaska, as hereinbefore shown, is 577,000 square miles, with a coast line accurately estimated at 11,270 miles, inclusive of bays and islands. In the Aleutian range, besides innumerable islets and rocks, there are not less than 55 islands upwards of three miles in length, seven exceeding 40 miles, and one, Oonimak, over 73 miles. In our part of Behring sea there are five large islands, one of which, St. Lawrence, is more than 96 miles long. Several of the islands of the southeastern archipelago, near Sitka, are of much greater extent than either of these, Prince of Wales island, Kodiak island, lying east of the Alaska peninsula, being the largest.

The Russian inhabitants of Alaska have been estimated at from 5,000 to 6,000, residing chiefly on the island of Baranof, where Sitka, their principal station, is situated.

The various indigenous races number from fifty to sixty thousand. The comparative climate of the coast is shown to be of nearly equal temperature with the Atlantic coast of New England, Sitka, on Baranof island, having a mean winter temperature the same as Philadelphia, but a mean yearly temperature the same as that of Portland, Maine, the thermometer not rising so high in summer nor falling so low in winter.

The climate of the islands and of the coast of the main land, as far

north and west as the peninsula of Alaska proper, varies but little from that of Sitka, according to the statistics obtained from observations by the late Russian possessors.

Notwithstanding the alleged objection to residence in Alaska on account of prevalent humidity at some seasons of the year, it is ascertained with correctness that the yearly fall of rain at Sitka is not much greater than at Astoria, Oregon, and that the climate is exceedingly salubrious, notwithstanding its excessive moisture, resulting from the warm moist atmosphere of the Japan current condensed in approaching the snow-capped mountains and colder currents of air from the north. In view of the probable increased immigration to and rapid settlement of portions of the country, it is suggested that a surveying and land district should be established in Alaska at an early day, with officers at Sitka, for the purpose of extending the United States land system over those sections of the country where possessory titles to farms, town sites, harbors, and coasts, will soon become indispensable to the interests of the settlers.

The surveyor general, resident at Sitka, the probable seat of the territorial government upon the organization of the same, this being the largest town and situated upon one of the most fertile, inviting, and thickly populated islands, would readily obtain information as to what sections should be surveyed, and then send his deputies to extend the lines of surveys, connecting the same with such initial points as may be found necessary.

The first of these initial points might be established at or near Sitka for the island of Baranof, and, perhaps, the whole archipelago and the southeastern portion of the main land. Another could be established at some point near Prince William sound for the country east of the Chigmit mountains and the Alaska peninsula. A third might be located at some point on the Yukon river, for the country north and west, with a base line and principal meridian intersecting each initial point, and extending as far as the configuration of the country would permit, until the extension of lines from another initial point should be reached. A great many of the islands, where the distance from the main land to islands already surveyed would not be too great, could be connected with the general lines by triangulation or astronomical observation, but it would probably be necessary in the case of several of the principal islands, and perhaps many of the lesser ones, to establish on each an initial point with base line and meridian for its individual surveys. This would quite as well serve the purpose of a distinct demarcation of boundaries of title or claim to possession.

Among the benefits which would accrue from the extension of the United States land system to Alaska would be the accurate information thereby obtained as to the resources of the country, its climate, mineral wealth, and the general inducements to immigration, while from the explorations of deputy surveyors and other officers valuable disclosures might be made in regions hitherto unknown to the civilized world.

The different localities of the national territory having been described in the foregoing in outline, it is now proposed to advert to operations under several heads of land legislation; and, first, the

SYSTEM IN REGARD TO THE DISPOSAL OF THE PUBLIC LANDS.

In the early age of the republic, the national domain was disposed of on the credit system at \$2 per acre, in four annual instalments. The

credit gradually yielded to the present cash system, which has ever since been in operation.*

The public lands, after survey, are brought into market by public offering pursuant to proclamation of the President of the United States, and thereafter all not disposed of are liable to ordinary private entry or sale at an established minimum of \$1 25 per acre, or where within certain limits of railway, or similar grants, at \$2 50 per acre.

A material part of the system concedes to each actual settler a preference right to take a farm of 160 acres, embracing his settlement, this privilege extending to offered lands and also to unoffered; allowing further to this favored class the privilege to settle even before survey, and when the public lines are established thereafter to adjust claims accordingly, and embrace the actual settlements.

The homestead settlers are restricted to surveyed lands, the sum required being merely nominal, in order to pay office expenses of local administration, yet the real consideration exacted of this class of settlers is five years' continuous actual residence and cultivation, with the privilege, after making a settlement in good faith, of thereafter proving the fact, making payment of \$1 25 per acre, and getting title without awaiting the expiration of five years:

Under existing legislation, no cash sales at private entry, nor locations with warrants, are admissible in the States of Arkansas, Louisiana, Mississippi, Alabama, and Florida, the disposal in those States being restricted, by act of 21st June, 1866, to homesteads, for actual settlement and cultivation. In Ohio, Indiana, and Illinois, there are only a very few small isolated tracts still undisposed of. Lands offered, and in considerable quantities, are now subject to private entry in Michigan, Missouri, Iowa, Wisconsin, Kansas, Nebraska, Minnesota, California, Oregon, and Washington Territory. In the Territories of New Mexico, Dakota, Colorado, Idaho, Montana, Arizona, and Utah, district land offices have been organized, but none of the public lands in those Territories have yet been offered at public sale, and hence can only be taken under the pre-emption and homestead enactments.

Pre-emptors, in all organized districts where surveys have been made, can pay for their tracts either in cash or with warrants, except as to double minimum, or \$2 50 lands, within the lateral limits of railroad grants, it being required for the double minimum tracts that the warrants shall be taken as half the consideration, and the residue be paid in money. The cash receipts are accounted for by the receivers of public moneys, who also hold the relation of disbursing agents for payment of salaries and other liabilities; and first, as to the

QUARTERLY ACCOUNTS OF RECEIVERS OF PUBLIC MONEYS.

Until the passage of the act of Congress approved August 26, 1842, our fiscal year dated from January 1, in common with the calendar. By that law, the fiscal year was made to date from the 1st day of July, the Secretary of the Treasury having been required by that statute to make his estimates for the half calendar year thereafter, ending 30th June. The 3d section of said act further ordered that the accounts of receipts and expenditures required by law to be published annually should, on and after the 1st day of July, 1843, be prepared and published for the fiscal year thus legislatively established, and the said accounts for the half calendar year ending

* See acts of May 18, 1796, 1 Stats., 464; May 10, 1800, 2 Stats., 73; and April 24, 1820, 3 Stats., 566.

June 30, 1843, should be prepared and published as required by law, separate and distinct.

The difference between the calendar and fiscal year has thus been clearly established by the legislative department, the calendar beginning on the first of January, and the fiscal, first of July. Pursuant to law and established practice, the same distinction has been applied in the adjustment of accounts, and in ascertaining the compensation of land officers, the calendar year being taken as the basis and computing from the first of January in every case, thus securing complete uniformity. The same rule is prescribed by the law of 2d February, 1859, directing that the act of April 20, 1818, fixing the compensation of registers and receivers of land offices, shall be so construed by the proper accounting officers of the government as to restrict the aggregate amount allowed as commissions in "any one calendar year" to the sum of \$2,500 each, with a pro rata allowance of said maximum for any quarter or fractional quarter of such year; their compensation, both for salary and commissions, to commence with and to be calculated from the time they enter upon the actual discharge of their official duties, which in every instance must be subsequent to the date upon which they execute their official bonds and take the oath of office.

Receivers of public money are required to render at the end of each quarter an account of all moneys received within the same for sales of the public lands, homestead entries, fees for locating military warrants and agricultural college scrip, also for filing pre-emption declarations and adjudicating claims, together with all payments made by them either upon drafts or into the treasury. The receiver as disbursing agent is required to render a separate account in that capacity, showing to the credit of the United States the sums placed in his hands by draft for meeting payment of current expenses, and to the debit of the same the items of moneys disbursed during the quarter for salaries, commissions, and legally authorized contingent expenses.

The accounts of all the officers referred to under the jurisdiction of this office have been adjusted and reported to the treasury to the end of the last fiscal year, or June 30, 1868.

By act of Congress approved March 3, 1849, receivers of public moneys are required to pay immediately into the treasury, without abatement, all moneys in their hands from the disposal of the public lands. They cannot, therefore, legally appropriate any portion of the same to the payment of salaries, commissions, fees, or other office expenses, until the amount required for these objects shall have first been placed in their possession by draft in their favor as disbursing agents, such drafts being issued upon estimates of the expenses.

With a view to promptness in the rendition of their returns and in the depositing of public funds in the hands of receivers, instructions were despatched in the first quarter of the present fiscal year to registers and receivers, directing them to keep from day to day the business in such a state of forwardness as to enable them to make returns within three days after the termination of the respective periods for which they may be due, the receivers being required, as heretofore, to render to this office at the end of each month a regular account current, and at the end of the quarter terminating September 30, 1868, to forward forthwith their detailed accounts as receivers of public moneys and separate accounts as disbursing agents.

By the treasury regulations of May 1, 1863, no receiver is allowed to retain in his hands more than two thousand dollars (\$2,000) at the termi-

nation of any one quarter. It has been ordered that when those officers have that sum on hand or upwards at the end of a quarter, or at any other time, the whole amount of funds in their possession must be deposited to the credit of the Treasurer of the United States, and thereupon they are required to report the fact to this office. It has been further directed, that should it so happen that the receivers have at the expiration of a quarter \$2,000 or less they must promptly report the fact, so that our balance sheet may show exactly the amount of public funds in their hands which the treasury can draw upon or otherwise control, as the department may deem proper.

FUND ACCOUNT.

It is the practice to adjust the account for the five per cent. fund accruing to several of the States, at the end of each calendar year, immediately after the adjustment of the account of receivers for the quarter ending December 31. By request of the State authorities they will be taken up for examination at any time within the year. The sum accruing during the more limited period will in most instances, however, be too small in amount to render the adjustment of the account an object.

Accounts have been adjusted and reported to the treasury for the five per cent. fund accruing to the close of the last calendar year for the States of Michigan, Wisconsin, Minnesota, Iowa, Oregon, Kansas, and Nebraska. Since the adjustment heretofore reported nothing has accrued to Arkansas, Alabama, Mississippi, Louisiana, and Florida, the disposal of the public land in those States being by the act of Congress approved June 21, 1866, restricted to entries only for homestead settlement; nor to Ohio, Indiana, Illinois, and Missouri, in which the expenses have exceeded the receipts. There is no authority of law for allowing to the States of California and Nevada a percentage upon the net proceeds of the sales of the public lands within their limits.

THE RELATIONS OF REGISTERS AND RECEIVERS TO THE LAWS GOVERNING THE DISPOSAL OF THE PUBLIC DOMAIN BY PRE-EMPTION AND OTHERWISE.

The tenth section of the act of Congress approved May 10, 1800, provides for ordinary private entry by registers only upon application to the surveyors general. There is no statute, however, conferring a similar privilege upon receivers; but that privilege has existed under long established practice, recognized as lawful in the Attorney General's elaborate opinion, bearing date August 12, 1843. (Opinions, document 55, page 1,618.) The principle of this rule, allowing receivers to purchase, has been severely criticised in the courts. (See the case of *Michoud et al. vs. Gerod et al.*, December term, 1846, 4th Howard, page 533; also 4th Kent, page 437; also 5th Howard, page 49, in the case of *The United States vs. Boyd et al.*, December term, 1847.) Notwithstanding the principle laid down in these legal authorities, the privilege of the register to purchase lands has been recognized, as stated, by the legislative branch, and that of the receiver long sanctioned by the Attorney General. Neither the right of pre-emption nor of homestead is, however, conceded to either the register or receiver, because in such cases they are required to render judgment as to the legality of proceedings under the pre-emption and homestead legislation.

As a principle of public policy, and upon the same considerations which govern the restriction applied to the official employés of the

General Land Office, which makes it an offence to purchase, directly or indirectly, government lands during incumbency in office, it is recommended that the existing restriction and interdict be extended so as to include all local or other officers connected with the disposal of the public domain.

THE PRE-EMPTION SYSTEM.

The ownership of soil by the United States brings to view some of the fundamental principles of social order. Among these the origin of the right of property has been the subject of keen and exhaustive discussion by the great lights of natural and international law, such as Grotius, Puffendorf, Barbeyrac, Burlamaqui, Rutherford, and others. Without attempting to revive the controversy whether the right of property in severalty results from the tacit consent of society to individual appropriation, or from some higher principle of the law of nature, of which this public consent was but the spontaneous and intuitive recognition, it is sufficient here to observe that both of these theories acknowledge the ultimate right of property to rest in society. The earth was given to the children of men as a race to occupy, subdue, and cultivate. The processes by which public ownership was superseded by private property are but dimly seen and imperfectly described in history. Happily, the importance of the question is now far more theoretical than practical.

The processes by which the government of the United States have acquired the title, both of eminent domain and proprietary right in the soil, are matters of authentic history. The principles of natural law, upon which they are based, are discussed in a previous official report. The extension of sovereignty over the vast regions of our western territory carried with it the ownership of the soil wherever there existed no prior appropriation of it by individual settlers. The aboriginal inhabitants never made any such appropriation. They claim only a usufructuary title to certain ill-defined areas under their tribal organization. This claim has been respected by the United States, and extinguished by successive treaty purchases as the pressure of immigration, by driving away wild game, has rendered the country inadequate to support the wasteful system of savage life. The government has made strenuous efforts in good faith to reform the wandering habits and conditions of the Indians by settling them on reservations, and providing for their instruction in civilization. With the failure to a great extent of those efforts, through difficulties inherent in the case, we have nothing to do in this report.

The title to the soil thus acquired it has ever been the policy of the United States to transmute into individual ownership in the shortest possible space of time. History having transmitted but imperfect records of this process in the early organization of society, the general government, in the administration of this most important trust, was left without the light of past experience, and compelled to have recourse to original experiment. The old Continental Congress spent a year in the consideration of "an ordinance for ascertaining the mode of locating and disposing of lands in the western territory," and within three years passed an amendatory ordinance greatly modifying the provisions of the original. Under our present Constitution, Congress has repeatedly amended and improved the original system in a series of statutes, showing the gradual approach of the public mind of the nation to our present liberal and enlightened policy. The method at an early period of

our history of treating the public lands contemplated the prompt payment in cash for all tracts disposed of, or by the location of warrants granted for military service, and the expulsion of all who could not comply with these terms from settlements already made. But the impulse of immigration among the landless was too powerful to await the ability to meet these conditions. Congress found it necessary to heal a multitude of breaches in its pre-existing laws by special retrospective statutes, granting pre-emption rights to parties who had settled upon the public lands. At length, by acts of September 4, 1841, and March 3, 1843, this special and limited policy was made permanent and general, applicable, however, only to surveyed lands. The executive department, animated by the same liberal ideas that had inspired these noble enactments of the legislature, inaugurated subsequently the policy of withholding for limited periods from public sale lands that had been surveyed, thus giving to the actual settler the choice of the most desirable localities, and saving them from the grasping monopoly of speculation. By successive statutes, passed in 1853, 1854, and 1862, the pre-emption privilege was extended to unsurveyed lands, thus giving every facility to the speedy settlement of the public domain. The consideration upon which this important privilege of pre-emption has been granted is a *bona fide* settlement upon and occupation of the tract by such cultivation and substantial improvements as clearly indicate an intention of making it a permanent home. This system has worked admirably hitherto, and has exercised an untold influence in spreading the benign institutions and social order of civilization over the late savage wilderness. Though to considerable extent superseded by the still more liberal homestead policy, there are numberless cases in which claimants under the homestead law find it desirable to commute that claim into a pre-emption.

During the past year there have been disposed of under the pre-emption and homestead laws an aggregate of over 2,500,000 of acres, covered by *bona fide* settlements, adding over 20,000 farms to the freeholds of this republic, with an untold increase of productive power. It is but fair to estimate the aggregate of farms in the whole Union, including the above additions and those which recent changes in the industrial system of the older States have brought about, at 2,800,000. The principle of pre-emption, in a modified form, has also been extended to urban settlements, giving great facilities to town building throughout the public domain, and thus introducing manufacturing interests *pari passu* with the agricultural. The diffusion of villages, as nuclei of a varied industry, throughout the national territory, is of far higher significance and importance than a superficial view of the case is likely to reveal. Their influence in building up a symmetrical and self-reliant civilization will be recognized hereafter when our social and industrial dependence upon foreign states will be broken up by a revolution as radical and thorough as that which dissolved our political bands on the 4th of July, 1776.

In the last annual report the number of urban settlements in the United States was estimated at 30,000. I am satisfied that the year just passed has, at the lowest computation, added a thousand to the above aggregate. Further legislation is needed to meet new developments of public interest, growing out of the working of the homestead and pre-emption systems, and especially to define and systematize their increasing practical relations. I desire in this connection to call attention to the recommendation in the last annual report to fix the limit of time within which pre-emptors on unoffered lands shall make proof and pay-

ment, also to prescribe limitations as to appeals, and to require the consummation of a claim, either pre-emption or homestead, pursuant to the requirements of the statute under which it had its inception.

HOMESTEADS.

Acts of May 20, 1862, March 21, 1864, and June 21, 1866.

The progress of actual settlement, under homestead legislation, has fully demonstrated the wisdom of the measure.

During the fiscal year ending June 30, 1868, 2,328,923 acres have been entered under the provisions of the homestead laws, being an increase of over 500,000 acres on the quantity taken up in the preceding year, making a total, since the initiation of the system, of nearly 9,500,000 acres, and adding 83,000 farms to the productive forces of the republic.

Of the quantity entered during the last fiscal year, 526,077 acres were taken in the southern States under the act of June 21, 1866, and the residue, being 1,802,846 acres, in the Mississippi valley and the States and Territories of the Pacific slope. Since our last annual communication the five-year limitation of the statute has expired. In anticipation of this, full instructions were timely despatched to the district officers, prescribing the mode of proceeding in the final adjudication of settlers' claims. Accordingly, up to the end of the fiscal year, titles embracing 147,000 acres have been proved up, constituting 2,906 farms, none of these, however, being in the southern States, the time for consummating titles under the legislation applicable to these not having yet arrived.

In beginning operations in taking final proof, instances occurred where the district officers allowed claims wherein the parties had not produced evidence of citizenship, but had merely filed their declaration of intention. The attention of the registers and receivers was called to the requirements of the statute in this respect, which is peremptory in this, that full citizenship must be shown at the time of completing title. In nearly all cases which had been suspended for the requisite proof the parties have come forward and met the legal requirements and perfected their titles.

Application has been made for permission to make final proof in homestead cases before county officers. This the law does not authorize, and properly so, thus avoiding the confusion and conflict incident to the transfer of adjudication to officers other than those of the general government.

Inquiry has been made as to the amount of commissions payable on proving up. It has been decided that where entries were made prior to the amendatory act of 21st March, 1864, the commissions are to be paid in accordance with the requirements of the original act of 20th May, 1862, but where *subsequent*, they shall be paid in accordance with the amendatory act of 21st March, 1864.

HOMESTEAD RULINGS.

Where different parties hold an undivided interest as tenants in common in an original farm, it has been decided that until a decision is made so as to fix the description of the tract taken by each, there cannot be a separate entry made as an adjoining farm by any one holding such individual interest, because the law contemplates a fee simple own-

ership in a particular tract as an essential preliminary to making an entry of other land as a farm adjoining.

Inquiry has been made as to the proof requisite where the parties apply to make payment under the 8th section of the homestead act of 20th May, 1862.

It has been ruled that proof must be made of settlement and cultivation up to the time of payment, so as to show a *bona fide* purpose on the part of the settler to make the land his permanent homestead. Wherever the proof may show an honest effort by the claimant to meet the requirements of the statute, the register and receiver are directed to deal with the matter in no narrow but in a liberal spirit, yet in subordination to the requirement of the statute. In cases where the settler is deceased, and his legal representatives thereafter discover that the homestead papers describe other land than the tract embraced by his actual settlement, it has been ruled that the widow or representatives may prove and thereafter certify on the application to the correct description of the tract upon which the deceased party actually settled, and when satisfactory, the error in description may be corrected.

Applications have been made to relinquish a homestead claim, in order to a subsequent filing on the same tract under the pre-emption laws. If the party relinquishing is entitled to the pre-emption, and sees fit to avail himself of it on the tract he had relinquished under the homestead, he has a right to do so, as it is not in any view a commutation, but a separate, distinct transaction, initiated and perfected under another law.

Cases have arisen where persons have made homestead entry on tracts previously offered, and complaint has been entered that settlers had failed to meet the requirements of the homestead law. Where such parties have made considerable improvements, but failed in residence, their rights as homestead claimants have been forfeited; but in view of the improvements existing they have been allowed to purchase the land at private entry, because it was liable to such entry, having been duly offered.

Where a settler upon an "offered" tract dies before the expiration of the five years, and his heirs, living at a distance from the premises, have failed to continue the settlement to the end of the five years, or to prove up under the 8th section of the act of 20th May, 1862, within the six months' limitation, we have allowed the heirs to take the tract at private entry. Where a settler deserted his family, leaving his wife and children on the homestead, and it was claimed that the wife should have the title of the land at the expiration of five years from date of entry, it is held that the patent cannot be issued upon the entry of the husband in the name of any other party, except in the event of his decease; but if he abandoned his homestead for more than six months, the wife might obtain the cancellation of the entry on the ground of abandonment, and thereafter, as the head of the family, might make a homestead entry of the tract in her own name.

Cases of abandonment have been presented wherein it has been shown that, by reason of sickness, want of means, or other good causes, the parties, although they had cleared and cultivated, had failed to meet the requirements of the law as to residence within the prescribed time. Where the intention was *bona fide* we have refused to cancel entries, but have allowed the five years' residence to take date from the day of actual settlement by residence on the tract, provided that the party file his affidavit within a reasonable period that he has permanently renewed settlement on the claim.

Where the widow of a deceased settler marries again, before the expiration of the five years, it is held that if she continues the settlement and improvement of the claim to the expiration of the period fixed by the statute, the fee inures to the heirs, and final proof may be made in the name of the said heirs.

The amendatory act of 21st March, 1864, authorizes parties in the *military or naval service, whose families, or some member thereof, are residing upon lands desired to be entered*, to make the affidavit required by the homestead law of May 20th, 1862, before the officer commanding in the branch of the service in which the applicant may be engaged; the affidavit, accompanied by the application, to be filed with the register and receiver of the land office, by the wife or other representative of the party, and become effective from the date of such filing.

Persons in both the army and navy have made application through agents, under the impression that no settlement is required until the expiration of their term of service, and that should their service absorb five years, such service will be accepted in lieu of settlement and cultivation. The law recognizes no such arrangement, and means have been taken properly to explain the scope and meaning of the statute, in order to counteract the evil, which has been so extensive as to induce this office to despatch to the several district officers a circular letter, directing them to receive no applications except such as may be accompanied by evidence of pre-existing settlement, as the law requires, on the part of the wife or representatives of the parties.

Since our last annual report the two years' restrictive clause in the act of 21st June, 1866, applicable to southern States, as to the *quantity* of an entry, has expired, and the question has arisen whether the fee required under the act was increased with the quantity allowed to be taken.

It has been determined that the fee is the same as under the original act of 20th May, 1862, which was amended by the 2d section of the act of 1866—namely, five dollars for eighty acres or less, and ten dollars for a greater quantity, payable at date of entry.

The officers at Huntsville, Alabama, had erroneously made sale *for cash* of tracts formerly in the Cherokee Indian reservation.

The Commissioner has apprised them that by treaty stipulations* the lands had been quit-claimed to the United States and restored to the public domain, hence subject to disposal only in conformity with the provisions of the act of 21st June, 1866, and that to sell for cash any tract would be in violation of law, and consequently the register and receiver are without authority for the sale of the premises. Propositions for amendments to the homestead act have been made:

1. For granting homesteads to children of deceased soldiers over the age of *sixteen* years, and without payment of the ten dollars government fee, which is recommended by this office.

2. To authorize certain settlers to make final homestead proof before *clerks* of county courts, a measure not approved by this office because leading to complications and embarrassments.

3. An amendment has been suggested to the 8th section of the original act of 20th May, 1862, so as to continue the restrictive clause of the pre-emption act of September 4, 1841, that any person owning 320 acres in any State or Territory of the United States, or who shall quit or abandon his residence on his own land to reside on the public lands in the same State or Territory, shall not have the benefit of the homestead act, an amendment which is recommended by the Commissioner.

* 1st article treaty Dec. 29, 1835, vol. 7, p. 479; 4th article treaty Aug. 6, 1846. vol. 9, p. 873.

EARLY SETTLEMENT CLAIMS IN OREGON AND WASHINGTON.

In the fourth section of the act of Congress approved 27th September, 1850, United States Statutes, vol. 9, page 496, there is granted to certain classes of settlers residing in what was then Oregon Territory, and to those who became residents before the 1st December, 1850, and who resided upon the land and cultivated it for four years, a tract to each single man equal to a half section or 320 acres, and if married before a specified period, a whole section or 640 acres, one-half to the settler and the other to his wife, the latter to be held as her separate interest. In the fifth section of the same law a grant was made to those who should be settled in Oregon before a then prospective period, one quarter section for a single man, and double that quantity to those who married.

The act of the 14th February, 1853, U. S. Statutes, vol. 10, p. 158, declares that instead of the four years' continuous occupation after settlement settlers should be allowed after two years' occupation to get title by paying \$1 25 per acre.

By the act of March 2, 1853, U. S. Statutes, vol. 10, p. 172, a portion of Oregon Territory was detached and erected into the Territory of Washington, and by the 6th section of the act of 17th July, 1854, U. S. Statutes, vol. 10, p. 305, the donation privilege was extended to said Territory of Washington, and the term of settlement before the title could be acquired by payment was reduced to one year.

Under these several laws there have been received from the district land offices in Oregon and Washington 5,205 certificates of donation title, calling for tracts varying each from 160 to 640 acres, covering an aggregate area of 1,884,210 acres, of which number patents have been issued in 4,593 cases, embracing 1,681,039.50 acres. Neither the original donation law of 27th September, 1850, nor the amendatory act of 14th February, 1853, fix a limitation as to time within which all claims must be established. The result is that sometimes embarrassment arises in separating the public from private property, because cases have occurred in which the original settler after residence for the required period has disposed of his title and left the country without making final proof at the district offices. His vendee may be a non-resident and fail to produce the proofs the law requires. Thus, in some instances, donation tracts have been regarded as public land and applications made to acquire the same under the pre-emption and homestead laws, upon the supposition that the claim to the land as a donation had been abandoned, there being no proof to the contrary upon the records of the district land offices.

To correct this and to enable the land department to segregate the public from any private interests of this character, the passage of an act is recommended requiring final proofs to be made within a specified period, say two years from the date of such enactment, after which all claims not proved up shall be liable to forfeiture and treated as other public lands.

TOWN SITES ON THE PUBLIC DOMAIN.

In order to secure uniformity in the administration of the act of Congress approved 2d March, 1867, vol. 14, p. 541, for the relief of the inhabitants of cities and towns upon the public lands, and of the amendatory law of June 8, 1868, instructions have been forwarded to the district land officers to the following effect:

The act of March 2, 1867, grants to the inhabitants of cities and towns on the public lands the privilege of entering the premises occupied as

town sites at the minimum price of one dollar and twenty-five cents per acre, the entry to be made through the corporate authorities or the judges of the county courts acting as trustees for the occupants, when such mode of obtaining title to town property is preferred to that provided in the act of July 1, 1864, and the amendatory statute of March 3, 1865, the act of 1867 not repealing these previously existing enactments. The inhabitants are, however, limited to one or the other of the modes indicated in these statutes and cannot commence proceedings under both systems. The act of June 8, 1868, amendatory of the act of March 2, 1867, provides that the inhabitants of any town located on the public lands may avail themselves, if the town authorities so elect, of the provisions of said last named act, provided the issuing of patents to persons who have made or may make entries and elect to proceed under existing laws shall not thereby be prevented. As proceedings to acquire title to town property cannot be commenced under both the systems in force since March 2, 1867, the amendatory statute must refer to cases where, previous to March 2, 1867, the inhabitants of any town or city had filed a plat of the same with the county recorder pursuant to the act of July 1, 1864, and had partly proved up and paid for the lots claimed by them, under the proviso in the 2d section of the said act, and extends the privileges of the act of March 2, 1867, if the town authorities choose to proceed under it, to such of the inhabitants as have not yet paid for their lots, without interfering with the issuing of patents to those who have made or may make entries and desire to proceed under the acts of July 1, 1864, and March 3, 1865.

Accordingly, where proceedings had been commenced by the inhabitants of any town or city before the passage of the act of March 2, 1867, and a part of them, not having entered and paid for their lots, wish to proceed under said last named act, the registers and receivers are required to permit the town authorities, if they apply for that purpose, to enter, pursuant to the provisions of said act, or file upon, such portion of the town site as has not already been entered and paid for, and is not in the possession of parties electing to complete their titles under the original proceedings; after which that part of the town site so entered or filed upon will be disposed of under the statutes of 1867 and 1868, and the remaining portion, if any, under the enactments of 1864 and 1865. The amendatory act of June 8, 1868, further provides that in addition to the minimum price of the lands included in any town site entered under the acts of 1867 and 1868, there shall be paid, by the parties availing themselves of the provisions of said acts, all costs of surveying and platting, and also the expenses incident thereto incurred by the United States. Hence, when it is desired to enter a town site found upon the *unsurveyed* public lands, a written application must be made to the surveyor general of the proper district for a survey of the same under the 10th section of the act of May 30, 1862, vol. 12, p. 410, Stats. at Large, and a deposit of the amount estimated by him as sufficient to cover the costs and expenses thereof, with any assistant United States treasurer or designated depository, in favor of the United States Treasurer, to be passed to the credit of the fund created by "individual depositors for the survey of the public lands," taking a duplicate certificate of deposit, one to be filed with the surveyor general to be sent to the General Land Office, and the other retained by the depositor. On receiving the certificate showing that the requisite sum has been deposited in a proper manner to pay for the work, the surveyor general is required to transmit to the register and receiver of the district land office his certificate of such payment having been made, and also to contract with some competent United States deputy surveyor for the survey and return, in the same manner as other

public surveys, after which the lands embraced within the site may be entered or filed upon as in the case of town sites upon surveyed lands. When town sites are located upon surveyed lands the entries must be made in conformity with the legal subdivisions of the public lands, and hence no cost for surveys can be demanded. When sites are upon the unsurveyed lands it will become necessary, after the extension thereto of the public surveys, to close these lines upon the exterior limits of the town sites.

The aforesaid act of 2d March, 1867, it will be observed, stipulates that there shall be conceded, where the number of inhabitants is 100 and less than 200, not exceeding 320 acres; where the population is more than 200 and less than 1,000, not exceeding 640 acres; where the inhabitants number 1,000 and over, not exceeding 1,280 acres; and for each additional 1,000 inhabitants, not exceeding 5,000 in all, a further grant of 320 acres.

All military and other reservations of the United States, private grants, and valid mining claims, are excluded from the operation of these laws.

In any Territory in which a land office may not have been established the declaratory statements provided for in the foregoing acts may be filed with the surveyor general of the proper district.

SPECIAL AND GENERAL GRANTS FOR INTERNAL IMPROVEMENTS—
PORTAGE LAKE AND LAKE SUPERIOR LAND GRANT.

By the act of March 3, 1865, granting lands to Michigan, "to aid in building a harbor and ship canal to connect the waters of Lake Superior with the waters of Portage lake," authority was vested in that State to appoint an authorized agent for the selection of the lands nearest the location of the canal. The service has been performed and the preliminary lists filed covering the grant of 200,000 acres.

In addition to the grant by said act of 1865, Congress, on the 3d of July, 1866, made an additional concession of 200,000 acres, to be selected in the upper peninsula. Under the provisions of the statute, the State has selected and filed lists of selections embracing 150,000 acres, leaving a claim of 50,000 acres yet to be satisfied. The examination of these returns has been completed, and certified transcripts furnished the State authorities, covering 279,808 acres.

Grant in aid of the "Des Moines river improvement," selections "in place," and "indemnity," have been made in certain lateral limits, extending from the southeastern part of the State in a northwesterly direction to the northern boundary of Iowa. These selections, made pursuant to the act of 8th August, 1846, vol. 9, p. 77, the joint resolution of 2d March, 1861, vol. 12, p. 251, and the enabling act of 2d July, 1862, vol. 12, p. 543, embrace an aggregate as returned to this office of 833,079.70 acres, for which title has been fully vested in the State of Iowa, by duly certified transcripts.

The grant made to the State of Wisconsin by acts of 8th August, 1846, vol. 9, p. 83, and 3d August, 1854, vol. 10, p. 345, for the improvement of the Fox and Wisconsin rivers in Wisconsin, has been finally adjusted and title duly vested in the State for 684,264 acres.

In regard to the extreme northern portion of the upper peninsula of Michigan, Congress by act of July 3, 1866, vol. 14, p. 80, made a concession, embracing 100,000 acres, in aid of the construction of a ship canal to connect the waters of Lake Superior with Lac La Belle, which has been finally adjusted and patent issued to the State.

By the act of April 10, 1866, vol. 14, p. 30, a similar grant was made

to Wisconsin, of 200,000 acres, to aid in the construction of a breakwater and ship canal at the head of Sturgeon bay to connect the waters of Green bay with Lake Michigan. The grant has been finally adjusted and title vested in the State.

In the adjustment of the claim of Nebraska to 500,000 acres for internal improvements, under act of September, 1841, as extended to that State by act approved February 9, 1867, vol. 14, p. 391, admitting the State into the Union, the point was considered as to whether Nebraska should be charged with the lands granted by the eighth, ninth, tenth, and eleventh sections of the enabling act of 19th April, 1864, vol. 13, p. 47. The Secretary ruled that the lands mentioned in the act of 1864 were granted for purposes totally distinct from those contemplated by the general improvement grant of 1841, and the only lands contemplated by said act of 1864 are those the right to which had passed to the Territory, and were made subject to its disposal for the purposes declared by Congress. The Secretary, therefore, decided that the lands granted by the aforesaid sections of the act of 1864 should not be deducted from the 500,000 acres granted by the general improvement law of 1841, and accordingly under that ruling the grant will be duly adjusted.

Pursuant to the grant aforesaid, the State has made and filed selections in part, embracing 260,169 acres, which are in progress of examination with a view of vesting the title to all the tracts in those selections found free from conflict.

LAND GRANTS IN AID OF EDUCATION.

The organic instinct of American society from its inception realized, as a necessity to its preservation, the establishment and maintenance of free schools, whose perpetuation, in turn, rested upon the intelligence and virtue of the people. Prior to the Revolution this appreciation of intellectual and moral discipline existed in various degrees of strength and intelligence in the different colonies, yet manifested itself in all, in the establishment of churches, colleges, and schools, on a scale extremely liberal compared with their material resources.

Our advance to the position of an independent republic gave to this sentiment a national development, which in legislation found prompt expression. The Continental Congress engrafted upon our infant land system, by the ordinance of March 20, 1785, a land endowment of the common-school system by reserving to that end a central tract, section 16, in every township, and stipulating in the organization of each new State and Territory in the public domain for that reservation, "in place," or where covered by prior valid rights, providing indemnity of equal quantity from other public lands. In the case of Oregon the policy was inaugurated of duplicating the quantity for the support of schools, section 36 as well as 16 in each township being granted "in place," and where taken by prior adverse rights, giving selections elsewhere.

In addition to this concession to the support of schools, at least two townships, or 72 sections, have been granted in each new State for the support of universities or colleges, besides special grants to isolated enterprises. By act of July 2, 1862, with its supplements, Congress donated to every State, for each senator and representative to whom it was entitled under the apportionment of 1860, 30,000 acres for the endowment of colleges for the cultivation of agricultural and mechanical science and art. The agency of this splendid donation in developing our resources can scarcely be conceived.

The report of the eighth census shows the interest of our people in this relation. Prior to the year 1775 10 colleges and professional schools, including the medical department of the University of Pennsylvania,

had been established, all of which were in existence in 1859. The New England school system was begun in several of the New England colonies, and in Pennsylvania, long prior to the Revolution of 1776. In 1791 the colleges and professional schools numbered 21, including those already mentioned, also the medical department of Harvard University, Cambridge, and one theological institution. In 1860 the whole number of educational establishments was 113,006, having 148,742 teachers, giving instruction to 5,417,880 persons, the annual income having amounted to \$33,990,482.

Of the foregoing 445 were collegiate, with 54,969 students. The academies and other schools, except public schools, numbered 6,636, in which were instructed 455,559 pupils. The number of public schools was 106,915; of pupils 4,917,552. The aggregate of libraries returned in 1860 was 27,730, containing 13,316,379 volumes.

Since these statistics were returned the expansion of the educational system has been coextensive with our rapidly increasing population and the demands of a high civilization, the general course of instruction including the usual elements, advancing to algebra, geometry, trigonometry, land surveying, the higher departments of mathematics, and classical studies, both ancient and modern.

It has been observed that emigration from the settled to the unsettled parts scatters "rapidly through the fertile wilderness of the west the seeds of an intense existence, full to excess of physical energy and intelligence, developing with magical swiftness into a vast population, with an enormous capacity of material progress." This is illustrated in the results in the city of Milwaukee, incorporated only 22 years ago, the commercial capital of Wisconsin, which was admitted in 1848 into the Union as a State. That city contains a population of 90,000, and by its school returns on 31st August, 1868, shows that 23,660 children were entitled to the benefits of public schools, more than two-thirds of that number being in actual attendance in public and private educational institutes in that beautiful and rapidly-growing western city.

An able English writer, in adverting to the right of suffrage in connection with our educational institutions, inquires, how then do the Americans "deal with this mighty power? Have they any check upon it? Do they believe the natural intelligence, the wise self-interest of their citizens a sufficient guarantee for its proper exercise? By no means. They are, on the contrary, convinced that the intelligence of every class cultivated to its highest attainable point, the information of every class extended to its utmost practical reach, the mental discipline of every class, through skilful process of intellectual instructions, secured in the highest possible degree, are indispensable to the safety and beneficent working of the universal power. Hence, the universal and immense exertions for the establishment of public schools, visible in every part of the Union."

The Congress of the United States, from our earliest history, have shown the judgment of our statesmen in this respect; the results indicating provision in the cause of education to embrace every township of six miles square and half township.

The concession will give for common schools.....	67, 983, 922 acres.
And that the grants for colleges and universities are equal to.....	1, 082, 880 acres.
For agricultural and mechanical colleges.....	*10, 260, 000 acres.
Making a total of.....	79, 326, 802 acres.

*This includes the Territories.

A greater area than the aggregate surface of New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Delaware. The number of pupils now entitled to all the advantages of a thorough education in the United States may be set down at 10,000,000.

These statistics mark educational progress coincident with our increase of population and development of material resources. Nothing is found in the old world comparable to this diffusion of popular intelligence. It has developed in our people those marked characteristics of self-reliant energy and practical intelligence which have enabled them to direct so admirably their matchless free institutions. We may admit that in our past national infancy the older educational establishments of Europe have been enabled to boast more copious contemporary literature, and a greater number of authors in science and art, for the best mind of our people has been absorbed by the pressing practical problems of growing civilization. Yet, in coming ages we may anticipate, from the broader diffusion of educational facilities, that a greater number of minds will be quickened into activity, and that the Augustan age of America will rival in learning and mental activity the proudest eras of history.

BOUNTY LAND GRANTS.

The Congress of the United States early provided for land bounties for the officers and soldiers of the Virginia line and navy for services in the Revolution, according to the promises of State legislation, and by act of June 1, 1796, provision was made of bounties for services in the continental line. The act of May 6, 1812, granted bounties for services in the war of 1812 with Great Britain; the act of February 11, 1847, for services in the war with Mexico; the act of September 28, 1850, for services in the Indian wars since 1790, and to volunteers and State militia in the war of 1812. The act of March 22, 1852, extended the provisions of the act of 1850, and the act of 3d March, 1855, extended and equalized grants by former acts. In pursuance of these provisions lands have been granted as bounties to the aggregate amount, including Virginia military scrip, of 71,852,595 acres.

Of the warrants issued under the acts of 1812, 1847, 1850, 1852, and 1855, there are still outstanding 35,487, to satisfy which 4,190,860 acres of public land will be required, besides satisfying warrants which conflicted with prior rights, and are consequently to be lifted and other lands granted in satisfaction of the same.

In the issue of land warrants to soldiers, and permitting them or their assigns to select the locations for themselves, instead of requiring the intervention of the officers of the government to make the location in specified military districts, it was supposed that more of the country's defenders would seek homes for themselves and families in the growing regions of the great west. With this view, Congress exempted the warrants from seizure and sale for debt, and the land obtained thereby from such liability, where contracted by the soldier prior to the issue of the patent; but notwithstanding these provisions, it is believed that not more than 1 in 500 of the recipients of the government bounty have located their warrants—the greater part of such warrants having been sold and assigned, the soldier having received in cash probably an average of 75 per cent. of the minimum price of the land.

During the fiscal year ending June 30, 1868, there were located with bounty land warrants 512,533.42 acres. At this rate, the outstanding warrants will soon be satisfied, yet considerable numbers are still being issued by the Pension Office, some 880 having been delivered within the last fiscal year, calling for 130,800 acres.

RESERVATIONS FOR MILITARY USES—REDUCTION OF FORT RILEY
MILITARY RESERVE IN KANSAS.

In the joint resolution of Congress approved March 2, 1867, "For the reduction of the military reservation of Fort Riley, and to grant land for bridge purposes to the State of Kansas," it is stipulated "that the southwestern boundary of the military reservation of Fort Riley, in the State of Kansas," shall thereafter be the channel of the Republican river, from its mouth to the point where the river intersects the present western line of the reservation, and the land released from said reservation, and lying between the Smoky Hill and Republican rivers, is granted to the State of Kansas, to aid in the construction of a bridge over the Republican river on the public highway leading through the present reservation; yet upon the express condition that this grant should be accepted by the State of Kansas with a guarantee by an act of the legislature that the bridge shall be kept up and maintained in good condition, and be free to the use of the government of the United States for all transit purposes without tolls or charges. It is further stipulated that on such acceptance and guarantee being filed in the office of the Secretary of the Interior, together with the certificate of the governor of Kansas that a good and permanent bridge has been constructed over the Republican river, a patent should issue for the land granted to the State of Kansas, or to such company as might be authorized by act of the legislature to construct the bridge.

The Secretary of the Interior having communicated to this office the data contemplated by the resolution aforesaid, a survey of the premises was ordered, and upon the receipt of the official returns of the same a patent, bearing date June 13, 1868, pursuant to said resolution, was issued for the tract therein mentioned, the same having been found to contain 3,922.06 acres, the patent containing the proper conditions, stipulating as to the right of the United States to the free use forever for all transit purposes without tolls or charges.

In the case of *Grisar vs. McDowell*, 6 Wallace Reports, page 381, the Supreme Court of the United States declares the fact "that from an early period in the history of the government it has been the practice of the President to order, from time, to time, as the exigencies of the public service required, parcels of land belonging to the United States to be reserved from sale and set apart for public uses."

The authority of the President in this respect is recognized in numerous acts of Congress. Thus, in the pre-emption act of May 29, 1830, it is provided that the right of pre-emption contemplated by the act shall not "extend to any land which is reserved from sale by act of Congress, or by order of the President, or which may have been appropriated for any purpose whatever."* Again, in the pre-emption act of September 4, 1841, "Lands included in any reservation by any treaty, law, or proclamation of the President of the United States, or reserved for salines or for other purposes," are exempted from entry under the act.† So, by the act of March 3, 1853, providing for the survey of the public lands in California, and extending the pre-emption system to them, it is declared "that all public land in that State shall be subject to pre-emption, and offered at public sale," with certain specific exceptions, and among others of lands appropriated "under the authority of this act, or reserved by competent authority."‡

The provisions in the acts of 1830 and 1841 show very clearly that by

* 4 Stat. at Large, 421.

† 5 Id., 456.

‡ 10 Id., 246.

“competent authority” is meant “the authority of the President, and officers acting under his directions.”*

During the year ending 30th September, 1868, the President ordered that the following military reservations shall be established, and instructions have been despatched accordingly by the Commissioner to the proper district officers, viz :

In Washington Territory.—Waaddah island, and certain lands on the east and west side of Neeah harbor, straits of Juan de Fuca ; also at the southern end of Vashon’s island and on the north side of Gig harbor, at the narrows of Puget sound.

In Montana.—Fort Ellis, situated between the upper waters of the Yellowstone and Gallatin rivers.

In Dakota.—Fort Buford, at the confluence of the Yellowstone with the Missouri river. This reserve extends 15 miles within the northeastern portion of the Territory of Montana. Also, Forts Stevenson and Wadsworth, the former situated on the Missouri river below Fort Berthold, and the latter on the Couteau des Prairies, equidistant between Lake Traverse and Dakota river.

In Kansas.—Forts Larned, Zarah, and Dodge, all of them situated on the Arkansas river ; also, Forts Hays and Wallace, the former about 45 miles north of Fort Zarah, and the latter on the overland route about 25 miles east of the western boundary of the State.

In California.—“The Sisters,” “The Brothers,” and the “Main islands,” in the bay of San Pablo.

Under existing legislation no authority is given for the disposal of abandoned or useless military sites, except in the State of Florida, the 6th section of the act of Congress approved 12th June, 1858, Statutes at Large, vol. 11, page 336, having repealed, with the exception indicated, all pre-existing enactments in that respect.

In the judgment of the Commissioner power should be delegated to the Executive to sell all such useless or abandoned sites to the best advantage, requiring that where improvements exist they shall be appraised, and where available for urban purposes that authority be given to have the premises surveyed into lots of such proportions as will subserve the interests of the public, and be likely to be most profitable to the United States treasury.

MEASURES FOR THE ESTABLISHMENT ASTRONOMICALLY OF THE EASTERN BOUNDARY OF NEVADA, AND OF THE COMMON BOUNDARIES BETWEEN COLORADO, NEBRASKA, AND WYOMING.

Eastern boundary of Nevada.

In the act of July 20, 1868, making appropriations for sundry civil expenses of the government for the year ending June 30, 1869, and for other purposes, provision is made at the rate of not exceeding \$25 per mile for the survey of the eastern boundary of the State of Nevada, estimated to be in length 425 miles.

In virtue of the authority vested in this office by the aforesaid act, instructions have been despatched to the United States surveyor general of Nevada to enter into contract with a practical astronomer and surveyor to determine by astronomical observations the 37° of longitude west from Washington, between the middle of the river Colorado of the West and the 42° north latitude, that degree of longitude forming the

* Wolcott vs. Des Moines Co., 5 Wallace, 688.

eastern boundary of the State of Nevada, or a common boundary to Nevada and the Territories of Arizona and Utah, as defined by the act of Congress approved May, 5, 1866, United States Statutes, volume 14, page 43.

As this is an important geographical line, it is required that the contractor shall determine the same by a series of astronomical observations, to be reduced and subjected to rigorous discussion, and the final results deduced in accordance with well-established mathematical formulae, a complete record of the astronomical, magnetic and other observations, and various reductions and final results, to be forwarded to the office of the United States surveyor general of Nevada, there to be permanently preserved for future reference.

The initial point at the intersection of the 37° of longitude west from Washington with the middle of the river Colorado of the West is required to be established astronomically on the north bank of that river, on the line at a measured distance from the middle of the river. A shaft of stone will there be erected conforming to the cardinal points, to bear the following inscription, to wit: Upon the east face "Arizona;" on that facing south, the year of survey; on the side facing west, "Nevada;" and on that facing north, " 37° L. W." The monument is required to be not less than six feet in length by twelve inches in diameter, four feet of which will project above the surface of the earth, two feet to be imbedded in the ground, and one foot at the top to be squared. Around the shaft will be constructed a circular mound five feet in diameter, composed of stone boulders, tapering up to the height of two feet, and at the distance of two feet, pits one foot in depth will be dug opposite the sides of the monument.

If there be any permanent natural objects which can be made available in perpetuating the monument, the bearings and distances of such objects from the shaft are to be carefully ascertained and described in the notes as "witnesses," whilst full and accurate description of the monument will be made a matter of record.

After the initial point shall have been established, a course due north will be taken, establishing mile posts in mounds and properly marking them, to the intersection of the 37° north latitude with the 37° longitude west from Washington, which point of intersection will be the northwest corner of Arizona and the southwest corner of Utah; from thence to the intersection of the 42° north latitude with the degree of longitude just described at the northwest corner of Utah and northeast corner of Nevada, mile posts to be established as in the first instance. At these points of intersection triangular-shaped stone monuments will be erected, bearing suitable inscriptions, and surrounded by pits and mounds similar to those constructed at the monument erected in commemoration of the initial point.

Around each mile post on the boundary line there is required to be constructed an earthen or stone mound four feet high, of conical shape, with pit two feet square and eighteen inches deep on the north and south sides of the mound, six feet from its base.

Prior to constructing the mound, an excavation will be made in the centre of the mound, and at the bottom there will be placed a marked stone, with quantity of charcoal, or a charred block. In the field-notes it will be stated which of these is used. Above the marked stone will be planted a post eight feet in length, six inches square, bevelled at the top, three feet planted in the ground, leaving twelve inches to project above the top of the mound, upon which will be durably inscribed, on the side facing north, " 37° L. W.;" on the east side "Arizona" or "Utah," as

the case may be; on the south side the number of miles from the initial point in the middle of the river, and west side "Nevada." Every mile post on aforesaid boundary line will be witnessed by as many natural objects or trees, and the bearings and distances carefully stated in the field-notes. If no permanent objects can be found in view, that fact will be noted.

It is also directed that the contractor shall avail himself of other natural objects, such as peaks of mountains, or bold, prominent landmarks standing on the line.

In order to make the boundary perceptible to the people of Nevada, Idaho, Utah, and Arizona, defining their respective jurisdictions, it is ordered, where monuments cannot be erected in their proper mile points, that they shall be established near travelled roads, rivers, and mountain passes.

It is further required that sketches shall be made of the topography of the country immediately along the boundary line, indicating remarkable ranges of mountains and lofty peaks, by which the vicinity of the boundary and the monuments perpetuating the same can be identified. The map of the boundary will exhibit the astronomical and mile monuments erected thereupon, together with other topographical data, and when returns are made to the United States surveyor general of Nevada, the same will be accompanied by report, exhibiting the character of the observations, results, and their application to the determination and marking of the eastern boundary of Nevada.

Nebraska, Colorado, and Nebraska and Wyoming boundaries.

In the aforesaid appropriation act making provision for the establishment of the eastern boundary of Nevada, authority is given and provision made for surveying the boundary line between the State of Nevada and the Territory of Utah, and of the western boundary of the State of Nebraska, embraced between the forty-first and forty-third degrees of latitude, estimated in length 320 miles, at not exceeding \$15 per mile.

Under date 3d September last, the United States surveyor general of Nebraska and Iowa was authorized to determine the aforesaid boundary lines astronomically, to survey and mark them in the field in accordance with the boundaries described in the act for the admission of Nebraska into the Union, approved April 19, 1864, United States Statutes, vol. 13, page 47. The southern boundary of Nebraska was astronomically determined in the year 1854, by Captain Thomas J. Lee, of the topographical engineers, as the base line governing the surveys of public lands in Kansas and Nebraska. The aforesaid line having been run and marked on the 40° north latitude up to the Rocky mountains, it is not deemed necessary to determine this parallel further than the point of intersection of the base line with the 25° of longitude west from Washington.

The following points of intersection of latitude and longitude, together with the 25° of longitude west from Washington, are to be astronomically determined:

- 1st. The 41° north latitude with the 25° longitude west from Washington;
- 2d. The 41° north latitude with the 27° of longitude west from Washington; and
- 3d. The 43° north latitude with 27° longitude west from Washington.

The United States surveyor general of Nebraska and Iowa has been ordered to enter into contract with a thoroughly competent astronomer and surveyor, for the determination of these points as well as the intermediate lines, and the principles and requirements as to the survey of the eastern boundary of Nevada are made applicable to the survey of these boundaries.

GEOLOGICAL SURVEY OF NEBRASKA.

The United States geologist appointed to conduct the geological explorations in Nebraska, under the provisions of the second section of the act of Congress approved March 2, 1867, has completed his service, which was restricted to one year from the date of appointment, and the final results were submitted to this office under date of July 23, 1868.

The State of Nebraska being strictly an agricultural and grazing region, with healthful climate, and soil of remarkable fertility, is capable of supporting a dense population. It possesses a highly advantageous geographical position, traversed by national thoroughfares, uniting by rail the Atlantic and Pacific, bordered on the east by the great natural highway, the Missouri, thus possessing direct lines of communication with the various commercial ports of the world; but like the neighboring States and territories retarded in the development of its other vast resources by insufficiency of timber for fuel and other economical purposes. The attention of the geologist was directed to the practicability of restoring forests to treeless plains by culture; also to the best means of securing from the natural resources of the country a substitute for timber as an article of fuel and for building material.

The inquiries of the geologist were chiefly upon points of which the following is an outline.

A careful and earnest search has been made to discover the existence of a workable bed of good coal within the limits of the State. At a point in the valley of the Des Moines river, in Iowa, from 75 to 100 miles east of the western limit of that State, and in some of the deep valleys further west, the lower coal measure rocks make their appearance, consisting mainly of sandstones, shales, coal, and some impure limestones, the maximum thickness of the whole estimated at from 200 to 300 feet, which it is supposed include all the workable beds of coal in Iowa, and which at these points are found in strata varying in thickness from one to seven feet.

These rocks in their westward extension have a slight but gradual inclination to the south or southwest, until after the limits of Nebraska are reached, where the inclination is changed to the north or northwest. It is thought probable that at Nebraska City, on the Missouri river, this lower coal-producing series might again be penetrated by boring from 600 to 800 feet below the bed of the river. The geologist recommends, as borings have already been made to the depth of 400 feet in that locality without penetrating substantial strata of coal, that all work on shafts be discontinued until the question has been set at rest by artesian borings. The discovery of such strata being of grave importance to the material prosperity not only of Nebraska but of the surrounding States and Territories, the geologist suggests that borings be made at or near Omaha and in the valley of the great Nemaha, and that they be carried to the depth of 1,000 or 1,500 feet, so that in case good strata should not be sooner penetrated, the vexed question would be settled in regard to the existence of a supply within accessible depth in eastern Nebraska.

The prevailing rocks of Nebraska are of the upper coal measures, and, so far as there are any means of determining, contain only thin seams of coal, varying, as shown by the natural exposures, shafts sunk, and drifts, from 1 to 22 inches in thickness; the thickest of these seams being an out-cropping near Aspinwall, in Nemaha county, in the southeastern part of the State. The number and extent of these exposures, as well as the value of the coal as fuel, were shown in the preliminary geological reports which were submitted with the previous annual report of this

office. Subsequent investigations only confirmed the opinions therein expressed by the geologist, that only thin beds would ever be found in the upper coal measures in the State of Nebraska.

These results, setting at rest as they do the prevalent idea that vast beds existed at moderate distances beneath the surface as a continuation of the Iowa coal-fields, has turned the attention of settlers with redoubled vigor to the feasible mode repeatedly recommended by this office of obtaining timber and fuel by forest tree culture.

The benefit to be derived from restoration of forests to the treeless plains of the west is not solely confined to the production of fuel and lumber for economical purposes, for it is well known to science that tree culture has the effect not only to change the character of the climate, rendering the winters less severe and the distribution of rain more equal throughout the year, but the soil itself, as well as the whole face of the country, may be materially improved, and that, too, in a single generation.

Peat, as an article of fuel, is regarded as ranking next in importance to coal, and as one of the most reliable sources of fuel in Nebraska.

Although the area covered by bogs in that region is by no means great, the dryness of the climate being unfavorable to the existence of vast deposits of this article of fuel, and although swamps, such as occur in many parts of Europe and on the Atlantic and Pacific coasts in this country, are unknown to that region, still there is scarcely a county in the State in which peat bogs may not be found to a greater or less extent, and these will yet become the source of profit inestimable in value. There are several different varieties of peat found in the various parts of the globe, the value of which, as an article of fuel, depends upon the amount of carbon it contains.

The geological formation of the country seems to determine the character of the vegetation from which peat is formed, while the climate and atmosphere have much to do in determining the quantity found in a given locality. Peat in calcareous districts is generally composed of coarse grasses and sedges, while that in silicious districts is likely to be formed from mosses. The different varieties may, by an experienced eye, readily be detected by the color, some kinds being red, while others are gray or black; sometimes they are almost destitute of fibre or any trace of vegetation; again, they do not appear to be in a far advanced stage of decomposition. Some kinds are so pure that in burning only a small per cent. of ashes remains, others contain much soil, iron, lime, and other mineral substances. The surface rocks of Nebraska being mostly calcareous, the peat found there is chiefly composed of flags, rushes, and the common sedges and grasses, which add a vast amount of vegetable matter to the bogs, while the peat remains a part or all of the year under water. Experiments have revealed the fact that peat as an article of fuel is well adapted for all domestic purposes, and may be used in a furnace, stove, or grate, and gives a more intense heat than almost any other kind of fuel. For the purpose of generating steam its use has been successful, both on steamboats and locomotives. In the latter, one ton of peat has performed the work of two tons of coal, while in the case of steamboats the results were still more satisfactory, peat lasting more than double as long as the same amount of coal. Besides, steam can be generated in much shorter time with this material than by either coal or wood, and as it is free from sulphur, it has recently grown into favor both in this country and in Europe in the manufacture of iron and other metals.

In regard to building materials the results show numerous and exten-

sive deposits of lime and sand stone of a character in many instances admirably adapted to building purposes; of materials for making brick and tiles in almost inexhaustible quantities. The existence is ascertained of potters' clay of superior quality and of sufficient quantity to be regarded as of importance; and further, the general excellence has been discovered of well water and the facility of obtaining it at reasonable depths, as well as the presence of sand of immense extent, thus presenting facilities for the manufacture of "patent concrete," which has lately grown into high favor as building material on account of its durability and cheapness.

The geologist has dwelt upon the value of walls built of stiff clay and gravel moulded and closely pressed together, the materials for which, in unlimited extent, are found in almost every section of the State. Walls constructed of these substances are highly appreciated, especially in those parts of the west where lumber and other building materials are scarce. Such walls may be rapidly constructed, and are remarkable for healthfulness, cheapness, durability, and beauty. The gravelly clays not available for brick-making are the most valuable for this kind of improvement. A considerable portion of the report of results of the exploration is devoted to the local geology of the settled portion of Nebraska south of Platte river.

The wants of settlers and the means of meeting the same in the readiest and most economical manner are fully considered. The report will furnish valuable information not only to science and the people of Nebraska, but to those of the whole country and to Europeans anxiously looking for authoritative publications in regard to the resources of the West, preparatory to immigration.

After an examination of the settled portion of Nebraska, the geologist extended his explorations to the westward beyond the limits of the State, crossing the first range of mountains on the line of the Union Pacific railroad into the Laramie plains, and in the vicinity of Fort Sanders, in order to examine the quantity as well as the quality of the vast deposits of lignite in that region, returning in a southeasterly direction into Colorado, and thence north along the eastern base of the mountains to Cheyenne City, in the Territory of Wyoming. After leaving Cheyenne and proceeding westward the first exposure observed was eight miles west of Corpus creek, where it seemed to have been brought to the surface by the upheaval of the mountains.

The lignite beds are reported as varying from a few inches to ten feet in thickness, and in appearance to resemble the best quality of Pennsylvania coal. In some places a seam several inches in thickness occurs similar to cannel coal, as if the vegetable matter of which it was formed was originally in a pulpy state. These lignite formations, in their westward expansion, are reported more extensive, and the number of beds exposed more numerous, and are believed to extend all the way to Great Salt lake, in Utah, and to reach over a district at least 40 miles in width and 200 in length, north and south, through which passes the Union Pacific railroad. This lignite burns readily with some draught, even when taken from an out-cropping where it had been more or less exposed and subjected to atmospheric influences. It has a bright smoking flame, producing adequate heat, and emitting odor between bituminous coal and imperfectly-burning wood. Some of the fragments emit slight sulphurous odor, occasioned by the minute scales and spangles of iron pyrites scattered through the lumps, but, as compared with most bituminous coals, this mineral fuel is remarkably free from sulphur and other foreign substances.

All these beds of lignite repose on well-defined cretaceous rocks, and

some plants were obtained by the geologist in a bed under the first strata, which were apparently identical with species occurring in the valley of the Missouri river. The best evidence attainable tends to show these lignite beds to be of the lower Tertiary age, the strata appearing to have been subjected to moderate but long-continued heat, the evidence of which disappears in going westward from the main range of mountains. The value of the lignite, and especially the lower strata, is increased by the heat to which it has been subjected.

The results of these observations tend to show this locality to be the eastern limit of a remarkable coal basin, which will yet have most important influence on the early development of all that vast range of country between the Rocky mountains and the Sierra Nevadas. This region being so scantily supplied with timber, both for fuel and building purposes, the importance of the existence of vast deposits of mineral fuel cannot be overestimated. These facts inspire confidence in the future importance and productiveness of that immense range of country lying between the Missouri river and the Pacific ocean, leading to its early settlement through the development of resources not hitherto understood.

In the light of these facts, the desert is transformed into an inviting abode, and the vast treeless plains give place to expansive groves, prosperous farms, and happy homes.

The report *in extenso*, it is believed, will prove a valuable acquisition to science, and of material advantage to our people of the region extending from the Mississippi to the Sierras and Cascades.

CONTINUATION OF GEOLOGICAL EXPLORATIONS IN THE PUBLIC DOMAIN.

By the sixth section of the appropriation act of Congress approved July 20, 1868, authority is given to the Commissioner of the General Land Office for the extension of geological explorations as begun in Nebraska, and to this end the sum of \$5,000 was appropriated.

Immediately after the passage of the act, the service was placed in charge of Professor F. V. Hayden, as geologist, and on the 28th of that month instructions were communicated informing him that his explorations would commence where his Nebraska labors, under instructions of April 29, 1867, had terminated; that his geological researches would be extended westward of Cheyenne City, through Laramie plains, as far as Green river, in the direction of Fort Bridger, Wyoming Territory, and that his reconnoissance should be directed along the eastern slope of the Rocky mountains, in Colorado. He was directed to examine along that slope southward to the Arkansas river, and, if time allowed, to visit the public land parks, viz: North, Middle, and South parks of Colorado.

The collections of specimens illustrating geology, mineralogy, and paleontology, the geologist was required from time to time to forward directly to this office, so that the same, as the property of the United States, might be deposited in departmental chambers assigned for their preservation, study, and investigation.

He was further directed to send on every few weeks preliminary reports of the progress of his explorations, in order that this office might avail itself of the information in regard to the natural resources of the country designed to be reconnoitred, and consolidate and arrange the same for submission to Congress.

In the preliminary reports despatched by the geologist from the field of his labors, the first of which was received at this office on the 14th September last, it is shown that he has not attempted to furnish a detailed account of his operations, but merely a general outline of the work done, with some of the leading results.

The time intervening between the organization of the corps and the submission of his report was too short to permit him to accomplish any great amount of field-work, and prepare a report accompanied by the necessary maps, diagrams, and sections.

His examinations were resumed at Cheyenne City, along the line of the Union Pacific railroad.

The geologist ascertained that the country for 150 to 200 miles west of Omaha is very fertile, and, in an agricultural point of view, can scarcely be surpassed; beyond that point, however, there is an absence of wood and water, but as a grazing country it will eventually prove very valuable.

Geologically, the underlying rocks of that section belong to the upper coal-measure formation; overlapping the upper coal-measures, sandstones of the cretaceous period are discovered at about 20 miles north and 10 miles west of Omaha.

At the mouth of the Elkhorn river the rusty sandstone of the Dakota group occupies the whole country.

About 200 miles west of the Missouri, along the Platte river, the light clays and marls of the Tertiary period commence, being kept by superficial deposit of fine brown grit, probably of post-pliocene age, as it is filled with recent fresh-water and land shells, such as *helix*, *planorbis*, *pupa*, and *phiza*. These tertiary beds extend to the margin of the Laramie range.

At Sidney Station on the railroad, and at the west of it, there are some thick beds of light brown calcareous grit, adapted to building purposes.

Along the base of Laramie range, 16 miles west of Cheyenne City, there occur beds of white limestone, of the carboniferous age, which is burnt into lime of the finest quality.

The mountains contain an inexhaustible supply of building-stone. Sienites predominate, of which a compact fine-grained variety is found along the line of the railroad, near the summit of the first range.

About 30 miles north of Cheyenne City a vast deposit of magnetic iron ore, of the best quality, is found. Large erratic masses (boulders) of this ore lie scattered over the adjacent hills and valleys, and may be traced to the neighboring mountains, where the ore is interstratified with metamorphic rocks, literally forming mountains of this ore.

This locality is favored by nature for erecting iron furnaces for smelting the ore, the same lying upon the surface in large masses and quantities, and coal for fuel, limestone for flux, and building material for erecting furnaces, are in the immediate vicinity.

The coal found in this locality being lignite or brown coal of the tertiary period, will answer well for smelting purposes and for generating steam.

The analysis made by Dr. Torrey, of New York, shows it to consist of—

Carbon.....	59. 20
Water.....	12. 00
Volatile matter.....	26. 00
Ash.....	2. 80
Total.....	<u>100. 00</u>

In physical appearance this coal resembles anthracite; but the specific gravity is lighter, and it is liable to crumble in the atmosphere if not protected. It proves, however, to be equal to true bituminous coal.

The next point examined was the valley of Chungwater river, north of Cheyenne. It is ascertained that this region has been scooped out by

erosion, during the glacial period; evidence of formative power of water is shown here in the extensive terraces leading along the base of the mountains.

Sienitic rocks, formed in nucleus of this range, appear at this place, upon the flanks of which are seen, first, the red arenaceous beds, from 1,000 to 1,500 feet thick; also from 600 to 800 feet in thickness of variegated marls, without fossils. These beds have an inclination to the southwest in angles of 19, 11, and 4 degrees.

Cretaceous beds are here well represented, containing *baculites oratus* and a species of *inoceramus*.

Upon the cretaceous beds rests the White River tertiary, at a very small angle, as if they had been disturbed by the latest upward movements of the mountain ranges.

The next point examined was the valley of the Laramie river, beginning at Fort Sanders, and extending to where the river issues from the foot-hills of the mountains. It is nearly a level country, underlaid by cretaceous beds, through which was noticed the occurrence of thin layers of fibrous carbonate of lime, the fibres being vertical to the plane of stratification, filled abundantly with the little oyster, *Ostrea congesta*; a number of vertebræ of a saurian animal were also found. One of the spurs projecting from the main range exhibited a peculiarity of character at the east base.

Above the spur facing the Laramie plains, the upper cretaceous beds lean against the side, and no rocks of older dates are visible; on the west side, however, five miles distant, there can be distinctly observed the entire series from the carboniferous to the summit of No. 3 cretaceous.

It is of the first importance to determine the exact relation of the metamorphic rocks which flank the central nucleus of sienite in all this mountain range, to the other unchanged beds which reach down into the valleys. Are they conformable or not to each other? Did the metamorphic rocks lie in a more or less inclined position prior to the deposition of the silurian or carboniferous beds upon them? Up to this time it has been found difficult to determine these questions, in consequence of the discordant relation of the two series.

The sienite beds were pushed up in such a way that their east front is almost vertical, and the cretaceous beds at the foot, which were elevated at the same time, have fallen abruptly down, showing that they passed the vertical position 20 or 30 degrees.

On the west side of the range the slope is more gentle, and the carboniferous, triassic, jurassic, and cretaceous beds present distinctly their upturned edges to the scrutiny of the geologist.

No fossils have been found in any of the unchanged rocks below No. 3 cretaceous, and west of Fort Sanders, nor does the nature of these beds indicate that the physical conditions during their deposition were favorable to the existence of animal or vegetable life; certainly not for the preservation of organic remains.

The next point visited was the gold diggings located on the summit of the lofty mountains between 10,000 and 11,000 feet above the level of the sea, and near the line of the Union Pacific railroad. The gold is sought after in the gulches formed by the little streams flowing from the Medicine Bow mountains and emptying into the North Platte river.

The quartz seams supposed to be the source of the stray lumps of gold which had been picked up, being covered by a great thickening of superficial drift, eluded the search of the geologist. So far as he could observe, the gold is confined to the lower glacial drift, and his conclusion is, that gold would not be found here in paying quantities. These moun-

tains are, however, a continuation northward of the same range in which the rich mines of Colorado are located.

In the more lofty ranges and in the lower mountains are large forests of pine timber, which will eventually become of great value to this country. Already large quantities of this pine in the form of railroad ties are floated down the various streams to the Union Pacific railroad, and should the future settlement of the country demand, a class of people like the lumbermen of Maine and Michigan will some day fill these mountain regions.

There are several species of pine and one of spruce or balsam fir, *Abies Douglassi*. It is a beautiful and symmetrical tree of 100 to 150 feet high and straight as an arrow. The ties made from this spruce are of the best quality.

The observations of the geologist were next directed to the North Park, the geological character of which appears to be as yet undetermined; the route lay nearly southeast from Fort Sanders up the Big Laramie river towards its source in the mountains.

Comparatively few exposures of the basis rock were met with, as they were covered by superficial drift; a few sections, however, along the river banks exhibited the same succession of strata observed in the valley of Little Laramie river.

As the foot-hills of the mountains were approached the transition beds appeared on the ridge, all rocks of more recent date having been swept away by erosion.

Scattered over the valley appeared fragments of puddingstone and rusty-colored sandstone; beneath this was found an exposure of 400 feet of variegated arenaceous rock, probably jurassic. Higher up the sides of the mountain were revealed the red beds, about 1,500 feet in thickness, having been lifted up in a nearly horizontal position, presenting lofty escarpments of wonderfully picturesque appearance, revealing each layer in the order of succession, but cut into conical or pyramidal shapes. The harder layers, yielding less readily to atmospheric influences, project from the sides.

Approaching the higher ridges of the mountains, the sienitic nucleus was seen in place, but the unchanged rocks were not clearly made out in contact with them, so as to define their exact relation to each other. Lower down the geologist passed a series of alkaline lakes, consisting of shallow depressions, which receive the drainage of a small area without any outlet. The bottoms of these lakes in dry seasons are covered with white incrustations, rendering the water unfit for the use of cattle and destroying the life of such fish as escape into the same from the freshwater streams.

The course of the geologist along the Cherokee trail was about southwest from the Big Laramie river, over ridge after ridge for 25 miles, where the North Park was reached, passing through some highly interesting scenery. From the summits of the high ridges there was observed a series of lofty cones or pyramids, composed of metamorphic rocks of easy disintegration, giving roundness to the contour of the hills. The red sienite forms the nucleus of this conical elevation, flanked by strata of hornblende and gneiss, with intrusions of white quartz and greenstone.

The North Park is nearly quadrangular but somewhat oval in shape, extending 50 miles from east to west, and about 30 from north to south; it is surrounded by a high border, causing the included space to appear like a vast depression, which might once have formed the bed of a lake. The surface is undulating and well watered. Myriads of antelope were quietly feeding in this great pasture-ground, and although the

soil is rich, the season is too brief for successful cultivation of crops. Frost is formed nearly every night, and snow falls every month in the year.

The geology of this great basin is somewhat obscure, from the want of facts; the geologist found, however, the entire series of red and variegated beds, including a portion of the cretaceous strata, to be fully represented. They all incline from the flanks of the mountains and gradually assume the horizontal position toward the central portion of the park.

The lower cretaceous beds to the southwest form very conspicuous ridges, and are composed of beautiful puddingstone, with small rounded pebbles connected together by silicious paste. On the north side are large areas covered with loose sand, which is blown about by the wind, resembling the sand-hills on the Niobrara river. When closely examined, the sand is found to be composed for the most part of rounded particles of quartz and feldspar. Scarcity of vegetation gives a peculiarly barren appearance to the whole tract.

In the progress of his explorations the geologist on leaving the North Park crossed the range and descended into the Laramie plains, observing the very symmetrical anticlinal of the ridge, with red sienite for its axis, and bearing on its sides unchanged beds of carboniferous, triassic, jurassic, cretaceous, and in some places the tertiary rocks. The plains of Laramie exhibit a broad, undulating and almost treeless surface of 60 miles from east to west, and 50 from north to south, underlaid by rocks of the cretaceous period, isolated patches of tertiary with small deposits of coal. A quantity of local drift was found on Cooper creek, on a hill 500 feet high, paved with boulders much worn. Still proceeding westward and reaching Rock creek, it was discovered that wherever the tertiary came to the surface it exhibited promising beds of coal, in one place showing from 10 to 12 feet thickness. The valleys of these two creeks were erosive, having on the west high walls of coarse sandstone, in which were leaves of deciduous phanerogamous plants of supposed Tertiary age.

The next point examined by the geologist was the Elkhorn range and the valley of the Medicine Bow river, with its tributaries, the tertiary and the cretaceous being the prevailing rocks. Beds of coal were met with six feet thick, also beds of lignite. The rocks exhibited few traces of deciduous leaves and curious concretionary structure, the rounded masses becoming divided where exposed to atmospheric agencies. Large deposits of iron ore were seen near coal beds. The animals observed in this region were the sage rabbit, the little rock squirrel, and the cock of the plains.

The next station was Pass creek where large accumulations of cretaceous and tertiary rocks are exposed, the thickness of the beds reaching 5,000 feet. The broad plains lying west of the Elkhorn, with cheerless fields of artemisia and covering of boulders extend westward to Green river, a branch of the Colorado.

The course next taken by the geologist was northwest, to the vicinity of the Union Pacific railroad. The ridges showed rusty calcareous sandstone of upper cretaceous age, inclined at an angle of thirty to forty degrees. Few fossils could be seen, inoceramus, baculite, and ostrea, being most common. From this point to the Laramie river the same rocks and fossils, fields of artemisia, and alkaline lakes, prevail.

At Carbon station, 80 miles west of Laramie, numerous coal beds are worked, side tracks having been laid to facilitate the transportation to the railway. More than 1,000 tons have already been mined; it is of excellent quality and appears to be almost inexhaustible, and owing to

its purity is regarded by experienced miners as superior to English or Pennsylvania coal for the generation of steam.

The beds of rock above and below the deposit contain leaves of populus, platanus, and tilia, well preserved.

At the crossing of the railroad and cut at the North Platte an examination of a ridge of upheaval was made, the exposures at the base showing fine gray sandstone, 80 feet thick, suitable for building. Next above a seam two feet thick of indurated slate clay with gypsum; also two feet of arenaceous clay; ten feet of compact gray sandstone; eight feet of arenaceous clay containing traces of vegetable fossils; then 50 feet of yellowish gray sandstone, showing similar fossils; then 150 feet of brown indurated clay, containing ferruginous concretions, and finally a layer of dark brown arenaceous mud rock.

At Rawling Springs a cutting was passed displaying the entire series of rocks from the sienite to the cretaceous. The sienite dips 70° to the southeast; the unaltered beds rest upon them nearly in horizontal position. The appearance here of the whole series suggests that Potsdam sandstone and rocks of the lower silurian period exist. The deposits are from 500 to 800 feet thick, exhibiting the usual evidences of tidal stratification. West of Rawling Springs cretaceous rocks again predominate, and at the distance of 10 miles a coal mine is in operation, having a seam 11 feet thick, and is probably a prolongation of the beds at Carbon Rock and Cooper Creek.

At the station called "Separation," the Union Pacific Railroad Company, in sinking a well, encountered at the depth of 83 feet a bed of coal which had been penetrated to the depth of three feet, leaving the impression that these coal deposits underlie the whole country.

From Qverton to Bitter Creek the beds are of fresh-water origin, horizontal in position.

Near Black Butte station there is a bed of yellow sandstone, in part concretionary, varying in thickness from 150 to 200 feet. In one of the layers was found an abundance of deciduous leaves and palm leaf, probably the *Sabal Campbelli* of the coal beds of the upper Missouri. Further on beds of marine tertiary appear, having abundant impressions of plants. On the surface very distinct ripple marks are found, with apparent tracks of animals of various species. From this point to Fort Sanders geology exhibits but few changes, and is for the most part of tertiary and cretaceous character.

GEOLOGICAL AND MINERAL INTERESTS.

The proper development of the geological characteristics and mineral wealth of the country is a matter of the highest concern to our people.

It has been said of geology that "it excites a distinct interest in the external character of a country or district, independent of the beauties, ruggedness, sublimity of its aspect or of its geographical peculiarities;" that "it endeavors to trace a connection between its exterior features and interior structure, and in these, its simplest details, it bears upon agriculture and ultimately upon all the numerous arts in which mineral substances are concerned." Hence, that the farmer and architect should be geologists, as must be the mineralogist; that it is thronged with "records of strange and mighty changes and convulsions, or revolutions in climate and in the genera and species of the organic creation, carrying the mind back to a period infinitely remote, and showing that everything as we now find it has been gradually and successively developed, as it were, and that man himself has appeared but late upon this singular stage."

The legislative mind has shown its appreciation of the economic values of science, not only to individuals, but to local communities and to the whole country, in giving authority of law for setting on foot geological explorations elsewhere referred to in this report, with a view to the analyses of soils, the ascertainment of the peculiar adaptation of the same to the successful growth of different agricultural products, and in order that the hand of science might trace the beds and other deposits of coal, the great propulsive element by land and sea, and of ores of the useful and precious metals, extending professional researches to clays, marls, peats, and to the determination of the peculiar characteristics of rocks and limestone, and the value of the same as building materials.

In regard to mineral interests in the public domain, Congress has laid the foundation by a carefully prepared enactment of a system destined to be followed by the most important results to the miners and to the nation.

In order to furnish some idea, although on a very limited scale, of these interests, chambers have been set apart in the General Land Office for the formation of a national cabinet of natural history.

Accordingly, a series of alcoves, corresponding to all the States and Territories, have been prepared, and there has been placed in the same, so as to be accessible to the public, a collection of geological and mineral specimens, with a view to the representation of each State and Territory by a full series, not only of the metallic minerals proper, but coals, peat, soils, building stones, marbles, porcelain clay, potter's clay, and organic or fossil remains.

The collections have been arranged on scientific and systematic bases, looking to the presentation of a synopsis of the principal geological subdivisions with the different periods and epochs upon a regular scale, having at the base of each cabinet the *azoic* rocks, formed when animal life did not exist on our globe, the *palæozoic*, *mesozoic* and *cenozoic*, following in natural order of succession and including all the geological subdivisions. By this arrangement there is first presented the *Silurian* age, or age of *mollusks*, at the base of which in the Potsdam rocks are found the first vestiges of animal life, such as shells. Next above is the *Devonian*, or age of *fishes*, at the close of which period there seems to have been a general destruction of all its peculiar species of life.

Then we have the *Carboniferous*, or age of *plants*, when vegetation was in many places so abundant as to be deposited in vast beds, afterwards covered with sand and soft earth, thus to become by heat and pressure changed into coal.

Next in order presented is the *Reptilian age*, divided into the *Triassic*, *Jurassic* and *Cretaceous*. To this succeeds the *Tertiary* or *Mammalian*, when animal life existed in many of its present forms and a new order of life was instituted, a large portion of which continues to the present time.

The utility of cabinets of this character has been acknowledged by enlightened nations, it being important to the development of the mineral resources of the country in a scientific and economical manner. The donations and additions are increasing to such an extent that the chambers appropriated to that purpose have been filled, and many of the most interesting specimens cannot be exhibited for want of space.

It is therefore suggested that authority of law be given for the construction of a suitable edifice, the chambers of which should severally represent the States and Territories in regard to their geological and mineral interests and other peculiarities, so that at the capital might be found in miniature, as it were, an illustration of the wealth of the different political divisions of the republic.

SURVEY OF ISLANDS IN MEANDERED LAKES AND RIVERS.

Numerous applications have been made for information in regard to the survey of islands in lakes or rivers in districts where the office of surveyor general has been discontinued. The mode of proceeding adopted in regard to this class of interests is this :

Islands over which the lines of the public surveys have not been extended may be surveyed at the expense of the party applying, under the provisions of the 10th section of the act of Congress approved May 30, 1862, "to reduce the expenses of the survey and sale of the public lands of the United States." Statutes, vol. 12, p. 410.

Applications for the survey must be addressed to the Commissioner of the General Land Office, and be accompanied by the affidavits of at least two reliable and disinterested persons, showing 30 days' notice had been given the conterminous proprietors of the intention to apply for the survey of such islands, stating the estimated area, character, and situation of the island in the lake or river, with reference to the description of the section, township, and range on the main land, the same to be illustrated by diagrams.

The width and depth of the channel on either side between the island and the main shore must be stated, and whether the configuration of either shore has materially changed since the original survey of the water front on the main land. The applicant is further required to designate some competent and reliable surveyor, and send to this office a statement of the amount for which the service will be performed.

If, upon examination of the data presented in support of the application, it should appear that the premises ought to be surveyed as an island not connected with the main land, the applicant will be advised of the amount necessary to be deposited with a public depository to the credit of the Treasurer of the United States on account of the proper appropriation to defray the expense not only of the field-work of the survey, but of the sum required to pay for clerk-hire in the examination of the returns and the necessary protraction of plats. Upon the requisite deposit being made the depository is required to issue certificates of the fact in triplicate, one to be transmitted to the General Land Office, upon the receipt of which, all the other requirements having been complied with, the Commissioner will issue the requisite instructions to the surveyor to enable him to execute the field-work of the survey in accordance with the public land system. The fact of having borne the expense of survey, however, will give no priority of claim to purchase under existing laws, or affect the vested interest of any party should such exist, and in the absence of any such interest the premises will be liable to sale for cash to the highest bidder upon proper notice being given by the register and receiver, under special direction of the Commissioner, as contemplated by the fifth section of the act of Congress, approved August 3, 1846, respecting fragmentary surveys of public lands and the disposal thereof.

THE PRINCIPLES AFFECTING THE RIGHTS OF PROPERTY ON MEANDERED LAKES AND RIVERS, AND TO THE BEDS OF THE SAME, WHERE THE WATER HAS DISAPPEARED BY NATURAL OR OTHER CAUSES.

Questions relating to the title and ownership of islands in our large navigable rivers, of the river beds themselves, and of the beds of the shallow lakes found in many of the western States, are frequently brought before this office by contending parties; the premises claimed, on one side, as property belonging to the United States, subject to entry

or pre-emption under laws regulating the disposal of the public domain, and on the other as private property belonging to the owners of the opposite banks, upon the principle of the English common law, that the proprietor of the bank of a river not navigable holds to the central thread of the same. A river, at common law, is navigable where the tide flows and reflows, and not navigable beyond such point. As far as the influence of the tide extends, the rivers of England come within the jurisdiction of the admiralty courts, and their beds are public property; beyond the flow of the tide they are held to be *not navigable* in law, whether really so or not, the admiralty courts having no jurisdiction over them, and their beds are private property.

It may be observed here that even with the aid of steam, the navigability of English rivers above tide-water is comparatively inconsiderable in point of distance, not exceeding in any one instance, with the most elaborate improvements in the removal of obstructions and the erection of locks and dams, over 250 miles.

Such cases coming before the officers of the Land department are usually contested with great perseverance and ability, arising probably from the fact that the decisions of the highest courts in the several States upon the points involved have been conflicting.

The question as to how far the rule of the common law in this respect is applicable to our large streams appears never to have been satisfactorily decided by State or national tribunals. Some courts have applied the principle of *ad medium filum aquæ* to our largest rivers above tide-water, notwithstanding this maxim had its origin long anterior to the use of steam as a propelling power in England, where the rivers are comparatively small, and then only navigable where the tide ebbs and flows, and under a system of land administration entirely different from that prevailing in the United States; while other tribunals have regarded the principle as altogether inapplicable when applied to streams navigable by steamboats for thousands of miles, floating an inland commerce many times more extensive than our foreign trade, although not subject to tidal action, and where the method of alienation is restricted to lands previously surveyed, with the boundaries and areas carefully determined and carried into patent as the description of the premises sold, with express reference to the plat for greater certainty in identifying the tract conveyed; the sales being executed by public agents exercising special and limited powers according to statutory provisions. These conflicting judicial rulings furnish contesting parties in such cases with numerous arguments and authorities.

The principal rivers of England and Wales are the Severn, Mersey, Thames, Humber, Ouse, and Trent, having a united length of about 800 miles, but a navigable distance, even by steam, through means of extensive improvements, amounting in the aggregate only to a little more than 400 miles. The flux and reflux of the tide is observed in the Severn at the distance of 120 miles from its mouth, in the Thames at the distance of 72 miles, and in the Ouse and Trent at some distance above their junction; the united distance of tide-water in all the above-named streams being about 300 miles.

At the period when the common law was crystallizing into a compact body of jurisprudence, steam vessels were unknown, and sailing vessels not being adapted to make headway against the descending current of a river, it is not probable that navigation in the rivers of England extended beyond the flowing and reflowing of the tide. Hence designating a river beyond the flow of the tide as *not navigable* was at that age strictly accurate in the country where common law had its origin,

and the common law definition of a "navigable river" was reasonable and just.

Since navigable streams were useful to the public as great commercial highways, the policy of the law prohibited their beds from becoming private property, and consequently the beds of all rivers as far as the tide flowed and reflowed belonged to the Crown for the common benefit of all; and as they were not navigable in fact beyond the flow of the tide, they were of no more importance, commercially speaking, than the numerous smaller rivers over which the lines of our public surveys are uniformly extended, and the title to which passes to the patentees with the tracts of land through which they flow, and the beds of rivers not navigable, or in which the tide did not flow and reflow, were private property. The colonial settlers introduced the principles of the common law so far as applicable to the changed circumstances surrounding them, and finding the rivers of the Atlantic slope generally short, with rapid currents, similar to the rivers of England, being practically unnavigable for sailing vessels beyond the flow of the tide, they applied its definitions and its rules to the rivers of the New World. Consequently an American river not affected by the flux and reflux of the tide was regarded as not navigable. Since admiralty jurisdiction in England was confined to public navigable waters, embracing rivers as far as the tide ebbs and flows, the same limit was assigned to it by our earliest decisions. The courts of the United States, in construing the judiciary act of 1789, granting to the district courts admiralty and maritime jurisdiction, including all seizures under the laws of impost, navigation, or trade, of the United States, where the seizures are made on waters which "are navigable from the sea by vessels of 10 or more tons burthen, within their respective districts, as well as upon the high seas." (Statutes at Large, vol. 1, page 76, sec. 9.) Here, although the act extends the jurisdiction in express terms to waters navigable from the sea, the Supreme Court of the United States restricted admiralty jurisdiction to tide-water in repeated decisions by adopting the common-law definition of navigability, and holding a river in which the tide did not ebb and flow as unnavigable in law, whether navigable in fact or not. Hence the Mississippi at the distance of several hundred miles from its mouth, and from that point upwards, and all its navigable tributaries, furnishing navigation for nearly 17,000 miles, were defined as streams not navigable; and to this construction of the act of 1789 the Supreme Court adhered for more than half a century in following a definition the offspring of a different age, and having reference to a class of rivers with none of the commercial characteristics of the magnificent arteries of trade which traverse the valley of the Mississippi.

In the early history of the government and in the old thirteen States this construction was not far from correct in point of fact, because at that period the head of navigation on the rivers emptying into the Atlantic was generally the head of tide-water. It was only after the valley of the Mississippi had been settled, and particularly after steamboats came into general use on the western rivers, that the inconveniences of the common-law definition of a navigable river began to be seriously felt. After deciding several cases arising on the Mississippi, and encountering embarrassments in determining how far up that stream the tide really extended, the court finally, in 1851, in the case of the propeller *Genesee Chief et al. vs. Fitzhugh et al.*, 12 Howard, 443, abandoning the common-law definition of navigable water, and adopting that of the civil law, which recognizes all rivers as navigable which are really so, held that the admiralty jurisdiction granted to the district

courts in the United States under the Constitution extends to the navigable rivers and lakes of the United States, without regard to the ebb and flow of the tides. The Chief Justice, in delivering the opinion of the court and referring to the definition that limits navigability to tide-water, said: "If such be the construction, then a line drawn across the river Mississippi would limit the jurisdiction of the courts of admiralty, although there were ports of entry above it, and the water as deep and navigable and the commerce as rich and exposed to the same hazards and incidents as the commerce below. The distinction would be purely artificial and arbitrary, as well as unjust, and would make the Constitution of the United States subject one part of a public river to the jurisdiction of a court of the United States, and deny it to another part equally public and but a few yards distant.

"It is evident that a definition that would at this day limit public rivers in this country to tide-water rivers is utterly inadmissible. We have thousands of miles of public navigable waters, including lakes and rivers, in which there is no tide. And certainly there can be no reason for admiralty power over a public tide-water which does not apply with equal force to any other public water used for commercial purposes and foreign trade." (See Supreme Court decisions on this point: The case of the *Thomas Jefferson*, 10 Wheaton, 428; *Perox vs. Howard*, 7 Peters, 324; *Steamboat Orleans vs. Phoebus*, 11 Peters, 175; *Waring et al. vs. Clark*, 5 Howard, 441; *New Jersey Steam Navigation Company vs. Merchants' Bank*, 6 Howard, 344; and the case above quoted, subsequently approved and affirmed in the case of the *Hine vs. Trevor*, 4 Wallace, 555. Now the question presents itself, regarding it as purely artificial, arbitrary, and unjust, to suffer a line across the Mississippi at the head of tide, difficult and perhaps impossible accurately to locate, to limit the jurisdiction of the admiralty, for the reason that there are ports of entry above such line, the water as deep and the commerce as rich as below, whether the same reasons do not prove the absurdity of retaining the common-law distinction as to the bed of the river, holding that portion of it below such line as public property, on account of its character for navigability, and that above the line as private property, although possessed of the same commercial importance and similar in every respect to that below the line, except in the ebbing and flowing of a scarcely distinguishable tide. Such application of common-law principles is believed to be at variance with its spirit, and would not now probably be sanctioned in an English court.

Chief Justice Tilghman, in deciding the case of *Carson vs. Blaizer*, 2 Binn., 477, in the supreme court of Pennsylvania, speaking of the *Susquehanna*, says:

If such a river had existed in England, no such law (declaring its bed to be private property belonging to the owners of its banks) would ever have been applied to it. Their streams in which the tide does not ebb and flow are small.

Chancellor Walworth, of New York, in *The Canal Commissioners vs. The People*, 5 Wend., 423, holds the following language:

It is, therefore, preposterous to contend that the limited doctrines of the common law are applicable to the *Mississippi*, *Ohio*, *Susquehanna*, *Niagara*, and *St. Lawrence*. If applicable, *Grand Island*, in the *Niagara*, with 18,000 acres, would belong to the owners of the shore

And in a quite recent case in New York the common-law rule was emphatically rejected in one of the ablest decisions ever rendered on this question. See *The People vs. Canal Appraisers*, 33 New York, (6 Tiffany,) 461.

The large rivers of the United States above tide water correspond, therefore, to the navigable tide-water rivers of England, in every respect,

except only the immaterial incident of not being influenced by the tide, and differ from those not navigable in all other particulars. As to having ports of entry, and being carrying places of foreign and domestic trade within the jurisdiction of the admiralty courts, they are like the tide-water rivers of England, and there would seem to be the same reason for holding their beds to be public property, and certainly more reason why that question should be determined by the commercial character of the streams than by the wholly unimportant circumstance of being more or less remote from the sea. It would appear unreasonable to place the Mississippi, Missouri, and Ohio, above tide, having an aggregate navigable distance of more than 6,000 miles, upon the same footing as to exclusive ownership as the upper portions of the Thames and the Mersey, naturally not navigable at all at such points. Equally inappropriate is it to subject conveyances by patent of lands bordering on these and other large streams, the beds of which are meandered and surveyed, to the same rules of construction as to boundary that apply to grants bounding on the unnavigable rivers of England, and hold that a conveyance of a quartersection of land on the upper Mississippi carries the patentee to the centre of the river in the same manner as a grant on the banks of the Thames, above tide-water, would carry the grantee to the middle of that stream. Here all analogy seems wanting, and a common-law maxim, excellent and valuable in its place, is violently forced into service, never sanctioned by an English authority that has come under our notice. In the public land system of the United States many sections of land are sold traversed by a river over which the lines of the public surveys have been extended, the bed of which constitutes a part of the section conveyed, is paid for by the purchaser and covered by his patent. In such a case the patentee is the exclusive owner of the bed of the stream within the boundaries of his purchase, and according to all the authorities, American and English, he may sell the bed to one man and the banks to another; he may sell the banks, reserving the bed, dispose of the banks to several purchasers, with one-half the bed to each, or he may sell the whole of the river bed to the purchaser of one of the banks. Being the exclusive proprietor, his right to deal with his property in such manner as he deems best is undoubted, and if he takes the precaution to express his intention in clear and explicit language, there is nothing left for a court of justice to do but to enforce his grants according to such intentions. But suppose that in conveying the opposite banks to several purchasers, bounding each by the river, without any express reservation of the bed, he uses language somewhat obscure as to his intention to carry each grantee to the middle of the stream or limit him to the banks. Here is a case for the exercise of the judicial functions in giving a construction to the doubtful calls in the description, and the maxim *usque ad filum aquæ* is adopted for the purpose of furnishing legal certainty in a case where actual certainty is wanting. In this case the grantor would be presumed to have intended to make the middle of the stream the boundary, for the reason that being the owner of the stream he had the power to convey it, and not having used language clearly indicating a different intention, as it was his interest and duty to do if he wished to reserve the bed, the grant should be construed strictly as to him and liberally in favor of the grantees; and this is precisely the position of every grantor in England to whose conveyances the rule of *ad medium filum aquæ* is applied. In every case it is a rule of construction and gives effect to what is presumed to have been the intention of the grantor in cases where he had the power to convey according to that rule and failed to use language

clearly showing a different intention. Conveyances made in this country by patentees and their grantees, of lands on the margins of rivers whose beds have been surveyed and patented, present the same opportunities for the application of the maxim as conveyances in England or in the older States of the Union. But such conveyances are altogether different in several essential particulars from that of United States patents for land bordering on meandered and unsurveyed streams. In such cases it cannot be presumed that it was the intention to convey to the middle of the river, for the sale was regulated by law, which provides only for disposal of lands previously surveyed and platted, no authority existing to embrace unsurveyed land in the patent. There are no doubtful calls requiring the intervention of a court to construe them; all is clear and explicit, evidenced by the field-notes, by the plat, by the act of Congress providing for the sale, and by the terms used in the description in the patent. All these are open to the inspection and examination of the patentee, and being presumed to know what the law provides, he is charged with a knowledge of the fact that the bed of the river, being unsurveyed, was inalienable when the patent was issued. Such a sale is therefore wanting in all those characteristics which, at common law, are necessary to call into force the maxim quoted. It never could be applied where the premises conveyed were clearly and explicitly, by express language, limited to the banks, or where the grantor had no power to go beyond. The bed of the river never passed as an incident or appurtenance to a conveyance of the bank, but as a part of the subject-matter of the grant, as a part of the premises actually described, upon the presumption that the call was intended to follow the central thread of the stream. It is more than preposterous to hold that a government patent, like the deed of an individual, is to be construed strictly against the government and in favor of the grantee.

The disposal of the United States lands is regulated by statutes with which every patentee is presumed to be acquainted; they are carried into effect by ministerial officers whose duties are also prescribed by law, and the question in all such cases is, what does the law provide? Within its provisions the acts of the officers are valid; if they exceed these, they are void. See 9 Cranch, 87, Polk's Lessee *vs.* Wendell; also, 5 Wheaton, 301. An individual acting in his own behalf is presumed capable of protecting his interests, and as to his own acts such a rule of construction is proper. The people, acting through public agents, have no protection except upon the principle that the laws they have enacted contain the full measure of their agents' authority. The inapplicability of the maxim *usque ad filum aque* to sales of land made according to a previous survey and plat may be further illustrated as follows: Sections one and two of a certain township are exposed to sale according to law; the line between the two sections runs up a river surveyed, platted, and sold, in such manner as to leave one-fourth the bed on section one, and three-fourths on section two. The patents describe the land according to the lines of survey, and the sections are held by different grantees, section one being sold first. Will it be contended now that the patentee of section one can cross the lines of his section, and claim half the bed of the river? It is very clear that he cannot, for in that case he would appropriate part of section two, which he never purchased, and which was patented to another grantee. If the line between the two sections were to run up on the margin of the river, leaving the whole of the bed on section two, the grantee of section one would still be limited by his section lines, and the whole of the bed would belong to the grantee of section two. These positions cannot be controverted. They have been acted upon ever since

the foundation of the public land system, are a matter of frequent occurrence, and furnish a complete answer to the claim that the common-law rule of riparian ownership applies to sales made by the government of the United States. Now, if the patentee of section one cannot cross his lines and claim to the middle of a surveyed river, subject to sale, the bed of which lies wholly in section two, with its margin on section one, upon what principle can he cross the lines of his grant, and claim to the middle of a river entirely segregated from the saleable lands, unsurveyed and not subject to disposal. The reason why the common-law maxim has no application to these sales is simply because it never was applied to grants in which the calls were certain and explicit, and the intention to limit the grantee to the bank or shore, expressed in appropriate language; circumstances necessarily incident to sales of land made according to surveys and plats previously executed. In an ably contested case recently before this office, from one of the northwestern States, involving claims to premises at or near the mouth of a river expanding into what is usually called a lake, the facts and rulings were to the following effect: The premises were not the product of gradual accretions to the fractional lots bounding on the waters, enlarging their areas and changing the course of the river and lake; nor was the same a portion of the main land previously surveyed, sold, and subsequently detached from the shore by the inroads of the stream. In the latter case no action could be taken, the power of this office to exercise control over the public lands ceasing with their sale; for tracts once disposed of to private parties cannot of course be surveyed and sold a second time. In reference to such inconsiderable augmentations as are frequently made to lands bounded by a stream by the deposit of alluvion between the former bank and the receded waters, the rule of the common law has been recognized as giving to riparian proprietors the new formed soil, upon the principle that the profits and advantages of a thing belong of right to him who, under a change of circumstances, is exposed to suffer its damages and losses. The land found within the old meandered lines of the lake falling within neither of the classes of formations above mentioned, may be described as the result of a gradual disappearance of the waters by evaporation, the elevation of the bottom of the lake or river, by the successive deposit of alluvion brought down the stream during freshets, and the annual accumulations arising from the decay of dense vegetation. These agencies have doubtless been operating for many years, gradually changing the condition of the premises from water to land, as similar causes are transforming the channels and beds of many of the shallow rivers and lakes in all portions of the country. The extent of the premises thus affected, and which was the subject matter of our ruling, is about 600 acres, embracing a large portion of what would be section 17 and a small part of what would be section 18, if surveyed and designated on an ordinary township plat, with portions of the partially surveyed sections 7, 8, 16, and 20, covering an area much larger than that of the fractional lots or smaller subdivisions bounding the marsh. To the claim of the contestants that the land, if any exists, belongs to the owners of the adjacent lots, upon the common-law doctrine that the proprietor of either bank of an unnavigable stream owns to the middle thread of the same, or, as usually expressed, *ad medium filum aquæ*, and that the proprietor of both banks owns the bed of the river, it may be replied that even at common law this maxim never was of universal application, and, as understood at the present day, operates only in giving construction to calls in a grant or conveyance referring in general terms to a river or stream as a boundary, and where the intention is not clearly

apparent to stop short of the middle of the stream. In all such cases the riparian proprietor is presumed to own to that line, or, if his grant embraces both banks, to own the *alveus* or bed of the river itself. But, as indicated in the foregoing, it has never been doubted that the owner may convey the bed of the river to one person, and the adjoining banks to others. Lord Chief Justice Hale, in his treatise *De Jure Maris*, admits "that one man may have the river and others the soil adjacent," and that "the prima facie presumption of ownership of the bed of the stream by the riparian proprietor may be rebutted by evidence that the contrary is the fact."

Chancellor Kent states the rule as follows :

A grantee bounded on a river goes *ad medium filum aquæ*, unless there be a decided language showing a manifest intent to stop short at the water's edge."

This of course is to be understood of a grantee whose grantor had the power to transfer to such a line, because, if he had previously conveyed the bed of the stream to another, the grantee of the bank would stop at the water's edge, no matter what the language of the conveyance might be. Deeds of land on the north bank of the Ohio river carry the grantees only to low-water mark, the Supreme Court of the United States having decided that in ceding the northwestern territory, Virginia retained the bed of the river, and a grantee of lands in Alabama, bounding on the Chattahoochee river, would own only to the bank of the stream, no matter what might be the language of his deed, as it has been decided that the boundary of the State extends to the west bank of the river, Georgia, in ceding the western lands of that State to the United States, retaining the bed of the stream to high-water mark on the west side. *Handy's Lessee vs. Anthony et al.*, 5 Wheaton, 374; John H. Howard, plaintiff in error, *vs. Stephen M. Ingersoll*; John H. Howard and Josephus Eckolls, plaintiffs in error, *vs. Stephen M. Ingersoll*, 13 Howard, Sup. Ct. Rep., 381.

Chief Justice Parker, in *Hatch vs. Dwight*, 17 Mass., 289, says:

The owner may sell the land without the privilege of the stream, as he will do if he bounds his grant by the bank. The proprietor of adjoining lands, who is also the proprietor of the bed of a river, may grant and convey the bed of a river separate from the land which bounds it.

See Angell on Water Courses, 4 and 5; *Den vs. Wright*, Peters, C. C. Rep., 64; *Knight vs. Wilder*, 2 Cush., 199; *Child vs. Starr*, 4 Hill, 369. There are at least two classes of cases, therefore, where the doctrine of *ad filum aquæ* cannot prevail. First, where by the terms of the grant it is evident that another boundary was intended; second, where the grantor had no power to make a conveyance to the middle of the stream. The rule of the common law may, therefore, be expressed in the language of Chief Justice Wilson in his separate opinion dissenting from some of the conclusions of the majority of the court in the case of *Middleton vs. Pritchard*, 3 Scammon, 522:

A grant of land upon a river extends the title of the grantee to the middle of the same, if the grantor has authority to extend it so far, unless limited to another boundary by express terms.

The right of a riparian owner to claim to the middle of the stream is therefore merely *prima facie*, and may be rebutted by showing that the calls in his conveyance limit him to the bank or shore, or that his grantor had no power to carry him further. The same principle applies to the construction of grants bounded upon highways, party walls, and ditches, constituting natural boundaries between the lands granted and the adja-

cent property. See Woolrych on Ways, 5 and 8; Warner *vs.* Southworth, 6 Cóm. Rep., 471; Jackson *vs.* Hathaway, 15 John., 454. As these are the views of text writers and the rulings of the courts, it follows that the maxim *ad filum aquæ* could have no application to sales of land bounding on meandered rivers, made by public officers under the laws of the United States, for such sales are prescribed by law and are expressly limited to the lands previously surveyed and platted; hence any attempt on the part of these officers to sell a single acre of unsurveyed land would be void for want of authority. The beds of meandered rivers and lakes are not surveyed, and the power of agents executing sales of adjacent lands to carry purchasers to the middle of the stream is clearly wanting. There is no question if the officers of the land department were to attempt to sell the bed of any meandered stream the purchaser would acquire no legal title, for the simple reason that the law does not authorize such a sale. Now if this cannot be done directly for want of authority in public officers, how can it be contended it may be done indirectly by a sale of the land adjoining, when, according to all the authorities, the doctrine of *ad filum* invariably presupposes a power in the grantor to convey to such boundary, and in the absence of such power the rule has no application.

Certainly such a theory would ignore the salutary principles pertaining to the conduct of public agents charged with the execution of a special trust for the purpose of giving effect to another legal principle confessedly inapplicable to a large class of riparian grants. It has been assumed that when the law has once fixed the proprietorship of the shore or bank of a river, the soil of the bed follows as an incident, or rather as a part of the subject-matter, *usque ad filum aquæ*. But if any such principle exists it must also apply to lands on the north bank of the Ohio and the west bank of the Chattahoochee, localities in which it has been already shown, according to decisions of the Supreme Court, proprietors own only to low-water mark in the first case, and to the west bank of the river in the other, and no phraseology in the deeds or grants under which they claim can carry them beyond these boundaries. This principle, if it has any foundation in fact, would also necessarily apply to a conveyance of the bank of a river by a grantor who had previously conveyed the bed to another grantee. But such doctrine would directly contravene an unbroken line of decisions extending back to the time of Chief Justice Hale. See Jackson *vs.* Hathaway, 15 John., 447; Tyler *vs.* Hammond, 11 Pick., 193, 214; Harris *et al. vs.* Elliott, 10 Peters, 53; Leonard *vs.* White, 7 Mass., 6; United States *vs.* Harris, 1 Sumner's Reps.; Cafel *vs.* Busyard, 6 Bing., 150; Archbishop of Canterbury *vs.* Tappen, 8 B. & C., 150; Coke Lit., 121 *b*; Child *vs.* Starr, 4 Hill, 482. In the last case it was said:

The bed of a river is a substantive matter of grant and can only pass as such. It can never pass as incident or appurtenant to a grant. It is land, and land cannot be incident or appurtenant to land. A conveyance of one acre of land can never be made by any legal construction to carry another acre by way of incident or appurtenance to the first. That land and that only which is expressly embraced in and forms the subject-matter of a grant, passes under it.

Apply these principles to conveyances made by government officers charged with specific trust, limited to the disposal of surveyed lands, described in the patents according to specific limits between township, range, and subdivisional lines, actually run by surveyors and represented on the official maps, and the idea of the title of the grantee extending to the middle of a meandered and unsurveyed stream would seem to be as effectually excluded as by any verbal reservation that might be introduced into the instrument of conveyance. Lands bordering on mean-

dered rivers are frequently entered by actual settlers under the pre-emption and homestead laws, in which the maximum quantity taken by any one person is limited to 160 acres. Will it be contended that such claimants, after having each selected and entered on the river bank the full quantity allowed by law, and applied for and obtained a patent for the same, are entitled by some undefined process to, perhaps, an additional 160 acres of unsurveyed land in the bed of the river, in defiance of statutory limitation? Such construction would give the rule a more latitudinous application than it has ever yet received.

Chancellor Kent, who was a great admirer of the common law, and favored its application to riparian rights, even in the case of our large navigable rivers, in the 3d volume of his Commentaries, p. 537, varying the language already quoted from his works, expresses the rule thus:

Grants of land, bounded on rivers above tide-water, carry the exclusive right and title of the grantee to the centre of the stream, unless the terms of the grant clearly denote the intention to stop at the edge or margin of the river.

Now, when lands bordering on a meandered and unsurveyed river are described in a United States patent as the southeast quarter of section eight, in a township and range of a given meridian, it may certainly be claimed that "the terms of the grant clearly denote the intention to stop at the edge or margin of the river," for the reason that beyond the margin there are neither sections, quarter sections, nor fractional lots. These terms, being exclusively applicable to the subdivisions of the surveyed lands on either side of the stream, can have no proper and legitimate application to sales made by United States officers of lands bordering a meandered and unsurveyed river, because all the authorities admit that no such result follows where the terms of the grant clearly denote the intention to stop at the edge or margin, or where the grantor has no power to go beyond, these circumstances uniting in all conveyances made by the United States.

No language could more emphatically denote the intention to stop at the margin or meandered line than what is used in government patents, for all the terms employed in the description have reference only to premises actually surveyed, platted, and areas computed, and could not by any rational construction be applied to the unsurveyed bed of a river or lake. Nor could there well be a clearer case of want of power to carry the grantee beyond the margin of such a stream or body of water. So well established is the rule that the United States officers can make no sale or conveyance of land except in pursuance of statutory provisions, that the Supreme Court has repeatedly decided that patents issued without such prerequisite authority are entirely void. See *Polk's Lessee vs. Wendell*, 9 Cranch, 99; *Stoddard et al. vs. Chambers*, 2 Howard, 284; *Wills vs. Stoddard et al.*; 8 Howard, 345; *United States vs. Stone*, 2 Wallace, 525.

As no law exists providing for the sale of unsurveyed land, the authority to transfer the title to the bed of a meandered river is altogether wanting; and as such bed cannot pass by a direct transfer, nor as incident or appurtenant to a grant of lands on the margin, it is not understood by what principle the grantee of the bank could hold to the middle of the stream. The body of water, in a case recently decided by this office, is more correctly called a port or harbor of Lake Michigan, and appears to be entitled to be considered such, from the fact that it has an actual head where the current of the river is lost in the still waters of the lake, from its depth and from participating in the changes occurring in the waters of Lake Michigan, and in that case grants of land on its borders extend only to the water's edge. If, therefore, the

premises in controversy at the time of the survey of the adjacent lands actually constituted the head of a lake, the maxim of *ad medium filum aque* has no application to grants of land on its banks. This is a point too well settled to render it necessary to enlarge upon it by discussion. See Angell on Water Courses, § 40; *Waterman vs. Johnson*, 13 Pick., 261; *Canal Commissioner vs. People*, 5 Wend., 423; *Kent's Com.*, vol. 3, p. 536. The cases of *Middleton vs. Pritchard*, 3 Scammon's Illinois Rep., 519, and *Morgan and Harrison vs. Reading*, 3 S. M. & M., Miss. Rep., 366, in which it was decided that riparian proprietors on the Mississippi own to the middle of that stream, are not in harmony with the established practice of the government, for ever since the organization of the public land system the Executive has claimed and exercised the right of surveying and disposing of islands in the Mississippi and its navigable tributaries, and all other navigable waters in the public land States and Territories of sufficient size to justify the expense. See Chief Justice Wilson's separate opinion hereinbefore mentioned. Sometimes these islands have been disposed of with lands on the margin; but more frequently they have been surveyed and sold long afterwards. The lands bordering the Kalamazoo river, Michigan, in a certain township, were surveyed in 1831 and sold subsequently, leaving a large island within the banks which was not dealt with until 1850, when the lines of the public survey were extended over the same and the land disposed of to the highest bidder. So of shallow lakes in the public domain. They have been frequently meandered when the bordering lands were surveyed, and subsequently on being reported as dry have been surveyed and brought into market. In all these instances the United States have but exercised the ordinary rights of proprietorship. Being the owners of the banks and the bed of the stream they have undoubted right to dispose of them to the same or to different individuals, at the same or at different times, as fully and completely at least as could be done by a private citizen under similar circumstances; the only substantial difference being that the government, acting through the instrumentality of public agents, could execute grants only according to regulations prescribed by law, and in the absence of legislative authority had no power to alienate any portion of the public lands.

The doctrine that the beds of the navigable rivers of the United States above tide-water belong to the riparian proprietors has been denied by the courts of New York, Pennsylvania, South Carolina, Alabama, and Iowa. In the New England States, and some of the southern and western States, the common-law theory has been recognized; while in Virginia, Tennessee, North Carolina, and Michigan, the decisions have been conflicting.

The tendency of the latter decisions, however, appears to be that the common-law rule is inapplicable to such large navigable rivers as the Mississippi and many of its tributaries, and the rulings of the courts are beginning to coincide more nearly with the practice and decisions of the department.

As to the integrity of the public surveys, it may be observed that the United States dispose of lands bounding on rivers upon the same terms as other lands are sold. The purchaser is protected as to the lines enclosing his purchase, and the government guarantees the title of the premises actually described and conveyed. As to these he cannot afterwards be disturbed; but no obligations are assumed in reference to lands lying outside his lines. The government, as a vendor, of course, neither guarantees that an adjacent lake will not eventually become dry land, nor that a bounding river will not change its course. As it is not proposed

to change the lines of the survey actually made on the borders of a marsh, or in any way interfere with the lands of the riparian proprietors, it was held that the claims of parties to the unsurveyed lands within the marsh stood without the pale of legislation respecting the disposal of the public lands. (Laws of March 2, 1849, September 28, 1850, and March 12, 1860, respecting swamp and overflowing tracts.)

In the report of last year allusion at some length was made to the subject of swamp concessions.

The service required by the legislative grants has been industriously prosecuted, yet great care and precaution are required in view of the many interferences from adverse individual claims, or franchises for special purposes, besides misapprehensions which existed as to the construction of the statutes here enumerated.

As will be seen by tabular statements elsewhere given, there have been within the fiscal year ending June 30, 1867, embraced by this report, approved and certified to the States 145,628.89 acres. This act of approval, however, carries with it no fee to the lands, except in the case of selected lands under the act of 1849, applicable to Louisiana alone, being in all other cases merely an intermediate action enjoined by the law as preliminary to the final act of patenting.

Of approved lands there have been within the last fiscal year carried into final patent 1,074,263.87 acres.

The State of California is the only one from which selections have been received since last report. These are in most instances in such shape as not to show the exact area; yet the estimated amount selected from that State is 47,174.04 acres. The aggregate quantity of swamp lands in all the States benefited by the various swamp grants is as follows:

Selected.....	60, 293, 388.67
Approved.....	47, 426, 851.44
Patented.....	44, 374, 463.86

Under the provisions of the indemnity acts of 2d March, 1855, and 3d March, 1857, there have been awarded during the past year in money \$13,217 84, and as indemnity 113,568.96 acres of other lands, making an aggregate cash indemnity since the passage of the acts last referred to of \$709,562 40, and 628,035.82 acres.

On reviewing the immense area of the swamp concessions, as shown in the foregoing statements, it is to be regretted that no data sufficiently reliable can be given exhibiting the extent to which the expressed objects of the grant may have been carried out by the several beneficiaries.

The additions to the productive surface of the earth, and the improvements in the sanitary condition of regions notoriously malarial, are matters of more than local interest; and an exhibit of the extent to which these may have been prosecuted would form an interesting feature in the history of our public domain. Were there assurances that these results had been to a considerable degree brought about by the munificence of this immense franchise, the country at large could feel that the republic was measurably compensated for the liberal donation. It is not improbable that in isolated cases of individual tracts the reclamation has been thoroughly made, but in the region of all others demanding urgent attention in this respect, the fact is apparent that the grant, extensive as it is, has failed to bring the results that were most ardently hoped for at the time of its passage, reference being here made to the region of the lower Mississippi.

In the previous annual report the extent and importance of the needed reclamation were adhered to, and reference made to some of the methods

by which it is supposed this could be accomplished. In view of the magnitude of the interests involved, it may not be amiss again to refer to the subject, if only to call attention to its importance.

The imperfect works constructed prior to the year 1860, for the purpose of restricting the waters of the Mississippi to their proper channels, were, during the years of the recent war, neglected to an extent which greatly impaired them, and which now threatens the utter desolation of extensive agricultural regions along its borders, unless timely and efficient preventive efforts are employed. The reports received from that locality, at every recurrence of the season of annual floods, show that unless efforts of this nature be vigorously and speedily resumed, an immense destruction of property by inundations, and the early transition of extensive areas of land, otherwise unsurpassed in productiveness, into worthless and miasmatic marshes, will be the inevitable result.

The subject is not a new one, having commanded the thoughtful attention of practical and scientific men from a period ante-dating our acquisition of the territory mainly subject to these inundations.

The efforts put forth from time to time by private enterprise, and even when re-enforced by legislative franchises in a limited degree, have failed to render permanently secure the regions they designed to protect. It is a work that would seem to demand, on account of its magnitude and importance, the helping hand of the country in its national capacity; a work to be speedily and effectually done; to endure for all time, and not to be constructed at long intervals of time and short intervals of distance, to be, perhaps, demolished in detail by successive floods.

In this reference is made to the levee system alone, but I am not unmindful of the fact that able and reflective men have advocated other methods for remedying the evil. In fact the hydraulics and physics of the lower Mississippi have been among the most fruitful of scientific studies afforded by our physically varied country.

It may not be inappropriate to briefly glance at the various methods proposed, by which it is sought to restrain the waters of the Mississippi and its tributaries in time of flood, and to consider the benefit to be derived from any successful accomplishment of that object. In this I am largely indebted to the able and exhaustive report made by the present efficient chief of the engineer corps, for most of the facts, statistics, and conclusions.

In addition to the levee system, hereafter to be more fully noticed, there have been proposed the following projects for preventing the inundations of the Mississippi:

1. By artificial lakes or reservoirs constructed at convenient and feasible points upon the upper tributaries by means of drains.
2. By directing the course of some of these tributaries to the extent of giving them new outlets.
3. By outlets from the main river.

The first named of these methods has commanded the attention of scientific men in both hemispheres, and in Europe, in some few instances, has been successfully carried into execution. This system of reservoirs has for its objects not only the withholding of surplus waters to prevent inundation, but also the use of waters thus withheld for the purpose of improving navigation in periods of extreme low water. In application to the region of the lower Mississippi it has, however, been found impracticable to employ them; first, for the reason that the natural topography of the country where the floods generally rise is in no manner adapted to the construction of such works; and second, even if the case were otherwise, the immense cost of reservoirs adequate to the object sought

would be an insuperable objection to their construction. It is estimated that to have fully protected the alluvial region of the Mississippi valley from the ravages of the great flood of 1858, by this system of reservoirs, would have involved an expenditure of \$215,000,000. The whole project can therefore be considered as chimerical.

The diversion of some of the principal tributaries by means of new channels of outlet is next to be considered. There have been many plans suggested by which it was thought the maximum discharge of flood water into the Mississippi could be lessened, and, perhaps, new channels for commerce created.

First of these in the extreme north is the project for uniting the upper Missouri river with the Red River of the North. The distance between the Missouri and Mouse rivers, the latter being a tributary of the Red River of the North, is 40 miles at the nearest point. This dividing space in its physical aspect is a high plateau, composed of substrata of clayey loam mingled with stone and boulders, which fact, together with the remote district in which it is situated, would render the work an expensive one, even if it promised success in diverting the waters. But as the inundations of the Mississippi are caused invariably by the sudden rise of waters in the lower tributaries, this remote northern experiment could in no event remedy the evil.

Public attention has also been called to a place for diverting the waters of the Arkansas river, but this also would of necessity be of enormous expense, and its greatest success would simply relieve one region of the country, to the detriment of another, for the waters thus drawn off from the Arkansas would again find their way to the Mississippi by the Red river, while the bayous through which the proposed channel would lead would themselves require the restraining influence of levees to prevent the same disasters along the new channel that it aimed to remedy in the old. The same can be said of any plan intended to change the course of the Red river. It would be merely shifting the difficulty from one region to another, and the change would bring a demand for additional efforts for protection against inundations.

An article in a recent number of De Bow's Review proposes a project, of grand proportions at least, by which it is claimed that not only could the maximum of water in the Mississippi be reduced, but at the same time a new, convenient, and important channel of commercial intercourse be established through a portion of the country where such advantages are much needed. It is briefly this: To construct a canal by tapping the Missouri at Kansas City, conveying the waters by canal to a branch of the Osage, connecting by canal with the Neosho river near the falls; thence down that river 250 miles to Fort Gibson; thence down the Arkansas to Fort Smith; thence passing around the base of San Bois mountain, through a branch of the Arkansas and into Red river by a canal; thence down Red river to a branch and connecting by canal with the Sabine river, and thence to Sabine bay. The intelligent writer of the article referred to claims for this project perfect feasibility, but in the absence of any scientific survey it is only referred to as one of the many projected plans arising out of the discussion of this important subject. It can hardly be supposed, however, that any canal serving the purposes of ordinary navigation could at the same time deplete the excess of waters in rivers of such magnitude as the Mississippi and many of its affluents.

We next consider the feasibility of outlets as applied to the main river.

This system receives the endorsement of many of our ablest engineers,

and there is no doubt as to its efficacy so far as simply depleting the waters of the river is concerned. This is fully demonstrated by the monster crevasses which at different periods of time have broken through the banks and discharged immense quantities of water into the adjacent swamps and bayous. But they are also exposed to imminent dangers that would arise therefrom, by showing that when the swamps or bayous have received to their full capacity the waters of these waste-rivers, an inundation of the surrounding plantations is certain to follow. There is also the additional danger that these artificial outlets would in time, by the continuous washing of their beds, become to all intents main channels, and by that means reduce the mean depth of the water in the Mississippi at the delta, and seriously impair the navigation of that stream. The conclusion reached is, that while these waste waters would reduce the maximum rise in the immediate localities where they might be constructed, they would afford no protection, for the simple reason that they in time would be as unmanageable as the river itself.

What remains then to be done, or what can be done within the reasonable limits of human capacity? It is evident from the foregoing that the most certain, economical, and permanent method of restraining and controlling the ravages of the annual flood, and affording protection to the fertile regions which are so often devastated by them, is the

LEVEE SYSTEM.

The Mississippi assumes its turbid character from the junction of the Missouri, and its depredations in flood time continue from that point to the Gulf of Mexico—a distance of 1,300 miles. Like all works of nature, this mighty and seemingly uncontrollable water-course is, even in its periods of maddest fury, governed by certain laws and subject to certain natural rules. This once ascertained, the work of providing remedies for the fearful destructiveness of the floods can be best obtained by conforming restrictive efforts to these laws of nature.

The alluvial region proper of the Mississippi begins at the mouth of the Ohio, continuing thence to the mouth of the river, with occasional interruptions of elevated or ridge lands.

The bluffs near Helena, Arkansas, mark the last point on the right bank not subject to overflow, while on the left bank bluffs or high lands occasionally appear until reaching Baton Rouge, from which point to the delta the banks on that side are also below the high-water level of the river.

In the overflowed regions the banks are highest near the river, as the coarsest washings of the overflow there find resting place. From these banks the surface gradually slopes for a distance of two or three miles to the swamps and marshes. For this reason it has been a matter of necessity as well as economy to construct levees as nearly as can safely be done to the margin of the river. In the present imperfect system of levees these swamps serve in time of high floods as reservoirs, and to a certain extent relieve the river of its excess of water at local points, but critical investigation has shown that they fail to reduce the aggregate volume of water, for the amount drawn off at one point is returned to another.

Efforts for the protection of this alluvial region by means of levees are coexistent with civilization in Louisiana, and as early as 1727 a levee was completed at New Orleans 5,400 feet in length and 18 feet wide at its summit. As the lands above and below that point were occu-

pied by the colonists additional levees were constructed, each planter building to the extent of his water front. In 1763—the date of the cession by France to Spain of the territory—these settlements and their accompanying levees extended 30 miles above and 20 miles below New Orleans.

Under Spanish rule but little was accomplished in the extension of these works of protection, and even at the date of the cession to the United States—1803—the inhabited region of the territory was confined to the country below Baton Rouge.

The construction of levees kept pace with the advance of the settlements, and in 1828 they were continuous, excepting where nature had provided her own protection, from New Orleans to Red river; in 1844 they had reached Napoleon, Arkansas, and from the impetus given by the swamp grants of 1849-'50, they were, from Cape Girardeau, in Missouri, to Point La Hache, below New Orleans, at the breaking out of the late rebellion, rapidly approaching completion.

The present system of levees is, however, inadequate to the permanent protection of the alluvial region, even if it were entirely completed on the scale projected. In fact, the system has been, to a great extent, insufficient, owing to the want of uniformity in the laws regulating them of the different States bordering on the river. Neglect on the part of one State works to the detriment of the labor of another, and until a sufficient and uniform plan of construction is determined upon, absolute security cannot be looked for.

In constructing levees with a view to retain within their banks the entire quantity of water that at any time may find its way into the channel of the Mississippi river, a careful observation of the laws of hydraulics is a matter of imperative necessity. The act of thus confining the entire aggregate of water tends of itself to elevate the surface of the river, and requires close mathematical calculation to arrive at the additional strength and height necessary to meet this.

The additional elevation of the river surface, caused by the present imperfect system of levees, varies at different points from one to nine feet in times of great floods. But this increase in the height of floods, produced by levees, returns a compensation in lessening their duration, owing to the increased velocity of the current. The conclusion reached by the able report of General Humphreys, the present engineer-in-chief, is, that, to fully provide for the security of the inundated regions, it would be necessary to commence the construction of levees near the mouth of the Ohio, with a height of three feet above the level of high water.

This height should be increased to seven feet at Osceola, Arkansas, and still increasing at certain intervals as the work progressed down the river, until Lake Providence is reached. From that point the height can be gradually reduced as far as Baton Rouge, where they can be constructed at the original elevation with which they were begun until the Gulf is reached. An outlet near Lake Providence might be constructed to afford local relief at that point, and thereby render the great height of less necessity.

It would also be essential to the success of this system that the "swamp rivers"—tributaries to the Mississippi—should, to a certain extent, be guarded by levees near their mouths, lateral to the main river.

To perfect the present system of levees, by giving them a cross-section corresponding to their elevation, as originally projected, would require the expenditure of \$2,000,000. But, as before stated, the present system is inadequate, even if completed, and whenever the floods rise

to a height of three feet above the natural bank of the river, crevasses are almost certain to occur. To construct these barriers on the scale herein indicated, and in such a manner as to render them merely permanent, would require an expenditure of \$17,000,000, as shown by a careful calculation on the basis of prices as they existed in 1860. The length of levees, on both sides of the river, necessary to be constructed, is in round numbers 1,800 miles. The area of the region subject to annual inundation is 19,450 square miles. If the one-half of this region could by these protective means be rendered cultivable, the value of the lands thus reclaimed would, at a moderate estimate, be \$160,000,000. The estimated value of lands below the mouth of Red river now under cultivation is \$100,000,000, and thus the perfection of this system of levees, by an expenditure of \$17,000,000, would afford absolute and permanent security to lands valued at \$260,000,000.

The aggregate amount of acres that would be protected is not far from 7,000,000, and the estimated value of the annual products of the same would reach \$315,000,000 when successfully and safely cultivated.

A single flood has destroyed by its ravages property estimated at more than one-fourth the entire sum required for the completion of these levees.

In view of the magnitude of these interests, and the immense value of the lands and products of this fertile district, as shown by figures in the foregoing, it may well be asked, should not this great internal improvement be made a subject of direct national legislation?

The wondrous valley of the Mississippi, in its entire extent, must for all time be the great corn-producing region of the country. In addition to this, the staples cotton, sugar, and rice, on the lower rivers and tributaries, render it of still weightier importance. Once restrained to its proper natural limits, this great artery, which traverses the entire length of our republic, would present the grandest feature of national wealth and commercial convenience possessed by any country on either hemisphere.

BARRENS, OR "PLAIN" LANDS.

In character directly opposite to the class of lands just referred to, are the inarable lands west of the valley of the Mississippi, commonly designated as "the plains."

Extending in an almost unbroken belt from the southern boundary of the republic to the British possessions, these inarable lands must at no distant day be the subject of important consideration, and their reclamation become a matter of necessity. In the abundance of unoccupied fertile acres to be found in the productive Mississippi valley, the wants of emigrants and pioneer settlers have been supplied without encroaching upon these wide-spreading and uninviting regions, but as these more favorable districts of our domain must in the course of time be entirely occupied by the rapidly increasing population, attention will be directed to the feasibility of transforming the inarable portion of the plains into resources of wealth and prosperity.

The growing population of the mining districts of the Rocky mountains already demands something of the kind, separated as they are from the mainly settled portion of the country by this belt of, at present, unproductive territory.

The construction of railroads across this region would also seem to require for the better care and economy of the roads the peopling of the wide extent of country which they traverse.

It is true the sterility of these districts, in an early period of our written geography, was to a great extent magnified, and represented in a character which a more definite knowledge shows to have been erroneous; and it is within the remembrance of the present generation that the maps of that meagerly explored country displayed a "great American desert," which was thought to be not only inarable but impassable, except at certain places where streams relieved the desert of its most dangerous features. It is safe, however, to state that each succeeding year brings with it information which lessens the prevailing unfavorable opinion respecting this region.

Although the barrier is not an insurmountable one, the fact nevertheless remains, that this belt of country is an obstacle to the progress of the nation's growth—an impediment to the prosperity of the new communities west of it, in not yielding that sustenance required for increasing populations.

The day is not remote when the question will be earnestly asked, what can be done to remove this impediment—to relieve this belt from natural inarability, and make it fit for the habitation of man?

Anticipating this inquiry, and in view of the importance that even to-day attaches to the subject, this office within the present year addressed a circular to the several surveyors general, requesting information respecting the extent and character of lands of this class within their respective districts, together with the methods adopted for their reclamation, if any such have been tried; extending the inquiry to all districts where lands of this kind are to be found.

From the replies to this circular there is but one system indicated by which any considerable portion of this territory can be made productive, and that is the obvious one of

IRRIGATION.

The science of supplying water for agricultural purposes to regions where nature has denied that indispensable element, and of rendering productive by artificial means lands otherwise unproductive, antedates history, and long before man commenced to write his own annals works of this nature were in operation.

So far as we may judge, from the remains of this character, irrigation would seem to have been resorted to even before drainage.

In the older nations of the globe, and particularly in Asia, the cradle of the human race, traces of these improvements are still to be found to an extent showing that in their earliest days the system of irrigation formed an integral part of the agricultural engineering of the nations then in existence. This, too, is discernible in districts whose people we are apt to designate as barbarous, but who have nevertheless left remains of such works as fully attest the great proficiency of their builders. In the heated plains and arid deserts of Assyria, Mesopotamia, and Asia Minor, as well as in Egypt, India, and China, these works are of frequent occurrence, and, as will be seen, are in some of these States still successfully and beneficially used.

It is a strange feature in history, however, that in some of the countries of Asia, the abandonment and consequent destruction of the system invented and employed by the rude natives to irrigate lands and fertilize the earth, can be attributed to "civilizing" innovations of the more accomplished Macedonian who overran and conquered the nations where they existed.

It is equally strange that this science, thus lost for the time to the

world by the ravages of the enlightened nations, again found its revival through the ingenuity of such so-called barbarous people as the Gothic tribes of Italy and the Saracenic invaders of Syria and Spain; and to the present time one of the oldest of the irrigating canals of the Pyrenees still bears the name of Alaric.

The antiquity of this science is seen in the traces of canals and embankments, evidently intended for purposes of irrigation, still to be found in Armenia, the construction of which must have taken place at a period prior to the earliest historical epoch. Similar remains are found in all the highlands where the sources of the Euphrates rise, and also in Egypt, India, and China.

In Palestine a population far more dense and prosperous than is now to be found there was once maintained chiefly through the benefits derived from a well-regulated system of irrigation; and as early as the reign of King Solomon we find reference made to works of this kind. Ecclesiastes, ii, 6.) In the hill-tops of that country the large reservoirs, carved out of the solid limestone, for receiving the waters in times of rain, to be used when drought and aridity prevailed, still remain to meet the eye of the inquiring traveller. So long as these frugal provisions were perpetuated and cared for, Palestine was unsurpassed in fertility; but when from internecine wars or foreign aggression these works were neglected or abandoned, her bounteous plains and valleys relapsed almost into a desert.

In more modern times the progress of this science has assumed proportions that at once place it among the foremost in respect to changes upon the physics of the earth.

In southern Europe and in the Turkish empire, a very large proportion of the entire surface is thoroughly moistened by the waters imbibed by the earth through the means of these irrigating canals. In the former kingdom of Sardinia it was estimated in 1856 that nearly 600,000 acres were made cultivable by irrigation; in France perhaps 250,000 acres, and in Lombardy more than 1,100,000 acres. In addition to these and other States of southern Europe, if we consider the great extent to which irrigation is employed in Egypt, we find that the area of evaporable surface created by means of these extensive works in the basin of the Mediterranean bears a very large proportion to the area naturally covered by that sea.

The cultivable area of Egypt—the true home of this science—is more than 7,000 square miles, between desert and desert. Much of this territory, however, lies too high to be irrigated with economy, and the area actually cultivated is between 5,000 and 6,000 square miles, the whole of which is watered by a complicated system of irrigation when not inundated by the Nile.

It is more than probable that under the reign of the Pharaohs and Ptolemies large districts, now relapsed into deserts, were, by the industry of the teeming population of those days, under a high state of cultivation, and that the ancient arable area of Egypt was not less than 11,000 square miles. It is predicted that the lateral canals in process of construction to connect with the Suez canal will, among other beneficial results, aid in restoring much of this abandoned region east of the Nile, and add to the productive area of this historical country hundreds of square miles for the second time wrested from the desert.

To the greater portion of Egypt, irrigation is a matter of stubborn necessity. The lordly Nile flows through its entire length without receiving a single tributary, and there is not so much as one living spring within the limits of that region. Wherever water is found it invariably

proves to be the infiltration from the Nile. Were irrigation abandoned, and Egypt left to the physical resources that nature alone supplies, the climatic changes that would ensue, the augmented heat, the reduction of evaporation, the increased aridity, would in a twelve-month transform the most fertile of regions into the most barren of deserts, and render uninhabitable a territory now densely peopled.

The experience of centuries, it will be seen from the foregoing statements, is assured to us in any practical attempts that may be made toward irrigation in America. This experience teaches :

1st. That the lands most benefited by irrigation are those which are most easily warmed and most permeable. Compact clay prevents the ready absorption of water, and denies it free access to the roots of grasses. From the cold nature of clayey lands it fails to transmit the heat which gives to water its greatest effect, and from the increased evaporation has a tendency rather to cool the ground.

2d. The chemical nature of the water employed is an essential thing to consider. The object to be gained is to assist or to enable plants to assimilate their food. In this the water employed may be too cold if taken directly from living springs, and the mineral elements of some waters are an evident detriment to the vitality of vegetation.

The waters best calculated for the purpose have been found to be those which have been longest exposed to air, and which may have thereby received chemical ingredients favorable to the growth of plants. The fertilizing matter held in solution or in suspension by moving waters operates beneficially, and hence the waters flowing from large towns or cities are, for these reasons, considered as of superior excellence.

A sufficient test is afforded in the character of the vegetation which attaches to the natural banks of the stream whence the supply is taken. If the waters abound in fish or mollusca, and the margins bear a vigorous vegetation, it is inevitable that the same growth can be secured wherever the waters are conveyed.

In connection with this, an eminent writer has suggested the theory, that where irrigation is for a continued series of years resorted to, plants are liable to change in their nature somewhat to conform to the system by which they are nourished.

3d. The season of the year and the proper period of the day when water should be applied, and the quantity to be economically used, are all questions dependent upon the latitude and climate, and the hygrometric state of the atmosphere should always be taken into consideration in determining these questions.

4th. Essential to the complete success of agriculture by irrigation is the equable distribution of water with equable velocity, and a final removal of all water not imbibed by the soil. A failure to provide for the final removal of surplus water, experience has shown to be attended with results highly deleterious. To this cause more than all others, perhaps, can be attributed the notorious insalubrity connected with the cultivation of rice in our southern States.

In portions of France and in the Milanese territory a supply of water for irrigating purposes has been obtained to a limited extent by means of artesian wells, and although this method is yet in its infancy, it is commanding the hopeful attention of philosophic men in both hemispheres. The water thus obtained from its higher temperature is even considered better for agricultural purposes than that obtained from streams.

The French government have experimented successfully with these wells in the heretofore uncultivable Algerine desert, where water can be found at a depth of from 100 to 200 feet.

The native sheiks, appreciating the immense benefits to be derived from the system, are also adopting similar measures.

Every well sunk in the desert becomes the nucleus of a settlement, and it is related that many of the nomadic tribes of that region, attracted by the benefits surrounding or following these enterprises, have abandoned their wanderings and established themselves in the vicinity of the wells, extensively planting the thrifty palm-tree, and successfully propagating other perennial vegetables.

Says an accomplished American writer in reference to this subject:

The most sanguine believer in indefinite human progress hardly expects that man's cunning will accomplish the universal fulfilment of the prophecy, "the desert shall blossom as the rose," in its literal sense; but sober geographers have thought the future conversion of the sand plains of northern Africa into fruitful gardens by means of artesian wells, not an improbable expectation. They have gone further, and argued that if the soil were covered with fields and forests, vegetation would call down moisture from the Libyan sky, and that the showers which are now wasted on the sea, or so often deluge southern Europe with destructive inundation, would in part be condensed over the arid wastes of Africa, and thus, without further aid from man, bestow abundance on regions which nature seems to have condemned to perpetual desolation.*

In all countries requiring irrigation to any considerable extent it is made the subject of direct legislation, the government retaining the right to all running water, constructing or aiding in the construction of canals and embankments, and supplying by regulated systems the needed amount of water to the agriculturists requiring the same. It has proved a fruitful source of revenue, besides adding to the general prosperity of individuals and communities.

Under the auspices of the British East India Company an elaborate report was made by a competent engineer† of the extent and results of irrigation in three agricultural districts of the Madras presidency, as projected and constructed under the fostering care of that company.

By this report it is shown that an area of 20,000 square miles, or 12½ millions of acres, are or will be affected by these works of art when fully completed. One-half of this region is cultivable if not already under cultivation, and is inhabited by a population of 4,000,000 souls.

There was at the date of this report, 1856, not less than 2,000,000 acres supplied with water by this system, bringing to the state an annual revenue of nearly £2,000,000, and which, it is predicted, will speedily increase.

As affecting the prosperity of communities, this system has produced results of even greater importance, but which may not be given in figures. The report states that "the whole social fabric sympathizes with the ebb and flow of agricultural progress; the capital circulated in the district to promote the latter gave a new impetus to the general power of production; all trades felt it." The return on invested capital from these improvements is estimated at from 50 to 63 per cent.

Prior to the construction of these more elaborate works, projected by the East India Company, the native population, as in China and elsewhere, had made extensive progress in these useful improvements.

There are to be found in the Madras country 53,000 tanks or reservoirs—43,000 of which are still in successful use—constructed by the natives at an epoch so remote as to be beyond the range of their history. An inscription upon one of them shows it to have been in use more than 400 years, but no record is found to indicate the date of its construction.

These tanks are simply artificial lakes, or reservoirs, in which water may be securely stored, to be used when required for purposes of irriga-

* Man and Nature, by George P. Marsh: 1864.

† Irrigation in the Madras Provinces, by R. Baird Smith, F. G. S., Lieutenant Colonel Bengal Engineers: London, 1856.

tion. They are supplied sometimes by precipitation, and at others by feeders from convenient rivers. Their magnitude can be seen in the statement that one of them, bearing the formidable name of Chum-brumban-kum, covers an area of $9\frac{1}{2}$ square miles, and maintains a sheet of rice cultivation of nearly 10,000 acres in extent.

Not only to valley or bottom lands, where the natural declivity admits of the regular flow of water, is this system applied, but in the higher plateaus above the rise of the water employed it has been found practicable in densely populated countries to elevate the water for irrigation by means of machinery—oftentimes rude—and in some instances the work is performed by the hand alone.

Having thus given a cursory glance at the extent and results of this important contrivance of man in his struggles with the soil, as shown to us in the older nations of the earth, we come to consider its application to the unwatered districts of the United States. It is to be regretted that the meagre facilities for obtaining accurate information, in many of the districts where irrigation could profitably be employed, prevent a statement of the actual extent to which the system might be economically carried.

Generally the pioneer seeks for lands over which nature has provided her own irrigation, unless the attraction of precious metals may lure him to places of another character.

It is in these latter regions that the incipient efforts toward irrigation have been commenced in the United States, although the native population of New Mexico and the citizens of Utah have to a greater or less extent constructed works of this kind.

From the reports received from the surveyor general it is found that in New Mexico by far the greater portion of the lands under cultivation are moistened by these artificial means. The lands in that Territory are divided into three classes: First, the valleys, which can be easily irrigated by the streams running through them; second, the mesas or table lands; and third, the mountains.

The valleys have been, to a certain extent, the subject of a systematic irrigation for 200 years. It is found to be more reliable than any other method; serving as it does to remedy the evils whether of continued drought or excessive rains. It serves also as a fertilizer, by depositing the sedimentary matter of waters over the lands under cultivation to an extent sufficient to render the efforts of man in that respect unnecessary.

The quantity of land in these valleys that can be economically irrigated is estimated at 1,000,000 acres, and, in fact, the question depends upon the quantity of water that can be obtained for the purpose, rather than the area of land susceptible of irrigation. The rains of that locality generally fall in July or August, too late in the season to save the crops from destruction unless aided through the preceding months by irrigation.

The second class—the mesas or table lands—includes two-thirds, and possibly three-fourths, of the entire surface of New Mexico. The greater part of these lands produce excellent grass for pasturage, and if supplied with sufficient moisture would equal the valleys in productiveness. They are, however, too elevated to admit of the construction of canals by which the waters of the rivers could be conveyed to them, and the only apparent method by which the needed element can be supplied is through the means of artesian wells, the feasibility of which remains, as yet, untested.

In the State of Nevada the natural formation of the country affords very favorable facilities for irrigation. In the report of the surveyor

general it is stated that 13 distinct ranges of mountains traverse that State from north to south, between which there are valleys varying in width from 10 to 30 miles. The melting snows of the mountains pour into these valleys in the months of April, May, and June, through ravines or cañons. It would be neither impracticable nor very expensive to construct dams at convenient intervals across these cañons, there being always at hand an abundance of material, and the peculiar formation of the cañons being highly favorable to such construction.

The valleys between the mountains comprise three distinct characters of land: First, the level and productive part, embracing one-half of the whole valley area; second, the table lands of poorer soil and higher elevation; and third, the alkali lands, comprising about the one-twentieth part of the whole area of the valleys.

The first class is of undoubted productiveness when supplied with an adequate quantity of water, which, owing to the unfrequent rains, can only be done successfully by irrigation.

The table lands afford excellent winter pasture in the white sage which they produce, but are of doubtful capacity for the raising of cereals, even if irrigated.

The alkali lands are beyond the power of reclamation by any means now known to man.

The methods indicated above for the construction of reservoirs in the ravines and cañons at the foot of the mountains have been satisfactorily tried in California, in obtaining water for use in the placer mines. When the working of these mines became unprofitable, the water of the reservoirs was appropriated to the service of agricultural irrigation with remarkable success.

In the vicinity of the Humboldt and Carson mines, above where the waters sink or cease to run, there are large districts of excellent land, with inexhaustible supplies of water for irrigation.

So far as investigations have been extended in Kansas, it would appear that but a comparatively small proportion of that State is absolutely unproductive where the proper moisture is supplied.

In the interesting report of the surveyor general, the statement is made that the insufficiency of rain is induced by the general absence of forests.

It is in Kansas already a matter of general remark that the eastern portion of the State is visited by more frequent and seasonable rains than formerly. This is attributed to the growth of young forests which impede the strong winds of the plains, aid in condensing the vapors, and prevent evaporation. The improvements erected by every thrifty farmer assist in accomplishing these results; and even the orchards, shade trees, and buildings, aid in producing climatic changes.

The conservative influence of forests in this respect has long been the study of philosophers; and whilst theories have varied in some respects, the one conclusion is reached by all, that in the husbandry of trees man receives one of his greatest assistants. They absorb the moisture, not of the earth simply but of the atmosphere, retaining it when the atmosphere is charged with humidity, and restoring it in seasons of excessive dryness, thus serving to mitigate extremes.

The very mosses and decomposed leaves in their spongy nature absorb the water of precipitation, and prevent its speedy escape over the surface, dispensing it to the thirsty earth at times when most required.

To change the climate of an extensive district by means tardy as the growth of artificial forests must necessarily be, would seem to be impracticable, if not chimerical; but it is something that has already commanded

the legislative attention of many of the older states of Europe, and it is to this method, connected with such efforts at irrigation as may be economically employed, that the occupancy of the rainless regions of the west for ordinary purposes of agriculture must depend. From the observations of men who have carefully studied the influence of trees upon the temperature of the earth, we have abundant evidence of the correctness of this theory.

It is also shown in the State of Kansas that the annual fall of rain at Fort Leavenworth, on the Missouri river, is six inches less than at Fort Scott, remote from large streams, but situated near the forests of the Ozark mountains.

That the fostering care of all pioneer settlers, if not of the government, should be directed towards the propagation of new forests and the culture of trees for purposes other than fruit-bearing, is fast impressing itself on the public mind.

The cases are rare, indeed, where the absolute impracticability to cultivate trees exists.

Says a writer, whom we have before quoted :

The special conditions required for the spontaneous propagation of trees may all be negatively expressed and reduced to these three exemptions: from defect or excess of moisture, from perpetual frost, and from the depredations of man or browsing quadrupeds. Where these requisites are secured, the hardest rock is as certain to be overgrown with wood as the most fertile plain, though, for obvious reasons, the process is slower in the former than in the latter case.

In the wide-spreading and treeless plains of the west, it is possible that, in the economy of nature, forests may in time be supplied without the intervention of man; but by timely efforts and the proper exercise of foresight and care, man may hasten to a remarkable extent the time when an equable temperature will prevail in these steppes of America, and when "the early and the latter rain" will visit those districts as seasonably and regularly as in the regions on the hither side of the Mississippi. Some further considerations in regard to forest culture are presented in a separate paper accompanying this report.

In view of the important interests connected with the districts embracing the precious metals, and the frequent inquiries made in reference to the construction of the mining act of July 26, 1866, the following "rulings" on prominent points of said statute, made by the Commissioner of the General Land Office, are presented :

LIMITATIONS IN THE PROVISOS OF THE FOURTH SECTION OF THE ACT CONSTRUED.

The attention of this office has been called to controversies existing in some of the mining districts, arising from differences of opinion in relation to the proper construction of the mining act of July 26, 1866, some persons contending, it appears, that since its passage a company formed merely for mining purposes and locating claims can take 3,000 feet on the vein, although such company or association may be composed of less than 14 individuals. It is held by this office that the manner of making locations, and the number of feet that can be taken on the same vein or lode by an individual or an association, depend upon the rules and customs of miners of the respective districts, the act of July 26, 1866, in no respect superseding or modifying these customs, except where they authorize the location of more than 200 feet on the same lode by any one person, or more than 3,000 feet by any association of persons. In such cases the statute restricts and reduces locations made since July 26, 1866, to the above-named quantities, respectively, as the maximum

in each case; and this is the only difference existing between the local mining regulations and the controlling act of Congress.

An individual cannot, since the date of the act, locate more than 200 feet on the same lode, nor an association more than 3,000 feet, no matter how many persons may be associated together, or what the local customs may prescribe. Whether a company or association can take as much as 3,000 feet, depends upon the mining regulations of the particular district, and the number of persons associated in such company.

Individuals cannot, by forming themselves into companies, locate a greater number of feet to each person than can be done by each acting separately.

They may locate as a company or an association at the rate of 200 feet to each individual embraced in it, with an additional 200 feet to the discoverer, if the local customs permit that much to be taken until 3,000 feet are located, after which no additional quantity can be claimed on the same lode by the same company, whatever may be the number of its members.

In districts where the mining regulations limit locations to less than 200 feet to each individual, or less than 3,000 feet to any association of persons, claimants will be restricted accordingly, such regulations remaining in full force, being unaffected by the act of Congress.

These remarks apply wholly to original locations, made in pursuance of the rules and regulations of miners in the several mining districts. They have no application to claims in the hands of purchasers, and it is not to be understood from what has been above stated that a mining claim of 3,000 feet may not be owned and controlled by an association of less than 14 persons, where possession is obtained by bona fide purchases for valuable consideration, or partly by purchase and partly by location, there being nothing in the act of July 26, 1866, to prevent an association composed of any number of individuals from holding such claim, and upon proper application and proof obtaining a patent for the same.

When the mining act was first passed it was thought that among the great variety of local rules and customs, existing in a thousand remote mining districts, and known to us only as they come here in actual cases, there were probably some, authorizing the location of large claims, amounting to 3,000 feet or more, by companies or associations, in consideration of the construction of improvements enhancing the value of large numbers of claims, as the building of a tunnel to drain the mines of a certain lode, or system of lodes, or the erection of any other improvements securing a common object and promoting a common interest. As such companies would not have been formed for the purpose of locating claims, and the privilege of doing so, if conferred upon them at all, would have been in the nature of a reward for having promoted the general welfare of a certain district, by the expenditure of capital and labor in works of improvement beneficial to all, the right of making such location to the extent of 3,000 feet in pursuance of such supposed mining regulations was believed to be independent of the question of the size of the company, and that having rendered the service it was entitled to make the location, whether it was composed of a greater or less number of members. If the regulations of any district embraced provisions of this nature, conferring upon any company, large or small, for reasons such as have been suggested, the right of locating 3,000 feet on a lode, or on each one of a number of lodes, benefited by such improvements, it is not perceived that there would be any incompatibility between them and the act of July 26, 1866, nor would the policy of the act in limiting locations appear

to be more impaired by such regulations than by the unlimited right of purchase generally recognized by these local customs.

It may be that no such regulations exist, but as the customs of miners scattered through the numerous mining camps of the western States and Territories are not to be found in any compilation, many of them never having been reduced to print, it is not surprising that misapprehension may have occurred in that respect.

As to associations or companies formed for the purpose of locating claim, however, it is very evident that they are subject to the limitations found in the provisos in the 4th section of the act, and that the restriction of 200 feet to each locator cannot be evaded by forming an association.

RULING IN RELATION TO THE APPLICABILITY OF THE MINING ACT TO "BLUE GRAVEL LEAD" CLAIMS.

The question having been presented whether the provisions of the act could be made applicable to the "blue gravel leads" found in different parts of the mineral domain, so as to entitle the holders of these claims to apply for patents, the Commissioner held as follows: The mining act provides for patenting veins or lodes of quartz, or other rock in place, bearing gold, silver, cinnabar, or copper, but furnishes no definition of the terms "vein" or "lode." In geology and among miners they imply generally an aggregation of metallic matter found in the fissures of the rocks which enclose it, but are of great variety; veins differing very much in their formation and appearance. Lode is a term in general use among the tin miners of Cornwall, England, having been introduced on the Pacific coast by emigrants from the Cornish mines, and signifies a fissure filled either by metallic or earthy matter. Lead is generally used in the same sense as lode.

In Nevada the term ledge is usually employed in regulations concerning mines, and in Montana the terms lead, lode, or ledge, are similarly used. Ledge would seem to convey the idea of a layer or stratum of metal interposed between a course or ridge of rocks.

Veins may be either sedimentary, plutonic, or segregated, or of infiltration, or attrition, depending upon their peculiar formation or the mode of occurrence of the metallic deposit.

In California the ancient river channels, or what are supposed to have been such, found in various mining districts, filled with a compact blue gravel rich in gold, are called the "blue leads," and in common parlance the "blue veins." Even the shallow diggings or placers are sometimes found to occur in such regular layers or courses as to receive from the miners working them the name of veins or leads. There is also another form of deposit of all or some of the four metals named in the mining act, different from either of those mentioned above, called *contact deposit*. European miners mention still others, called in England *floors*, in Germany *stockwerke*, and a form of deposit known as *fahlbands*. These latter are, more properly speaking, ore-bearing belts, irregular in their dimensions, but presenting a degree of parallelism with each other.

Neither is the mode of occurrence designated as "contact deposit" considered as a true vein or lode. In fact, if the question were raised, neither of the forms known as contact deposit, *fahlbands*, or segregated veins, could be accepted as true metalliferous veins, nor could it frequently be made to appear without expensive excavations, whether the metal in the mine, for which a patent is applied for, occurs in the form of a true vein or not. Hence, we discover that a very strict construction

placed upon the terms used in the mining act would exclude from its benefits a large class of claims, even of the branch of rock mining, from the impracticability of proving the metallic deposit to occur in the form of a true vein. But there is no reason for supposing that these terms were employed according to their strict geological signification. The plain object of the law is, to dispose for money value of the mineral lands of the United States, and if the claimant is willing to pay the price named in the act, it is clearly a matter of indifference to the government whether the metal occurs in the form of a true or false vein, or whether in the form of a vein at all. There is certainly no public policy to be subserved by favoring one class of miners and excluding others, nor has the Commissioner ever heard any reason assigned why vein mines should be patented, and other deposits excluded from patent, nor any intimation expressed that such was the intention of the act. An idea may have prevailed at the time of the passage of the law, that the placers were becoming exhausted, and that their claimants did not care about buying the land or obtaining patents; or it may be that the act was drafted mainly in view of localities where placer mining constituted a very inconsiderable branch of the business, compared to rock mining, and hence, the language of the act seems to have more direct reference to vein mining than any other branch. But whatever may be the cause of the phraseology adopted, it is very evident to the Commissioner that no purpose or design existed in the minds either of the framers of the bill, or of the Congress that passed it, to exclude any class of miners that chose to avail themselves of its provisions; consequently, the law should receive the most liberal construction that the language will admit of, and every class of claim that, either according to scientific accuracy or popular usage, can be classed and applied for as veins or lodes, may be patented under the law. It may be observed as an important point, that no proof is required to establish the vein formation of the deposit, the law evidently contemplating none. It requires the surveyor general to certify to the character of the vein exposed, but that is understood to mean that the certificate should show whether the exposed vein contains gold, silver, cinnabar, or copper, as it would frequently be impossible for the surveyor general, even if his knowledge of mineral veins were sufficient to render him otherwise competent, to determine whether the deposit conformed to one class of veins or the other, or whether it was a true vein at all, without extensive excavations; a requirement certainly not contemplated by the mining act.

The applicant claims a certain number of feet along the vein or lode, and as much surface ground on either or both sides of the same as is necessary for the convenient working of the mine. He may claim as many feet as the local law or mining regulations permit him to hold, not inconsistent with the act of Congress, and as much surface ground as he may need, taking care not to conflict with any other claimant. The case being presented in this form, no proof is necessary to show that the deposit appears in the form of a vein, the phraseology of the act appearing to render it evident that the claimant was not to be put to the necessity of producing such proof, the evidence called for being confined to the posting and publishing the necessary notices and diagrams, to proving the local mining customs, the location of the claim, possessory rights of the applicant, and the amount expended in actual labor and improvements; which being satisfactory, and the surveyor general having made proper survey and plat of the claim, with the required endorsements and certificates, a patent must issue to the applicant.

No reason is perceived why a blue gravel lead might not be presented

in this form, both in the application and on the diagram and plat; and being presented, if the applicant is the *bona fide* holder of the claim, and it is clear of conflict, it will be patented to him without any proof being required as to the mode in which the deposit occurs.

To conform to the language of the act, however, the claim must call for so many feet along the lead, and a given quantity of surface ground on one or both sides of the same.

INSTRUCTIONS UNDER THE TENTH AND ELEVENTH SECTIONS OF SAID MINING ACT.

The 10th section of the mining act provides for homesteads made prior to the passage of the law by citizens of the United States, or persons who had declared their intention to become citizens, upon lands previously reserved as mineral, and, as such, excluded from survey and sale, but which are properly agricultural, no valuable mines of gold, silver, cinnabar, or copper, having been discovered thereon, and which have been improved and used by settlers for agricultural purposes.

These settlers have a right of pre-emption to such lands not exceeding one hundred and sixty acres, and may purchase the same at the minimum of one dollar and twenty-five cents per acre, or enter them under the homestead laws after they become surveyed, upon the usual proceedings in such cases. If the deputy surveyor returns them as agricultural, there being no data to the contrary, and no one files an affidavit of the land being more valuable for mineral than agricultural uses, the settler is allowed to enter under the provisions of said section. If an affidavit is filed alleging it to be mineral, an investigation is required, before the local land officers, to determine the class to which the land properly belongs. In such cases, a day is fixed for the hearing, and sufficient notice given to the claimant and the party filing the affidavit to enable them to be present with witnesses; and, when the tract has been occupied for agricultural purposes, and improved as such, before the 26th of July, 1866, the burden of proof will be upon the party seeking to establish its mineral character, and the testimony is required to be of a nature clearly proving it to be such before a decision is rendered against the right of the settler to enter the land.

Should the deputy surveyor return a tract as mineral, the settler will be required to furnish satisfactory proof of the error of such return prior to making entry on the premises claimed under said 10th section.

The return of a deputy surveyor, although entitled to respect as coming from a sworn officer, is not taken as conclusive in such cases when disputed, but the matter is investigated by the proper local land officers by the examination of witnesses, capable, from experience, observation, and previous examination, to testify understandingly as to the existence or non-existence of minerals upon any particular tract, and as to whether the deposit is of sufficient extent to render it more valuable for mining than for agriculture.

The testimony adduced and all the papers are required to be transmitted to this office, with the joint opinion of the register and receiver, for review and final determination.

The 11th section of the mining act authorizes the Secretary of the Interior, after the survey of the lands previously reserved as mineral, to designate and set apart such portions of them as are clearly agricultural, and tracts of the latter character are made subject to pre-emption and disposal as other public lands.

To give effect to this section, the surveyors general in the mining

States and Territories have been instructed to require their deputies to describe in the field-notes and designate on township plats the tracts which are agricultural, the designation to apply to each of the smallest legal subdivisions. After the filing of the plats in the district land offices, if no counter-affidavits are presented, the tracts designated agricultural may be filed upon under the pre-emption or taken under the homestead laws; but pre-emptors are not authorized to prove up and enter until after such a period of actual settlement and cultivation as shall show good faith, generally not less than six months from date of settlement indicated in the declaratory statement, and if before the expiration of that time an affidavit is filed alleging the mineral character of the particular tract claimed, an investigation is necessary before the entry is made to determine the question.

It cannot be doubted that in almost every township there are tracts of land more valuable for farms and gardens than for mining, and the object of the law evidently is to segregate these from the mineral, and dispose of them as agricultural. It is a matter of no legal consequence whether the precious metals are found in quartz ledges, placers, or hydraulic mines. If the particular subdivisions containing them are more valuable for mining than for agriculture, they cannot be entered as arable lands under the pre-emption or homestead statutes; yet placers once valuable, but which have become exhausted, and are no longer valuable as mines, may be entered as arable.

INSTRUCTIONS TO SURVEYORS GENERAL IN RELATION TO DUTIES
REQUIRED BY THE TENTH AND ELEVENTH SECTIONS OF THE AFORESAID
MINING LAW.

Under the provisions of the 10th section of the act of Congress entitled "An act granting the right of way to ditch and canal owners over the public lands, and for other purposes," approved July 26, 1866, the public lands on which no valuable mines of gold, silver, cinnabar, or copper, have been discovered, and which had been occupied and improved by *bona fide* homestead or pre-emption settlers, are permitted to be taken up by said settlers in quantities according to legal subdivisions not exceeding 160 acres, at the rate of \$1 25 per acre.

In order that the lands of that character may be known to the government and its local land officers, and that the same may be set apart as "agricultural," circular instructions have been issued to the registers and receivers of the United States land offices how to proceed in the ascertainment of that class of lands and their segregation from mineral lands, copies of which have been sent for the information and government of surveyors general. It will be perceived that the instructions allude to directions having been given to surveyors general, requiring them to cause their deputy surveyors to describe in their field-notes, and designate on township plats, "agricultural lands," as contemplated in mining circular dated January 14, 1867. In amplification of these instructions, it is found of importance to the public service that deputy surveyors should avail themselves, while executing their surveys in the field, of all trustworthy information in regard to the mineral localities falling within the sphere of their contracts, in addition to their personal and diligent observations, and to record in their field-notes sufficient descriptions of different mineral characteristics to afford draughtsmen adequate data for indicating the same on township plats, in yellow dotted shade, in respect to the out-boundaries of lands containing gold; in blue, those embracing silver; in red, such as contain cinnabar; and in

green, those lands which are more valuable for copper mining than for agricultural purposes. It has accordingly become necessary that such tracts shall be designated on the township plats in a conspicuous manner as "mineral," within the out-boundaries of the respective shades as aforesaid, so that the government officers may possess the necessary information for correctly carrying out the object of the laws in the adjudication of any conflicts that may arise in the disposal of the public lands. Such designations of "agricultural lands" and "mineral" on township plats the surveyors general have been required to have officially represented on the approved plats of townships, sections, quarter-sections, and smaller legal subdivisions, in conformity with the data on file in their respective offices.

Timber lands on rocky hills and mountains, not known to contain any of the aforesaid minerals, will be designated as "agricultural," and, if the contrary, as "mineral."

Although gulch and creek mines are not specially named in the act of July 26, 1866, yet if the lands containing them are more valuable for mining than for agriculture, they will be reported as mineral.

Placers, once valuable, but which have become exhausted, so as no longer to be valuable as mines, will be returned as agricultural.

QUESTIONS RELATING TO AFFIDAVITS FILED UNDER THE TENTH AND ELEVENTH SECTIONS OF THE MINING LAW.

The act of 21st March, 1864, amendatory of the homestead law, and for other purposes, (United States Statutes, vol. 13, page 35,) allows registers and receivers $22\frac{1}{2}$ cents per hundred words for the testimony reduced to writing in pre-emption and homestead cases; but no authority is granted for charging a fee for simply filing an affidavit. The affidavits authorized by instructions from this office under the 10th and 11th sections of the mining act are not in the nature of declaratory statements or homestead applications. They are an expedient adopted, and the only one practicable under the circumstances, to obtain more special information than can be furnished by deputy surveyors touching the character of the various subdivisions of the public lands in what is known as the mineral domain, so that lands more valuable for mining than for agriculture may not be disposed of as belonging to the latter class; and lands really arable in character may not be withheld from settlement under the apprehension of being mineral. These two classes of land are so intermingled as to render it frequently a matter of the greatest difficulty to determine whether a particular subdivision belongs to one or the other, and the most feasible mode of coming to a reasonable conclusion appears to be by an investigation based upon the testimony of persons acquainted with the particular tracts involved.

The affidavits are further useful in enabling the registers and receivers to revise the lists of lands selected by agents of railroad companies before certifying to the correctness of the same, the plats and field-notes not in all cases furnishing a reliable guide, from the fact that surveyors generally are supposed to pass only along the exterior lines of the various subdivisions, and hence not always able to report accurately as to the character of the interior portions. There is consequently no fee chargeable to individuals for filing these documents, unless a trial is had, in which event the rule as to fees in other cases will be applied.

RESPECTING CITIZENSHIP OF INDIVIDUALS AND CORPORATIONS.

In reference to the question of citizenship under the mining act of July 26, 1866, when application is made by corporations organized under State or territorial laws, the Commissioner has ruled to the following effect:

It is an invariable principle in the pre-emption and homestead acts of the United States to limit the privileges conferred by these laws to citizens or persons having declared their intention to become such, and the same policy is indicated by the 1st section of the mining act. The limitation to citizenship is not repeated in the 2d section, but is necessarily implied, for the first section legalizes only the occupancy of citizens and those who have declared their intention to become such; and as occupancy must precede an application under the 2d section, it would seem to follow that if the occupancy of the applicant is not such as has been legalized by the statute, it could have no standing in any proceeding under it. A proper rule of interpretation requires us to consider the several sections together and the whole as declaratory of one uniform and consistent policy; and the principle of considering together all statutes *in pari materia* warrants an examination of other enactments for the disposal of the public domain and the rule therein established, with a view of ascertaining the intention of the law-making power when in any particular statute it may not be clearly expressed. It would, therefore, be entirely too narrow a construction to hold that, because the restriction was not repeated in the 2d section, the uniform policy of the government, for many years, was intended to be set aside in the cases provided for in that section.

These remarks apply to applicants appearing in the character of individuals, in whose cases the general principle must be adhered to and proof of citizenship furnished. This class of applicants is the only one that can take advantage of the pre-emption and homestead laws, corporations, as such, not being provided for in these acts. Yet, as corporations, at the date of the mining act and for a long time previous, had occupied and improved mining claims according to the local customs and rules of miners, and as the right to apply for a patent is, by the terms of the act, extended to any person or *association of persons*, it would be unreasonable to suppose that it was designed to exclude them from the benefits of this law. Such an interpretation would deny its privileges to valuable and extensive mining claims, and entirely disappoint the expectations of the friends of the act. Corporations must, therefore, be permitted to share in its benefits. But "a corporation is an artificial being, invisible, intangible, and existing only in contemplation of law. Being the mere creature of law, it possesses only those properties which the charter of its creation confers upon it, either expressly or as incidental to its very existence." It can neither exercise the duties of citizenship, become naturalized, nor file a declaration of intention to become a citizen. Hence, the relations of citizenship or alienage cannot, properly speaking, be said to belong to it at all. To look beyond the mere artificial entity to the stockholders composing it, and require the citizenship of each one of a large number scattered frequently through several States and Territories to be established by proof in applications under the mining act, would involve such an amount of inconvenience and delay as practically to debar corporations from the privilege of ever making application.

The Supreme Court of the United States, in giving effect to the constitutional provision allowing *citizens* of the State where the suit is

brought to be sued in the circuit courts of the United States by citizens of another State, after a variety of decisions, has at last, in the case of the Louisville Railroad Company *vs.* Letson, (2 Howard, 555,) decided that a corporation created by the laws of a State, performing its functions under the authority of the same, and only suable there, though it may have members in other States, is a *person*, though an artificial one, *inhabiting* and *belonging* to that State, and entitled, for the purpose of suing and being sued, to be deemed a *citizen* of said State, and it is believed that an equally liberal construction should be adopted in reference to applications for mining patents by corporations. It is true that the questions in these cases before the Supreme Court pertained to State citizenship, and that the question of alienage was not involved; but when the court ceased to look beyond the mere artificial being to the natural persons composing the same; it is doubtful whether the existence of aliens among the stockholders would produce any change in the rule ultimately adopted. At all events, the necessities of the mining law would seem to require that the rule should be carried to that extent in proceedings under it. Hence, every corporation created by State or territorial laws should be treated as a citizen in all applications for mining patents, if legally competent to transact business and to acquire and hold real estate in such State or Territory.

In view of this construction, public officers of the Land department have been directed to require evidence of incorporation, the usual proof of which is a certified copy of the charter or certificate of incorporation, with the signature and seal of the proper officer, and when this is presented, proof of citizenship of stockholders is dispensed with.

ON THE COMPETENCY OF WITNESSES.

The third section of the act of Congress approved July 2, 1864, (United States Statutes, vol. 13, p. 351,) provides that in the courts of the United States there shall be no exclusion of any witness on account of color, nor, in civil actions, because he is party to or interested in the issue tried. As the interest of a witness in the issue tried is no longer an objection to his competency in the courts of the United States, the registers and receivers of the local land offices will be governed by the same rule in all proceedings before them under the pre-emption, homestead, or mining acts, and in *ex parte* affidavits filed. The weight of the evidence is, however, a matter for the consideration of the executive officers, as in all other cases where a witness may have a stronger motive to favor one side than the other. *Ex parte* affidavits may be received in applications for patents under the mining act, in proof of posting notices on claimed premises and as to other facts; reasonable care being taken by the register and receiver to avoid imposition by pretended affidavits or reckless or dishonest witnesses. The officers before whom such affidavits are taken should be able to certify to the credibility of the witnesses; but where this cannot be done on account of the witnesses being strangers, their character for truth must be established to the satisfaction of the local officers by other means before giving weight to such testimony.

MINERAL AND AGRICULTURAL LANDS—RAILROAD SELECTIONS.

In every case reported from the district land officers of selections made under the acts of 1862 and 1864, for the Pacific railroad, the agent of the company in the first instance is required to state in his affidavit that the selections are not interdicted, mineral, nor reserved lands, and are of the

character contemplated by the grant. Upon the filing of lists with such affidavits attached, it is made the duty of registers and receivers to certify to the correctness of the selections in the particulars mentioned, and in other respects. They subsequently undergo scrutiny in this office, are tested by our plats, and by all the data on our files, sufficient time elapsing after the selections are made for the presentation of any objections to the department before final action is taken; and to more effectually guard the matter, there is inserted in *all* patents issued to said railroad company a clause to the following effect: "Yet excluding and excepting from the transfer by these presents *all mineral lands*, should any such be found to exist in the tracts described in this patent, this exception, as required by statute, 'not extending to coal and iron land.'" A decision is said to have been made by the supreme court of California, which, it is claimed, decides that an occupant of a mining claim having no title from the United States has no such standing in court as enables him to enforce the exception as to mineral lands, in patents issued to railroad companies, and may, therefore, be lawfully ejected from lands included within the general description of the tracts patented to such companies, notwithstanding the particular tract may be mineral in character, and fall within the exception. Not having seen that decision, we are ignorant as to the exact character of the ruling, but it is not understood how a person in the occupancy of mineral lands under the local customs and rules of miners, protected by the license granted in the first section of the act of July 26, 1866, could be ejected by a railroad company having no title to the land at all. The government license, it is reasonable to suppose, would constitute a sufficient defence against any one not able to show a better title. The grantee of such license is no trespasser upon the public lands, and although the license is revocable by the United States, it cannot be considered as revoked by a patent to a railroad company when such instrument expressly excepts and excludes from the grant all interdicted mineral land. Claimants authorized to apply for and to obtain patents under the mining act have an efficient remedy in its provisions, and by taking the proper steps may obtain patents for their claims, even should they happen to be embraced within tracts patented to railroad companies, as the exceptions in such patents enable the United States to segregate the mineral lands included by distinct and separate conveyance to mining claimants. Placers more valuable for mining than for agriculture cannot be entered as pre-emption or homestead lands, nor can they be selected by railroad companies. There may be difficulties, and sometimes even hardships, connected with the system of filing affidavits to prove the mineral character of lands claimed by a railroad company, or an agricultural settler, and taking witnesses before the local land officers; but these are, in a great measure, inseparable from the subject-matter; pre-emptors and homestead settlers have the same difficulties to contend with, more onerous in the new States and Territories than in the older States, from the sparseness of the population not justifying additional land offices. It has been suggested to this office that the government should appoint a commission to segregate the mineral from the residue of the public lands; but let any one consider the vast amount of money expended by practical miners in excavations to test the value of mines, subsequently abandoned as worthless, and some idea may be formed of the time and expense such an undertaking would require, and how little confidence it would be likely to inspire. When a miner has taken possession of mineral lands under the license of the government, and has developed their character for mining purposes, it would seem that the task of protecting his rights could not be more

onerous than that which every settler is liable to encounter in defending himself against adverse claimants. The regulation of filing affidavits is simply a means of ascertaining the class to which a particular tract of land may belong, and although it may not be the best that could be devised, it is the only practical mode that has suggested itself to meet the difficulty of disposing of different classes of land mingled together in such a way as to render it frequently impossible to tell, without great labor and expense, whether a particular subdivision belongs to one or the other class.

IN REFERENCE TO THE STAY OF PROCEEDINGS FOR THE DETERMINATION OF ADVERSE CLAIMS UNDER THE SIXTH SECTION OF THE MINING LAW.

The sixth section of the mining act requires all proceedings to be stayed until a final settlement and adjudication in the courts, whenever an adverse claimant appears before the approval of the survey as provided in the third section.

The third paragraph of the instructions of June 25, 1867, requires such opposing claimant to show, by proof, the claim or interest he may have in the mine, and directs the register and receiver, should the same be satisfactory to them, to stay all further proceedings. It is not to be understood by this that the sufficiency of the adverse claim is to be investigated before the land officers. That is a matter that is expressly referred to the local courts by the statute. But the land officers are to be satisfied that the opposing claim is such as is contemplated by the sixth section of the mining act. They are not to suffer the forms of law to be fraudulently used by pretended claimants, having in fact no rights worthy of investigation before the courts. For instance, should it appear that the adverse claim relied upon relates to a settlement claimed under the pre-emption or homestead laws of the United States, it would at once be decided not to be such a claim as is to be referred to the judicial tribunals for determination, and upon the filing of which, the proceedings are stayed and the case suspended to await a trial in the courts; these tribunals having no jurisdiction of claims arising under the pre-emption and homestead laws. The adverse claim must be one arising under the local customs and rules of miners; such claimant is required to file an affidavit stating fully the nature of his claim, and if the facts disclosed present opposing interests under these regulations, or the local laws of the State or Territory, the proceedings must be stayed; after which it becomes the duty of the party out of possession to carry the case into the courts, not only for the reason that claimants ought not to be called upon to assume the offensive in relation to claims of which they already have possession, but because the act extends the right to apply for patents only to claimants having previously occupied and improved their claims according to the local customs or rules of miners; and although there may be cases where claimants have been fraudulently ousted of a rightful possession, and are legally entitled to patents, still, as that question is to be settled in the courts, and not in the land offices, the party out of possession is not in a condition to receive a patent until his right to possession is judicially determined.

The language of the second section, "having previously occupied and improved the same," &c., does not refer to an occupancy at some remote period. It means an occupancy continuing up to the date of the application for a patent; otherwise the mine for which a patent is asked could not be said to be one "in regard to whose possession there is no contro-

versy or opposing claim," "as the statute requires it to be, in order to entitle the claimant to a patent." The very fact, therefore, of the applicant for a patent being out of possession, and an adverse party in possession, shows the claim to be one for adjudication in the courts before it can be disposed of in the land office. Hence it is the duty of all applicants under the mining act to state in their applications whether they are occupying the premises for which a patent is asked; and if not, whether an adverse party is in possession. If the latter is the case, the party is notified that an application for a patent has been made, in order that he may file an affidavit of his claim, and the case is then suspended for action in the courts.

RIGHTS TO THE USE OF WATER UNDER THE NINTH SECTION OF THE ACT.

The ninth section of the mining act maintains and protects the owners of water rights wherever, by *priority of possession*, rights to the use of water for *mining, agricultural, manufacturing, or other purposes*, have *vested and accrued*, and the same are recognized and acknowledged by the *local customs, laws, and decisions* of courts.

To make such a claim good, under the act, the right to the use of water must have accrued—

First, by priority of possession; second, it must be recognized by the local customs; third, by the laws of the State or Territory and the decisions of the courts.

Whenever a claim to the use of water is thus recognized and acknowledged by the local customs, laws, and decisions of the courts of any State or Territory, the owner cannot be disturbed in his possession, no matter whether the land has been returned as mineral or agricultural; nor can his improvements be appropriated by other claimants under the pre-emption or homestead laws. As the right vested in the owner is an extraordinary one, differing essentially from the systems of water rights existing either under the common or civil laws, being, in fact, an anomalous system based upon the peculiar wants and conditions of things found in some of the mining States and Territories, it will be necessary for the claimant to show that it has been fully adopted in the State or Territory in which the claim is situated, as the law upon the subject of water rights by enactments of the legislature or the decisions of the highest courts, and it will not be sufficient to show that such a claim has the sanction of the local customs. This office would not, by issuing patents under said ninth section, contribute to fasten upon one of the new States or Territories a system so materially affecting its local proprietary regulations without the same having been first adopted and engrafted upon the laws of such State or Territory by the proper departments of the same; and any claimant applying under said section must produce satisfactory proof of such adoption and acknowledgment. When such proof can be satisfactorily furnished, claims of this nature might be included in patents for mines, as the reasonable quantity of surface ground for the convenient working of the same, allowed by the act of July 26, 1866, where the water is used for mining purposes, according to the local customs and rules of miners, and the fact of not being adjacent to the vein or lode would not, it is believed, contravene either the letter or spirit of the act. Where these claims are embraced within lands returned as agricultural, and the water is or may be advantageously used for irrigation, they may be included in patents for agricultural lands under the pre-emption or homestead laws, as a part of the realty conveyed, being adjacent to the

same, and constituting a part of the legal subdivisions embraced in such patents.

The doctrine of exclusive ownership of water, by virtue of prior occupancy, appears to have been fully adopted in California by numerous decisions of the supreme court of that State. Whether a similar rule has been adopted in any other State or Territory by the legislature or the courts, is not known here. At all events, any owner of a water claim, in a condition to ask for a patent granting such exclusive right, is in a condition to maintain himself, for the present, without a patent, against all adverse claimants, by virtue of the protection extended to him by the act itself.

APPLICATIONS FOR PATENTS—HOW CONDUCTED.

1. All applications for patents under the mining act should be in writing, in which should be stated the name of the applicants, and whether the claim is made by individuals, or a partnership or corporation; it should designate the mining district, county, and State, in which the claim is located; describe the character of the mine, as to whether it bears gold, silver, cinnabar, or copper; state the number of feet claimed along the lode and laterally; the date of the original location of the claim under the mining customs; when and where it was recorded; the names of the locators; whether the applicant claims as a locator or as a purchaser—if the latter, whether by deed or verbal contract of parties in or out of possession; the nature and value of the improvements made or labor performed; whether the applicant is occupying the claim or is out of possession; and finally, whether the claim is one in regard to the possession of which there is any controversy or opposing claim within the knowledge of the applicant. The application should further state that claimant has posted a diagram in a conspicuous place on the claim, together with a notice of his intention to apply for a patent, with the date of posting such notice and diagram; and it should distinctly appear to whom the patent is to issue.

2. With the application there must be filed, first, a diagram of the claim, similar to that posted in a conspicuous place thereon, representing its boundaries and location, its length along the lode, with the surface ground necessary to the convenient working of the mine; second, a copy of the notice posted on the claim with the diagram; third, a certified copy of the mining customs of the district; fourth, a certified copy of the record of the location from the recorder's office; fifth, if the applicant is a corporation, a certified copy of the charter or certificate of incorporation; sixth, if the application is made by an individual or an unincorporated company, an affidavit or affidavits of citizenship, or of having filed a declaration of intention to become a citizen, the applicant's own affidavit will be sufficient; facts must be stated, such as place of nativity, in what court declaration of intention was filed, and the date of such declaration, with a certified copy of the same; if applicant claims to be a citizen, he must state in his affidavit the place of his birth, his residence for the past five years, and whether he has exercised the elective franchise, and where; seventh, the affidavit of claimant that he is in the occupancy of the claim, stating the length of time he has occupied the same, the amount of money and labor expended thereon, and that he knows of no adverse claim to the possession; and eighth, if claimant is in possession under purchase, a certified copy of the deed, or if the deeds are numerous, a brief abstract of title, certified by the recorder, or even a certificate from that officer that a regular chain of title, ending in the applicant, appears on his records, will answer the purpose.

3. Upon filing these papers, the register of the land office will make the publication required in the third section of the act in a newspaper published nearest the claim, carefully stating in the notice the name of the claimant, of the mine, district, and county; also the names of the adjoining claimants, and if the claim is a relocation, the names of former claimants and claim, designating the lode, and, as near as practicable, the locality of the claim upon the lode.

The names of the adjoining claims and claimants ought never to be omitted, as that will generally be found one of the readiest means of fixing the locality of the claim. The register will also post a copy of the notice in his office for the period of ninety days, and on the publisher's presenting his account, the register will transmit the same to the surveyor general, unless the applicant has made provision for its immediate payment, in which case a duplicate receipt will be taken from the publisher, one of which to be transmitted to the General Land Office.

4. On the expiration of ninety days after posting diagram and notice, the claimant or his agent must file his own affidavit, with that of some other person cognizant of the fact, with the register and receiver, that said diagram and notice were posted in a conspicuous place on the claim at least ninety days, or prove the same by verbal testimony to the satisfaction of these officers. If all the proof furnished is satisfactory to the register and receiver, and no adverse claim has been filed, the applicant for a patent will apply to the surveyor general for an estimate of the expenses of surveying or platting the claim and of making publication, if the latter has not been paid by the applicant; and on depositing the amount with any assistant United States treasurer, or designated depository, in favor of the United States treasury, to be passed to the credit of the fund created by "individual depositors for surveys of the public land," and filing with the surveyor general one of the duplicate certificates of deposit taken by the claimant, that officer will order the claim to be surveyed, and transmit the certificate of deposit to the General Land Office. If an adverse claimant appears before application is made to the surveyor general for a survey, no action will be taken by that officer until the question as to possession is settled in the courts.

5. The survey when made must be approved by the surveyor general, who will also make a plat of the claim, accurately representing its boundaries, its area, and its relative position in respect to the subdivisions of the public surveys, the township and range lines being extended for this purpose according to instructions on page seven, circular of January 14, 1867, if the claim is upon unsurveyed land. In the margin of the plat the surveyor general will endorse his approval of the survey as in other government plats; also his certificate of the value of the labor and improvements, and of the character of the vein exposed, and will transmit papers to the local officers and to the General Land Office, as heretofore instructed.

6. The register and receiver will carefully examine all testimony presented, whether in the form of affidavits or parol proof, exercising the precautions heretofore recommended in reference to the former. They will also examine the returns of survey approved by the surveyor general, and transmit the application with all the testimony, if the same is satisfactory to them, endorsed with their approval to the General Land Office, if no opposing claimant appears before the approval of the survey, so that a patent may at once be issued.

RAILROADS IN THE UNITED STATES.

The railway system was inaugurated in this country some forty years ago. The Baltimore and Ohio, the first passenger railroad constructed, was commenced at its eastern terminus in Baltimore July 4, 1828. The extension of these artificial communications by private capital and enterprise alone over the States east of the Mississippi, during the following twenty years, constitutes a chapter of absorbing interest in our social progress. During this period were established those main lines of east and west travel and transport, which effectually neutralized the isolating influence of the Alleghanies. The main lines of natural communication in the Mississippi valley by the river courses led towards the Gulf of Mexico, and New Orleans had a fair prospect of becoming the great depot of the teeming productions of the mighty west. What the destiny of the country would have been but for the interweaving of these natural longitudinal lines of commercial movement by the cross lines of railway communication, it is impossible now to estimate. These two agencies, the warp and woof of a consolidated Union, have placed the industrial and commercial interests of American civilization upon an impregnable basis and have secured its hopeful development. It may be safely estimated that in the absence of this splendid railway movement our national development would have been retarded at least half a century, and that the desolation of the wilderness would be now unbroken over a vast territory at present teeming with the arts and institutions of civilization.

In 1850 the advance of our material interests had created a demand for railway communication between different sections of the country, which private enterprise unassisted by government could not meet. The endowment of the Illinois Central railroad in 1850, by the donation of the odd-numbered sections of public land lying within five miles of its line, was merely an exercise of the power of disposing of the public domain in a new and more advantageous manner, in which the liberality of the government was fully reimbursed by doubling the price of the reserved lands. The 2,595,000 acres of public land thus granted at the minimum price of \$1 25 per acre represented a nominal value of \$3,243,750. But it was well known that these lands, lying near no great natural means of communication, would be a drug in the market for many years, while the tide of population would be deflected to more eligible portions of the country. The establishment of the railway, however, would bring them at once in demand, and secure their disposal at double the minimum rates. The national landed interest intrusted to the general government would, by this disposition, be very greatly advanced, and an incidental public benefit derived from the speedy settlement of these lands would be secured.

The principle established in the case of the Illinois Central was destined to a speedy and enormous application in other public land States where railway enterprises were struggling against the general embarrassment of want of capital, and where eligible railway movements, yet to be inaugurated, were soon to advance very powerful claims to the same assistance. Land concessions in aid of railroads have been granted by Congress to fourteen States, viz.: Illinois, Iowa, Michigan, Kansas, Missouri, Minnesota, Wisconsin, Arkansas, Alabama, Mississippi, Florida, Louisiana, California, and Oregon; the aggregate amount of land so conceded being 58,108,581.40 acres. Land concessions amounting to 3,782,213.27 acres have also been granted to these States, viz.: Michigan, Wisconsin, and Oregon, for the construction of military wagon roads.

The results of this policy of government aid are wonderful. Through all the States to which these subsidies were granted a system of railroads, embracing thousands of miles, has been inaugurated, giving an untold impulse to every form of industrial and commercial activity and adding an enormous volume and force to our great national forward movement.

The third grand stage of American railroad enterprise is the present, in which it launches out into the wilderness in advance of civilization, laying its iron track through primeval forests and boundless prairies and over rugged mountain ranges in order to unite the outlying members of the Union upon the Pacific coast with the great mass of home civilization. These communities, numbering a million of inhabitants, and rapidly advancing in all the elements of social prosperity, were isolated by thousands of miles of desert occupied by wild beasts or still more formidable savage men. Their pathways across this intervening wilderness were devious, uncertain, toilsome, and perilous. The necessities of commerce could brook neither the delay nor the cost of transportation. Immigration was restricted by the difficulties and dangers of these routes to a limited number, travelling in expensively equipped companies. A route partly by sea and partly by land across the territory of a foreign power, and a still longer sea route round the stormy cape, were the only alternatives to this overland travel.

In spite of these difficulties, American society had established itself upon the Pacific coast in astonishing vigor, and was rapidly working eastward to meet the main tide of settlement, advancing towards the Rocky mountains from the Mississippi. The increasing volume and variety of agricultural and mineral production on the Pacific called loudly for a speedy and safe communication with the older States, attracting the best minds in the nation to the practical solution of the problem. The sudden and powerful quickening of the sentiment of nationality at the opening of the late civil war demanded speedy action upon a project deemed essential to the territorial unity of the republic. In spite of the heavy financial burdens of the war, Congress responded to the patriotic instinct of the nation, by passing various acts from 1862 to the present time, endowing several railroad corporations with magnificent areas of land, and loaning to two of them the government credit to the amount of \$50,000,000 in order to enable them to complete a line of road from Omaha and Kansas City to San Francisco in the shortest possible space of time.

In the previous landed endowments of railroad enterprises, the States within whose limits the roads were to be constructed were made the trustees of the national subsidies. But in the novel aspects of this new movement, and in default of State authority to exercise such trust, Congress was obliged to create corporate agencies to carry out this project. By the acts of July 1, 1862, July 2, 1864, May 21, 1866, and July 26, 1866, the Union Pacific Railroad Company, the Central Pacific Railroad Company of California, and the Union Pacific Railway, Eastern Division, were designated for the work of constructing a line of railway from Omaha to San Francisco, with a branch from Kansas City, passing through Denver, an extension having been proposed in a south-westerly direction to reach the Pacific. To aid in the construction of these stupendous works, the odd-numbered sections lying within 10 miles of each line of route were granted, with a loan of government credit varying from \$16,000 to \$48,000 per mile, in proportion to the local difficulties of each route.

The operations of the aforesaid companies have exhibited a degree of energy and of financial and engineering skill unparalleled in history. The Union Pacific Company commenced building its eastern connection

from Omaha, and completed 50 miles during the year 1865. During 1866 255 miles were built, 235 miles during 1867, and 335 in 1868, up to the present time, making 875 miles of the eastern end of the route now in running order; the process of construction is being rapidly pushed, the latest telegraphic reports recording an instance of seven and a half miles being laid in a single day. The Central Pacific road had 31 miles constructed by July 1, 1864, and by November, 1866, had opened 94 miles further, reaching a point 11 miles from the summit of the Sierra Nevada. This formidable point has since been passed and the line has been finished 300 miles east of Sacramento, with a fair prospect of reaching Humboldt Wells, 200 miles further east, by December, 1868. Nearly 1,200 miles of the main line have thus been completed in four years. Meanwhile, of the branch line known as the Union Pacific Railway, Eastern Division, 385 miles have been completed from Kansas City to Fort Wallace, making an aggregate of nearly 1,600 miles of road complete and in running order between the Missouri river and the Pacific. By the latest, the next anniversary of national independence will witness a complete line of railway across our continent, while intelligent men, well informed as to the progress of the work, predict an earlier consummation.

The splendid qualities exhibited in this enterprise, both by the nation that conceived it in a sublime faith in its own indomitable energy, and by the individual spirits who have worked out the practical problem so far within the time allotted, have already illustrated the American name with a glory not eclipsed by any other achievement. When the enormous extent of the work is considered, with its towering obstacles in certain localities, we may well be astonished at the results obtained even in this age of engineering wonders. The systematic prosecution of the work under some very remarkable difficulties, growing out of the want of local supplies of materials, developed a superior administrative and executive ability. Everything essential to the wants of the workmen and the construction of the road must be procured a thousand miles off, gathered in large magazines at some point, and sent along the line at a heavy cost of transportation. The materials used were of the best quality, regardless of price, and the work finished in a style equal to that of any road east of the Alleghenies.

The equipment of this road is of the first character, embracing 100 locomotives from the best manufactories in the country. The rolling stock of the company is constructed at their own shops in Omaha, in the best style. In the erection of these establishments and of the buildings along the route, the wants of the future have been kept in view, and preparations made for an immense amount of travel and transport, which may be expected on the completion of the line to the Pacific.

The portion of the route confided to the Central Pacific Company presents much more formidable obstacles, especially in crossing the Sierra Nevada. The grades in this part range from 75 to 116 feet per mile, averaging 95 feet. Tunnels were cut through solid rock for very considerable distances, the length of the longest being 1,658 feet. Along 40 miles of the route heavy sheds of timber have been erected to protect the track against the avalanches of mountain snow. While yet the work of passing the summit was in progress, the grading on the eastern slope was commenced, and the necessary iron and rolling stock for 78 miles of track were dragged over the mountain by ox-teams. The main difficulties of this end of the route having been overcome, the work is now advancing at a rate approaching that of the Union Pacific, little or no heavy grading being required west of the Salt Lake mountains. The

construction of this part of the road is of the most substantial character, the culverts being of granite and the bridges of the best Oregon timber. The equipment of the company embraces 105 locomotives and 600 cars. It is estimated that the two roads will unite at a point 100 miles west of Salt Lake City.

This great steam highway traverses three States and three Territories, with other States and Territories lying within its sphere of developing influence. Of these, California has a population of 600,000, Nevada 60,000, Nebraska 100,000, Oregon 100,000, Utah 120,000, Montana 40,000, Idaho 40,000, Colorado 60,000, Wyoming 40,000, and Dakota 10,000, making a sum total of 1,170,000. These populations are increasing by heavy annual ratios, which, on the completion of this route, will be yet further enhanced. When the fertile lands and productive mineral resources of this magnificent area shall be rendered easy of access by the completion of this and other lines of railway already projected, the tide of immigration will be expanded, and the beneficent provisions of our pre-emption and homestead laws will be laid under contribution by millions of settlers. The agricultural and mineral productions of these regions, finding this outlet, will be enormously increased in volume and value. The triumphs of scientific culture may be expected within the limits of fabled great American deserts. Splendid forests will grow from seed upon bleak ridges and plains, arresting excessive evaporation and ameliorating climates. Irrigation will redeem millions of acres from sterility and add magnificent tracts to the productive areas of the country. The vine, the olive, and other generous fruits of all kinds, will grow in those climates with a luxuriance that will astonish the fruit culturists of the older States. Heavy crops of cereals will enhance the stock of breadstuffs of the nation, while immense numbers of live stock nourished in those rich pasture lands will add to the physical comforts of the people. The enhanced yield of the precious metals will swell the volume of solid circulating medium to such an extent that our national debt will be unimportant. The useful minerals will then be subjected to an investigation and exploitation which will develop an amount of industrial wealth beyond all present conception.

This mass of production, in seeking a market, will give rise to a domestic commerce of transcendent value. The domestic trade of this country far overshadows our foreign commerce, indicating a healthy preponderance of the home activities of American life. But there will be added a vast foreign traffic that will flow across the American continent upon the completion of this continental railway, leaving great accumulations of wealth at all the commercial centres along its entire line. The streams of oriental commerce, so long monopolized by European nations and carried around the Cape of Good Hope, across the Isthmus of Suez, or by long and expensive overland caravan routes across the eastern continent, have already been tapped by the pioneer line of American steamers from San Francisco to Yokohama and Shanghai, and the tide of travel and transport has already been deflected to the Panama route. How will that tendency be enlarged upon the completion of this grand interoceanic highway! The tonnage of San Francisco increased from 765,900 tons in 1866 to 901,400 in 1867. The number of passengers arriving during 1867—38,800—was nearly equalled by the aggregate of the first half of 1868—32,000.

The immense mass of export destined to pass from that commercial centre on the Pacific will find a ready transit by way of the route now opening. Wagon freights to the Pacific are even now estimated at 230,000 tons per annum, costing \$13,000,000. It is supposed that 154,000

persons annually pass from ocean to ocean, involving an expenditure for travel and transport of \$31,000,000 per annum. Upon the opening of this route the travel will doubtless be augmented to half a million persons per annum, and the cost of transportation will not be less than \$100,000,000.

But the mass of oriental commerce that will seek this transit will add still further to these splendid aggregates. The improvements both in navigation and railway transport will soon quicken the passage on both elements at a rate conceivable only by comparing the present capacities of locomotion with those existing a century ago. I have elsewhere alluded to the opinion ardently expressed in scientific quarters, that the entire passage from London to Yokohama, through New York and San Francisco, will ere long be reduced to the time now required for the voyage across the Pacific—about three weeks. The trade of China and the neighboring islands, amounting to \$300,000,000 per annum, which Europe has hitherto practically monopolized, will pass quietly into our hands, and our commercial cities will become the centres of the world's financial operations.

The volume of transportation and travel that will pass over our continent will soon outstrip the capacities of any single route. In anticipation of this result, other trans-continental lines are already authorized. The Kansas branch of the Union Pacific, known as the Eastern Division of the Union Pacific Railway, has proposed, as hereinbefore intimated, an extension to the Pacific by alternative routes along the 32d and 34th parallels, traversing some of the most unique and valuable portions of the country. New Mexico, Arizona, Nevada, and southern California, present an area of productive soil and genial climate that promise, under the stimulus of railway communication, to attract and support a large industrial population. Both the agricultural and the mineral resources of these regions are on a magnificent scale, indicating, in the event of the success of the last-named enterprise, a large increase of immigration and an advance in civilization. For the construction of such a route, Congress has been asked for a landed endowment and a loan of credit similar to those accorded to the Union Pacific Company.

Another candidate for the same congressional patronage is the Northern Pacific Railway. By act of July 2, 1864, this company was incorporated for the purpose of building a line of railway and telegraph from Lake Superior to Puget sound, in a line north of the 45th parallel, with a branch down the Columbia river to a point at or near Portland. A grant of land including 20 odd-numbered sections per mile on each side of said line of road was the extent of government subsidy promised. It is claimed by the projectors of this route that it possesses very important advantages over routes further south; that it is the shortest and most central line, crossing the continent at a point where the waters of the great lakes approach nearest the Pacific; that it is the best practicable route, the mountain ranges being here most depressed. It is furthermore stated that there are no deserts along this line, which traverses everywhere tracts of great agricultural and mineral wealth. The climate of this region is of a mildness far beyond what might be expected in such high latitude, as is shown in the great northern deflection of isothermals. It is said that on account of the depressed elevation of the mountain passes the obstructions of winter will be less formidable than on the routes projected further south. It is claimed that the local business of this route will support each successive section as it is placed in running order, and that the completion of the entire line will make it the great artery of northern trans-continental foreign commerce. With all

these advantages, the statement of which does not seem to be controverted, it has been found hitherto impracticable to enlist the capital essential to its prosecution. In this exigency, Congress has been asked for a loan of its credit on terms similar to those accorded to the Union Pacific Company. The success of this policy in the case in which it has already been tried is pointed to as sufficient security for its safety in the present instance. We may reasonably expect that the rapid development of the industrial and commercial value of the routes contemplated by the Northern Pacific Railway and the Union Pacific Railway, Eastern Division, will cause their construction in any event.

In the course of the regular and normal development of our western territory, railroad enterprises connecting with these trunk lines will be inaugurated and successfully carried into execution. The ideas of civilization have in the last decade become startlingly progressive. Man, impatient of the slow labors of the past, is hardly willing to accord even the briefest space of time necessary to the accomplishment of results. There is a feverish anxiety to secure ends in view by constantly improving mechanical processes. The labor of years has already been compressed within days and even hours. The transmission of intelligence by the instantaneous flash of electricity has spread a network of iron nerves, both sensitive and volitional, over every civilized country, while the rapid enlargement of the railway system has supplied a power analogous to the muscular force of the human body, in handling the masses of matter and in dominating the motive powers of nature. The earth under the hand of this intelligent discipline promises soon to become a highly organized mechanism, meeting the wants of its human occupants with a delicate appreciation and an abundance of provision that will realize the dreams of optimist philosophy. We stand, doubtless, at the threshold of grander developments of social life than has ever yet been witnessed in any age.

AREA OF THE PUBLIC DOMAIN—EXPANSION OF AMERICAN NATIONALITY.

By the treaty of 1783, at the close of our Revolution, the limits of the republic of 1776, as acknowledged by Great Britain, extended from the great lakes on the north to the 31° of latitude, and from the Atlantic to the middle channel of the Mississippi, that channel having been recognized as the western boundary of the Anglo-American colonies in the 7th article of the treaty concluded on the 10th of February, 1763, at Paris, between the Kings of Great Britain, France, and Spain, the three great powers then colonizing on this continent. If from the surface of the United States of 1776—1783 we deduct the aggregate area of the original 13 States, also the area of Vermont, admitted into the Union in 1791, but whose territory was claimed by New York and New Hampshire; the surface of Kentucky, once a part of Virginia, but admitted in 1792; of Tennessee, once a portion of North Carolina, but admitted in 1796; and of Maine, its territory having been once claimed by Massachusetts, but admitted as a State in 1820; there will remain unclaimed by any other State a quantity of public land equal to 354,000 square miles, or 226,560,000 acres, that being the aggregate area of this national interest prior to and at the opening of the year 1800. Since then, the limits of the Union have been enlarged and fixed by the treaty of cession in 1803, with Napoleon as First Consul of the French republic; of 1819 with Spain; by the admission in 1846 of Texas, retaining her proprietorship in the lands of the State; by the treaty of limits in that year with Great

Britain, fixing the dividing line between the then Territory of Oregon and the British possessions; by the treaties of 1848 and 1853 with Mexico; and the treaty of 1867 with Alexander II, the Emperor of all the Russias.

In virtue of the treaties of cession here referred to, the area of the public domain has been increased eight times its original extent, and now embraces 1,834,998,400 acres, or 2,867,185 square miles. This immense increase of national territory embraced numerous individual foreign titles founded on written grants, in form extending even to nascent claims resting upon actual settlement before change of government. The whole scope of congressional legislation, from an early date to a recent period, shows how scrupulously this government has made provision for fulfilling treaty stipulations and the requirements of public law, so as to secure to individuals their rights which originated under former governments. No nation has shown a higher sense of justice in this respect or a more liberal spirit. We have acknowledged and carried out the principle, that although sovereignty changes, private property is unaffected by the change, and that all claims in this relation are to be maintained sacred, including those in contract, those executory, as well as those executed. Such are the rulings of boards of commissioners for the examination of foreign titles and the decisions of the district courts, and of the Supreme Court of the United States. The enlightened decrees of the highest judicial tribunal of the Union show how jealously private rights have been vindicated and confirmed, while the records of our government bear evidence of the fact that multitudes of titles, derived under the former sovereignties of Great Britain, France, Spain, and Mexico, have been secured to the lawful owners.

Of the whole surface, as hereinbefore given, 2,867,185 square miles, or 1,834,998,400 acres, acquired at different times and known as the public domain, there have been surveyed from the foundation of our system to June 30, 1868 an aggregate surface of 496,884,754.00 acres. Leaving unsurveyed..... 1, 338, 113, 646. 00 acres.

To this unsurveyed surface add such portion of the surveyed territory as has not been disposed of, viz..... 67, 253, 032. 93 "

And we have yet to be disposed of an aggregate of..... 1, 405, 366, 678. 93 "

This surface exceeds the united areas of European Russia, Prussia, Austria, Norway, and Sweden, and is greater by 1,200,000 square miles than all of Europe outside of Russia. The South American states of Venezuela, Ecuador, Guiana, Bolivia, Peru, and Chili, falling short of this area 300,000 square miles, while it transcends in extent the great empires of antiquity, and is exceeded only by a few in modern times whose enormous surfaces are pieced out by inhospitable regions.

The present territorial limits of the republic embracing this domain cover nearly 4,000,000 of square miles, extending through 58 degrees of longitude, from ocean to ocean, and through 25 degrees of latitude, from the chain of the great northern lakes to the Gulf of Mexico; our country occupying the main strategical points on the North American shore line of both oceans. Our Atlantic coast with the Gulf line stretching from the St. Croix to the Rio Grande, our Pacific seaboard extending with the exception of a few hundred miles of British territory, from the 32d parallel to the Arctic ocean. The northern land frontier passes from the Pacific ocean through Puget sound eastward along the 49th paral

lel, intersecting the basin of the lakes near the head of Lake Superior, following their course for more than 1,200 miles, deflecting eastward along the 45th parallel, with a northward curve, to include the State of Maine. Our southern land frontier, ascending the Rio Grande to El Paso, strikes westerly to the confluence of the Colorado and the Gila, oscillating above and below the 32d parallel.

Our geographical position places us in the chief highway of the world's commerce, enabling us ere long to control its movements and absorb a large share of its profits. The development of the American industrial and commercial system upon the Pacific slope has already deranged the old commercial relations of Europe with eastern Asia, promising to reverse the course of trade, causing it to pass over this continent to Europe. Our centres of production are shifting towards the Pacific. Commerce follows industry, and the great centres of commercial Europe are soon to be disturbed by mighty influences. The eastern question of to-day will be superseded by more potent and fundamental interests rapidly reconstructing the social system of the world.

The Union Pacific railroad, the completion of which is now but a question of months, will yet constitute the main channel of communication between eastern Asia and western Europe. In the last annual report of this office it is shown by undeniable facts and figures that for travel and for the carriage of light and high-priced articles, the transportation whereof constitutes but a small proportion of the cost of bringing them into market, such as the teas and silks of China and Japan, the Pacific railway, notwithstanding the double transshipment, first at San Francisco and then at New York, will be a formidable rival to the European steamship lines, even with the advantage of the Suez maritime canal. The extent of this carrying trade is partly indicated by the importations of tea into the United Kingdom from China and Japan for three years, as stated in vol. 26 of the British Parliamentary Papers of 1866, to wit: for 1863, 136,803,218 pounds; for 1864, 124,359,243 pounds; for 1865, 121,156,712 pounds; total, 382,319,173 pounds. Of this enormous aggregate, over 97 per cent. entered the port of London. A correspondent of the London Times of the 16th October, 1868, says: "China sends us every year more than 100,000,000 pounds of tea, and takes from us in the same period more than 100,000,000 yards of Manchester and Yorkshire fabrics. English steamers reach the very heart of China by ascending the great rivers Yang-tze-kiang and Peiho." It is in place here to state that in the second article of the treaty of 1844 at Wang-Hiya between the United States and the Chinese empire, it is stipulated that "if additional advantages or privileges of whatever description be conceded hereafter by China to any other nation, the United States and the citizens thereof shall be entitled thereupon to a complete, equal, and impartial participation in the same." (Statutes at Large, vol. 8, page 592.)

The rapidity of transit, which is constantly stimulated by commercial rivalry and the advantage of speedy marketing, will send a large proportion of this carrying trade across our continent.

But we will soon develop a basis of oriental commerce from the mutual necessities and capacities of the United States and Asia grander than the accumulated masses of commercial power and thrift in the capitals of western Europe. The importation of teas and other Asiatic products must continue to increase at a rate proportioned to our increase in population and to the settlement of our public domain. In return for this immense mass of imports, the Pacific slope alone will export a surplus production of breadstuffs, also fruits of most exquisite quality, to meet the increasing demand of Asia. Our unrivalled fisheries on the Pacific

from the Gulf of California to the Arctic will afford to 400,000,000 Chinese, 50,000,000 Japanese, and many odd millions of East India islanders, an immense volume of cheap animal nutriment, superseding to a considerable extent even their favorite rice.

By our late treaty with China, concluded at Washington during the current year, provision is made for the construction of internal improvements in the Celestial Empire by American capital and enterprise. Already a company of American capitalists have been authorized by the Emperor of China to construct a line of submerged cable connecting the leading maritime cities. This will doubtless be followed by the introduction of railroads on an extended scale. The iron and machinery necessary for their construction and equipment will be supplied by American industry, and largely from the yet undeveloped enterprise of the Pacific slope. The transportation of this heavy material will give scope to an immense extension of our carrying trade, which an increasing demand in eastern Asia for our manufactures will still further enlarge.

The Pacific ocean is the sphere of the peculiar triumph of steam navigation, and the age of American enterprise in this direction is now opening. We are daily diminishing the disadvantages in our commercial rivalry with Great Britain, growing out of want of capital, and may now hope that upon the expanse of the Pacific our flag will soon be found covering a larger commerce than has ever yet been known on the Atlantic.

The pioneer enterprise of Pacific steam navigation is an American line known as the Pacific Mail Steamship Company, originally organized to ply between New York and San Francisco, connecting with the Panama railway. In 1861 this company had 11 steamships on the Pacific, of comparatively moderate capacities, and assets amounting to \$4,201,283 17. During that year the transportation both ways amounted to 22,806 passengers, 10,444½ tons of merchandise, and \$41,202,985 45 in treasure. In 1868 the company employed 22 steamers of increased capacity, with four new ones building, showing assets above liabilities amounting to \$25,000,000. The business of the previous year includes 31,897 passengers, 60,134 tons of merchandise, and \$40,754,175 in treasure.

This company has lately established a branch line from San Francisco to Yokohama, in Japan, and to Shanghai, at the mouth of the Yang-tze-kiang, the Mississippi of China. The business of this branch is rapidly increasing, paying handsome dividends, the first five voyages each netting an average profit of \$30,000. It imports large quantities of clothing to the 75,000 Chinese settled on the Pacific slope, and immense supplies of tea from China and Japan. This carrying trade, rapidly increasing, is destined to an indefinite expansion on the completion of the Pacific railroad, from local demand along its line, to say nothing of through freight to the eastern States and to Europe.

The experience of this company in Pacific navigation inclines them to prefer large side-wheel steamers to propellers, carrying 2,000 tons of merchandise, and 1,500 passengers, besides 1,700 tons of dead freight. These, with the expenditure of 40 tons of coal, average over 220 sea knots per day, making the 5,000 sea knots of the longer winter passage in three weeks, with proportionate reduction in the summer route, some 250 miles shorter. The late discovery of islands* in the

* These islands were first discovered in 1859 by Captain Brooks, of the Hawaiian bark *Gambia*, in latitude 23° 12' north, and longitude 177° 12' west from Greenwich, not having previously appeared on any chart. They stretch from the Hawaiian group in a general west-

Pacific, near the track of these steamers, by their coaling facilities, will render available for merchandise hundreds of tons on each voyage now absorbed by dead freight.

The earlier trips on this line from Yokohama to San Francisco were made within three weeks. It is but reasonable to expect that increasing experience and constant improvements in construction will reduce these voyages to the present average trips from New York to Liverpool, say 10 or 12 days, while the latter will be compressed within a week. Railroad men are already broaching the idea that the railroad transit from New York to San Francisco will shortly be made within 72 hours. This would require an average speed of 44 miles per hour, not including any time for stoppage. To accomplish this result, of course immense improvements must be made in railroad construction and equipment. But such improvements are not to be compared with the revolution wrought in the world's locomotive power by the substitution of railways for stage coaches, or to the improvements effected in railroads. We may therefore reasonably expect the transit from Yokohama to London, *via* San Francisco and New York, to be made within the time now required for Pacific voyages, say three weeks; at the opening of the Pacific railroad it will require about 40 days, some 15 or 20 less than are required by the most speedy European line. An opposition American line has already been established from New York to San Francisco, which is called the North American Steamship Company, and has four steamers in commission.

We are now rapidly recovering from the temporary depression of our shipping interests, owing to the depredations upon our commerce during the late civil war, and there is every prospect of a permanent and speedy advance in this, as in all industries affected by the same cause.

The special advantage, however, in controlling the trade of Asia lies in our mineral wealth. In 20 years we have probably added to the metallic circulating medium of the world about \$1,250,000,000, 10 per cent. of which is silver. Of the world's annual product, about \$200,000,000, we are producing more than one-half. It is true the decline of placer mining has been more rapid than the expansion of vein mining, and that consequently our aggregate annual production has diminished, yet this is no ground of apprehension to minds conversant with the subject. We are now recovering from the lethargy that followed the reckless speculations in the mining regions. Costly experience has been fruitful in lessons of practical wisdom, and in specific facts in regard to our mining resources. Schools of mining are being established, combining the accumulated science and skill of Europe with the ready tact and restlessness of American mind, and promising a greatly enhanced metallic production in the coming age of mining enterprise.

The practical results of the important facts suggested are beginning to be developed in a remarkable degree, and can only be fully appreciated in connection with some peculiar characteristics of Oriental society which have perplexed political economists from the days of Pliny to the present.

The industrial organization of eastern nations has secured, from time immemorial, heavy balances of trade in their favor, resulting from the inexpensive habits of their laboring population. The average wages of labor in Bengal do not exceed from three to three and a half pence per day, the average in southern and eastern Asiatic countries being about

northwesterly direction, are important as a "coaling station" for American China steamships, also for United States vessels cruising in these waters, and were formerly taken possession of for the United States by an American man-of-war on 28th of August, 1867, receiving the name of Midway islands. (*Vide* Ex. Doc. No. 79, 2d session 40th Congress, July, 1863.)

the same. When rice does not cost more than a half penny per pound, this sum represents the full share of animal comfort that is requisite to meet the limited aspirations of these down-trodden masses, and to maintain their effective laboring strength. Such labor is found inefficient when compared with the muscular force of civilized men; yet, after meeting all home demands, it secures a very large annual surplus for exportation. This export is not balanced by any commensurate import to meet the most lavish expenses of the small ruling class, to whose wants the demand for foreign productions is limited, the mere physical necessities of the masses being satisfied with the fruits of the soil. On the other hand, the staple exports of such countries—tea, silk, coffee, cotton, and spices—have, through the settled habits of civilized life, become articles of imperious necessity. Reciprocity of supply and demand, then, having but a limited application to the trade with Oriental nations, these balances must be paid in the precious metals, mostly silver. From this has resulted that puzzling financial problem, “the drain of specie to the east.” From the time Pliny estimated the annual export of precious metals to the east at a sum equal to \$4,000,000 for luxuries and female ornaments, this drain has continued, with occasional fluctuations, yet with general expansion, to the present time. If it had not enlarged beyond the estimate of Pliny, it would by this time have accumulated not less than \$8,000,000,000 in Asiatic countries—a sum equal to double the national debt of England, and exceeding many times the entire stock of precious metals, both in Europe and America. But the gradual enlargement of this export for hundreds of years, and especially its enormous expansion since 1853, renders the conditions of the problem unmanageable, and its results indeterminate.

In volume 39 of the British Parliamentary Papers for 1866 is found a report of the Bengal Chamber of Commerce, urging the adoption of gold currency, as the annual absorption of silver by India is greater than the world's entire production. The Bombay Chamber of Commerce, estimating the world's annual silver product at £10,000,000, stated that for the previous six years India had absorbed an average of £11,500,000, and during the year immediately previous £14,500,000, or from 15 to nearly 50 per cent. in excess of the annual product of the globe. Individual estimates are also given, slightly varying from the above, which are endorsed by the governor of Bombay. Dr. Nassau Lees, in his “Drain of Specie to the East,” estimates that this drain will, from the necessities of local traffic alone, engulf some four or five hundred millions more of the world's silver, while other authorities estimate India's absorbent power as practically unlimited.

From these and other facts, it will be seen that the increase of trade with Asia involves an increased draught upon the world's stock of silver. What is especially remarkable, is the fact that Asiatic countries have so little to show by way of accumulation. In 1857, India had a circulation of \$400,000,000 among a population of 180,000,000, or about \$2 22 per capita; China and Japan having about \$3 per capita; whilst France, with a population of 38,000,000, has a metallic circulation of \$910,000,000, or \$24 per capita. Yet western nations are still pouring their uncounted millions into this apparently fathomless abyss.

During 1866, European exports of specie to Asia amounted to \$58,000,000, of which \$56,250,000 were silver. The exports of the previous fourteen years amounted to \$911,000,000, of which \$787,000,000 were silver. Without attempting to account for this phenomenon upon any of the theories propounded by different writers, attention is invited to the elements of

power which our enormous production of gold and silver gives us in meeting this demand. During the year 1866, our direct shipments of treasure from San Francisco to Asia amounted to \$6,633,418, being an excess of \$101,211 over the shipment to England, seven times greater than the shipment to France, and nearly one-fifth of the shipment to New York. The president of the San Francisco Chamber of Commerce, in a report made in 1867, shows by facts and figures that the cost of laying down silver in China from San Francisco direct, in sailing-vessels, is less than one-half the cost of sending it by way of London, the freight and primeage being in the latter case more than double the former, and saddled with a double insurance, besides commissions.

The establishment of the China branch of the Pacific Mail Steamship Company has since enlarged the facilities of a prompt and safe transmission of treasure. It is not easy to estimate the full force of our advantage thus accruing in controlling the commerce of eastern Asia. The ultimate result cannot fail, as heretofore suggested, to be the establishment at San Francisco and New York of clearing-houses for the commerce of the globe.

The rapid and radical changes lately wrought in the relations of the different Asiatic powers present favorable opportunities for the extension of the commercial influence of the Union. The maps of that continent promise speedy reconstruction. The Eastern question of the last and present century has broadened its issues, and is involving world-wide interests in its solution. The Czar is becoming essentially an Asiatic potentate, and the drift of Russian civilization is eastward, to meet and join hands with our own across the Pacific. The laborious efforts of the Russian government to elevate its masses will be far more effective when once it shifts its capital towards the Pacific, which is soon to be the grand arena of commerce and industry.

England has also become an Asiatic power; leaving the Gallic and Germanic fragments of the Carlovingian Empire to struggle for the mastery of continental Europe, she stakes her power, perhaps her national existence, upon the stability of her Indian empire. Russia, having swept across the Kirguis steppe and conquered three-fourths of Turkestan, now holds a commanding position towards the Anglo-Indian frontier, which has been pushed across the Indus, absorbing Scinde and Punjaub, and now rests upon the summit of the Hindoo Koosh. Its right flank is further protected by a diplomatic ascendancy over Thibet and Cashmere, which, by degrees, may pass into territorial sovereignty. Both parties are now struggling for the diplomatic control of the whole Iranian plateau.

Looking to eventualities, England has an army in India of 150,000 troops, of whom 70,000 are English; yet her main hope is in the reconstruction of Indian civilization, and in the consolidation of her empire by the construction of a magnificent system of railroads, involving an expenditure of \$440,000,000. These are arranged with rare strategic skill, quadrupling the efficiency of her military force by multiplied facilities for concentration. Civilization is radiated downward, through strata of ignorance and superstition, the whole forming a unique political and social organism, the greatest colonial empire of history. It is scarcely concealed by British publicists that the main object of British rule is to transform Hindostan into a market for her manufactures, thereby drawing new aliment to her home industry. France has again entered the field of Asiatic colonial enterprise, and is already pressing the soil of Farther India, evidently with the good will of her English neighbors.

The Russians, in addition to their conquests in Turkestan, have advanced their Siberian frontier southward, at the expense of China. First the entire left bank of the Amoor was secured during the Taeping rebellion. Subsequently, Russia pushed her line southward, through Mantchooria, to the borders of Corea, within 800 miles of Peking.

Amidst the complications of internal discord and external hostility in China, the military prestige of this republic loomed across the Pacific, developing a new and commanding interest in Asiatic affairs. A new line of policy has been adopted by the statesmen of the Celestial Empire, being nothing less than an abandonment of the isolation of forty centuries, the empire taking its place in the family of nations, and assuming the obligations and sharing the benefits of international comity.

The United States have ever recognized the sentiment of the brotherhood of mankind as the basis not only of our domestic institutions but of our foreign policy, not looking beyond our immediate continental relations, and having no motive for aggression. This general idea of our national character has been confirmed by our intercourse with the Chinese government, and our commercial transactions with their people. Under the auspices of America, China now seeks to secure position among the nations of the earth, and to escape the fate of other oriental states. This involves the reconstruction of her civilization, and the introduction of those improvements of science and art which have enabled European nations to dominate the immensely more populous regions of Asia. She desires now to introduce the latest processes of art without impairing the industry of her people; to increase facilities for manufacturing, agricultural, and mining enterprise, as the basis of a more extended and mutually profitable foreign and domestic commerce.

To enable the Chinese to realize such results, by assisting them in avoiding the complications of European diplomacy, in affording adequate moral support against ambitious schemes of foreign conquest, but above all in striking the key note of nobler social organization and individual manhood, this country will render a service that will add to the American name a glory not eclipsed by past achievements in civilization. Our claims to the regard of that people will of course unlock to us the doors of a more intimate commercial intercourse than has yet been accorded to any nation, an advantage not lessened by recollections of any injustice or aggression.

Through an established trading intercourse with China, exerting a powerful influence on her internal as well as her external trade, the commercial interests of America will gain permanent footing. The railroads which will soon intersect the Celestial Empire will act as feeders to our American Pacific steam fleet. These railways will reach the tribes of the interior, and develop commercial relations with people yet but partially known. Our steamers upon the Yang-tze-kiang, the Hoang-ho, and the Hoang-kiang, will bring down the products of Chinese industry, and in return carry to the furthest point of navigation cargoes of American mechanical, agricultural, and mining products, thus diffusing the blessings of a varied industry and an enriching commerce, not controlled by military conquest and colonial empire, but by the regular normal influences of fair dealing and intelligent enterprise.

In order to furnish some idea in concentrated form of the existing interests to be affected by the trans-Pacific commerce in connection with the progressive and active settlement of the public lands, inquiries within the last few months were addressed by the Commissioner to the governors of the several States and Territories, and the authorities of

371 municipalities. The results as far as received will appear in an accompanying paper.

From these, with other sources, it is estimated that there are now completed 40,000 miles of railroad, at a cost of nearly \$2,000,000,000; that 20,000 miles additional are projected and in process of construction; that the earnings of the American people may be set down at \$7,500,000,000 annually, and that the domestic trade is now nearly \$6,000,000,000 a year.

Among the agencies which have secured the expansion of American power over this continent, the public land system, in effecting progressive and rapid settlement, stands pre-eminent. The ruling principle in its legal constitution and uniform administration has been the diffusion of democratic civilization, affording choice places for homes to multitudes of actual settlers in different latitudes, yet with climatic variations fading into each other with remarkable serial regularity.

The agricultural and mineral resources of the Union are supplemented by manufacturing facilities and diversified industries, in a vast territory not isolated in its parts, like those of Asia, by almost impassable mountains and irreclaimable deserts, but dominated by a matchless river navigation and extended artificial facilities of intercommunication. What will be the aggregate of domestic trade and the effect upon our foreign commerce when American resources have been developed! What system of statistics can embody the commercial and industrial movements of the rich and powerful States which our people, aided by immigration, will ere long plant in unbroken column across this continent!

There are submitted the following statements showing the number of acres of public lands surveyed in the land States and Territories up to June 30, 1868; the quantity remaining unsurveyed; also the area of public lands disposed of under the various laws, as illustrated under 22 different heads, since the commencement of the land system; estimates of appropriations required for the office of the Commissioner of the General Land Office for the fiscal year ending June 30, 1870; those for the surveying department for the same period. There are also herewith annual reports of the surveyors general of the 12 surveying departments, with accompanying documents; historical and statistical table of the United States of North America; also 29 separate maps of all the public land States and Territories, showing the extension of the lines of public surveys. Also herewith will be found a connected map of the United States from ocean to ocean, exhibiting the public surveys, land districts, sites of surveyors general and district land offices, prominent railroads and mineral deposits. Map of the world on Mercator's projection, indicating routes of trade from an early date, anterior to the Christian era, to the present time. Preliminary reports are also sent by the geologist engaged in extending explorations pursuant to the act of Congress approved July 20, 1868.

JOS. S. WILSON,
Commissioner.

HON. O. H. BROWNING,
Secretary of the Interior.

List of papers accompanying Commissioner's annual report.

No. 1. Tabular statement showing the number of acres of public lands surveyed in the land States and Territories up to June 30, 1867, during the last fiscal year, and the total of the public lands surveyed up to June 30, 1868; also the total area of the public domain remaining unsurveyed within the same.

No. 2. Statement of public lands sold; of cash and bounty-land scrip received therefor; number of acres entered under the homestead law of May 20, 1862; of commissions received under the sixth section of said act; also land located with scrip under the agricultural college and mechanic act of July 2, 1862, and commissions received by registrars and receivers on the value thereof; and statement of incidental expenses thereon in the first half of the fiscal year commencing July 1, 1867, and ending June 30, 1868.

No. 3. Statement showing like particulars for the second half of the fiscal year ending June 30, 1868.

No. 4. Summary for the fiscal year ending June 30, 1868, showing the number of acres disposed of for cash, with bounty-land scrip, by entry under the homestead laws of May 20, 1862, and March 21, 1864, with aggregate of \$10 homestead payments, homestead commissions; also locations with agricultural college and mechanic scrip, under act of July 2, 1862.

No. 5. Statement showing the quantity of swamp lands selected for the several States under the acts of Congress approved March 2, 1849, and September 28, 1850, and March 12, 1860, up to and ending September 30, 1868.

No. 6. Statement exhibiting the quantity of swamp land approved to the several States under the acts of Congress approved March 2, 1849, September 28, 1850, and March 12, 1860, up to and ending September 30, 1868.

No. 7. Statement exhibiting the quantity of swamp land patented to the several States under the acts of Congress approved September 28, 1850, and March 12, 1860; and also the quantity certified to the State of Louisiana under the act approved March 2, 1849.

No. 8. Statement showing the State selections under the "internal improvement" grant of 4th of September, 1841, on the 30th June, 1868.

No. 9. Exhibit of bounty-land business under acts of 1847, 1850, 1852, and 1855, showing the issue and locations from the commencement of the operations under said acts to June 30, 1868.

No. 10. Statement showing the selections made by certain States of lands within their own limits under agricultural and mechanic act of July 2, 1862, and its supplemental acts of April 14, 1864, and June 21, 1866; also the locations made with scrip under said acts.

No. 11. Statement exhibiting land concessions by acts of Congress to States and corporations for railroad and military wagon-road purposes from the year 1850 to June 30, 1868.

No. 12. Statement exhibiting land concessions by acts of Congress to States for canal purposes from the year 1827 to June 30, 1868.

No. 13. Estimate of appropriations required for the office of the Commissioner of the General Land Office for the fiscal year ending June 30, 1870.

No. 14. Estimates of appropriations for the surveying department for the fiscal year ending June 30, 1870.

No. 15. Estimates of appropriations required for surveying the public lands for the fiscal year ending June 30, 1870.

No. 16. Estimates of appropriations required for the surveying department to supply deficiency for the fiscal year ending June 30, 1869.

No. 17. Reports of surveyors general, A to L inclusive.

No. 18. Statement of confirmed Indian pueblo grants and private land claims in New Mexico.

No. 19. General tabular statement exhibiting the following: No. 1, States and Territories containing public land; No. 2, square miles and areas of States and Territories containing public land; No. 3, quantity sold; No. 4, entered under the homestead law; No. 5, granted for military services; No. 6, granted for agricultural colleges; No. 7, approved under grants in aid of railroads; No. 8, approved swamp selections; No. 9, quantity granted for internal improvements; No. 10, donations and grants for schools and universities; No. 11, locations with Indian scrip; No. 12, located with float scrip; No. 13, estimated quantity granted to wagon roads; No. 14, quantity granted to ship canals; No. 15, salines; No. 16, seats of government and public buildings; No. 17, granted to individuals and companies; No. 18, granted for deaf and dumb asylums; No. 19, reserved for benefit of Indians; No. 20, reserved for companies, individuals, and corporations; No. 21, confirmed private land claims; No. 22, quantity remaining unsold and unappropriated June 30, 1868.

No. 20. Historical and statistical table of the United States of North America.

No. 21. Set of twenty nine maps of all the public land States and Territories, to wit: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Dakota, Missouri, Arkansas, Louisiana, Mississippi, Alabama, Florida, Nebraska, Kansas, Indian Territory, Colorado, New Mexico, Montana, Wyoming, Idaho, Nevada, Utah, Arizona, California, Oregon, Washington, and Alaska.

Each map shows the extent of the public surveys where such have been extended; also the names of counties and resources, so far as furnished by the data on hand.

No. 22. Connected map of the United States from ocean to ocean, exhibiting the extent of the public surveys, localities, land districts, seats of surveyors general's offices and district offices; also localities of railroads of general interest and mineral deposits.

No. 23. Map of the world on Mercator's projection.

OBSERVATIONS ACCOMPANYING ANNUAL REPORT OF 1868 OF THE COMMISSIONER OF THE GENERAL LAND OFFICE ON FOREST CULTURE.

The extension of settlements west of the Missouri river, across the treeless prairies of Kansas and Nebraska, has recently attracted much attention to the value and importance of forests, not only as means of supplying fuel and lumber, but from the influence they are supposed to exercise upon the character of the climate and general well being of society. Observation and experience appear to establish the fact that as settlements have advanced over the States of Illinois, Iowa, and Minnesota, as well as certain portions of Ohio, the protection afforded to the prairies in preventing fires has resulted in increased growth of timber, independent of the planting of orchard and shade trees, and a greater regularity and more equable distribution in the fall of rain. The destructive inundations, excessive droughts, and sudden changes of temperature, so well remembered by the early settlers of Iowa, and prevailing a quarter of a century ago, are diminishing every year in that prosperous State. Similar changes are noticed in the eastern portion of Kansas

and Nebraska, in the vicinity of Denver, and in the valley of Salt lake; in fact, in every locality where the improvements of settlers, even for so short a period as ten years, have resulted in adding considerably to the number of trees; attesting not only the extraordinary importance of the forest in rural economy, but the readiness of nature to second the operations of man in respect to climate, and other agencies affecting the productiveness of the soil. It were well if the lessons thus silently taught by these climatic changes, annually developing in our western States and Territories, were seriously heeded in every section of our common country, as there might even yet be time to avoid entailing upon succeeding generations the evils which the imprudent destruction of the forest in many portions of Europe has bequeathed to the people of the present day.

The extraordinary fertility of Spain in the time of the Romans, and during the Moorish domination, is a matter of history. In those early times extensive forests covered not only the numerous sierras, traversing the country from the shores of the Atlantic to the Mediterranean on the east, but many of the valleys and table lands; the attachment of the Moors to trees and groves having, in a great measure, preserved them from unnecessary removal. The tastes and theories of the Spaniards were so entirely different, that in the course of a century after the expulsion of their Moslem invaders, many districts of the peninsula were almost entirely destitute of trees; and so ruthless has been the havoc of the woodman's axe in that once favored land, that at the present time Spain is suffering more from the want of timber and woods than any other European country. Although there are doubtless other causes contributing to the decline of Spanish industry, the improvident destruction of trees and forests is generally regarded as one of the most prominent causes of the deterioration of the soil and the arid character of the climate. Sir John F. W. Herschel, in a recent work on physical geography, designating the absence of trees as one of the influences unfavorable to rain, says, "this is no doubt one of the reasons of the extreme aridity of the interior of Spain. The hatred of a Spaniard toward a tree is proverbial."

At the commencement of the French revolution, in 1789, the southern and southeastern parts of France, the slopes of the Alps and Pyrenees, and the valleys bordering on the sources of the Rhone and the Gironde, were celebrated for their prosperity, the salubrity of their climate, and fertility of soil. Arthur Young speaks in glowing terms of the great number of cattle and sheep grazing in the mountain pastures, and of the extreme beauty and productiveness of the vine-clad valleys. At the time of his visit the forest of Cévennes, skirting the valley of the Rhone on the west, had not been completely destroyed, and the mountain declivities still contained extensive belts of timber, all, or nearly all, of which have since disappeared, under the mistaken notion that the lands might be more profitably occupied as vineyards and gardens; the increasing demand for lumber also contributing additional incentive to enlarging the area of cleared land. The change that has taken place in the climate, and the increasing frequency of inundations, appear to have disappointed all these expectations. The removal of the woods has exposed the country to storms, cold, and drouths. Destructive torrents have excavated frightful ravines through many once flourishing vineyards, and carried enormous masses of rock, sand, and gravel into the lovely valleys, which, less than a century ago, challenged the admiration of the tourist. So desolating has been the influences of the changes brought about that the population of some of the departments, and the

amount of taxes collected by the government, have been decreasing from year to year. The olive, once cultivated successfully as far north as Avignon; by the increased severity of the climate, has been banished to the more sheltered localities of the coast; and the cottages and improvements of the departments of the Alps and the Pyrenees have greatly diminished in number. Other portions of the French empire have witnessed similar misfortunes, consequent upon clearings in the ancient forests of Ardennes, the Vosges, and other wood lands; and so general is the conviction upon the minds of the people and scientific men of France, that the unfavorable climatic influences experienced are mainly attributable to the mistake of having reduced the forest area too much for the amount of cleared land, that the legislative body in 1860, by an almost unanimous vote, passed a bill making provision for replanting 250,000 acres of new forest, and appropriated 10,000,000 francs in aid of the enterprise; having the previous year organized a police force for the protection of existing forests, and preventing unnecessary and injudicious clearings. Besides the appropriation made in 1860 for the planting of new forests, France expends annually over \$2,000,000 in the management and protection of 2,700,000 acres of state forest. But the evils of an indiscriminate clearing of wood lands have not been limited to France and Spain. Almost every European country has experienced like inconveniences, and Italy, Belgium, and the German states, had restored many thousands of acres of forest before France commenced the work of replanting. In Germany the art or profession of forestry is one of high scientific attainment, and is always represented by men specially trained for the purpose; the object of maintaining the proper harmony between forest and cleared land being regarded as of the highest importance to the productive capacity of the soil, as well as in maintaining a continued supply of fuel and lumber. Austria alone maintains 13,000,000 acres of state forest; Prussia, 5,000,000, and Bavaria nearly 2,000,000, and to the conservation and restoration of these, liberal expenditures are annually made, and authors of distinguished abilities have enriched the forest literature of Germany by many able works.

The climate of northern Italy is said to have been so much injured by the destruction of timber that maize would no longer ripen in certain parts of the valley of the Po; and the cultivation of this crop ceased to be profitable until the restoration of the forest again diminished the occurrence of early frosts, of droughts, and hailstorms, and restored atmospheric conditions favoring its maturity.

Extensive clearings upon the crest and sides of the Apennines have been found to expose the country to the enervating winds from the African desert, not only seriously affecting the sanitary condition of the exposed localities, but greatly injuring the harvests and vineyards of Parma and Lombardy. In some of the provinces these winds have become so destructive as to sweep off whole crops of grapes and grain, and even to blow the tiles from the houses; disasters never witnessed, it is said, until after the removal of the Apennine forests.

"There are parts of Asia Minor, of northern Africa, of Greece, and even of Alpine Europe," says the Hon. G. P. Marsh, "where the operation of causes set in action by man has brought the face of the earth to a desolation almost as complete as that of the moon; and though, within that brief space of time men call the 'historical period,' they are known to have been covered with luxuriant woods, verdant pastures, and fertile meadows, they are now too far deteriorated to be reclaimable by man; nor can they become again fitted for human use except through great

geological changes or other mysterious influences or agencies of which we have no present knowledge, and over which we have no prospective control."

From the 27th of September to the 4th of October of the present year, (1868,) the sources of the Rhine, Rhone, Reus, and Tessin, became so swollen by continued rain and the melting of the mountain snow by the constant blowing of the warm south wind, as to convert all those streams into roaring torrents, sweeping away mills, manufacturing establishments, villages, farm-houses, railroad tracks and bridges, vineyards, and live-stock, detaching from the mountain sides vast masses of rock, sand, and gravel, and filling densely populated valleys with the accumulated debris, destroying human life, and inflicting devastation upon many hitherto prosperous communities of Switzerland, amounting in estimated damages of from fifteen to fifty millions of dollars. This terrible inundation is said to be without precedent in the region of the Alps, in the extent of the injury done, and the breadth of surface over which its ravages prevailed. Well-informed persons in Switzerland explain the calamity as being due to the same causes which have produced similar but less destructive disasters in Spain, in Italy, and in southern France; and aver that evils such as are now experienced by the present inhabitants of the mountain districts of southern Europe were unknown to their ancestors, before the Alps and Pyrenees were so extensively denuded of their forests.

Mr. Marsh has collected nearly all the historical facts bearing upon the question, in his excellent work published in 1864, entitled "Man and Nature," and from the great variety of the illustrations presented there appears to be but little room to doubt the general accuracy of the position assumed, that the climate of a country is influenced in a most important respect by the extent and distribution of its forests. Not only are floods and torrents of more frequent occurrence after the removal of the woods, but the regularity of the rain-fall being destroyed, inundations are succeeded by droughts, and streams and springs become alike irregular in the quantities of water discharged.

The author of the "Economie Rurale" furnishes an account of the subsidence and subsequent increase of the waters of Lake Valencia in the valley of Aragua. Prior to the visit of Humboldt in 1800, the volume of water had been diminishing for half a century, exposing from time to time the surface of numerous islands, entirely covered by water at an earlier period. The distinguished traveller made the phenomenon a subject of careful examination; proved the unsoundness of the usually received hypothesis of a subterraneous outlet, and did not hesitate to explain the gradual depression of the level of the lake as the result of the numerous clearings made in the valley during the latter half of the preceding century.

In 1822, Boussingault visited the locality and found that instead of retiring, the waters of the lake had been sensibly rising for several years. A number of sugar and cotton plantations, on land formerly constituting a part of its bed, had become submerged, and the islands above the surface at the time of Humboldt's visit had disappeared. No apparent reason existed for this, as no particular change in the seasons had been noticed. Boussingault proceeds to state that during the war for independence by the South American colonies, the fertile valley of Aragua, became the theatre of bloody struggles, desolating its fields and exterminating its population. The large plantations, which during the preceding fifty years had been wrested from the domain of the forests, were abandoned, and in the tropical climate of Venezuela, the ten or a dozen

years that had elapsed had sufficed to cover them a second time with trees and shade; the rise of the water of the lake keeping pace with the encroachment of the forest. Other instances are mentioned by the same writer, of large clearings in Venezuela and New Granada being accompanied by a similar disappearance of the waters of adjacent lakes, while in districts always bare of trees, or where the forest had never been disturbed, no such changes had occurred. This eminent scholar maintained that the lakes of Switzerland have sustained a like depression of level since the too prevalent destruction of woods, and arrives at the general conclusion that "in countries where great clearings have been made there has most probably been a diminution of the living waters which flow upon the surface of the ground, and that very restricted local clearings may diminish and even suppress springs and brooks, without any reduction in the total quantity of rain."

Marschand relates the circumstances of the Sorne and the Doubs, streams in Switzerland from time immemorial furnishing an abundant water-power for the manufacturing establishments on their banks, becoming so deficient in the supply of water, after cutting the woods near their sources, as no longer to furnish the required power, so that in one case steam had to be introduced, and, in the other, the factory was stopped entirely. Instances are related of celebrated springs disappearing with the cutting of woods in their vicinity, and commencing to flow again on replanting the forest.

Hummel mentions a striking instance of the influence of forests on the flow of springs, as witnessed at Heilbronn. The woods on the hills surrounding the town are treated, it appears, as a copse, being used only for supplying fuel; they are cut at intervals of 20 or 30 years, and planted or allowed to shoot up again from the roots. Regularly after each cutting the springs of Heilbronn fail; but as the young shoots increase in size, the water flows more freely, and at length bubbles up again in all its original abundance until the next cutting takes place.

Writers who have investigated the subject do not entirely agree upon the point whether the removal of woods diminishes the annual fall of rain, or merely destroys its equability; some authors maintaining that a country deprived of forests suffers a consequent decrease in the annual precipitation of rain and dew, while others incline to the belief that the changes produced in the climate consist wholly in its greater irregularity both as to moisture and temperature; that the annual rain-fall, although the same in quantity, is precipitated in floods, frequently doing great damage, the beneficial effects to vegetation soon disappearing, to be followed by spells of drought equally as destructive as the preceding freshet. These results, to a greater or less extent, are believed to follow in all latitudes, in mountainous countries or in level valleys, modified, nevertheless, by the peculiarities of climate and topography; a moist climate, like that of England, being less affected by a scarcity of trees than a dry one, like that of Spain, and a comparatively level country less injured than one that is hilly or mountainous, on account of the latter offering greater facilities to the action of torrents. For this latter reason, Scotland has suffered much more from the destruction of her ancient forests than either England or Ireland, and the southern and eastern departments of France more than the interior.

But the conservative influence of trees is not confined to mountainous and warm countries. The climate of the Schelde valley and the plains of Bavaria and of Austria, was so much injured by immoderate clearings, in the judgment of those having the best opportunities of deciding correctly, that extensive areas have been replanted, with the favorable effects, it is said, anticipated by the projectors of the enterprise.

It is a common remark on the prairies of Illinois and Iowa, in localities where encouragement has been given to the growth of young timber, that the winds are less annoying of recent years than at the first settlement of these States; and the observation explains an important office of the forest, in exercising a modifying influence on the climate. Acting as a barrier against the force of the wind, it diminishes its desiccating effects in summer, and moderates its depressing and chilling influence during winter. The climate of a country destitute of trees must necessarily be more variable than would be the case with large belts of woodland distributed over it; for the winds having unobstructed sway upon its surface from all points of the compass, may send down the thermometer in the morning by setting from the north or northwest, to rise in a few hours after, in consequence of a southern breeze, to a temperature corresponding to a warmer latitude. Hence extensive clearings render the climate of a country more changeable, more subject to alternate freezing and thawing, and the winds having a freer sweep, the winters will be subject to severer frosts, and the summers to a higher temperature; to increased evaporation and more frequent drought. These results will be experienced more or less in all sections of a country in which large clearings have been made, some particular districts, however, being less affected than others, from the contiguity of large bodies of water, or from other topographical peculiarities; the effects of felling the forest being most decidedly felt in the interior expanse of a country which, from a variety of causes, presents a surface specially liable to the action of the wind. When it is remembered that the warm waters of the torrid zone are carried from the Gulf of Mexico, from the Indian ocean, and the Philippine islands, by regular currents across the Atlantic and Pacific oceans, retaining a temperature sufficiently high to soften the climates of the western coasts of Europe and America, even to the latitude of the Arctic sea, the extraordinary effects of atmospheric currents moving over extensive plains or prairies, unobstructed by forests, will be easily realized.

The influence of large masses of trees on the temperature of a place is probably not limited to their action in resisting the force of the wind. The roots of the trees absorb water from the earth, frequently from the depth of many feet, which is exhaled again in a rarefied form through the leaves, the change from a denser to a rarer medium requiring an increased amount of caloric, which, becoming latent, leaves the surrounding atmosphere cooler to the extent of the caloric absorbed. The action of the roots and leaves being dormant during the winter season, the refrigerant effects produced by the transpiration of the leaves is mostly confined to the warm weather of summer. On the other hand, the conversion of the carbon and other elements, obtained from the atmosphere by inhalation through the leaves, and from water absorbed by the roots, into the various secretions of the plant and ultimately formed into wood, is attended with the evolution of heat by liberating the latent caloric contained in the carbonic acid gas.

Respectable authorities differ as to the action of trees on temperature in mid-winter, when the vegetable functions are dormant; some contending that at such times no heat is developed and that the interior of a tree differs from its exterior only in being further protected from the external air, while others ascribe to living trees a specific heat of their own by which they maintain a temperature higher than that of the surrounding atmosphere during the cold weather of winter, and a lower temperature during the hot weather of summer, the internal warmth of the tree being nearly, although of course not quite, uniform. According to the first theory, the greater moderation of the temperature of a

forest in extremely cold weather is due merely to the mechanical resistance offered to the motion of the air, and not to any action of the trees as living organisms.

Further investigation is necessary to determine this and many other points relating to the action of trees and forests in their influence upon the humidity and temperature of the atmosphere; the whole subject, as a matter of scientific inquiry, being one of comparatively modern date, and the action of large bodies of trees in equalizing the fall of rain, in modifying the tendency to drought on the one hand and deluging storms on the other, is not sufficiently understood. A growing tree is a good conductor of electricity, and it seems very probable that an extended surface covered with such conductors would influence the electrical condition of masses of vapor passing over it. At all events it cannot well be doubted, even from what has been experienced in our own country, that a less regular distribution of moisture takes place after, than prevailed before the felling of the woods.

The impression is a very general one in the older States that both droughts and violent rain-storms are much more frequent than was formerly the case, while in some of the western States and Territories, where timber has been increasing in quantity, the uniform testimony appears to be that the climate is improving in regularity, both as to moisture and temperature.

Such is the experience in large portions of Illinois and Iowa, in the eastern part of Kansas and Nebraska, and in the valley of Salt lake. But if the experience of the various sections of our own country should be thought insufficient to justify any positive opinion on the subject, that of other and of older nations should at least admonish us that the utility of the forest is a question of very great importance, involving consequences, favorable or unfavorable, of the highest moment; that its removal in localities where it may be too abundant, and its preservation and reproduction in districts where it has been too much reduced, or has been entirely wanting, should receive the thoughtful care of every proprietor and every one interested in the welfare of his country; that the indiscriminate felling of every grove from the fallacious idea of converting the land to more profitable uses, the carelessness of suffering accidental fires to destroy hundreds of acres of timber every year in the older States of the Union, are acts of improvidence, the consequences of which will only be realized when their far-reaching effects shall have become fully developed in calamities such as have compelled other nations to bestow upon the subject the consideration due only to the gravest matters of human concern.

Meeting with a wide expanse of forest, extending inland from the Atlantic for hundreds and even thousands of miles, the first European settlers of this continent contracted habits of indifference to the value of trees that continues characteristic of a generation already upon the threshold of a scarcity that cannot fail to be attended with most serious inconvenience; not merely in reference to those climatic effects to which we have been referring, and which fortunately may be repaired in a comparatively few years, but in reference to the equally if not more important consideration of a destitution of fuel and lumber. It is high time that the preservation and enlargement of our forests were invested with something of the importance these subjects receive elsewhere; and it will be an interesting problem whether in republican America, where the right of every person to use his own property according to his own judgment and pleasure, meets with so few limitations, habits can be formed, regulations and restraints imposed, by the voluntary adoption

of our people, countervailing the temptation of immediate profits, from considerations looking to the welfare of coming generations.

In France and Germany the government has taken the matter in hand, and stringent laws are passed and enforced regulating the matter of felling trees and preventing the depredation of animals, not only in regard to the state forests, but to those belonging to private individuals, and heavy penalties are visited upon those who violate these regulations.

Where the breadth of woodland is deficient additional groves are planted, the clearing of private woods conducted under the direction of the state foresters, and every precaution taken so to proportion the amount of woodland and cleared land, as the nature of the climate, topography of the country, and the wants and necessities of the people seem to require; and that these highly important interests may not suffer from the ignorance of those intrusted with the management, schools are established for the purpose of furnishing the necessary instruction in reference to all the interesting problems connected with forestry. Forest schools have been established at Aschaffenburg, in Bavaria, at Tharandt, near Dresden, at Hohenheim, near Stutgard, at Newstadt, Eberswald, near Berlin, at Eisenach in the Thuringian forest, at Bardiensk in the Russian Steppes, at Eldena in Pomerania, at Nancy in France, as well as at other places in the German states.

Some of these institutions are specially devoted to forestry, while others are properly agricultural schools of high grade, at which forestry is one of the departments. In all of these the professors are men of the highest attainments, and the students admitted are usually young men having already made considerable proficiency in collegiate studies and of good standing as to intelligence and moral character.

In the Bavarian school the training extends to over five years, one half of which must be given to a practical apprenticeship in the state forests. Lectures are delivered on the principles of forestry, culture, and management of forests, forest utility and technology, protection of forests, forest nursery, vegetable physiology, including forest botany, forest zoology and entomology, forest microscopy, national or state forestry, forest literature and taxation, special forest mathematics, and climatology, including the influence of forests on climate. Connected with many of these schools are botanic museums containing specimens of wood of every known variety of tree or shrub, and of every insect injurious to trees, and of the larvæ and chrysalides of such insects.

The different branches into which the general subject is divided at these schools, in each of which students are subjected to a rigid examination, indicate an interest and profound attention in reference to forests that can scarcely be appreciated in this country.

The forest service of France consists of 849 conservateurs and inspecteurs, the highest grades receiving salaries of from 8,000 to 12,000 francs a year. Under these are the "gardes generaux," numbering 3,500, performing the work of the various government forests all over France. The whole service is under the supervision of the "Bureau Central de l'Administration Général des Forêts," in Paris. The influence of these schools, and the valuable books from time to time contributed to the literature of Europe by their professors and students, have created a profound interest among all classes, and as the subject is better understood, the stringent regulations adopted by the governments of France and the German states received with greater respect and are more easily enforced.

What is the proper proportion of forest and cleared land in a country is a question that depends upon the two considerations of the demand

for fuel and lumber, and the conservative influence of woods and trees in modifying extremes in climate, in maintaining greater uniformity in the flow of springs and rivers, preventing frequent droughts and freshets, and the consequent evils resulting from these.

More than a century ago Mirabeau estimated the forests of France at 42,000,000 acres, or about 32 per cent. of the whole area, which Mr. Marsh, considering the surface and climate of France, regards as about the proper quantity for permanent maintenance. The extent of woodland in 1860 has been stated by Troy at 19,769,000 acres; but Mr. Simmonds, one of the commissioners appointed to examine and report upon the various classes of the Paris Universal Exhibition of last year, reported to the British government the wooded surface of France, in 1867, at 27,000,000 acres, or nearly 21 per cent. of the whole, or six per cent. more than the estimate of Troy for 1860. The true proportion is probably between these estimates, and it may be assumed that in 1860, when the government appears to have commenced replanting the French forests, the percentage of woodlands had been reduced to at least 20 per cent. This would indicate a reduction annually, during the preceding century, of about 160,000 acres.

The conviction of the French people, at the present day, appears to be that their forest area is deficient, and government and people are alike striving to increase it, not merely from considerations looking to an adequate supply of fuel and lumber, but from a prevalent opinion that a sparsity of woods has injured the climate. Mr. Simmonds reports the annual product of the French forests at 20,000,000 cubic metres of wood, equal to about 5,500,000 cords, while the imports of wood and lumber from Norway, Russia, Germany, and Italy, amounted in 1865 to the value of 154,000,000 francs, or \$31,000,000, being \$17,000,000 more than the imports amounted to in 1855. These are the statistics presented in the report made to the British government, by commissioners appointed for the purpose, as appears in the Blue Book recently published. The amount given as the annual product of 27,000,000 acres is so very small as to suggest the probability of a typographical error. At the same time it is sufficiently apparent that the present policy is to preserve and enlarge the forest surface, and the praiseworthy efforts made in that direction, and the liberal appropriations voted in support of the object, are not so much for the benefit of the generation by which they are made, as for those that are to succeed.

The wood-lands of Prussia, according to the report of the English commissioners, amount to 32,000,000 acres, and those of Sweden to about the same quantity; Austria has 35,000,000; Italy 11,000,000 acres. According to the estimate of Rentzsch, the Swedish forests cover an area of 52,000,000 acres, which is evidently more correct than the quantity assumed by Simmonds. The forests of Norway are about equal in extent to those of Sweden, and together embrace more than 100,000,000 acres, chiefly of coniferous trees, and furnish vast quantities of wood and lumber for the British islands, France, Spain, and Portugal. The wooded surface of Great Britain falls short of 4,000,000 acres, or about five per cent. of the whole area; Spain has about the same percentage of forest, and Portugal still less, while Switzerland, Holland, Belgium, and Italy have 15 per cent. of woodlands. European Russia has extensive forests in Finland and other northern divisions of the empire; but the vast plains stretching from the Baltic to the Caspian sea are very inadequately supplied, and a large portion of the Steppes are as destitute of trees as our own western plains. Of the whole surface, exceeding an area of 2,000,000 square miles, 380,000,000 acres may be assumed as

covered with timber. The entire forest area of Europe, according to the careful calculations contained in the prize essay of Rentzsch, a second edition of which was published in Dresden in 1862, cannot exceed an aggregate of 600,000,000 acres, or about 25 per cent. of the whole surface, the greater portion of which is in the northern half of the continent, and mostly in the condition of "primitive forest." If the 300,000,000 inhabitants in Europe used wood in the proportion that it is consumed in the United States, and exercised as little concern in the preservation of forests as is done here, the supply would be entirely exhausted in less than half a century.

In Germany, and generally in Italy, Switzerland, France, and Great Britain, the woods of the present day, except on the tops of mountains, are no longer in the condition of native forests, many of them having been planted by hand.

Such is particularly the case in Prussia, Bavaria, Saxony, Wurtemberg, Hesse-Cassel, and some of the smaller principalities of Germany, and in portions of the Austrian empire.

Rentzsch computes for the woodlands of Germany now existing something more than 26 per cent. of the whole surface; and efforts are made by the different governments to retain about this proportion in forest, that quantity being deemed amply sufficient, by proper cultivation, to furnish the wood and lumber required, as well as to meet demands of the climate.

In Austria and Prussia the supply of wood is sufficient to meet the home demand and furnish considerable quantities for exportation; the former having exported wood and lumber in 1865 amounting to the value of fifteen millions, while the exports from the latter, at the same time, through the port of Dantzic alone, amounted to the value of nearly three and a half millions.

The trees mostly cultivated in that part of Germany lying north of Austria, the section in which sylviculture, as an art and a science, has been most cultivated and practiced, belong to the pine family, the soil and the climate being found better adapted to that class of forest trees than to others.

In more limited quantities the birch, beech, oak, and maple are planted; some of the governments awarding premiums to individuals for successful efforts in cultivating groves of the last two.

Pine trees are allowed to grow from 60 to 80 years, when they are felled and the ground replanted. In large forests the land is divided into 60 or 80 equal divisions, one of which is cleared and planted every year. The trees are raised from seed sown either in the spring or fall of the year, in small plats in sheltered spaces, and at the age of two or three years are transplanted into rows, crossing at right angles, from five to six or seven feet apart each way.

Grown so close together, they shoot up in long, straight stems, almost without branches, to the top; averaging at the end of 80 years from 50 to 70 feet in height and from 9 to 15 inches in diameter within three feet of the ground, and continuing nearly of the same thickness frequently to half the height of the trees, thence tapering gradually to stems of but a few inches through, averaging in solid contents from 14 to 20 cubic feet. In good soils and under excellent management, better results are sometimes obtained; but the above are thought to be medial estimates applicable to a large number of localities. Experience has shown that the most rapid growth of wood in the pine takes place during the first 80 years of its age; more being gained at the end of that period by cutting down the old and planting a new forest than by suffering the

first to remain another period of equal length. During the first few years the ground is kept clean of weeds, after which the trees monopolize the soil; no logs or brush or pieces of decayed wood are allowed to remain on it to furnish a harbor for insects. When the period for clearing has arrived, all the trees and stumps are removed and the wood is converted into the uses most profitable to the proprietor; trees of 80 years' growth generally furnishing saw-logs to the height of 50 feet and over. Planted at the distance of six feet apart each way, an acre of land will accommodate 1,200 trees; and if it were customary in our country to saw timber as small in the stick as they do in northern Germany, would be worth in many of our States and Territories from \$2 to \$4 per tree, and at the end of 80 years from \$2,400 to \$4,800 per acre; equal to an annual average increase in value of from \$30 to \$60 for every acre thus cultivated. Considering the trifling care required by a field of growing trees after the first half dozen years from transplanting, this would certainly be as profitable a crop as any of those generally raised by our farmers; and although it is not now usual with us to make sawed timber out of logs so small as eight and ten inches through, yet from present indications the time is less than 80 years distant when lumber in most parts of the United States will be as scarce as it is this day in Germany, and even more expensive; for while we are rapidly consuming and destroying existing supplies, we are as yet making comparatively little or no efforts to meet the demands of the future.

When deciduous trees are cultivated, the most prevalent practice is to plant them with the pine in the alternate rows, or rather in the centre of every alternate square made by the crossing of the rows, in which position both classes are suffered to remain until their branches begin to interfere, and the hard-wood trees have attained such a size and habit of growth, that the annual shoots produced on their tops may always be ripened before the approach of weather sufficiently cold to injure them, usually from 10 to 20 years, according to the severity of the climate and the vigor of the trees; after which the pines, or nurse-trees, are cut down and the whole of the ground surrendered to the others, leaving them 10 or 12 feet apart, according as the rows in the first instance were five or six feet distant.

This plan is very generally pursued with the oak, and sometimes, though not always, with the beech and birch, the object of this mode of culture being to improve the climate of the forest. The evergreens retaining the radiation of heat from the ground, protect the oaks from the winds, and soon cover the ground with a matting of needles, forming an excellent material for and enriching the soil much more than the growing trees impoverish it.

Hard-wood trees are generally suffered to stand a longer time than pines, the length of time, however, depending upon the uses for which the timber is wanted. If fuel is the object a shorter period than 80 years is generally adopted, as all trees are found to produce wood faster when young, than they do at a more advanced age. A difference of treatment also prevails in reference to the distance apart they are allowed to grow, some foresters planting them closely and suffering them to draw each other up, as it is sometimes worded, into tall straight stems, without many branches. Others regarding the leaves and branches as too necessary to the health and vigor of the tree to be sacrificed to the number and symmetry of the stems, commence thinning out as soon as the lower branches begin to interfere with each other, and regulate the distance in this way, continuing to thin out from time to time as the increased growth of the branches causes further interference.

As soon as the lower branches begin to show symptoms of decay at their extremities, they are cut off close to the stem. It is said this pruning should take place before the branches are over an inch in diameter at the point of union with the tree, even if no decay has appeared at the extremities. When the next tier of branches begins to decay they, too, must be cut away like the first; this process of thinning out when healthy branches interfere, and pruning when decay manifests itself, being continued until the trees have attained an average height. This mode of culture is perhaps more common in England and Scotland than on the continent, and it is quite likely that no uniform rule prevails in either place, forestry as a scientific study not being sufficiently developed to challenge invariable acquiescence on the part of its votaries, but the general principle of growing deciduous trees at such distances apart that their healthy branches may not interfere with each other, and pruning such branches when signs of decay appear at the extremities, probably indicates the true theory in reference to distance and pruning.

The plan has been recommended by English writers of determining in the first instance upon the number of full-grown deciduous trees that can stand upon a given surface to advantage, and plant them in their proper places at the start, filling up the intervals with pines and firs to serve as nurses. As these latter increase in size and their branches touch the hard-wood trees, they are to be thinned out, or their limbs pruned away so as to leave the others sufficient room to clothe themselves with branches on every side, and allow the leaves a full exposure to the sun. Finally when the hard-woods have attained sufficient size to require the whole of the ground the evergreens are cut down and removed.

Different varieties of trees, if allowed all the room their branches will cover, will stand at different distances apart, the pines and firs requiring least room and the oak the most. Whether it is at all necessary to permit each deciduous tree grown in a forest to extend its branches laterally to the same distance that it would in the open ground, or whether such a mode of culture is the speediest for producing wood, are questions in regard to which there is room for difference of opinion. It is doubtless true that in reference to a given number of trees the greater the number of healthy leaves the more rapid the production of wood; but it hardly follows from this that upon a given space in the forest just large enough to furnish full development to one free-growing oak, two trees would not produce more wood in a given time, although each might suffer somewhat from a deficiency of light and leaves; and probably the most profitable system is one pursuing a middle course between too great a repression of the branches on the one hand, and too great a freedom of expansion on the other. In the natural forest unusually large trees are generally found somewhat isolated, being surrounded for considerable distances by dwarfed and smaller growths, while at the same time it is common enough to find those of medium size, quite large enough for all practical purposes, growing in dense clumps less than a dozen feet apart with the ends of their branches interlocking, three or four of them occupying a space not larger than that monopolized by the giant of the forest, containing more wood in their united trunks, with the additional advantage of having produced it in a less number of years. Experience will probably demonstrate that for all ordinary uses for which lumber is required, from 15 to 20 feet is sufficient distance for every variety of deciduous trees, and half that distance for pines and firs; they are frequently grown at less distances than these, while mature trees are often cultivated at distances varying from 20 to 30 feet. Close planting produces a slender tree with few branches. It appears also to produce a more vigorous growth, each tree seemingly making an effort

to reach above its fellows in pursuit of increased light and air, thus, as it were, drawing each other up. Planting at greater distances yields trees of shorter stems and more spreading habit, and as the materials forming the wood are elaborated in the leaves, it is reasonably supposed that the rapidity of its growth is in proportion to their abundance. Each mode has some advantages that ought not to be overlooked, and the most successful culture will perhaps be found in blending both in such manner that each may contribute its own influence without too much impairing the efficacy of the other. The seed of the pine and fir tribe ripens from the beginning of October till January, according to locality. The cones should be gathered as soon as ripe and put in a secure place until perfectly dry, when the seed may be extracted. In many parts of Europe it is sown broadcast in a small plat of rich sandy loam, well mellowed, and allowed to grow up in a dense mass, the young trees forming nearly straight stems and roots, which at the age of two or three years are replanted. As the land to receive them is frequently very hilly and has been used for forest from time immemorial, ploughing is often dispensed with, one person with a hoe following along a line marked out in regular distances, making the holes for the young pines, which another following after distributes, while a third puts them in place and presses the earth around the roots. They are sometimes taken from the bed where they have been grown from the seed with a fork, fifty or a hundred being taken up at a time. Cultivating them in such a dense mass prevents the formation of numerous roots and decreases the liability to injury from transplanting. The hole to receive the young tree is sometimes made with a kind of auger instead of a hoe, the straight root placed in and the hole filled up. In land of a sandy or gravelly subsoil, moist and loose from the constant mulching of a thick coating of needles and cones, this may be a very excellent method, but would hardly answer upon land converted for the first time into a forest. Another mode is to plant the seed in the nursery in drills so far apart that the plants at the end of the first season may not touch each other. The seeds are carefully distributed and covered to the depth of not more than half an inch for the smaller kinds; and that they may be brought into close contact with the soil a roller is drawn over the bed, rendering the surface smooth and compact. The sowing is done in the fall or as early in the spring as the ground is in condition for working. To protect young pines or firs from the hot sun during the first season, and to preserve a uniform moisture, the ground is covered with straw, leaves, and twigs. When the plants are two years old they are removed to the place where they are to remain, some persons transplanting them at once at the distance they are finally to grow, others in rows four or five feet apart either way, thinning out the alternate rows when the trees become too thick, leaving the residue at the distance of eight or ten feet. The transplanting of evergreens should not be deferred beyond the second, or, at most, the third year from the seed. If older than three years when transplanted they rarely succeed well as timber trees. No pruning is required for evergreens; the only attention necessary after transplanting is to keep the ground clean of weeds and replace such as may fail. Deciduous trees are in like manner generally raised in a nursery and cultivated for several years previous to transplanting.

Seeds that ripen before the ground freezes should be planted in the fall, as many refuse to germinate after they have become dried.

Deciduous trees will bear transplanting at a more advanced age than firs and pines, and if the ground is deep and mellow, with sufficient moisture, may be set out even when six and seven years old.

Some foresters avoid transplanting altogether by putting the seed at

once in ground intended for their final growth, having previously prepared it in the same manner as for a crop of grain, whenever, from the nature of the surface, it is susceptible of such treatment; planting about four feet apart for every variety of tree, and removing the alternate rows whenever the size of the trees requires it, and during the first few years running the plow, harrow, or cultivator between the rows, both ways, when the nature of the ground admits of this, otherwise using the hoe to keep down the weeds, until the accumulation of leaves, with the shade of the trees, will be sufficient to prevent their growing.

When the rows are four feet apart the removal of every alternate one will leave the rest of the trees at eight feet, which for evergreens is sufficient. For hardwood trees the same process may be repeated at the end of a certain number of years, leaving the standing trees 16 feet apart, which for most purposes is sufficient, and abundantly so if the wood is wanted only for fuel. After that a further thinning out may be done here and there around choice trees intended for special purposes, regulating the matter according to pleasure. This method is recommended by many persons as presenting the fewest objections, and as furnishing the speediest growth of wood. Planting closely at first is said to be a protection against wind and drought, and injury from transplanting being avoided the trees continue growing without interruption. Depositing several seeds in each hill requires a subsequent thinning out, but has the advantage of insuring at least one healthy and well formed plant to each hill, and all the others should be pulled up. In good land, kept mellow and clean by proper cultivation, trees make a very rapid growth, and the amount of fuel obtained by cutting out the alternate rows is said to be very considerable, being worth more than several crops of grain, much more than paying for the labor expended. Some cultivators intermingle different varieties of trees, somewhat after the manner of a native forest, while others cultivate only the particular kinds believed to be best adapted to the soil and climate, and from which it is thought the greatest profits may be derived in the shortest time.

Turning attention to our own country, we find the price of wood of every description increasing from year to year throughout the whole area included between the Atlantic and Mississippi river, once a region of immense forests. Throughout this whole extent of surface, except in a few localities, the more valuable varieties of timber are almost entirely exhausted; the immense supplies required for domestic use and to meet the export demand being almost wholly obtained from some half dozen different points, where the work of destruction has not yet been completed.

The area of the United States east of the Mississippi may be stated in round numbers at 555,000,000 acres, of which, in 1860, there were included in farms as improved land 142,043,377, and as unimproved 174,098,762 acres, or a total acreage in farms of 316,142,139 acres. The number of acres included in farms in 1868, east of the Mississippi, will not vary much from 320,000,000, of which 170,000,000 may be estimated as improved land, and 150,000,000 as unimproved, leaving a residue, as lands not embraced in farms, of 235,000,000 acres, composed (1) of United States lands in Michigan, Wisconsin, Mississippi, Alabama, and Florida, amounting to about 45,000,000 acres; (2) of swamp and overflowed lands, granted to the States under acts of Congress and not yet reclaimed; (3) waste and worn out lands in some of the southern States; and (4) the rocky and sterile ridges of the Appalachian mountains from Maine to Georgia and Alabama. The amount of swamp land yet unreclaimed in the States east of the Mississippi, including the extensive marshes of southern Florida, embraces a considerable area, and is comparatively not valuable

as timber land; and when it is considered that the highest peaks of the mountains named are bare of trees, and the highest ridges for many miles contain but a stunted and scanty growth, it will at once appear that of the 235,000,000 acres not included in farms, not more than one fourth, or about 60,000,000 acres, can properly be classed as timber lands. Of the 150,000,000 acres unimproved, included in farms, much the greater portion may be assumed as covered with timber, some of it valuable for lumber and other portions only for fuel.

But a certain portion must be deducted for prairie and for other descriptions of unimproved property, included within farms, such as waste and marsh. It will not be too much to deduct one fifth of the whole, or about 30,000,000 acres; leaving as timber east of the Mississippi about 180,000,000 acres available for fuel and lumber. It is true, there are perhaps in the older States small "wood lots," enclosed and classed as "lands improved in farms," but the aggregate thus enclosed is small, rarely sufficient even to meet the wants of their proprietors, and not available for general market purposes. The above estimate would give about 32 per cent. of the whole area east of the Mississippi as forest. Much of it has, however, already been picked over, and all the really valuable trees taken off; other large portions never contained first-class qualities of timber, and in still other portions the trees are dying out from injury by fire, through the careless habits too prevalent among us; from the browsing of animals suffered to run at large, and from change in the climate, rendering it less humid now than when the forest was untouched. When these circumstances are taken into consideration, it will not be difficult to realize that the good timber lands in the portion of the United States to which our attention has been directed are in fact very limited, and that it is a tolerably high estimate to set them down at 100,000,000 acres. The sawed and planed lumber in the States east of the Mississippi in 1860 amounted to the value of \$78,000,000, representing, at the ruling price of lumber at that time, 450,000,000 cubic feet. The sawed and unplaned lumber used for fencing, houses, barns, and bridges, must have amounted to a still greater quantity, and it will not be too large an estimate to set down the quantity of wood consumed by the multitude of mills in those States in the manufacture of all kinds of lumber at 1,500,000,000 of cubic feet; and when to this is added the quantities otherwise prepared, such as hewed timber, staves, hoop poles, &c., excepting cord wood, the quantity will not fall far short of 2,000,000,000. If each family in the United States uses annually on an average but four cords of wood as fuel, it will equal an aggregate of 4,000,000,000 of cubic feet for the population east of the Mississippi; showing a working up into fuel and all kinds of lumber and wood material of at least 6,000,000,000 of cubic feet. Taking the timber tracts throughout the eastern portion of the country, good and bad, and they will not average more than 6,000 solid feet to the acre; hence 1,000,000 acres must be cleared every year to furnish the wood required in all branches of manufactures, carpentry, fuel, fencing, and railroad ties. But, besides what is annually consumed for the above-named purposes, vast forests are destroyed in sections remote from transportation facilities, where timber is disproportionately abundant, by girdling the trees. In 1860, the amount of improved lands in farms, in the region under consideration, was, as already stated, 142,043,377 acres, and in 1868, by estimates based on the increase from 1850 to 1860, with deductions on account of the civil war, 170,471,928 acres, showing an increase of 28,428,551; three sevenths of which may be supposed prairie, and four sevenths wood land. This gives us an annual clearing of 2,000,000 of acres of timber. When the immense quantities lost every year from the other causes heretofore men-

tioned are taken into the account, it may be realized that our forests are disappearing with alarming rapidity; that while the demand for all descriptions of lumber is annually increasing, the districts furnishing the supplies are rapidly diminishing in number and extent, indicating but too clearly that even at the present rate of consumption, 50 years will not have passed away before every forest will have disappeared from that portion of the United States lying east of the Mississippi. West of that river the prospect is still more unfavorable from existing supplies of woods. From the Missouri river westward to the Rocky mountains, from the southern to the northern boundary, the general characteristic of the country is that of a vast, treeless plain. Between the Rocky mountain chain and the Sierra Nevada and Cascade ranges, extensive tracts exist, destitute of trees, leaving a narrow belt between the last-named ranges and the Pacific ocean, of first-class timber lands. Between the eastern foot-hills of the Rocky, and the crests of the Sierra Nevada and Cascade mountains, are many tracts containing a fair quantity of timber; but considering the vast extent of the territory between the Missouri river and the Pacific ocean, and the unlimited quantities of fuel and lumber required by the mining enterprises growing up there, the supply is very inadequate to the demand. What makes the matter still worse, the public domain on the Pacific, in the States of California and Oregon, and in the Territory of Washington, is being denuded of forests by trespassers, the lumber being sent to South America, China, and Japan, and even to European countries, so that long before the population shall become even moderately numerous in the regions to which these forests should furnish the required supplies, spoliation will have brought about a destitution almost as great as exists east of the mountains; and it may be said of the country west of the Mississippi, as of that on the east, that unless the forests now existing are better protected, and the system of planting new ones speedily commenced, scarcely a tree will be left at the end of 40 years, except in remote and inaccessible localities.

There is not, perhaps, an acre of wood land now existing in the United States convenient to railroad or water transportation that should be permanently cleared. When the timber has been taken from a tract it should be immediately enclosed with a substantial fence to prevent the depredations of cattle, sheep, and hogs, all of which should be carefully excluded. It is thought best when a clearing is made to take off everything, in order that the new growth may be of the same age. All the old logs and decayed pieces of wood should be removed, so that nothing may remain as a harbor for destructive insects. If cattle are excluded, a few years will witness a new crop of young trees, some of which will be crooked and unhealthy, presenting but few chances of becoming valuable for any purpose. These should be removed at once for the benefit of the others. Here and there spots will be found too densely covered. These should be thinned, and the extra plants transplanted to spots that are deficient. When the young growth comes up sufficiently thick all sprouts springing up from the old stumps should be cut away, as being less valuable than plants growing from seed. In the course of a few years another thorough examination should be made, and the trees again thinned out, so that the distance between them may average from six to eight feet. In case of evergreens this will generally be sufficient, at least for a half dozen years more, when further thinning may take place, if thought advisable. If the forest is of hard wood trees, six and eight feet will not be sufficient distance. As soon as their branches begin to interfere the number of trees should be further reduced, so as to insure sufficient light and air to those remaining. In these operations good practical judgment is required to select for removal such

trees as are of inferior quality or defective form, in order that those finally remaining may be the best specimens furnished by the new growth. In this way as much improvement is effected in the quality of trees as in that of cereals and garden vegetables, which it is well known undergo a complete change by cultivation.

The new forests of Germany, which have grown up under the controlling care of intelligent foresters, are worth from three to five times as much as an equal number of acres of native woods. Besides the improved quality of timber produced in this way, its greater rapidity of growth is equally marked. In a native forest of young trees, where too many occupy the ground to grow to advantage, the result of the struggle continued for many years is that a few succeed in outgrowing the rest, which thence become stunted and worthless, but that all have suffered more or less injury and much impediment in growth.

Chevandier experimented on growing trees by irrigation, and found that by keeping up a uniform moisture by infiltration from running brooks the yield of wood in the pines may be increased in the ratio of seven to one, and the profits in that of twelve to one.

To hasten the growth of wood on the flanks of a mountain he divided the slope into zones 40 or 50 feet wide by horizontal ditches closed at both ends, two and a half feet deep and three and a half wide, to retain the water from rains and force it to filter through the soil gradually, instead of running off upon the surface. By this treatment he obtained from pines and firs shoots double the dimensions of those growing on soil of the same character where the water was allowed to run off without obstruction.

At the Exposition of 1855, Chambrelent exhibited young trees which in four years from the seed had grown to the height of 16 and 20 feet and the diameter of 10 and 12 inches. One of the effects of suffering cattle and sheep to run in a forest is the removal of the underbrush and lower branches of the trees, permitting the winds to sweep through more freely, and parch the earth much more than would otherwise be possible by the most severe droughts; thus depriving the growing trees of a moisture that may oftentimes be too deficient without this additional drawback. The tread of quadrupeds exposes and bruises the roots of trees, from which many of them die every year or are rendered feeble in growth and dwarfed in size. It is not doubted that by carefully studying the habits of trees, great improvements may be accomplished in their cultivation, even beyond the best results yet obtained in Europe, and if the matter were promptly taken hold of by intelligent capitalists, the superior pine lands of Maine, and other New England States, of Northern New York, and Pennsylvania, Michigan, Wisconsin, Minnesota, and some of the southern States, from which the timber has been taken, might be in a very few years again covered with young trees, producing timber 50 years hence of better quality on an average, and in greater abundance, than the previous yield; and considering the continual advance in the price of lumber during the last 20 years and the greatly increased price it is sure to command before the close of the present century, but few better investments could be made than to purchase these lands and subject them to the intelligent supervision of trained and practical foresters, bestowing upon them the same care and attention that are found in the best cultivated forests of Europe.

Let it be remembered that during the last 20 years the price of lumber has doubled in nearly all the business centres of the United States; that the surface from which the supplies are obtained are diminishing rapidly every year, while the demand, on the other hand, is as constantly increasing; that greater inroads are annually made, not only into our

own but into all other native forests, while little or no precautions are taken to bring forward the young trees under circumstances favoring a vigorous growth. Nearly everywhere, except in some of the oldest European countries, chance and accident are allowed to have their sway, under the influence of which at least a century will be required to render the young groves available for the purposes of commerce; and in the great majority of instances when the timber is once removed the land is cleared and converted into farms, and the forest surface permanently diminished. Let this process continue 40 or 50 years longer, and where then are our supplies to be obtained?

Before that period has arrived our own forests will have disappeared, and those of Canada, Norway, and Sweden will be speedily approaching the same fate.

Already Quebec furnishes to European ports every year nearly or quite 100,000,000 cubic feet of lumber of various descriptions, besides consuming immense quantities in the building of ships, sloops, and schooners; and New Brunswick and Nova Scotia export probably one half as much more.

The number of acres culled over annually in the forests of British North America, to supply its lumber trade with Great Britain, and to furnish the materials for the construction of the sail and steam vessels built on the St. Lawrence and in the eastern provinces, must amount to many thousand, and the sphere of these enterprises is becoming more extensive yearly. The construction of every new railroad opens up new sources of supply by facilitating transportation from previously inaccessible forests.

Forty years ago the Saul timber (*Shorea robusta*) of British India, extending in immense belts along the base of the Himalaya mountains, and through Central India, was supposed to be inexhaustible. It is one of the most valuable and durable timbers to be found, and almost the only one in that country capable of standing the climate for railway uses, yet it is already so scarce as to be hardly procurable, and the East India Railway Company has been obliged to import sleepers from Norway for the construction of its road.

France, Spain, Holland, and Great Britain resort to the mountains of Scandinavia for spars and masts, for building-timber and for fuel, and before the end of the present century the United States may be compelled to supply itself from the same source; but the forests of Norway and Sweden cover only about 100,000,000 acres, and cannot supply both continents for a very great length of time. The timber for the British navy and commercial marine is contributed by her own oak forests, by those of Africa, North America, the East and West Indies, British Guiana, and Australia; and Puget sound, on our own western coast, sends ship-timber and lumber to both shores of the Pacific and of the Atlantic. Our live-oak, one of the best ship-timbers in the world, abundant enough at one time to have supplied, with prudent management, our navy yards and ship-builders for generations, may be for all practical purposes considered as exhausted. Our walnut timber, one of the best cabinet woods we have, will soon share the same fate. It is already so scarce that New York manufacturers are obliged to send to the forests of Missouri to recruit their supplies, the expense of transporting it from great distances by rail rendering it nearly as expensive as mahogany, which latter wood, with other valuable varieties found in the West Indies and some of the Central and South American states, sharing the same fate of improvident destruction without any efforts at reproduction, has in like manner disappeared from wide areas which less than a century ago were almost entirely covered with it, every year becoming less abundant, and, consequently,

to be had only at an increased expense. Next we may expect a scarcity in our ash and hickory timber so much sought after by the manufacturers of agricultural machines and implements, so important an item in our manufacturing industry. Everywhere throughout the New World, and over much the greater portion of the Old, man has pursued and is pursuing the same prodigality in the destruction of forests, apparently considering them as inexhaustible as the supplies of air and water, and taking as little heed as to the ultimate consequences of his depredations as if all use for trees were to end with his own generation. This apparent indifference to the welfare of future generations invoked the indignant protest of the far-seeing Palissy more than three centuries ago, and led him to exclaim—

“When I consider the value of the least clump of trees, or even of thorns, I much marvel at the great ignorance of men, who, as it seemeth, do now-a-days study only to break down, fell, and waste the fair forests which their forefathers did guard so choicely. I would think no evil of them for cutting down the woods did they but replant again some part of them; but they care not for the time to come, neither reckon they of the great damage they do to their children, which shall come after them.” * * * * *

“I have divers times thought to set down in writing the arts which shall perish when there shall be no more wood, but when I had written down a great number I did perceive that there could be no end of my writing, and having diligently considered I found there was not any which could be followed without wood.”

The proportion of woods to cleared land in the part of the United States east of the Mississippi cannot vary much from that existing in France in 1750, according to Mirabeau's estimate. The French people persisted in the work of destroying for nearly a century longer, and the present generation are now at great expense and labor endeavoring to repair the injuries inflicted by the mistaken policy of their fathers by inviting forests to return again to the declivities of the Pyrenees and French Alps, from which they have been removed to make room for pasture lots and vineyards. Although the topography of the eastern portion of the United States may render it less liable to disasters such as have visited the mountainous regions of Europe, the evils which may be safely enough predicted from further denudation of the surface without replanting new forests will greatly outweigh all the advantages that might be thought to result from increasing the proportion of arable land. The changes in the climate that have been already experienced from this cause, to say nothing of the increasing scarcity of wood and lumber, are entailing annual losses of no inconsiderable amount. Forty and fifty years ago the peach flourished in the latitude of northern Pennsylvania and Ohio and southern New York. The early settlers on the Connecticut reserve, without any extra care or attention, raised more uniform crops of this fruit than can be done at the present day in southern Virginia except in a few favored localities. Not only has the peach become a very uncertain crop in all of these States and others within the same latitudes, but the apple and pear frequently fail of late years from the same causes. Half a century ago it was a very unusual occurrence in these States for a wheat crop to become winter-killed, or to have the soil blown away from the roots by the winds. Now-a-days, in most sections of the States named, hardly a crop escapes more or less injury from these causes. The removal of so large a proportion of timber in so many different places has opened the country to the freer play of the wind, and setting from the south early in the spring, oftentimes thawing suddenly deep coverings of snow in the more northern States, which would otherwise pass off gradually without causing the destructive freshets now so frequently witnessed. The elevated temperature brought by the warm south winds prematurely swells the fruit buds, and a north or northwest wind a week or two later kills the crop. Doubtless such circumstances some-

times occurred before the forests were so much reduced, just as storms and tornadoes occasionally happen in the most densely wooded regions; but there are few aged persons of reflection, residents of the States referred to, who will not readily admit that they are much more frequent now than formerly, and that the climate is much less regular now than it was in their earlier years. Besides, it requires no arguments to convince any one that the less obstruction there is to the action of the wind the more sensibly will its influence be felt; and it needs only to be further considered that it is almost constantly shifting its course, to satisfy all the conditions of the proposition that a country stripped of its forests is thereby necessarily subject to increased variability of temperature, and experience and observation also establish the fact that a country thus denuded is also less regular in reference to humidity. These influences are likely to be still further increased by clearing the forests of northern Michigan and Wisconsin, and from still further reducing the wooded surface of the southern States.

If the losses experienced from the causes just named were properly considered, and an estimate made of the amount to be added to the sum thus annually abstracted from our resources on account of increased prices paid for lumber, and for every article into which it enters, the fact would be easily realized that clearing a country of its forests is an act that has its natural limits, which cannot safely be exceeded, and is not one requiring mere physical effort, but presents many nice problems that can be rightly determined only by the exercise of an intelligent judgment; and that the highest excellence in the productive capacity of a country depends upon a certain proportion between its arable and wooded surfaces, the proper distribution of these surfaces, and their position in reference to each other, points to be determined by a consideration of the prevalent climatic and topographical features and the necessary requirements of fuel and lumber.

When the proper ratio has been reached it must be maintained; a new growth, properly cared for, must be allowed to take the place in continual succession of the one removed, and the productive forces and industrial enterprises of a country will depend very much upon the degree of intelligence and skill exhibited in management of these relations.

The wood-lands existing at the present time in the eastern part of the United States, although not too abundant in the aggregate, are not as well distributed as the conditions of the climate and the demands for wood, as fuel and for manufacturing purposes, require them to be; and if new forests were planted where they are needed they might safely be further reduced at other points. Some regard should be had in these matters to the character of the soil. It is evident that a very indifferent soil can render but a poor return for the loss of its forests, and as many trees, particularly the conifers, grow remarkably well even on a light sandy soil, it would in general be much better economy to continue such lands in forests; and the time is speedily coming when a hundred acres in forest properly managed, in almost any part of the country, will yield to its proprietor no inconsiderable return. Although trees cannot be brought to a size rendering them useful for lumber and fuel in the course of a few years, yet their conservative influence upon the climate is a result that, fortunately, requires no great length of time to bring about. A young forest of 10 or 12 years' growth, if well taken care of, will furnish a very valuable shelter, and a sufficient number of them rightly distributed over a country will produce most of the effects contributed by larger trees, and will be continually improving. Nor should the length of time required to bring trees to maturity deter persons from under-

taking the work of producing them. If the early settlers of Illinois, Nebraska, Kansas, and other new States had suffered discouragements of that kind to control them, the many promising young groves, contributing so much to the value and beauty of so many homes in those States, would never have been planted. If the enterprise of planting a few acres of forest each year by each proprietor of a farm too scarce of good timber were commenced and continued for 10 or 20 years, the good that would be accomplished would be incalculable; and, after all, 30 or 40 or 50 years—a very insignificant period of time in the age of a country—are long enough to produce trees of a size sufficient for nearly every purpose. Emerson, in his "Trees of Massachusetts," mentions a white pine measuring, 30 years after being planted, 80 feet in height and 3 feet in diameter. He states that 10 white pines planted at Cambridge in 1809 or 1810, were, in the winter of 1841 and 1842, of an average diameter of 20 inches at the ground; and that another pine growing in a rocky swamp, measured seven feet in circumference and 62½ feet in height, at the age of 32 years. Mr. Marsh relates, as coming under his own observation, the case of a young pine planted in 1824, in the State of Vermont, which in 1860, at the time he measured it, had grown to the diameter of 2 feet 4 inches at 4 feet from the ground. It had been occasionally watered, but received no other special treatment. Professor Hayden, while making his geological survey of Nebraska, examined young cottonwood trees 10 years old, from the seed, measuring 50 feet in height and 4 feet in circumference; others of the same age, 2 feet 11 inches in circumference and 30 feet high; at eight years old, 2 feet 8 inches in circumference; at four years old, 18 inches in circumference and 20 feet high; and at seven years old, 2 feet 6 inches in circumference. Soft maple of 10 years' growth, 2 feet 8 inches in circumference, 30 feet in height; at seven years old, 2 feet 1 inch in circumference and 15 feet high. Common locust of 10 years' growth, 2 feet 5 inches in circumference, and 15 to 20 feet in height; five years from seed, 23 inches in circumference. Black walnut, 10 years from seed, 13 inches in circumference and 15 feet high. Box elder 10 years old, 2 feet 2 inches in circumference. Equally good results have been obtained in Kansas; and in the valley of Salt lake, where irrigation is practiced, a much more vigorous growth is said to have been produced, but not being in possession of the actual measurements, we are, unfortunately, unable to report them for the benefit of other experimenters.

In the prairies of Illinois the black and white walnut, wild cherry, red elm, white and red cedar, soft maple, silver maple, and cottonwood, planted 15 to 30 years ago, are doing finely, while the common locust has been so much preyed upon by the borer as to render it much less valuable than the other varieties above named. In some of the counties of Illinois a species of willow, known there as the European white willow, has become very popular. Cuttings planted 25 years ago are said to measure 10 feet in circumference above the spread of the roots; and a farmer in Macoupin county raised a plant in two years from the cutting 18 feet high and 13 inches in circumference. Planted closely, this willow attains the height of 70 and 80 feet. Grown alone, it assumes a low and branching form. It has given satisfaction as a timber tree and for hedging. Planted for a hedge the cuttings are set 6 to 15 inches apart, and are cultivated and kept clear of weeds for four or five years, at the end of which time it makes an impassable fence against cattle.

Most of the settlers by whom these experiments were first made have lived to see the success of the enterprise; and if every young man, in

commencing his career as a farmer in a section of country without trees or where they are becoming scarce, were to commence by planting each year even a few dozen of the varieties most valuable in his neighborhood, increasing the number as experience ripened into greater skill, he would in the majority of instances, before reaching an advanced age, have the satisfaction of realizing the benefits his example and his perseverance were conferring upon the community, and contributing to the value of his realty. Let the inexperienced gather a few dozen walnuts and hickory nuts in the fall of the year, as soon as fully ripe, and plant them in moist soil, in shallow beds, not more than six inches deep, leaving them exposed to the frosts and thaws of winter, which crack the shells, and they will sprout up the following spring; or they may be planted in boxes filled with good rich soil, taking care not to cover the nuts more than five or six inches in depth, and to leave the boxes in an exposed place, so as to receive the full action of the frost. The plants may be suffered to remain in the box until they are transplanted, which may be several years, or as long as the roots have sufficient room. Raising the young plants in pots or boxes is one of the most desirable methods, from the facility it affords of taking up and transplanting without injuring the roots; and if it were not impracticable in operations conducted upon a large scale, it would be advisable to pursue it in all cases. Beeches, elms, oaks, hickories, pines, walnuts, firs, and the ash can all be safely managed by any one, however inexperienced, by raising them for the first few years in boxes or pots, having them always convenient for inspection. Raised in this manner they suffer no interruption in their growth by transplanting if set in good, rich, and mellow soil, loosened to sufficient depths to be easily penetrated by the tender roots. In many European countries the sides of every highway are lined with planted trees, their extending branches meeting and interlocking in the middle, adding not only to the beauty of the landscape, but, when numerous, performing many of the offices of large forests. It is one of those customs that might be imitated in many portions of our own country with much advantage. The cultivation of forest trees, wherever the experiment has been tried in the west, has been eminently successful. Doubts are entertained by some as to the feasibility of continuing their cultivation beyond the 98th meridian, over what are usually denominated the Great Plains, from an apprehension that the climate is too dry and the soil in many places too sandy to render it practicable. We are satisfied, however, that experience will prove this notion to be entirely erroneous.

Indeed most of the planted forests of Europe are upon soil not in any respect superior to that of our western plains, and many upon soil greatly inferior to it in almost any portion. The plains of northern Germany, extending from Berlin to the Baltic and the German ocean, including the Prussian provinces of East and West Prussia, Pomerania, Mecklenburg-Schwerin and Mark Brandenburg, and the kingdom of Hanover, are in many parts covered with deep sand, lying upon the surface so light and loose as to be moved about by the action of the wind like the billows of the sea. Yet in these sandy plains the Prussians have under cultivation some of the finest pine forests in Europe. So on the western coast of France, and extending inland for many miles, there are extensive sand ridges, rising sometimes to the height of 300 feet, covered with dense forests, and the vast sand dunes of Gascony, rolling inland from the sea and threatening destruction to the whole province, have been fixed and rendered harmless with the maritime pine, over 100,000 acres of which have been planted under the direction of Bremontier and his successors. Although these pines are planted in pure sand resting on an impermea-

ble stratum, forming a soil for centuries considered incapable of cultivation, they are flourishing finely, and are redeeming from what was supposed a hopeless sterility one of the most extensive wastes in Europe.

The dune lands and sand plains of that continent, estimated as equal to about twice the area of Maryland, or as covering more than 13,000,000 acres, most of them naturally as arid and as sterile as the Llano Estacado of northwestern Texas, are being everywhere brought under cultivation by planting them with the pine.

In France, Belgium, and Holland the *Pinus maritima* has been most successfully used, a tree resembling the pitch pine of the southern States, from which large quantities of turpentine and resin are manufactured. Other varieties of the pine and fir are used on the sand plains of Denmark, Prussia, and Austria.

The birch and tamarisk are likewise used. The Steppes of southern Russia have been compared to our western plains, containing large proportions of sand, but different in composition from the "landes" of Gascony or the Belgine campine, constituting a soil covered for the most part with vegetation. Nevertheless there are scattering belts of sand as deep and shifting as in the wastes of Holland or the plains of Poland.

As in the case of our own plains, it has been questioned whether the Russian steppes were ever covered with trees—some geologists affirming that they never were. They are alike also in their earliest historical incidents; the nomadic Scythians, with their moving flocks, finding a parallel in the equally roving Indian and buffalo of our western plains; incidents that may furnish a very rational solution for the present treeless condition of plains and steppes. Both are alike subject to storms and drought, and are in a great measure uninhabited.

The Russian government has attempted the wooding of the steppes, and already has many thriving plantations at Odessa and other points. Experiments with the pine are said to meet with very flattering success generally; but Rentzsch mentions the case of an Odessa landholder who attempted to fix the sand of a certain tract in the steppes, covering the rocky ground to the depth of a foot and forming moving hillocks with every change of the wind, who tried acacias and pines in vain, but succeeded completely with the Japan varnish tree, (the *Ailanthus glandulosa*.) This is a rapid growing tree, and has been extensively planted in the steppes within the last 20 years, at present forming large forests; and Mr. Marsh is of the opinion that the tamarisk and the varnish tree will at least partially supersede the arundo and the maritime pine, which have fixed so many thousand acres of drifting sand in western Europe. The tamarisk referred to is supposed to be the *Tamarix gallica*, or French tamarisk, a very elegant shrub of 12 or 15 feet in height. The maritime pine and the varnish tree flourish as well on the inland sand plains as on the coast dunes.

The forest of Fontainebleau grows in a soil composed of 98 per cent. of sand, "and as it is almost without water, it would be a drifting desert but for the artificial propagation of forest trees upon it." (See Levergne, *Economie Rurale de la France*, quoted by Marsh.) The trees cultivated in the Fontainebleau forest are the oak, the beech, and the pine, and they attain to extraordinary size. There are few spots on our western plains where the soil is not naturally superior to that of this celebrated forest, so destitute of water that its great aridity has been assigned as one of the causes why birds are seldom seen in it.

Certainly if trees can be successfully cultivated in this forest on the drifting sand plains of Gascony, of northern Germany, and the Russian

steppes, there is not the remotest reason why forest culture should fail on any part of the great American plains, the favorite haunts of the buffalo for centuries on account of their nutritious grasses.

Sandy deserts and plains, even the most arid and sterile upon the surface, often contain abundant supplies of water at no great depth beneath.

At the altitude of 600 feet the summits of the sand dunes, or ridges of sea sand, on the western coast of Africa are found to be quite moist a little below the surface, and in the dunes of Algeria water is so abundant that it is always easily procured by digging wells even at the highest points. Throughout the great desert of Sahara French engineers are constantly bringing water to the surface by means of artesian wells, sunk at a very moderate depth. The Union Pacific Railroad Company have wells along the line of their road, supplied with pumps worked by wind, and have rarely met with difficulty in obtaining water in abundance at the depth of from 10 to 50 feet. A stratum of loose sand and gravel underlies nearly the whole surface of the plains, generally within 10 or 12 feet of the top, very often within two and three, and always contains sufficient moisture to nourish any tree or plant. The roots of trees penetrate to much greater depths than this, and have been known to descend 50 feet through compact clay. The roots of an ordinary sized tree will frequently be found 10 feet below the surface, and where a moist stratum underlies it at or near that depth, it will readily be reached by the roots of young forest trees, and furnish sufficient moisture.

It may be found advisable to commence planting such varieties of trees as require least moisture, when the uplands are cultivated, on the plains west of the 98th or 100th meridian. The nut pine, or piñon, (*Pinus edulis*,) flourishes in New Mexico and Colorado on the tops of the highest buttes of the cretaceous limestone, sending its roots deep into the ground, and seemingly preferring the driest soil, even, it is said, receiving injury from irrigation.

It is probable this tree would grow with a little attention in the most sandy and barren spots on the plains. It is easily cultivated from the seed, as has been tested by numerous experiments in and around Denver, and in the valley of the Rio Grande, in New Mexico. It attains a height of 40 to 60 feet, and although not so valuable for lumber as many other varieties of the pine, it is, doubtless, the best for fuel of any of the pines, and not inferior for that purpose to many of the hard wooded trees. The North American white pine, (*Pinus strobus*,) as it grows in nearly every variety of soil, from the banks of the Saskatchewan, in latitude 54° north, to the State of Florida, and from Maine to the Rocky mountains, attaining everywhere in the forest a tall straight stem from 120 to 160 feet high, would probably succeed in nearly every part of the plains, and being a rapid grower and easily cultivated it is worthy of trial.

The experiment might also be tried of raising the sugar pine of California, (the *Pinus Lambertiana*) one of the finest of timber trees, and always found growing upon the most sterile and sandy ridges of the coast and Sierra Nevada mountains.

The pitch pine (*Pinus rigida*) and the southern pine (*Pinus Australis*) grow in the poorest and driest soils throughout the Carolinas, and in Pennsylvania and Virginia, and might be tried, as they are of easy cultivation and generally of rapid growth. The *Ailanthus glandulosa*, having proved such a great success in the sandiest parts of the Russian steppes, should receive a trial. It grows rapidly, makes a fine polish as a cabinet wood, and may readily be propagated by root cuttings. When the wood becomes well seasoned it makes very good fuel. It has been introduced

into this country as an ornamental tree, and is quite commonly met with in the States east of the Mississippi. In the bottom lands or near streams the cottonwood, black walnut, locust, butternut, or white walnut, elm, birch, box-elder, chestnut, ash, hickory, and horse chestnut, should be planted. Close planting at first would, perhaps, be advisable for protection against wind and sun. Mulching to the depth of three or four inches with dried grass or hay, or other like substance, would have the effect of retaining moisture, keeping down weeds, and would greatly promote the growth of trees. Sufficient water to irrigate several acres of trees and other products might be obtained at most points in the plains by wells and windmills, pumps similar to those in use by the Pacific railroad company. All the trees above named, except the piñon, are much benefited by irrigation, and with the cottonwood, the ailanthus, and the locust, fuel could be produced in a very few years.

The redemption of sterile and desert lands is one of the growing ideas of the times. The French have restored to fruitfulness many arid tracts in the Algerian desert, and Mehemet Ali has already planted over twenty millions of trees in the valley of the Nile, thereby greatly extending its cultivable area. The Sahara is being dotted over with date groves, planted within the last twenty years, and irrigated from artesian wells.

The Emperor of Russia has undertaken the reclamation of the steppes, and the disciples of Brémontier are redeeming from worthless sterility the sandy wastes of western France and central Europe. In all these cases the agent relied upon to induce a return of fertility and verdure is the forest. In the middle ages, we are informed by Müller, who quotes from Willibald Alexis, "a great pine forest bound with its roots the dune sand and the heath uninterruptedly from Danzig to Pillau. King Frederic William I was once in want of money. A certain Herr Von Korff promised to procure it for him without loan or taxes, if he could be allowed to remove something quite useless. He thinned out the forests of Prussia, which then indeed possessed little pecuniary value. But he felled the entire woods of the Frische Nehrung, so far as they lay in the Prussian territory. The financial operation was a success. The King had money, but in the elementary operation which resulted from it the State received irreparable injury. The sea winds rushed over the bared hills; the Frische Haff is half choked with sand; the channel between Elbing, the sea and Königsberg is endangered, and the fisheries in the Haff injured. The operation of Herr Von Korff brought the King 200,000 thalers. The State would now willingly expend millions to restore the forest again." (Man and Nature, p. 486, n.)

If one-third the surface of the great plains were covered with forest there is every reason to believe the climate would be greatly improved, the value of the whole area as a grazing country wonderfully enhanced, and the greater portion of the soil would be susceptible of a high state of cultivation.

In view of what has been said it is recommended that an amendment be made to the homestead law requiring each settler, on proving up at the end of five years, to make proof of having planted and cultivated a certain number of trees, living, and at least three years old from the seed or from setting out at the time of the application for a patent. The labor of tree planting being first enjoined as a requisite to obtain a title, would fix the attention of settlers to the subject, and discovering the feasibility of the enterprise, they would soon prosecute it from the consideration of its evident advantages to themselves and the whole community. An additional inducement might perhaps be presented by a general law, offering an additional number of acres to each settler who

should successfully cultivate for a given number of years a certain number of acres in forest.

The production of a thriving forest at some point west of the 100th meridian, as it would establish the fact of its practicability, would, without doubt, contribute greatly to the value of that part of our domain. Whether an enterprise of the kind, under the auspices of the government, would be likely to realize the expectations of its projectors, would depend very much upon the character of the persons who might be charged with the duties and responsibilities of the undertaking. It is scarcely to be doubted that the artesian well system might be rendered a great success on the plains. All the conditions appear favorable. The rain-fall in the vicinity of the mountains is as great as in many portions of central Europe; and the melting snows on the highest crests feed the stream flowing from the sides of the mountains until late in the summer. The quantity of water thus flowing towards the plains is very great, but much the greatest quantity sinks in the sand within 50 or 100 miles of the foot of the mountains, and as the strata dip eastward, the water follows the same course, descending until it reaches an impermeable bed, and it seems very reasonable to suppose that there are reservoirs at various points beneath the surface of the plains that could be utilized by such wells. Even the water that falls on the plains themselves, not by any means inconsiderable, soon sinks into the parched and sandy soil, in much larger quantities than those carried off by drainage or evaporation: If this matter were thoroughly tested and the fact established, the confidence it would inspire as to the reclaimability of the least inviting portion of the plains would be very great, and would result in the rapid settlement and improvement of that part of our national territory.

Respectfully submitted.

JOS. S. WILSON,

Commissioner General Land Office, November 5, 1868.

Hon. O. H. BROWNING,
Secretary of the Interior.

CONDENSED EXHIBIT FROM REPORTS RECEIVED AT THE GENERAL LAND OFFICE IN ANSWER TO CALLS MADE BY THE COMMISSIONER UPON STATE, COMMERCIAL, AND MUNICIPAL AUTHORITIES.

During the past summer letters were addressed to the governors of the different States and Territories requesting the latest and most reliable information in regard to population, real and personal estate, capital invested in manufactures, commerce, and commercial facilities, cities and towns. A number of replies have been received containing very full and satisfactory statements. Some parties promised similar statements not yet received, while a few regretted their inability to furnish the desired information for the reason that no legal provision had been made for the collection of such statistics.

This latter fact develops a deficiency in legislation which it is suggested should be supplied. The advance of statistical science and the perfection of its processes are among the cheering indications of the increasing subjection of the elements of social life to a pervading general intelligence which is prompt to detect and remedy any false movement of social and political forces.

The operations of commerce and industry are daily making new demands for the latest and most reliable information not only of current

transactions in different parts of the world, but for the movement of the steps of social progress by frequent statistical inquiries embodying the tangible results of the productive and distributive forces in action. The necessity for these more accurate and prompt statistical arrangements is becoming more keenly felt throughout society, and we may expect in this branch of social organism greater and more valuable results than hitherto.

Circulars were also addressed to the municipal authorities of 371 towns and cities calling for the latest statistics of civic character and growth. A large number of these have elicited responses developing results which amply remunerate the labor of the correspondence. The leading points of this extensive correspondence have been compiled and are herewith presented.

Especial attention is invited to the letter of Charles G. Nazro, esq., president of the Boston Board of Trade, which I have inserted entire, believing its admirable statements and luminous arguments will secure general attention and careful perusal. Interesting communications will be found, also, from the presidents of the Boards of Trade of Providence, Rhode Island; Louisville, Kentucky; Omaha, Nebraska, and Little Rock, Arkansas.

MAINE.

Governor J. L. Chamberlain referred the call from this office to Hon. John A. Poor, of Portland, a gentleman thoroughly acquainted with the material and social interests of the State. Mr. Poor has prepared a very able and exhaustive review of the resources of Maine, bestowing great pains and admirable intelligence upon his work. It is regretted that the limits of this report will not admit the insertion entire of this able paper. I am happy, however, to present its satisfactory conclusions, as follows: The population of Maine has increased from 96,520 in 1790 to 628,279 in 1860, according to the United States census reports. The rate of increase, however, has been declining with each decade from 57 per cent. to 7 per cent. During the current decade, however, this rate of increase seems to have been enhanced, as seen in the increasing ratio of the electoral vote cast at the successive State elections. On an estimate of 7 per cent. increase Mr. Poor fixes the population at 673,177 in 1868. It perhaps reaches 700,000. The value of personal and real estate he estimates at an average of \$500 to each person, making an aggregate of \$344,035,000 on the gold valuation of 1860; adding at least one-third for premium, he fixes the present currency value at \$458,713,330.

The capital invested in manufactures increased from \$22,044,020 in 1850 to \$38,193,234 in 1860. For 1868 the estimated capital is \$40,000,000, with an annual product of \$81,287,695.

Of railroads there are in Maine 12 lines, with an aggregate length of 577½ miles, costing \$21,499,441. Seven new lines are in process of construction, with an aggregate length of 314½ miles and an estimated cost of construction of \$9,276,000. A number of additional lines have been projected, which will add 275 miles to the foregoing aggregates.

These artificial communications are but supplementary to admirable natural facilities for commerce in the extensive ocean and river navigation so well represented in this paper. Over 100 towns on the sea-coast are able to own, build, and sail ships on the ocean.

In 1868 there are 42 towns and cities with a population of 3,000 and upwards. Of these Portland has about 30,000 inhabitants, with a real and personal estate of \$21,860,000. Bangor has a population of 20,000, and real and personal estate valued at \$6,015,601. Lewiston has 11,000

inhabitants; Biddeford, Bath, and Augusta, 10,000 each; Rockland, Saco, Calais, Belfast, Auburn, Westbrook, Brunswick, Ellsworth, and Camden, from 5,000 to 8,000 each.

Augusta, Maine—*D. Williams, mayor; August 29, 1868.*—This city is the capital of the State, and is situated at the head of navigation on the Kennebec. Population, 12,000; real and personal estate, \$5,650,000; capital invested in manufactures, \$5,000,000, mostly of cotton and lumber. Has considerable river and coasting trade. Accessible by rail to all parts of the country. The Kennebec, rising in Moosehead lake, the largest sheet of water in New England, affords great facilities for floating lumber, and an immense water-power for manufacturing.

Biddeford, Maine—*Ferguson Haines, mayor; November 16, 1868.*—Population, 11,000; real and personal estate, \$4,515,538; capital in manufacturing, \$2,500,000, mostly cotton and woollen fabrics, machinery foundry work, lumber, boots, shoes, &c. Annual product, \$6,000,000. Commerce mostly coastwise. Tide-water reaches the heart of the city by the Saco river. Railroad communications extensive.

NEW HAMPSHIRE.

Manchester, N. H.—*James A. Western, mayor; October 10, 1868.*—Population, 28,000. Manufactures, cotton, woollen, and linen fabrics, annual product 66,200,000 yards, besides 2,000,000 bags, the whole being worth \$14,925,000, on a working capital of \$6,700,000. Hosiery, paper, machinery, locomotives, carriages, &c., annual product \$3,045,000. Aggregate capital invested in manufacturing, \$7,640,000. Total annual product, \$17,970,000.

MASSACHUSETTS.

Hon. Oliver Warner, secretary of the commonwealth, by direction of his excellency Governor Bullock, under date of August 15, 1868, gives the following replies to the inquiries propounded in my circular letter:

Population of Massachusetts in 1868 estimated at 1,305,242; valuation of property, personal and real, \$1,300,000,000.

Capital invested in manufacturing, \$200,000,000. Value of annual product, \$500,000,000. Leading articles: cotton, woollen, and linen fibres and fabrics, leather and its manufactures, iron, wire, anchors, agricultural implements, straw goods, &c.

Railways, 66 companies; 1,343 miles, mostly finished; capital, \$79,300,000. No canals; rivers devoted more to manufacturing than to navigation.

Cities, 14; towns, 321. Of these, 96 have 3,000 inhabitants or more; 46 have 5,000 or more; 21 have 10,000 or more, and 11 have 20,000 or more.

ROOMS OF THE BOARD OF TRADE, *Boston, August 29, 1868.*

SIR: Your esteemed favor of the 26th instant, requesting answers to certain queries propounded therein, was duly received.

You state that a leading daily journal estimates that the daily result of the productive labor of Massachusetts equals a million of dollars, and thereupon request me to express my opinion on the following points:

1st. As to the entire accuracy of the above estimate.

2d. If so, does it include all branches of business pursued in the State ;
or,

3d. Is it restricted to agriculture, mining, fisheries, manufactures, and other pursuits which either confer original values by producing the raw material or develop latent values by mechanical processes?

In answer to the first interrogatory, I think it falls far short of the actual value of the daily product. Our last tabular statement was made up to the 1st of May, 1865. This statement was carefully prepared by the secretary of our commonwealth from returns furnished by each city and town in the State, under an act of the legislature requiring such returns to be made every ten years. By that table I find that the industrial products for the year ending May 1, 1865, exhibited a grand total of \$517,240,613, being over a million and a half of dollars for each working day in the year, with a capital of \$174,499,950, and giving employment to 271,421 persons engaged in manufacturing, and 68,636 in agricultural pursuits, making together 340,057 persons. The increase during the last decade is about 75 per cent. over the former one, and as three years have elapsed since the date of the last return, we should add at least 25 per cent. to obtain the result at the present time, so that the amount at the present moment should be estimated at \$650,000,000, or \$2,000,000 each working day. If I understand your second query correctly, it asks if mercantile or other pursuits not directly connected with the production of raw material or the enhancement of its value by labor or mechanical skill are included.

If this is the right understanding, I should answer no, except so far as necessary to bring the products to market, &c. And this I think answers your third question, to which I would further say that these tables include every kind of manufactured product, including agricultural productions, ship-building, coastwise freights, erection of buildings, fisheries; in short, every industrial pursuit, except commerce, banking, and business of like nature, and also excluding the value of farms, lands, and buildings.

I believe that the foregoing has answered your questions, and any remarks that I might add would only be speculation. Should peace and prosperity continue throughout our land, and particularly if a settled policy should be pursued by our government in regard to the redemption of the bonds in gold, so that foreigners as well as our own people could feel that the obligations would be met in good faith and that they could invest their money with perfect security; and also a steady policy be adopted towards the national banks, by which that most excellent system by which they are now regulated shall be made permanent, and thereby a uniform currency be fully established, I think the ratio of increase of productions in Massachusetts will be much larger during the present decade than it was during the previous one; but if an unsettled policy should be adopted, and it shall not be known whether the government will pay 50 or 100 cents on the dollar, or whether our national banking system shall be made permanent or broken up, it is impossible to predict the effect upon the industrial interests of the land, except so far as to expect great injury to them.

If I can be of any further assistance in this matter, I pray you command me freely.

Most respectfully,

CHAS. G. NAZRO,
President Boston Board of Trade.

Hon. JOS. S. WILSON.

Nantucket, Massachusetts—F. A. Chase, secretary of the board of selectmen.—Population, 5,000; value of real estate, \$703,738; personal estate,

\$1,300,641. Whaling vessels, 6; tonnage, 1,263.60. Coasting vessels, 7; tonnage, 1,065.64. Fishing vessels, 15; tonnage, 1,022.91. Total, 28 vessels of 3,312.15 tons. Annual product of American fisheries, \$150,000. Manufacturing establishments, 37; hands employed, 60 males and 180 females; capital invested, \$60,000. Annual product, \$81,534. Farms on the island, 111, with 6,165 acres improved, value, including buildings, \$140,735, and employing 250 hands. Of the 8,513 acres of unimproved lands, 500 acres are not susceptible of improvement; 705 acres are in woodland, worth \$9,500. Cereals produced during the year, 8,729 bushels, worth \$12,524. Potatoes, 4,850 bushels, worth \$4,900. Other crops, \$31,717, including 1,583 tons hay. Value of horses, mules, and cattle, \$44,112. Value of butter and milk sold, \$8,797. Value of dressed meats, \$34,875.

Worcester, Massachusetts—*Samuel Smith, city clerk; August 19, 1868.*—Population in 1865, 30,000; in 1868, 38,000. Capital employed in manufacturing in 1865, \$5,000,000; in 1868, \$8,500,000. Branches of manufacture in 1865, 120; in 1868, 150. Leading articles: boots and shoes, clothing, machinery, iron manufactures, cotton and woollen fabrics, agricultural and mechanical implements, fire-arms, &c. Annual product in 1865, \$15,000,000; in 1868, \$25,000,000. Real estate, \$25,000,000; personal estate, \$10,500,000; total, \$35,500,000. Five railways centering here give great facilities for transport of raw material and manufactured products. No water communications. The city is called "the heart of the commonwealth."

Northampton, Massachusetts—*H. R. Starkweather; September 22, 1868.*—Situated on the Connecticut river, 17 miles north of Springfield; Connecticut River railroad and New Haven and Northampton railroad pass through the town. Population, 9,300. Real estate, \$4,825,000; personal estate, \$2,786,000; total, \$7,611,000. Three national banks, capital \$1,050,000. Capital invested in manufacturing, \$1,370,000, embracing cotton and silk fabrics, iron castings, cutlery, agricultural implements, sewing machines, baskets, paper, &c.

Cambridge, Massachusetts—*Charles N. Saunders, mayor; October 13, 1861.*—Population, 36,000. Personal estate, \$11,728,900; real estate, \$22,364,900; total, \$34,093,800. Value of wharf property and buildings, \$2,000,000. Annual arrivals of vessels, 1,500, giving rise to a commercial business of \$5,000,000. Water frontage, 5 miles.

There should be added to the above official aggregates of real and personal estate at least \$2,000,000. Annual increase of valuation from 10 to 12 per cent; ranks next to Boston in wealth; large manufacturing interests embracing soap, books, glass, furniture, machinery, oil, &c.

Holyoke, Massachusetts—*George C. Ewing, selectman; October 13, 1868.*—Population, 11,000; real estate, \$3,140,070; personal estate, \$1,665,910; total, \$4,806,980; capital invested in manufacturing, \$7,185,000, mostly cotton and woollen fabrics, and threads, paper, machinery, &c., situated near Hadley falls, on the Connecticut, with immense water-power which is in rapid process of utilization.

RHODE ISLAND.

Hon. John R. Bartlett, secretary of state, under date of 11th September, 1868, gives the following statistics of this State:

Population by State census in 1865, 184,965. An estimated addition of 3 per cent. would give a population of 190,510 in 1868. It is probably 200,000.

Real estate, \$275,659,000; personal, \$42,317,963; total, \$317,976,963.

These official figures are far below the truth. Many estimate it at double those aggregates.

Capital invested in manufactures in 1865, \$32,646,630; in 1868, \$35,911,290. Manufactured products in 1865, \$103,106,395; in 1868, \$113,417,034; chief articles: cotton and woollen fabrics, iron, sugar, refinery, jewelry, silverware, &c.

Miles of railway in the State, 158. Capital invested, \$18,219,073. No canals or navigable rivers. The foreign commerce chiefly with Africa and the West Indies. The coasting trade is very large.

Towns and cities, 34, of which 24 are intersected by railroads. Of these 16 have a population each of over 3,000. Providence has 64,000, and Newport 12,688.

Banking capital, \$22,616,250; deposits in savings banks, \$17,751,713; insurance stock companies, \$1,950,000. The secretary believes that the investments of the like character by people of Rhode Island in institutions of other States are far greater than in their own.

BOARD OF TRADE ROOMS,
Providence, October 19, 1868.

DEAR SIR: I have given the subject referred to in your letter to me under date of September 4, 1868, careful consideration. I am unable to procure the answers in detail as requested. The census reports fail to report on the subject in the form you requested them to be answered. I therefore proceed to give you an answer made up in the same manner, and based upon similar reports to that presented by the Boston Board of Trade.

By the census of Rhode Island for the year ending on the first day of June, 1865, the products of agriculture, manufactures, and fisheries was in value..... \$111,118,886

I add the same percentage for increase as was added in Massachusetts, say 25 per cent., for instance, in 3 years... 27,779,721

Giving a total for the year ending July 1, 1868..... \$138,898,607

If we allow 300 working days in the year this would give a daily production in the State of Rhode Island of \$462,996. The value of the products in 1865, for the year ending June 1, was \$601 to each inhabitant in Rhode Island, and \$408 to each inhabitant in Massachusetts.

My impression is that, in the estimates presented for Massachusetts, and also for Rhode Island, the figures given show the value of the raw material used in producing the same.

The present price of labor is very much above the average of any year or of any ten years preceding 1865, and it is not improbable that the amount paid for labor may not be nearly as great in each of the above States as the sum named in this communication.

This is not a prosperous period in the general manufacturing or merchandising business of the country. We want a few years of peace and good crops to restore confidence, make trade profitable, and give the country a sound currency on a good basis.

Very respectfully, your obedient servant,

AMOS D. SMITH,

President of the Board of Trade, Providence.

Hon. JOS. S. WILSON,

Commissioner Gen. Land Office, Washington, D. C.

Providence, Rhode Island—*Edwin M. Snow, city registrar; September 29, 1868.*—Population, 64,000. Real estate, \$50,000,000; personal estate, \$42,000,000. Number of manufacturers, 705; capital invested, \$11,837,548; annual product, \$33,690,994, embracing cotton, woollen, and India-rubber fabrics, castings, machinery, soap, &c. Commerce is mostly confined to the coasting trade, yet with a considerable importation of coal from Nova Scotia, lumber from New Brunswick, iron from Great Britain, and salt from Turk's island and the West Indies. Arrivals of vessels during the year ending June 30, 1868, 5,416, embracing 156 from foreign ports. Domestic imports by sea, 287,210 barrels flour, 2,259,399 bushels grain, 142,681 bales cotton, 1,125 tons hay; very large quantities of the same articles are brought by rail. Railway connections with all parts of the country; daily lines of propellers to New York and Philadelphia. Manufactures the principal source of its wealth. Surrounded by a number of manufacturing villages using capital owned here.

CONNECTICUT.

Meriden, Connecticut—*Charles Parker, mayor; October 12, 1868.*—Population, 10,000. Real estate, \$7,864,730; personal estate, \$3,644,070; total, \$11,580,000. Capital in manufacturing, \$2,764,000; in national banks, \$1,000,000; insurance companies, \$500,000; one savings bank with deposits amounting to \$428,804. Railway and telegraphic communication with all parts of the country; direct water communication with New York, Boston, Philadelphia, Baltimore, Providence, and Portland.

NEW YORK.

The governor of New York, in answer to the inquiries of my circular, sends copies of executive documents, from which and from other sources it is estimated that the population of the State cannot fall far short of 4,500,000.

The board of assessors for 1868 have equalized the assessment of real property at \$1,377,403,886, and of personal property at \$438,685,254; total \$1,766,089,140. The true value may be safely rated at over \$4,500,000,000. The report of the State engineer, for 1867, shows 55 railway lines, with an aggregate length of 3,663 miles, and a paid-up capital of \$113,530,395. In 1868 the State owned 900 miles of canal, with an annual income, from tolls, of \$4,088,057 84; showing a movement of freight for the year of 5,667,537 tons, valued at \$279,194,381. No other returns of foreign or domestic commerce were given.

Troy, New York—*F. B. Hubbell, esq., city clerk; September 5, 1868.*—Situated at the head of navigation on the Hudson river. Sailing crafts owned, 227; steamers and tugs, 28; connected with Lakes Erie and Champlain by canals. One line of steamers and two lines of barges to New York. Sloops and schooners ply to different New England ports, and as far south as Philadelphia. Extensive railroad connection with all parts of the country. Capital invested in manufactures \$9,000,000, about two thirds of which are in blast furnaces, iron and steel manufactures. Among the other manufactures are malt liquors, boots and shoes, clothing, hoop-skirts, prepared lumber, &c. The manufacture of shirts, and paper and linen collars and cuffs, amounted, in 1866, to \$1,429,458, paying a United States revenue tax of \$85,767 18. Manufactures of the city employ 9,000 males and 7,000 females; annual product \$20,000,000. Population 41,000; real estate, \$10,000,000; personal estate, \$6,000,000.

Rochester, New York—*Henry L. Fish, mayor; August 29, 1868.*—Incor-

porated as a city in 1834; situated five miles from Lake Ontario, on the Genesee. Good harbor. Surrounded by a rich agricultural country whose principal crops are wheat, barley, rye, oats, and potatoes. Water-power extensive, and largely occupied by flouring-mills. Erie and Genesee canals pass through the city, as well as several lines of railway, giving extensive communications with all parts of the State. Population, 70,000, and rapidly increasing. Value of real estate \$40,000,000; personal estate, \$10,000,000. Capital employed in manufacturing, \$15,000,000, embracing all branches of mechanical industry. Fifty churches and a large number of benevolent institutions. Three daily and two weekly journals. City presents great attraction as a residence.

Niagara Falls, New York—*Alexander McNaughton, president; September 22, 1868.*—Population, 3,500. Real estate, \$1,051,950; personal estate, \$146,950. Capital invested in manufactures, \$3,500,000. Immense water-power lying idle for lack of capital.

Lansingburg, New York—*William Allen, jr., president; September 29, 1858.*—Population, 6,000. Has no city charter.

Kinderhook, New York—*William R. Merrick, president; September 28, 1868.*—Population, 1,200. Real estate, \$273,700; personal estate, \$660,187. Capital employed in manufactures, \$200,000, mostly cotton fabrics, boots, shoes, hoop-skirts, &c. River Hudson and railroad within five miles.

Lockport, New York—*C. Stag Mack, city clerk; October 3, 1868.*—Population, 17,000. Real estate, (true value,) \$10,709,967; personal estate, \$858,676. Manufacturing capital, \$2,165,000, mostly flour, iron-work, woollen fabrics, lumber, cooperage, building-stone, furniture, glass-ware, malt liquors, &c. Commerce by railway and canal involved the carriage of 280,405 tons, being an increase of 86,000 tons over last year. Retail dry goods sales, \$225,000 per annum.

NEW JERSEY.

His excellency Governor Ward, under date September 16, 1868, gives the following statistics of the State: Population, 820,000. Personal and real estate, \$513,000,000. Railroads completed, 780 miles. Capital, about \$78,000,000. Canals, 125 miles. Several navigable rivers. Towns and cities 519, of which 25 have a population of 3,000 and over.

Hudson, New Jersey—*G. D. Van Riepen, mayor; September 30, 1868.*—Population, 18,000. Real and personal estate, \$8,000,000. Manufacturing capital, \$460,000. Several railroads passing near the city.

Jersey City, New Jersey—*Charles O'Neill, mayor; September 14, 1868.*—Population, 45,000. Real estate, \$23,089,875; personal estate, \$7,892,940. Has the best water front on the west bank of the Hudson, offering to all classes of vessels the best harbor against tides, gales, and ice. Depot of Cunard steamers located here. Is the terminus of several trunk lines of railroad, and of the Morris canal.

PENNSYLVANIA.

Hon. F. Jordan, secretary of state, under date September 25, 1868, furnishes the following statistics:

Population, 3,500,000. Real estate, \$892,762,052 60; personal estate, \$202,829,941 40. Miles of railroad completed, 4,632; in progress, 200; capital invested, \$266,250,000; railroad lines, 115. Lines of completed canal, 13; aggregate length, 931 miles; capital invested, \$54,600,000.

Cities in the State, 17, viz: Alleghany, Allentown, Altoona, Carbon-

dale, Chester, Corry, Erie, Franklin, Harrisburg, Lancaster, Meadville, Pittsburg, Philadelphia, Reading, Scranton, Titusville, and Williamsport. Incorporated boroughs, 405.

Erie, Pennsylvania—*Orange Noble, mayor; October 14, 1868.*—Population, 20,500. Real estate, \$14,642,070; personal estate, \$1,200,000; total \$15,842,070. Manufacturing capital, \$1,500,000. Commerce amounts to \$5,000,000 per annum, mostly transactions in iron ore, coal, lumber, salt, grain, &c. It is the terminus of four lines of railroad and of the Erie canal. Great efforts are now being made to enlarge the variety and extent of the manufacturing and commercial interests of the city, and a new spirit of enterprise has been awakened. As a place of residence, Erie, with its picturesque surroundings, its educational and religious institutions and its benevolent enterprise, presents superior attractions.

DELAWARE.

Wilmington, Delaware—*Edward Betts, president Board of Trade; October 7, 1868.*—Population, 35,000; present annual increase, 2,000. Real estate, \$18,000,000; personal estate, \$13,000,000. Capital employed in manufactures, \$11,500,000, embracing iron and woollen, ship-building and machinery, castings, powder, chemicals, paper, cotton and woollen fabrics, leather and its manufactures, breadstuffs, cooperage, carriages, wagons, brick, fertilizers, railroad rolling stock, stoves, furniture, lumber, copper and brass works, malt liquors, &c.

The custom-house reports direct imports of guano, plaster, and lumber, and direct exports of flour, powder, and lumber. Exports from the city, mostly its iron production, amount to \$15,000,000 per annum. Vessels registered 134, tonnage 20,753, mostly employed in the coasting trade.

Wilmington is situated at the junction of the Christiana and Brandywine rivers, and has lately been extended to the Delaware with a river frontage of 12 miles, affording excellent harbor facilities. It is 68 miles from the ocean; has extensive railroad connection with all parts of the Union, especially with the eastern commercial centres.

MARYLAND.

Baltimore, Maryland—*Robert T. Banks, mayor; October 16, 1868.*—Population, 325,000. Real and personal estate, \$225,000,000. Imports in 1867, \$12,280,067; exports, domestic, \$12,156,697. Foreign merchandise re-exported, \$181,473; total exports, \$12,338,080. No statistics of manufacturing capital accessible. The manufacturing interests very large, embracing cotton and woollen fabrics, iron, brass, and copper work, flour, tobacco, sugar, canned oysters, vegetables, &c. Railroad facilities unsurpassed. Domestic commerce enormous and increasing. Foreign commerce rapidly increasing. Lines of steamers to Liverpool and Bremen; very large shipping and ship-building interest.

Cumberland, Maryland—*Henry McKean, city clerk; August 29, 1868.*—Population, 12,000. Real and personal estate, \$3,600,000. Capital invested in manufactures, \$400,000. Local trade, \$600,000. Coal shipped, 1,000,000 tons. Railroad communications by Baltimore and Ohio and Connellsville roads; on Chesapeake and Ohio canal. Two national banks, capital, \$150,000.

VIRGINIA.

Hon. J. M. Herndon, secretary of state, under date September 14, 1868, gives the following estimate of statistics:

Population, 1,205,914. Real estate, \$790,000,000; personal estate, \$40,000,000. Miles of railroad completed, 1,325; in progress, 600; total, 1,925; capital paid in, \$30,000,000. Miles of canal, 273 $\frac{3}{4}$. Eastern Virginia has great facilities for trade from the number of rivers, creeks, and inlets navigable to the head of tide-water for large vessels and for smaller vessels to a considerable distance inland. The disorganized condition of industry and commerce incident upon the close of the war forbids anything like an accurate estimate of resources.

WEST VIRGINIA.

Hon. J. M. McMorten, State auditor, under date August 15, 1868, sends the following statistics:

Population, 434,700. Real estate, \$86,894,762; personal estate, \$32,597,938; total, \$119,492,640. This aggregate does not include railroad property. Manufacturing capital not less than \$6,000,000. Principal articles salt, iron, glass, and leather. Railroads: miles completed, 373; under construction, 200; total, 573. Capital invested in railroads in the State, \$22,214,525.

River navigation: Ohio, 269 miles; Kenawha, 90 miles; total, 359 miles. Aggregate river and railroad communication, 932 miles; towns and cities, 134, of which four have over 3,000 inhabitants, viz: Wheeling, South Wheeling, Parkersburg, and Martinsburg.

NORTH CAROLINA.

Wilmington, North Carolina—Benjamin Durfee, clerk and treasurer; September 28, 1868.—Situated on Cape Fear river, 30 miles from its mouth. Surrounding country sandy, with pine forests intermingled with rice swamps. The latter produce immense quantities of rice, which is largely shipped from this port. Settled in 1730, and at first called New Liverpool; named Wilmington in 1739 in honor of Spencer Compton, earl of Wilmington. In 1758 the real estate was \$30,000. In 1762 the population was 1,000. First newspaper published in 1764. The present merchants mostly northern men. Extensive railroad connections, with 150 miles of river navigation. Large shipments to northern and foreign ports.

Population 16,500, having doubled in 20 years. Real estate, \$8,000,000; personal estate, \$3,000,000. Manufacturing capital, \$975,000. Export of pitch, turpentine, &c., nearly half a million barrels in year 1868, prior to September 1; also during the same time nearly 1,700 bales cotton, 52,993 bushels of peanuts, 1,300,000 feet of lumber, and over 3,000,000 shingles. Steamers arrive and depart every day. Large shipments to England and West Indies of lumber, naval stores, &c. Never visited by yellow fever but once. Fine attractions as a residence. Promise of commercial eminence.

GEORGIA.

Savannah, Georgia—James Stewart, clerk of council; August 24, 1868.—Population, 40,000. Principal products of vicinity, cotton, rice, lumber, and turpentine. Four lines of steamers to New York, with ten first-class steamers; trips tri-weekly. One line to Philadelphia; two large steamers; trips tri-weekly. Tri-weekly line to Baltimore; two steamers. Three steamers, weekly trips to Florida ports, and five steamers to

Georgia ports. Five steamers soon to run to Liverpool. Shipping to all parts of the world. Extensive railroad connections north and south. Savannah promises to be the great cotton port of the south. Exports during the year ending June 30, 1867: cotton, 258,089 bales, 119,252,301 pounds, worth \$37,495,173; rice, 4,242,000 pounds, worth \$363,300; lumber, 35,156,000 feet, worth \$765,000; manganese, 87 tons; domestic fabrics, 12,393 bales, worth \$1,858,950; wool, 1,221 bales, worth \$91,575; naval stores, \$129,612; sundries, \$519,821. Total value of exports, \$41,221,488. Tonnage entered and cleared, 820,991.

Macon, Georgia—*George S. Obear, mayor*; November 6, 1865.—Population, 13,000. Real estate, \$5,000,000. Cotton received in 1867, 79,752 bales, worth \$7,088,579. Sales of merchandise \$8,388,936 besides cotton; one national bank, capital \$100,000; private banks, \$400,000. Large manufacturing interest, including flouring mills, machinery, cotton-spinning, &c. Five railroads, (870 miles,) with a net annual income of \$1,484,023. Situated on the Ocmulgee, which is navigable to this point by small steamers; is the geographical centre, and will soon be the railroad centre of the State; noted for elegant private residences.

FLORIDA.

His excellency W. W. Gleason, acting governor, under date October 21, 1868, sends the following statistics: Population, 160,000. Real estate, \$13,239,601; personal estate, \$12,744,860; total, \$25,984,461. Manufacturing capital, \$1,600,000. Lumber produced worth \$10,000,000 annually. Miles of railroad completed, 393; projected and partially constructed, 408; total, 801 miles. The routes completed cost about \$20,000 per mile. The coast of Florida is largely indented with inlets and rivers, navigable for craft drawing from 10 to 20 feet. Eighteen navigable rivers give facilities to internal trade, embracing 2,000 miles of steam navigation. A system of internal navigation from Fernandina to Key West, including 40 miles of auxiliary canal, is in process of construction. Other river improvements in progress. Four towns—Key West, Jacksonville, Tallahassee, and Pensacola—have a population of 3,000 and upwards. The other principal towns are Appalachicola, Marianna, Quincy, Monticello, Cedar Keys, Ocala, Gainesville, Lake City, Fernandina, Pilatka, and St. Augustine.

ALABAMA.

Montgomery, Alabama—*Thomas O. Glasscock, mayor*; October 13, 1868.—Population, 13,065. Real estate, \$4,914,000; personal estate, \$1,200,000. Manufacturing capital, \$300,000. Receipts of cotton, 70,000 bales; receipts of corn, 300,000 bushels. Five railroads terminate here, with an aggregate length of 422 miles. Steam communication with all points on the Alabama river. Merchandise sold during the past year, \$6,000,000. Montgomery is the capital of the State; has a rich agricultural country around it; offers great inducements for the investment of capital and for immigration.

Selma, Alabama—*W. B. Gill, mayor*; September 18, 1868.—Situated on Alabama river, 400 miles from Mobile. Population, 2,556 white and 4,163 colored; total, 6,719. Black population decreasing. Real estate, \$4,500,000; personal estate, \$500,000. Manufacturing capital \$45,000, mostly railroad machinery, foundries, sash and blinds, carriages, employing 150 hands. 50,000 bales cotton and 7,000 tons coal shipped per annum. Lime trade amounting to 22,000 barrels. River navigation

extensive, and railroad connections with the whole country. Surrounded by splendid agricultural and mineral resources. The free school system has been introduced since the war, with great acceptance.

MISSISSIPPI.

His excellency Acting Governor Ames, under date September 20, 1868, regrets his inability to give any information except that the aggregate of real estate in 1866 was \$114,000,000.

Columbus, Mississippi—Levi Donnell, mayor; September 14, 1868.—Population between 5,000 and 6,000. Real estate, \$1,135,000; manufacturing capital, \$62,000, mostly woollen and grist mills, carriage manufacturing, &c.

Grenada, Mississippi—R. D. McLean, mayor; September 1, 1868.—Population, 3,000. Real and personal estate, \$375,000. Merchandise sold in 1867, \$300,000. No manufactures. Two large female colleges and five churches. Two railroads and the Yallahusha river furnish ample facilities for trade and transportation.

LOUISIANA.

New Orleans, Louisiana—E. L. Bowen, assistant secretary; August 19, 1868.—Population, probably not less than 250,000, of all colors. Real estate, \$107,021,475; personal estate, \$26,648,770. Exports for year ending August 31, 1868: Cotton, 681,692 bales; tobacco, 15,052 hogsheads; sugar and molasses, 2,807 hogsheads and 27,088 barrels; flour, 285,704 barrels; pork, 10,240 barrels; bacon, 3,459 hogsheads; lard, 93,787 kegs; beef, 8,116 barrels; wheat, 83,824 bushels; corn, 1,949,664 bushels; value of produce from the interior, \$127,459,561. Imports of specie, \$3,267,351.

TEXAS.

Galveston, Texas—Isaac G. Williams, mayor; September 16, 1868.—Population, 26,000; at the close of the war it was 5,000. Real and personal estate, \$16,200,000. Capital in manufacturing, \$675,000. Bales cotton received per annum, 101,915. Annual imports of merchandise, \$584,183, of which \$84,571 was re-exported with \$7,033,092 of domestic staples, making a total export of \$7,117,663. Annual entries from foreign ports, 79; tons, 24,386; domestic ports, 1,351 vessels, of 492,711 tons; total, 1,430 vessels, of 517,097 tons. Capital in cotton presses, \$3,545,000. Four miles city railroad finished; cost \$500,000. Galveston, Houston and Henderson railroad, capital \$1,000,000, includes two miles of bridge to Galveston island. Galveston and Brazos canal, 14 miles; cost \$270,000.

ARKANSAS.

Little Rock, Arkansas—John Wassel, mayor; August 24, 1868.—Situated on Arkansas river, 250 miles from its mouth. River navigation, about 700 miles. Population, 10,000. Real estate, \$3,315,207; personal estate, \$278,247. Trade chiefly in cotton. Great facilities for manufacturing, but little used as yet. The city quite healthy—called the Forest City.

TENNESSEE.

Memphis, Tennessee.—Annual report of Chamber of Commerce for 1868, compiled by W. L. Trask.

Population, 60,000. Surrounded by an extensive fertile region, and excellent water-power; abundance of iron and coal. Railroad communication with all parts of the Union. Large steamboat trade.

KENTUCKY.

BOARD OF TRADE ROOMS,

Louisville, September 28, 1868.

DEAR SIR: Under date of September 2, 1868, you addressed our board for views, or rather statistical information, in regard to the State of Kentucky. Having no systematically compiled data to judge from, we find it difficult to answer your interrogatories in as concise and methodical manner as desirable. In fact, the questions are somewhat foreign to us, and, like a good deal of other statistical matter, must result in mere aggregates of value as well as of labor.

The eastern States have had a uniform system of labor and mechanics for many years, while ours, covering a good deal of territory, is more diffuse, and during the past five years it has undergone a great change—that is, from slave to free.

Your first query is, "What is the aggregate annual value of the unskilled labor expended in Kentucky in agriculture, &c.?"

In answer, in general terms, I can estimate the population of Kentucky to be 1,195,000. This is probably below the full number, though the belief is entertained, owing to the cause above mentioned, that the population has not materially increased since 1860. Say that one in ten devotes his time to pursuits as indicated in the first proposition, and this labor is employed at an average of \$1 per day, equal to \$119,500 per day. This is a low estimate.

The second proposition, as to the annual value of skilled labor, &c., the deduction can be estimated at 1 in 25 of the population; say 50,000 at \$2 per day, or \$100,000 per day.

The third, as to the aggregate annual profits of all kinds of merchandising, can also be estimated at 10 to 12 per cent., or about \$7,250,000 in the State.

The fourth is as to the aggregate annual value of the salaries of clerks, &c. The pay of clerks varies from \$300 per annum to the sum of \$2,500. The average may be put down in total at \$3,000,000.

The fifth proposition is asking the aggregate of the net profits of railroads, steamers, and other lines of communications. This embraces, like all others, a very wide range, and in reply we can state that the Nashville railroad's net profits are \$900,000 per annum, and the Louisville and Frankfort railroad some \$250,000. The others are much less. Steamboating has not been very profitable or heavy during the year, and the net profits would not reach more than \$200,000.

The sixth query relates to banking and insurance companies, asking for their annual profits. The actual capital employed in Louisville is about \$15,000,000, to which must be added many local agencies and the balance of the stock, which might be \$3,000,000 more, and you could estimate the net profits at 10 per cent.

The result of the productive labor of this State, aside from manufactures, should certainly equal that of Massachusetts, and I conceive that

the estimate made by the president of the Boston Board of Trade must be either very extravagant or it embraces everything and makes only supposable values. The value of the imports into Louisville during the year were nearly \$200,000,000, with exports exceeding \$160,000,000, with no estimate whatever of the balance of the State.

It is a fact, however, that very many counties in the State do not produce to exceed five per cent. over and above what they consume.

Hoping that the foregoing, crude as it is, may prove of some service in helping you to form your data, I subscribe myself,

Respectfully yours,

C. H. CLARKE, *Secretary.*

J. S. WILSON,

Commissioner General Land Office, Washington, D. C.

Annual report of Board of Trade of Louisville, Kentucky, 1868.—Population, 150,000. Banking capital, \$12,076,741. Imports of cotton, 156,602 bales; exports of cotton, 158,945 bales. Corn imports, 462,224 sacks; exports, 323,178 sacks. Coal imports, 20,486,042 bushels; exports, 13,978,110 bushels. Cattle, imports, 40,787 head; exports, 10,494. Hogs, imports, 195,669 head; exports, 7,386 head. Sheep, imports, 86,597 head; exports, 17,296 head. Fruit, imports, 68,722 packages; exports, 14,566 packages. Flour, imports, 114,420 barrels; exports, 97,050 barrels. Hay, imports, 95,686 bales; exports, 74,821 bales. Pig-iron, imports, 14,156 tons; exports, 3,351 tons. Lumber, 45,156,789 feet; exports, 4,131,808 feet. Shingles, imports, 70,109,333; exports, 48,870,875. Lead, 15,812 pigs; exports, 4,403 pigs. Oats, imports, 187,740 bushels; exports, 40,352. Sales of tobacco, 40,313 hogsheads; value, \$4,631,861. Wheat, imports, 171,837 bags; exports, 45,433 bags. Annual imports, \$197,904,569; exports, \$161,494,569. Steamers built, 80; tonnage, 31,845; value, \$2,081,000. Manufacturing establishments, 570; capital, \$16,313,000; hands employed, 12,681; annual product, \$40,091,745.

OHIO.

His excellency Governor Hays, under date August 31, 1868, gives the following statistics: Population, 2,800,000. Real estate, \$1,400,000,000; personal estate, \$700,000,000; total, \$2,100,000,000. Railroad companies, 35 main lines, 2,805 miles; employes, 18,778; capital stock, \$92,528,515. Canals, 830 miles. Lake and river navigation, 650 miles. Turnpike and plank roads, 3,000 miles. Towns and cities of 3,000 inhabitants and upwards, 50.

Springfield, Ohio—C. M. Nichols, editor of *Daily Republican*; October 16, 1868.—Population, 16,000. Real estate, \$2,516,615; personal estate, \$2,900,510. Manufacturing capital, \$3,000,000, producing building stone, lime, agricultural implements, brass, iron, and copper-work, flour, clothing, furniture, carriages, &c. Five railroad lines. Two daily, six weekly and one semi-monthly journals.

Delaware, Ohio—J. D. Van Deman, mayor; September 19, 1868.—Population, 6,500. Real and personal estate, \$7,000,000. Manufacturing capital, \$1,000,000, producing machinery, dressed lumber, flax-tow, linseed oil, carriages, clothing, boots, tinware, &c. Two railroad lines. Three banks. Two colleges, with 700 students. Fine sulphur spring in the city, making it a popular summer resort.

Toledo, Ohio—C. A. King; August 19, 1868.—Population, 30,068. Real and personal estate, \$20,000,000. Two canals. Six railroad lines. Situated eight miles from Lake Erie, on the Maumee. Exports for 1867,

\$185,145,096; imports, \$167,786,626. Two daily lines of screw-steamers, one tri-weekly, and one weekly; immense sail tonnage. Breadstuffs received in 1867: flour, 668,604 barrels; wheat, 2,150,875 bushels; corn, 5,747,005 bushels; oats, 1,038,293 bushels; barley, 223,474 bushels. The second primary wheat market of the world. Black walnut lumber received, 48,000,000 feet; pine lumber, 112,425,250 feet; total lumber, 160,425,250 feet.

Chillicothe, Ohio—*George P. Shaefer, mayor; September 10, 1868.*—Population, 15,000. Real and personal estate, \$6,000,000. Manufacturing capital, \$500,000, including woollen fabrics, spirituous and malt liquors, paper, &c. Railroad communication extensive. Surrounded by a very rich agricultural region. Large domestic commerce. Beautiful situation and vicinity.

Cleveland, Ohio—*S. Bohrer, mayor; October 17, 1868.*—Population, 85,284. Real estate, \$52,000,000; personal estate, \$29,676,500; total, \$81,676,500. Value of commerce, viz: lake, \$175,936,590; rail, \$684,976,136; canal, \$4,144,600; total, \$865,057,326. Vessels entered, 4,894; tonnage, 1,540,500; vessels cleared, 4,946; tonnage, 1,530,484. Lake vessels owned, 202; tonnage, 44,875; canal boats, 177; tonnage, 9,175. Manufacturing capital, \$44,000,000, principally petroleum, iron, machinery, dressed stone, cooperage, agricultural implements, &c. Capital in coal trade, \$3,000,000; tons received, 669,000; forwarded, 334,000. Iron ore received, 290,957 tons; sold by Cleveland offices to other lake ports, 420,000 tons; pig scrap, and other iron manufactured, 55,000 tons. Petroleum trade: capital, \$3,000,000; annual receipts of crude oil, 750,000 barrels; refined oil produced, 590,000 barrels; forwarded, 496,000 barrels. Lumber trade, capital, \$1,000,000; lumber received, 142,500,000 feet, of which 103,374,000 feet were forwarded. Receipts and shipments of shingles, 128,685,500; lath, 73,382,000; staves, 19,458,000; hoops, 4,635,000.

ILLINOIS.

Chicago, Illinois—*J. B. Rice, mayor; September 3, 1868.*—Population, 300,000. Real estate, \$350,000,000; personal estate, \$150,000,000; total, \$500,000,000. Capital invested in manufactures, \$60,000,000, embracing agricultural implements, malt liquors, leather, brass, lead, iron, and copper work, tobacco, musical instruments, machinery, &c. Ship canal from Lake Michigan to Illinois river. Lake tonnage owned, 289,765. Twelve trunk railroad lines. Annual receipt and shipment of lumber, 1,401,645,124 feet; 217,433,388 lath; 927,969,775 shingles; 2,916,851 hogs; 517,361 cattle, 176,851 barrels pork; 27,241,225 pounds lard; 7,168,427 pounds tallow; 82,325,522 pounds cutmeats; 51,261,165 pounds hides; 22,512,716 pounds wool; 15,399,031 pounds lead; 100,069,727 bushels grain; 84,621 barrels beef; 3,566,831 barrels flour. The city contains 18 elevator warehouses with an aggregate capacity of storage for 10,680,000 bushels of grain, and 30 miles of dockage.

MICHIGAN.

Detroit, Michigan—*William W. Wheaton, mayor.*—One of the oldest western cities; growth solid and healthy; no city of its size so lightly taxed, owes less money, has better credit, is more efficiently and cheaply governed, or enjoys a more profound security of life and property; has an unrivalled system of sewerage and sanitary police, and excellent supplies of pure water. Public school expenditure, \$90,000 per annum: fire department, \$66,372; police, \$60,000. Admirable religious, literary, and

humanitarian institutions; forty-eight churches; excellent harbor. Population, 75,000. Real estate, \$47,150,560; personal estate, \$40,863,677; total, \$88,014,237. Capital employed in manufactures, \$18,360,000, embracing lumber, iron, leather, furniture, tobacco, spirituous and malt liquors, ships, copper, brass, and iron work, clothing, wooden-ware, musical instruments, &c. Twelve lines of steamers to this port.

WISCONSIN.

Honorable Thomas J. Allen, secretary of state, under date September 15, 1868, gives the following statistics:

Population, 1,000,000. Real estate, (actual value,) \$300,000,000; personal estate, \$100,000,000; total, \$400,000,000. Railroad, miles in operation, 1,013, costing \$40,161,533. Perhaps 1,000 miles of river and lake navigation. Towns of 1,000 inhabitants and over, 60; of 3,000 and over, 22; Milwaukee about 90,000, Racine, Kenosha, Fond du Lac, Oshkosh, Janesville, Beloit, Madison, Green Bay, and Watertown, contain populations varying from 8,000 to 14,000.

Milwaukee, Wisconsin—Edward O'Neil, mayor; October 5, 1868.—Has the best harbor on the great lakes. Population, 90,000. Surrounded by a very rich wheat country, and is reported the largest primary wheat market in the world, being the depot of Wisconsin, Minnesota, and part of Iowa. During 1867, \$45,000,000 worth of produce was marketed here, and 91,924 tons merchandise were received from the east, exclusive of such coarse freight as coal, plaster, salt, &c. The mercantile transactions of 1867 amounted to \$110,675,000, according to official statements. Port arrivals, 4,396; tonnage, 1,713,043; departures, 4,343; tonnage, 1,699,825. Railroad communications on a grand scale, with lake and river navigation to the Atlantic, thus giving Milwaukee direct business relations with the grand commercial cities of the world. Regular lines of steamers to Buffalo, Oswego, and other prominent lake ports. The school census, August 31, 1868, shows 33,660 persons for whose education legal provision had been made, of whom 10,481 were in actual attendance upon public schools, besides 6,409 in private schools; cost of public schools, \$73,819 20 per annum.

MINNESOTA.

His excellency Governor Marshal, under date September 23, 1868, gives the following:

Population, 440,000. Real estate, \$55,155,000; personal estate, \$24,333,000; total, \$79,488,000. Railroad, miles complete, 552; river navigation, 700.

St. Paul, Minnesota—J. D. Ludden, secretary Chamber of Commerce; September 23, 1868.—Situated at the head of Mississippi navigation, latitude 45° north, longitude 93° west, 2,140 miles from Gulf of Mexico, and 700 from Lake Itasca, is the State capital. Population, 20,000. Real estate, \$2,155,161; personal estate, \$956,418; total, \$3,112,179. Sixty-five steamboats came to the port in 1867, most of them running regularly. Fifteen thousand miles of river navigation and extensive railroad communications. Wholesale trade in 1867, was \$8,000,000; in 1868, \$12,000,000. Leading imports: agricultural implements, 11,063 packages; apples, 20,937 boxes; buffalo robes, 35,000; coffee, 835,830 pounds; corn, 100,057 bushels; castings, 16,103 packages; flour, 132,874 barrels; hoop-poles, 2,000,000; lath, 2,300,000; lumber, 9,200,000 feet; malt, 47,863 bushels; oats, 252,185 bushels; wheat, 150,000 bushels; wool, 86,347 pounds. Exports: flour, 108,500 pounds; hides, 154,800; hoop-poles, 1,500,000;

wheat, 107,338 bushels; wool, 106,979 pounds; staves, 2,000,000. St. Paul has great manufacturing advantages, such as good water-power, cheap food, accessible raw material, &c. Need of more capital, especially banking capital. Building enterprise very active. General feeling of confidence in the future.

Stillwater, Minnesota—*C. J. Butler, mayor*; October 23, 1868.—Located at the head of Lake St. Croix, the highest point accessible by Mississippi steamers. Population, 4,500. Real estate, \$1,500,000. Sends 120,000,000 feet pine logs to market per annum. Saw-mills representing \$1,000,000, turn out \$1,000,000 per annum. General business prosperous, and rapidly increasing. Steamboat arrivals about 25 per week. Railroad communications established and increasing.

Saint Anthony, Minnesota—*Winthrop Young, mayor*; September 29, 1868.—Population, 4,500. Real estate, \$1,175,300; personal estate, \$325,000; total, \$1,500,300. Capital invested in manufactures, \$525,600, including lumber, sash, doors, furniture, paper, flour, iron castings, &c. Value of annual product, \$1,407,744. Water-power on this side of the Mississippi estimated at 120,000 horse-power, but a small portion of which is yet used. Connected with Minneapolis across the river by a suspension bridge; extensive railroad connections. Boats sometimes come to the falls, but St. Paul, nine miles below, is practically the head of main navigation. The river above the falls is navigable for light craft, 70 miles to Sauk rapids. Timber cut in the forest during the winter and floated down the river. Inexhaustible deposits of good building rock in the vicinity. State University with 200 students located here.

Mankato, Minnesota—*J. S. Wiswell, mayor*; September 15, 1868.—Situated on the Minnesota river, which gives navigation to St. Paul, on the Mississippi. Population, 3,500. Real estate, \$1,000,000; personal estate, \$425,000; manufacturing establishments, 39; capital, \$577,000; annual product, \$731,800, consisting of flour, machinery, lumber, furniture, carriages, farm implements, woollen fabrics, oil, lime, dressed building-stone, malt liquors, &c. Sales of merchandise and manufactures in home market, \$648,000. Exports of grain, flour, peltries, lumber, hops, wool, and hides, \$329,000. The country around has inexhaustible supplies of timber and building-stone.

IOWA.

Davenport, Iowa—*M. Donahoe, mayor*; August 21, 1868.—Population, 20,000. Real estate, \$3,250,000; personal estate, \$1,750,000. Manufacturing capital, \$1,000,000, principally lumber, flour, woollen fabrics, malt liquors, agricultural implements, furniture, soap, candles, vinegar, carriages, bagging, &c. Extensive railroad communications and continually enlarging. Surrounding country highly cultivated, especially in grain and fruits.

Dubuque, Iowa—*Solomon Turck, mayor*; September 2, 1868.—Settled permanently in 1833, incorporated as a city in 1841. For twenty years the annual increase of population has averaged 1,000; the present population being 24,000. Annual product of the neighboring lead mines for 30 years has averaged \$250,000 of ore; but the commerce of Dubuque has largely outstripped this trade, showing an aggregate for 1867 of \$16,000,000, including general merchandise, groceries, provisions, clothing, boots and shoes, hardware, &c. From 15 lumber yards 31,000,000 feet of lumber were shipped. The shipments of flour were 91,000 barrels, and of wheat 2,000,000 bushels; the corn crop of northern Iowa being mostly converted into pork, 16,000,000 pounds of which, and 23,000 live hogs, were shipped from Dubuque during 1867. Value of articles manufac-

tured during 1867, \$3,194,000. Population of this city has increased in a grater ratio than that of the State. In three months a railroad bridge will be completed at a cost of \$750,000. This will place the city in immediate railroad communication with all parts of the country east of the Mississippi. Dubuque has two lines of street railroads, 19 churches, one of which cost \$97,000; 61 public school teachers, with 3,000 pupils, and \$150,000 invested in school buildings. It promises to be one of the most attractive cities of the great northwest.

NEBRASKA.

Under date August 31, 1868, his excellency Governor Butler gives the following statistics:

Population, 100,000. Real estate, \$10,760,796; personal estate, \$25,796,895. Manufacturing capital, \$236,740. Railroad finished, 375 miles; in progress, 90 miles. River navigation, 350 miles. Towns of 3,000 inhabitants, 21.

OMAHA *September 28, 1868.*

SIR: In reply to your favor of the 10th instant, I have the honor to state that the following estimates in response to your inquiries are based upon a careful examination of the books of our assessors and upon the best judgment of some of our most prudent and cautious business men.

1. The aggregate annual value of unskilled labor expended in the State of Nebraska in the production of raw material is not far from \$9,000,000.

2. The aggregate annual value produced by skilled labor in the different branches of manufacture devoted to the development of secondary values is about \$6,600,000.

3. The estimated annual aggregate profit of all kinds of merchandizing is \$4,000,000.

4. The estimated aggregate of salaries of clerks and all other business agents is \$3,600,000.

5. The annual profit arising to railroads, canals, steamers, stages, and other lines of communication, cannot be arrived at with any certainty of approximation.

6. The annual profits of our inland marine transportation, including chartered vessels, will reach \$60,000.

7. The annual profit of banking (we have no home insurance) companies is estimated at \$125,000 net.

Perhaps a fair estimate of the annual product of skilled and unskilled labor would be \$15,000,000 in the aggregate.

I have the honor to remain, sir, very respectfully, your obedient servant,

WILLIAM R. KING,
President Board Trade.

COMMISSIONER OF THE GENERAL LAND OFFICE,
Washington, D. C.

MISSOURI.

Under date September 21, 1868, his excellency Governor Fletcher sends the following:

Population, 1,300,000. Real estate, \$339,493,359; personal estate, \$115,378,536. Miles of railroad complete, 1,165; under construction, 555. Towns and cities, 765; towns of 3,000 inhabitants and upward, 15.

Brunswick, Missouri—L. Benecke, president Chariton County Board of Immigration; *September 5, 1868.*—Situated on the Missouri near the mouth of Grand river. Population, 2,500. Real estate, \$1,000,000; per-

sonal estate, \$500,000. Capital employed in manufacturing, \$150,000, chiefly tobacco and woollen fabrics, admirable commercial facilities in an extensive system of railroad communication and the navigation of the Missouri Grand rivers.

St. Ferdinand, Missouri—*Charles Castello, mayor*; November 7, 1868.—Population, 1,000. Real estate, \$250,000; personal estate, \$50,000. Capital in manufactures, \$25,000, viz: boots, shoes, harness, furniture, wagons, &c.

KANSAS.

Leavenworth, Kansas—*C. R. Morehead, jr., mayor*; September 8, 1868.—Manufactures embrace tobacco, soap, candles, woollen fabrics, iron work, &c. Sales of merchandise, per annum, \$6,500,000. Situated on Missouri river, with fine railroad communication. Laid out in 1854.

CALIFORNIA.

Under date September 8, 1868, his excellency Governor Haight sends several public documents, from which the following statistics are taken, partly from estimate from the reports of former years.

Population, 600,000. Real estate, \$111,585,339 24; personal estate, \$99,527,147 51: total, \$211,112,486 75. These aggregates, being official assessments, were of course largely below the truth. Property exempt from taxation, in addition to the above, was returned to the amount of \$17,764,741 60.

Nevada, California—*Charles H. Mead, city assessor*; October 26, 1868.—Population, 5,000. Real estate, \$925,000; personal, \$625,000. Principal industry: mining. Shipments of gold by express, \$1,800,000. Lumber largely produced; considerable manufacturing.

Sacramento, California—*Charles H. Swift, mayor*; September 29, 1868.—Population, 17,500. Real estate, \$6,000,000; personal estate, \$5,000,000. Manufacturing, \$950,000. Freight annually landed at the wharves, 250,000 tons, one-half of which goes to the interior, principally by railroad. Daily steamer lines to San Francisco. Terminus of Central Pacific railroad; also of the Sacramento Valley railroad.

San Francisco, California.—From "Cronise's Natural Wealth of California," forwarded by his honor the mayor of San Francisco, and other documents of reliable character, it is estimated that the population of this city is not less than 150,000. Real estate of San Francisco county, \$57,882,113; personal estate, \$51,152,613 88; total, \$109,034,726 88. Port arrivals during 1867, 2,677; tonnage, 909,025; being an excess of 520 arrivals and 160,752 tons over the previous year's aggregates. Freight charges on import cargoes, \$6,940,592. Exports of merchandise and produce, \$22,465,903—an excess of \$5,162,885. Exports include grain shipments worth \$13,000,000; treasure exported, \$41,676,292; total export, \$64,142,195.

NEVADA.

His excellency Governor Bladell, under date September 25, 1868, sends the following:

Population, 40,000; other estimates reaching as high as 60,000. Real estate, \$15,000,000; personal estate, \$10,000,000; total, \$25,000,000, (true value.) Manufacturing capital, \$2,500,000, including quartz mills, saw mills, iron foundries, &c. Railroad, miles finished, 150. Forty towns and cities, of which only 2 have over 3,000 inhabitants.

UTAH.

J. A. Smith, under date August 25, 1868, sends the following:
 Population, 120,000. Real and personal estate, \$12,000,000. Manufacturing capital, \$1,630,000, mostly cotton and woollen mills, lumber, flour, &c. Towns and cities, 137, of which 8 have 3,000 inhabitants.

MONTANA.

His excellency Acting Governor Taft, under date September 8, 1868, sends the following:

Population, 38,875. Real and personal estate, \$9,400,000. Manufacturing capital, \$1,765,000; annual product, \$19,075,000—mostly quartz mills, foundries, flour, lumber, malt liquors, wagons, refined gold and silver, &c. Towns and cities, 37. Helena has 7,000 inhabitants; Virginia City, 3,000. Acres under cultivation, 243,427. Missouri river navigable to Fort Benton for steamers of from 200 to 300 tons burden.

The surveyor general at Helena, under date October 20, 1868, gives substantially the same figures as above.

Helena, Montana—J. S. Slater; November 12, 1868.—Population, 8,500. 5 banks; 4 churches; 1 high school and several primary schools; 3 weekly, 2 tri-weekly, and 3 daily newspapers; 9 wholesale and 75 retail stores; 6 hotels. The city is supplied with pure water brought several miles in pipes. Buildings very creditable, \$50,000 having been invested during the past year in building improvements.

Virginia City, Montana—L. Danvers, mayor; September 8, 1868.—Population, 3,000. Real and personal estate, \$1,625,028. Annual amount of commerce, \$2,500,000. Product of gold since July, 1865, \$50,000,000. Distant from Fort Benton, 275 miles; from line of Union Pacific railroad, 300 miles.

WYOMING.

Cheyenne City—O. T. B. Williams, esq., publisher of *Rocky Mountain Star*.—Population, 3,000. Real and personal estate, \$300,000. Railroad, miles finished, 480. Manufacturing capital in the Territory, \$550,000. Excellent wagon road to Fort Laramie. Good road also making from Fort Sanders to the Sweetwater country. Quite a number of creeks afford excellent facilities for irrigation. Twelve hundred head of sheep in the Territory, and 10,000 more coming. Soil adapted to culture of small grain, and extensive preparations for farming next season. The only difficulty arises from Indian hostilities. Country well adapted to stock raising; atmosphere pure; climate salubrious; scenery magnificent. Population of Territory, 20,000.

DAKOTA.

Fort Fetterman, Dakota Territory—William N. Hutchinson; October 16, 1868.—Situated on south side of the Platte; surrounding country healthy; winters long and springs short and windy; country rolling and vegetation very imperfect, the soil being mostly alkali; grasshoppers destructive; Platte unfit for navigation, fringed occasionally with cottonwoods, box-elders, and willows; wild game abounds; face of the Territory mountainous; iron ore and coal abound.

The following replies have been received since the compilation of the above:

NEW JERSEY.

Rahway, New Jersey—*John F. Whitney, mayor; November 20, 1868.*—Population, 7,500. Personal and real estate, \$3,202,000. Manufacturing capital, \$507,000; 19 trains per day to New York, 20 miles distant. Accessible at high tide to vessels drawing 8 feet.

OHIO.

Zanesville, Ohio—*A. R. Cassidy, mayor; November 14, 1868.*—Population, 20,000. Real estate in 1858, \$1,870,874; personal in 1867, \$2,435,196; estimated real and personal estate in 1870, \$7,000,000. Manufactures extensive. Surrounded by coal and iron country. Muskingum slack water navigation to the Ohio. Two main lines of railroad, transporting 88,000,000 pounds freight per annum.

DISTRICT OF COLUMBIA.

Georgetown, District of Columbia—*Charles D. Welch, mayor; November 24, 1868.*—Population, 12,000. Real estate, \$5,326,475; personal estate, \$1,284,505; including \$1,000,000 manufacturing capital. Flour manufactured, 300,000 barrels per annum. Coal shipped, increased from 216,792 tons in 1863, to 458,153 tons in 1867. Terminus of the Chesapeake and Ohio canal, and head of Potomac navigation. Extensive railroad communication projected south of the Potomac with southern and western States.

JOS. S. WILSON,
Commissioner.

DEPARTMENT OF THE INTERIOR,
General Land Office, November, 1868.

Tabular exhibit of railroad statistics, in so far as returns have been sent to the General Land Office, in answer to Commissioner's circular dated July 15, 1868.

Name of road.	Capital actually invested.	Annual earnings.	Annual expense of operation, repair, and renewal.	Total miles of road.
Alabama and Florida.....	\$2,697,266 00	\$359,793 94	\$238,831 56	112.500
Adirondack.....	2,079,058 83	18,465 28	11,651 51	25
Albany and Susquehanna.....	5,415,929 58	484,228 19	428,513 48	140
Albany and West Stockbridge.....	2,411,055 75	Not reported.	195,033 17	38
Atlantic and Great Western*.....	58,713,750 35	5,531,338 92	5,473,521 53	505.680
Cleveland and Mahoning*.....				
Avon, Genesee, and Mount Morris.....	217,344 58	27,573 67	10,446 97	15.050
Bellefontaine.....	4,420,000 00	1,376,369 53	973,217 22	203
Blossburg and Corning.....	250,000 00	Not reported.	Not reported.	15.640
Buffalo, Corry, and Pittsburg.....	1,119,074 41	49,159 47	42,754 51	36.070
Buffalo and Erie.....	5,109,932 80	2,346,281 80	1,948,481 17	88
Buffalo and Washington.....	89,015 20	Not reported.	Not reported.	170
Baltimore and Ohio.....	25,072,406 41	11,771,875 72	6,740,215 53	523
Boston, Clinton, and Fitchburg.....	940,278 25	99,971 10	86,222 91	50
Boston and Maine.....	4,609,254 16	1,621,676 66	1,122,971 90	145
Burlington and Missouri River.....	5,541,684 49	466,745 27	285,328 11	206
Cayuga and Susquehanna.....	589,110 00	127,041 79	176,013 61	34.610
Central Ohio.....	1,541,000 00	888,080 09	910,050 66	154
Cincinnati, Dayton, and Eastern*.....	796,596 44	679,999 71	69,543 28	211.720
Cincinnati and Sandusky*.....				
Columbus and Springfield*.....				
Cincinnati, Hamilton, and Dayton*.....	11,883,724 80	2,344,423 34	1,746,019 89	77.760
Dayton and Michigan*.....				
Cincinnati, Richmond, and Chicago*.....	1,669,361 00	354,347 36	213,635 39	139.805
Cincinnati and Zanesville.....				

* Operated by one organisation.

† Report for 1865.

Tabular exhibit of railroad statistics, &c.—Continued.

Name of road.	Capital actually invested.	Annual earnings.	Annual expense of operation, repair, and renewal.	Total miles of road.
Cleveland, Columbus, and Cincinnati.....	\$4,690,859 37	\$1,903,438 54	\$1,339,094 63	248.220
Cleveland and Pittsburgh.....	5,351,775 00	2,138,043 92	1,498,162 08	270.440
Cleveland and Toledo.....	5,000,000 00	2,427,354 06	1,243,750 66	173.370
Cleveland, Zanesville, and Cincinnati.....	369,673 56	141,457 96	115,605 01	65.750
Columbus and Indianapolis Central.....	2,890,200 00	1,164,317 92	751,659 46	230.000
Cleveland, Painesville, and Ashtabula.....	5,000,000 00	2,547,381 56	1,571,627 09	136.217
Carrollton and Oneida.....	98,000 00	3,555 62	7,059 44	12.085
Cincinnati and Indiana.....	2,500,000 00	Not reported.	Not reported.	31.200
Chicago, Burlington, and Quincy.....	16,203,038 22	6,083,138 05	3,353,398 99	400
Connecticut River.....	1,936,970 87	629,165 01	414,209 74	50
Chicago, Rock Island, and Pacific.....	15,313,822 84	3,574,033 71	1,995,034 68	409.750
Concord.....	1,665,826 73	826,634 52	546,721 22	95
Central, (of New Jersey*).....	15,730,264 92	3,350,397 93	1,878,021 67	182
South Side*.....				
Chicago and Alton.....	11,108,520 59	3,892,861 48	2,149,128 06	280
Central of Georgia.....	3,500,000 00	2,220,947 88	1,357,140 41	132
Detroit and Milwaukee.....	7,265,758 42	1,761,308 14	992,519 10	192
Dayton and Union.....	244,288 00	113,991 86	97,481 81	33.572
Dayton and Western.....	309,276 65	147,475 01	169,657 47	44.841
Danbury and Norwalk.....	435,537 50	150,200 96	86,832 39	23
East Tennessee and Virginia.....	3,382,090 51	501,698 03	418,113 96	130
Elmira, Jefferson, and Canandaigua.....	500,000 00	282,878 75	310,284 92	46.840
Elmira and Williamsport.....	1,000,000 00	400,000 00	515,273 76	78
Erie Railway*.....	49,247,769 70	14,317,213 14	10,674,921 86	467
Rochester and Genesee Valley*.....				
Buffalo, Bradford, and Pittsburg*.....				
Fitchburg and Worcester.....	275,000 00	90,294 73	73,521 50	26
Florida, Atlantic, and Gulf Central (1860).....	860,769 88	Not reported.	Not reported.	Not rep'd.
Greenville and Columbia, S. C.....	3,081,213 52	269,787 47	169,973 90	143
Georgia Railroad and Banking Co.....	4,325,858 66	1,003,723 66	511,834 28	171
Hudson River*.....	17,505,037 26	5,267,100 23	4,054,495 89	150
Troy and Greenbush*.....				
Hudson and Boston.....	194,197 03	151,921 97	34,500 84	17.330
Hartford and New Haven.....	3,642,932 29	1,685,334 59	1,080,509 45	62
Housatonic Railway.....	2,141,875 78	534,544 69	382,149 39	124
Iron.....	289,100 00	61,727 50	51,105 52	14
Junction, (Cincinnati and Indianapolis).....	1,962,195 75	516,040 88	516,040 88	71.500
Jeffersonville, Madison, and Indianapolis.....	5,997,448 63	1,039,547 77	673,121 01	204
Jackson, Lansing, and Saginaw.....	1,134,241 40	83,389 15	43,537 06	115
Little Miami*.....	5,358,600 00	1,815,388 77	501,449 70	212.610
Columbus and Xenia*.....				
Dayton and Xenia*.....				
Long Island.....	4,206,820 00	693,016 13	243,827 40	122
Lake Erie and Louisville.....	1,211,700 00	48,971 31	36,324 58	38.450
Louisville, Cincinnati, and Lexington.....	2,330,559 24	510,319 02	357,101 90	174
Louisville and Nashville.....	11,973,374 54	2,158,874 57	1,348,405 90	85
Middletown, Unionville, and Water Gap.....	271,374 87	Not reported.	Not reported.	13
Montgomery and Erie.....	276,520 96	Not reported.	Not reported.	10.270
Michigan Southern and Northern Indiana*.....	17,560,698 82	4,747,219 11	2,886,387 50	520.800
Detroit, Monroe, and Toledo*.....	14,256,253 42	1,203,634 68	1,012,225 50	298.800
Marietta and Cincinnati.....				
Memphis and Little Rock.....	777,106 30	Not reported.	Not reported.	131.120
Mobile and Great Northern.....	1,164,000 00	201,654 21	174,837 24	72
Mississippi and Tennessee.....	2,197,029 61	512,760 92	304,913 44	99
Milwaukee and St. Paul.....	19,715,000 00	5,683,608 59	3,665,685 82	825
Milwaukee and Prairie du Chien*.....				
Iowa and Minn. Div'n Mil. and St. Paul*.....				
Minnesota Central.....	1,555,972 25	45,497 19	27,507 69	120
Mobile and Ohio.....	11,307,059 92	2,449,286 09	1,390,398 46	472
New York Central.....	36,594,405 52	13,979,514 00	10,869,712 93	593.750
New York, Housatonic, and Northern.....	216,660 14	Not reported.	Not reported.	39.750
New York and Flushing*.....	325,000 00	113,680 57	23,753 83	20
North Shore*.....				
New York and Harlem.....	10,055,381 92	2,688,120 86	1,736,660 45	130.750
New York and New Haven.....	7,720,846 97	2,330,894 65	1,633,649 65	62.250
Northern, (of New York).....	493,707 45	252,365 74	237,561 53	21.250
Norwich and Worcester.....	2,613,654 21	1,506,678 17	500,149 74	66
New London Northern.....	1,698,846 90	327,476 59	251,889 86	100
Naugatuck.....	1,690,395 45	494,026 47	280,597 98	57
New Haven and Northampton.....	1,843,301 99	79,855 72	47,631 53	85
New York, Providence, and Boston.....	2,568,000 00	617,543 78	363,292 70	62
New Britain and Middletown.....	105,387 88	Not reported.	Not reported.	3.190
New Orleans, Opelousas, and Great Western.....	4,093,425 00	370,209 83	259,872 37	80
New Jersey Railroad and Transportation Co.....	6,512,448 80	1,770,862 40	789,014 94	146
North Pennsylvania.....	6,538,359 59	892,056 87	514,840 84	54
Northern Central.....	11,315,510 51	3,690,868 16	2,478,709 45	366
North Missouri.....	7,319,893 21	797,344 89	732,508 15	305
Ogdensburg and Lake Champlain.....	5,071,900 00	908,654 51	685,463 32	118

* Operated by one organization.

Tabular exhibit of railroad statistics, &c.—Continued.

Name of road.	Capital actually invested.	Annual earnings.	Annual expense of operation, repair, and renewal.	Total miles of road.
Oswego and Rome	\$925,998 89	\$111,195 71	\$55,797 00	28.80
Oswego and Syracuse	1,300,774 73	256,528 24	173,390 17	36.20
Ohio and Mississippi	27,647,335 47	3,339,258 07	2,115,297 92	340
Pittsburg, Columbus, and Cincinnati	1,983,140 97	1,275,161 49	1,262,079 82	145
Pittsburg, Fort Wayne, and Chicago	25,478,860 66	7,586,620 44	4,962,117 10	641.250
Plattsburg and Montreal	Not reported.	48,776 43	Not reported.	23
Pittsburg and Connellsville	2,765,747 44	498,180 90	325,208 25	75.080
Philadelphia, Wilmington, and Baltimore	10,219,072 26	2,506,800 85	1,602,776 48	98
Portland, Saco, and Portsmouth	1,500,000 00	518,591 58	364,272 34	Not rep'd.
Pennsylvania*	47,847,256 14	18,673,916 30	14,091,172 50	1,070
Philadelphia and Erie*				
Philadelphia and Reading	27,685,657 25	9,106,496 23	6,602,953 87	185
Providence and Worcester	1,802,246 59	692,946 59	542,517 35	43
Providence, Hartford, and Fishkill	4,204,866 39	742,851 62	531,889 33	122.365
Petersburg, Va.	1,411,762 08	220,232 44	126,570 36	63
Rockville, Conn.	184,573 97	28,610 14	20,039 09	4.080
Albany and Vermont*	6,945,392 47	1,423,000 43	1,186,484 17	105.220
Saratoga and Schenectady*				
Rensselaer and Saratoga*				
Saratoga and Whitehall*				
Rome, Watertown, and Ogdensburg	4,000,724 40	1,146,471 78	638,783 97	189.630
Richmond, Fredericksburg, and Potomac	2,287,187 49	301,077 34	248,421 91	75
Richmond and Petersburg	922,822 39	136,456 71	82,633 09	22
Raleigh and Gaston	1,500,000 00	290,832 55	211,022 36	97
Shore Line, Conn.	749,422 05	285,348 63	218,169 91	50
Sandusky, Mansfield, and Newark	2,968,474 18	410,667 68	291,875 40	125.396
Schoharie Valley	81,481 80	8,769 83	5,744 83	4.370
South Side, Va.	3,726,590 12	330,090 36	323,230 42	Not rep'd.
Staten Island	354,132 24	268,894 77	242,258 76	13
Sterling Mountain	495,105 77	59,733 46	28,214 65	7.600
Syracuse, Binghamton, and New York	3,182,489 26	522,314 86	292,591 40	81
Southwestern, Ga.	3,802,326 84	1,006,953 20	535,454 55	207.500
Southwest, Pacific	1,000,000 00	118,970 83	112,219 99	89.500
Troy and Boston	2,277,344 12	509,582 28	321,190 79	34.910
Toledo, Wabash, and Western	20,999,000 00	3,809,353 58	2,786,882 32	522
Terre Haute and Indianapolis	1,988,150 00	1,134,539 84	675,337 13	73
Toledo, Peoria, and Warsaw	7,057,255 91	574,462 86	387,457 63	117
Troy Union	762,237 78	Not reported.	Not reported.	2.140
Utica, Chenango, and Susquehanna Valley	538,495 41	Not reported.	Not reported.	82
Utica and Black River	952,731 82	149,783 57	68,707 93	86.250
Virginia Central	6,018,317 53	554,510 64	418,862 90	205
Vermont Central	Not reported.	1,783,991 44	1,300,862 99	184
Vermont and Massachusetts	3,466,429 51	461,423 81	308,329 13	69
Virginia and Tennessee	7,190,550 41	764,147 93	487,130 13	204
Warwick Valley	172,576 67	51,630 19	31,034 26	10.330
Western and Atlantic, Ga.	Not reported.	1,273,191 35	687,462 22	138
Western Union	6,963,352 12	775,075 59	610,423 64	181
Wilmington and Weldon	3,670,000 00	583,836 98	278,891 96	180
Wilmington and Manchester	3,367,361 11	463,288 62	249,148 20	171
Westchester and Philadelphia	1,761,212 95	330,135 61	189,798 33	27
Worcester and Nashua	1,522,200 00	449,383 28	298,022 72	46
Total 162 companies	788,179,238 79	203,543,847 76	140,025,862 11	19,738.431

* Operated by one organization.

JOS. S. WILSON, *Commissioner.*

DEPARTMENT OF THE INTERIOR.

General Land Office, November —, 1868.

REPORT OF F. V. HAYDEN ON THE GEOGRAPHY OF THE MISSOURI VALLEY.

SIR: In accordance with instructions, I have the honor to submit the accompanying preliminary report of geological surveys during the season of 1868, preceding it with a brief outline of the physical geography of the Missouri valley.

Nearly all the vast area west of the Mississippi may be divided into mountain and prairie, for very soon after passing westward from Leavenworth, there is very little timber to be seen except that which skirts

the streams. This consists mostly of cottonwood; a few low oaks or pines are found on the dry hills, and here and there an elm or ash. The whole surface is undulating; ridge on ridge and hill on hill as far as the eye can reach. This combination of mountain and prairie may be said to comprise what is generally known as the Rocky Mountain region. As we proceed westward we find that the ascent is gradual, at first not more than one foot per mile, gradually increasing until we approach the mountain elevations, when the grade of ascent becomes 40 to 50 feet per mile. If we examine in their order some of the barometrical profiles which have been made along the lines of the routes explored for the Pacific railroad, we can readily ascertain the gradual ascent towards the mountain elevations.

Leaving St. Louis westward, we gradually ascend, passing over a prairie country for the most part, for the distance of nearly 800 miles, and when we have reached an elevation of 6,000 feet above the sea we come abruptly to the lofty rugged peaks which compose the various series of elevated ridges. Examining the map of the country west of the Mississippi, published by the War Department, we observe that the immediate Rocky Mountain region is not composed of merely a single lofty upheaved ridge extending across the continent, but a vast series of ridges or ranges, which taken singly do not seem to have any definite trend, but when viewed in the aggregate extend across the map in a direction nearly northwest and southeast, forming a zone or belt 500 to 1,000 miles in width from east to west.

From longitude 96° westward to the foot of the mountain ridges the country traversed exhibits the true typical prairie, no timber being found to any extent, except that which skirts the streams. From thence to the Pacific coast we have what may be called the true mountain portion, which is composed of a vast number of ridges of elevation, interspersed with beautiful valleys, many of which are remarkable for their fertility. Some of the valleys are quite large and surrounded by the mountain ridges as by gigantic walls.

If we examine the barometrical profile constructed by Governor Stevens, from St. Paul, Minnesota, to the foot of the mountains westward, we find that the former locality is 828 feet above the sea level. Near the mouth of the Yellowstone 670 miles to the westward, we find that the elevation is 2,010 feet above the sea, and that we have made a gradual, almost imperceptible ascent of in that distance 1,172 feet, or an average of nearly two feet to the mile. As we approach the base of the mountain ridges the ascent continues to increase, and when we reach the valley of Dearborn river, 448 miles further west, we ascertain that this locality is 4,091 feet above the sea level, and that in the distance of 448 miles we have ascended 2,081 feet, or nearly five feet to the mile. The valley of Dearborn river is just at the foot of the mountains, and to that point the country traversed belongs to the true type of the western prairie. Again, if we examine the profile commencing at Council Bluffs, on the Missouri river, we find the elevation at that point to be 1,327 feet above the sea level. Thence proceeding westward to the sources of Lodge Pole creek, at the base of the Laramie range of mountains, we have made an ascent, while thus passing over the prairie region, of nearly 5,000 feet. We thus see that in the distance of 550 miles we have reached an elevation of 3,000 feet higher than our starting point, by an ascent of five feet to the mile.

Again glancing at the profile extending from Fort Leavenworth westward, we observe that at the Missouri river the elevation is 904 feet above the sea. At the base of the Laramie range of mountains, 659

miles west, the elevation is 6,716 feet. To illustrate the increased rapidity of ascent as we approach the vicinity of the upheaved ridges, we see that the elevation at the forks of the Platte is 3,000 feet above the sea, making an ascent from the Missouri river to this point, a distance of 413 miles, of 2,096 feet, or about five feet to the mile. From the forks of the Platte to the foot of the Laramie mountains, a distance of 413 miles, we find an increased elevation of 3,716 feet, or 15 feet to the mile. After reaching the base of the elevated ridges, the ascent is more or less abrupt, sometimes rising to the height of 3,000 to 6,000 feet above the open prairie country around.

We might continue our remarks in regard to the profiles still further southward with similar results, but we have said enough to indicate the beautiful unity in the physical development of the western portion of our continent. We have shown that the whole country west of the Mississippi to the Pacific may be regarded as a vast plateau, and that it was gradually elevated until the crust of the more central portions was strained to its utmost tension, and that it then burst, and slowly were evolved the lofty ranges which, taken collectively, soon pass under the name of the Rocky mountains.

So far as my own observations have extended, there appear to be two types of mountain elevations—namely, those elevations which have a granite nucleus and form long continuous lines of fracture with far less inequality of outline, and those ranges which are composed of erupted rocks, which are very rugged in their outline and irregular in their trend. The Black Hills, the most eastern outlier of the main mountain range, present an excellent illustration of the first type. Very little was known of these mountains until they were explored in the summer of 1857 by an expedition placed by the War Department under the command of Lieutenant G. K. Warren, United States army, to which expedition the writer was attached as geologist and naturalist. A preliminary report of the results of this exploration was presented to the War Department under the title "Explorations in Nebraska and Dakota in the years 1855-'56 and 1857."

The Black Hills lie between the 43d and 45th degrees of latitude and the 103d and 105th parallels of longitude, and occupy an area about 100 miles in length and 60 in breadth. According to Lieutenant Warren, "the shape of the mass is elliptical and the major axis trends about 20° west of north. The base of these hills is 2,500 to 3,000 feet above the sea, and the highest peaks 6,700 feet. The whole range is clasped, as it were, by the north and south branches of the Big Shyenne river, the most important stream in this region. The north branch passes along the northern side of the range, receiving very many of its tributaries and most of its waters from it, but takes its rise far to the westward of the range near the sources of Powder river in the "divide," between the waters of the Yellowstone and those of the Missouri."

The south fork also rises in the same divide, flowing along the southern base of the range, and also receives numerous tributaries which have their sources in it. These two main branches unite about 30 miles east of the Black Hills, forming the Big Shyenne, which flows into the Missouri, about 60 miles above Fort Pierre. The Moreau, Grand, Cannon Ball, and other rivers flowing into the Missouri north of the Shyenne and south of the Yellowstone, rise in a high tertiary divide north of the Black Hills, and are for the greater part of the season quite shallow and sometimes nearly dry; but the Little Missouri derives a portion of its waters from the Black Hills through a number of small branches which flow from the northwestern slope.

We thus see that the Black Hills do not give rise directly to any important stream, if we except the Little Missouri, a few branches of which flow from springs near the base of the hills, but afford a comparatively small supply of water from that source.

We will now allude for a moment to what we believe to be the economical value of the timber in the Black Hills to the people now rapidly settling Dakota Territory. As we have previously remarked in this chapter, these hills occupy an area about 100 miles in length, and about 60 in breadth, or about 6,000 square miles. I think it is safe to say that at least one-third of this area, or about 2,000 square miles, is covered with excellent pine timber, or 1,280,000 acres. How is this timber to be made available? As I have before remarked, the two forks of the Shyenne river, as it were, clasp the Black Hills; the two branches passing along close to the northern and southern borders of the hills. From four to six months of the year these streams are quite high. The logs could be cut and transported to the sides of these streams during the dry season, and when the streams are high in the spring of the year they could be taken down into the Missouri river with a good degree of safety and ease. At least, that is my impression. In a report made to Lieutenant G. K. Warren, March 15, 1856, I made use of the following language in reference to this matter:

"The Black Hills, which appear in the distance, and derive their name from their dark and gloomy appearance, contain an inexhaustible quantity of the finest timber, mostly pine, which will doubtless remain undisturbed for many years to come. I will, however, propose a plan for obtaining this timber, and rendering it useful to future settlers; though I do it with some hesitation, lest it may seem visionary. The left fork of the Shyenne passes through the northern portion of the Black Hills, and even there is a considerable stream, from 30 to 50 yards wide. In the spring the river is much swollen, and the current exceedingly rapid, and the timber, if cut and hauled to the banks of the river, might be floated down into the Missouri with considerable safety and ease."

At the time the above was written I had seen but little of the Black Hills, and nothing was known of the geography of the forks of the Shyenne.

The geological structure of the Black Hills may be mentioned briefly in this connection. The nucleus or central portion is composed of red feldspathic granite, with a series of metamorphic slates and schists superimposed, and thence upon each side of the axis of elevation the various fossiliferous formations of this region follow in their order to the summits of the cretaceous, the whole inclining against the granitoid rocks at a greater or less angle. There seems to be no unconformability in these fossiliferous rocks from the Potsdam inclusive to the top of the cretaceous.

From these facts we draw the inference that prior to the elevation of the Black Hills, which must have occurred after the deposition of the cretaceous rocks, all these formations presented an unbroken continuity over the whole area occupied by these mountains. This is an important conclusion, and we shall hereafter see its application to other ranges, and also to the Rocky mountain range taken in the aggregate.

Proceeding in a southwest direction from the Black Hills we find that there are ample proofs of the connection of these hills with the Laramie mountains, through a low anticlinal which can be followed for many miles. It is sometimes concealed by the recent tertiary beds, but it reappears at different points. By the Laramie mountains we designate those eastern ranges which extend from the Red Buttes southward to the Arkansas. This range when examined in detail is composed of a large number of smaller ranges, all, so far as I have observed, of the true granitic type. The trend of the whole group is very nearly north and south, northward as far as Fort Laramie, where they make an abrupt

flexure around to the west and northwest, and gradually cease and die out at the Red Buttes. From this point westward and northward there is a space from 20 to 40 miles in width, destitute of mountain elevations, though the strata exhibit evidence of dislocation or crust movements.

Geologically the Laramie range is also composed of a granitoid nucleus, with the fossiliferous formations, silurian, carboniferous, red arenaceous beds, (triassic,) jurassic, cretaceous, and in many places lignite tertiary, inclining from each side of a central axis at various angles. It is from these mountains that the numerous branches of the Platte have their sources, extending a distance of nearly 400 miles. From the observations which I have made in this range, it seems to me that the conclusion is plain that all the above-named rocks in a nearly or quite horizontal position were continuous over the whole area at present occupied by it some time during the tertiary period.

The most important outlier of the Rocky mountains, on the eastern slope, is the Big Horn range, which, though somewhat irregular in the shape of its mass, has a general trend nearly northwest and southeast. It occupies an area about 180 miles in length and 50 in breadth, near latitude $43^{\circ} 30'$, and longitude 102° . The line of fracture seems to have partially died out as it were toward the south or southeast, and to have made a gradual flexure around to the west, the whole range soon losing its granitoid character, and becoming entirely composed of more modern eruptive rocks. The eruptive portion continues westward until it joins on to the Wind river range near the sources of Wind river, at the southern end of the Big Horn mountains. We can trace a single anticlinal across the prairie connecting these mountains with the Laramie range at the Red Buttes, on the North Platte. We also know by the position of the sedimentary beds upheaved along the mountains that these mountains also form a connection with the Wind river range, by the gradual flexure westward of the eruptive rocks. The central portion of these mountains is also composed of granite and granitoid rocks, with the same series of fossiliferous formations, inclining at various angles from each side of the axis of elevation, as are seen around the Black Hills and along Laramie mountains. Some of the more lofty peaks are from 8,000 to 12,000 feet above the sea, and are covered with perpetual snow. We think that the evidence is quite conclusive that up to the time of the accumulation of a large portion of the lignite tertiary beds all these formations, from the silurian to the true lignite strata inclusive, were in a horizontal position, extending continuously over the whole area occupied by the mountains; but as they were slowly elevated the central portions were removed by the erosive action of water. The eruptive portion which unites the Big Horn range with the Wind river mountains is exceedingly picturesque, presenting the appearance of a connected series of basaltic cones; and so rugged and inaccessible are they that the persevering trappers have never been able to penetrate them in their hunting explorations.

Like the Black Hills, the Big Horn range does not give rise to many important sub-hydrographical basins. The largest stream in this region, and one which gives name to the mountains, rises in the Wind river range, passes through the Big Horn mountains, and unites with the Yellowstone about 70 miles to the southward. Before reaching the mountains it takes the name of Wind river, and assumes the name of Big Horn after emerging from them. This range, however, constitutes quite an important feeder to the Yellowstone. Powder river, which rises in this range by numerous branches, drains a large area mostly lignite tertiary, and pours a considerable volume of water into the

Yellowstone, near longitude $105\frac{1}{2}^{\circ}$ and latitude $46\frac{1}{2}^{\circ}$. Tongue river is the next most important stream, which, though not draining so great an area as Powder river, empties into the Yellowstone a much larger volume of water.

The Medicine Bow and Sweetwater mountains appear to be of the same character for the most part; but on the east side of the Sweetwater river the evidence of igneous action is shown on a large scale. The ancient volcanic material would seem to have been elevated to a great height in but a partially fluid condition, and then to have gradually cooled, affecting to a greater or less extent the fossiliferous strata in contact.

Near the junction of the Passo Agie with Wind river we come in full view of the Wind river mountains, which form the dividing crest of the continent, the streams on the one side flowing into the Atlantic, and those on the other into the Pacific. This range is also composed to a large extent of red and gray feldspathic granite, with the fossiliferous rocks inclining high upon its sides. After passing the sources of Wind river the mountains appear to be composed entirely of eruptive rocks. Even the three Tetons, which raise their summits 11,000 feet above the ocean bed, are formed of very compact basaltic rocks. The Wasatch and Green river ranges, where we observed them, have the same igneous origin, and the mountains all along the sources of the different branches of the Columbia exhibit these rocks in their full force. In Pienis hole, Jackson's hole, and other valleys surrounded by upheaved ridges, these ancient volcanic rocks seem to have been poured out over the country and to have cooled in layers, giving to vast thicknesses of the rocks the appearance of stratified beds.

The mountains about the sources of the Missouri and Yellowstone rivers are of eruptive origin, and in the valley of the Madison Fork of the Missouri are vertical walls of these ancient volcanic rocks 1,000 to 1,500 feet in height, exhibiting the appearance of stratified deposits, dipping at a considerable angle. As we pass down the Madison Fork we find some beds of feldspathic rocks and mica and clay slates beneath the eruptive layers dipping at the same angle. After passing the divide below the three forks of the Missouri, we see a number of partially detached ranges which appear to be of the same igneous character. In the Belt, Highwood mountains, and indeed all along the eastern slope in this region, we find continual evidence of the outpouring of the fluid material in the form of surface beds or in layers thrust between the fossiliferous strata. These igneous beds thin out rapidly as we recede from the point of effusion. A large number of these centres of protrusion may be seen along the slope of the mountains west of the Judith range.

The erupted material sometimes presents a vertical wall 300 feet high, then suddenly thins out and disappears. The Judith, Bear's Paw, and Little Rocky mountains seem to be composed for the most part of granite and other rocks, with igneous protrusions here and there. I had supposed from the observations made in my former explorations that the central portions of our mountain ranges were composed of feldspathic granite, and to a certain extent this is true of the more eastern outliers; but the observations during this expedition have convinced me that these rocks, which I have classed as eruptive, compose by far the greater portion of the mountain masses of the west.

In this connection I have thought it best to remark more systematically in regard to the principal rivers that drain this immense area of country. The Missouri river and its tributaries form one of the largest as well as

most important hydrographical basins in America. It drains an area of nearly or quite 1,000,000 square miles. Taking its rise in the loftiest portions of the Rocky mountains, near latitude 44° , longitude 113° , it flows northward in three principal branches, Madison, Gallatin, and Jefferson Forks, to their junction, and then proceeds onward until it emerges from the gate of the mountains, a distance of nearly 200 miles; it then bends to the westward, flowing in this direction to the entrance of White Earth river, a distance of nearly 500 miles; it then gradually bends southward and southeastward to its junction with the Mississippi, a distance of 1,500 to 2,000 miles. The branches which form the sources of the Missouri rise in the central portions of the Rocky Mountain range, flowing through granite, basaltic, and the older sedimentary rocks, until it emerges from the gate of the mountains, when the triassic and jurassic are shown. The falls of the Missouri, extending for a distance of 20 or 30 miles, cut their way through a great thickness of compact triassic rocks. Below the falls the channel makes its way through the soft yielding clays and sands of the cretaceous beds for about 250 miles, with the exception of the Judith tertiary basin, which is about 40 miles in length. The cretaceous beds continue, extending nearly to the mouth of Milk river, when the lignite tertiary formations commence. These are also composed of sands, marls, and clays, as the character of the valley will show.

The river flows through these tertiary rocks to the mouth of Heart river, below Fort Union, a distance of nearly 250 miles, when the cretaceous rocks come to the surface again. These latter rocks extend nearly to Council Bluffs, a distance of over 500 miles. I have estimated the distance in a straight line as nearly as possible. Just above Council Bluffs the coal-measure limestones commence, and the valley of the Missouri becomes more restricted, though it is of moderate width even below the mouth of the Kansas.

The Yellowstone river is by far the largest branch of the Missouri, and for 400 miles from its mouth up, it seems to be as large as the Missouri itself from Fort Union to Fort Pierre. It is navigable for large steamers during the spring and early summer for 300 to 400 miles above its junction with the Missouri. This river also takes its rise in the main divide of the Rocky mountains, near latitude $44\frac{1}{2}^{\circ}$, longitude 110° , in a lake, as some suppose, called Yellowstone lake, which is about 60 miles long, and 10 to 20 wide. Its channel is formed in rocks similar to that of the Missouri, about 400 miles of its course passing through lignite tertiary beds. The character of its valley is very similar to that of the Missouri. Most of the important branches of this river I have alluded to in the preceding portion of this chapter. Tongue and Powder rivers, which are quite long branches, have their origin in the Big Horn mountains, their channels cutting through the different rocks that surround the Big Horn range. Tongue river is nearly 150 miles in length, and flows for the most part through the soft yielding rocks of the lignite tertiary. Powder river is from 250 to 300 miles in length, and also flows, nearly all its course, through the same tertiary beds as Tongue river.

Passing below Fort Union we observe on the right side of the Missouri river several large rivers, as Little Missouri, Big Knife, Heart, Cannon Ball, Grand Moreau, and Big Sheyenne. The Little Missouri receives a small portion of its waters from the Black Hills, but most of its branches have their origin in the prairie. The Big Sheyenne, though receiving most of its water from the Black Hills, takes its rise far west of the hills, in the tertiary beds; but, after flowing past the Black Hills, wears its channel through the cretaceous beds Nos. 4 and 5 of the section. The

other rivers mentioned above take their rise in the lignite tertiary beds, near the eastern base of the Black Hills, and flow through lignite tertiary rocks until very near or quite to their junction with the Missouri.

The Teton river takes its origin in the northwestern rim of the White river tertiary basin, runs nearly east for the most part through formations Nos. 4 and 5 of the cretaceous period. It drains an area about 100 miles in length, and 30 to 50 miles in width. The next most prominent stream is White river, which is noted for its relations to the "bad lands," and giving name to one of the most remarkable tertiary deposits in the world. It takes its rise in the prairie near latitude $42\frac{1}{2}^{\circ}$, and longitude 104° , flows for a time in a northeast direction, then bends around so as to enter the Missouri a little south of east near latitude $43^{\circ} 41'$, and longitude $99\frac{1}{2}^{\circ}$. Nearly its entire course is through the White river tertiary beds, and, for the greater part of the year, its waters are so full of sediment that they are quite unfit for use. When they stand for a time a thick scum accumulates on the surface which has much the color and consistency of cream. The water itself looks much like very turbid lime water, and is very astringent to the taste. The river has generally a wide open valley, tolerably well wooded, and abounding in fine grass, and has always been a private resort for the Indians. The road between Forts Laramie and Peirre passes along the valley for a considerable distance, through some of the most picturesque scenery in the west. It has numerous branches; the only one of importance is called the South fork, and is nearly as large and long as the main stream. It drains an area about 250 miles in length, and 40 to 60 in breadth.

The Niobrara river is the next most important stream; and as the area drained by this stream has been the subject of much interest to the inhabitants of Nebraska and Dakota, I take the liberty of quoting the minute and excellent description of Lieutenant Warren:

* The Niobrara being a stream heretofore unknown, and one in which the people of Nebraska feel much interest, I shall describe it in detail. This river is about 450 miles long. From its source to longitude $103^{\circ} 15'$ it is a beautiful little stream of clear running water, of a width of from 10 to 15 feet, gradually widening as it descends. Its valley furnishes here very good grass, abounding in rushes or prele, but is for the most part destitute of wood even for cooking. After flowing thus far it rapidly widens, till in longitude $102^{\circ} 30'$ it attains a width of 60 to 80 yards; its valley is still quite open and easy to travel along, but destitute of wood, except occasional pines on the distant hills to the north. In longitude $102^{\circ} 30'$ it enters between high steep banks which closely confine it, and for a long way it is a complete cañon; here, however, wood becomes more abundant and pine is occasionally seen on the bluffs, while small clusters of cottonwood, elm, and ash occupy the narrow points left by its windings. In longitude $101^{\circ} 45'$ the sand-hills come on the north side close to the river, while on the south they are at the distance of from one to two miles off, leaving a smooth road to travel on along the bluffs; the bluffs gradually appear higher and higher above the stream as it descends until they reach the height of 300 feet. The sand mostly ceases on the north side in longitude $100^{\circ} 23'$; but it lies close to the stream on the south side nearly all the way to the Wasihonska. Throughout this section, lying between longitude 102° and longitude $99^{\circ} 20'$, a distance of 180 miles, the Niobrara is in every respect a peculiar stream, and there is none that I know of that it can be compared with. It flows here between high rocky banks of soft white and yellowish calcareous and silicious sandstone, standing often in precipices at the water's edge, its verticality being preserved by a capping of hard grit. It is here impossible to travel any considerable distance along its immediate banks without having frequently to climb the ridges which rise sometimes perpendicularly from the stream. As you approach from the north or south there are no indications of a river till you come within two or three miles of the banks, and then only by the trees, whose tops occasionally rise above the ravines in which they grow, so completely is it walled in by high bluffs which enclose its narrow valley. The soft rock which forms the bluffs is worn into the most intricate labyrinths by the little streams, all of which have their sources in beautiful gushing springs of clear cold water. In these small deep valleys the grass is luxuriant; pine, ash, and oak are abundant; cherries, currants, gooseberries, plums, and grapes grow in profusion in their season; elk, deer, and other animals find here their choicest haunts,

* Letter to Hon. G. W. Jones relative to his exploration of Nebraska Territory, January, 1868.

and here they congregate during the snows and cold of winter. The region is a perfect paradise for savage life, and the brutes who now have possession of it probably value it as highly as ever human being did a home. Their indignation was great at our intrusion among them, and they were earnest in declaring that white men should never dispossess them while they lived. To the agriculturist this section has, however, comparatively little attraction, and that between longitude $99^{\circ} 20'$ and the mouth, an extent of about 90 miles, is perhaps far more valuable. Here the bottoms will probably average a width of a quarter of a mile; are susceptible of cultivation; and cottonwood, oak, walnut, and ash will furnish settlements with all the timber and fuel they will need. The river banks seem to present no good building stone, nor did we, though searching diligently, discover any signs of valuable coal or other minerals. In describing the tributaries to the Niobrara, I shall begin at the mouth and take the north side first. The Ponka river, which has a very fine, well-wooded, and fertile valley, runs into the Missouri about five miles north of the Niobrara, in latitude $42^{\circ} 48'$ north. Its course is parallel and near to that of the Niobrara, as far up as the mouth of Turtle Hill river. Turtle Hill river (Keha Paha) is the main branch of the Niobrara, and is about 120 miles long. I crossed it in 1855 60 miles above its mouth, and it has a very fine valley one-half to three-fourths of a mile wide, with good soil and a limited quantity of fine cottonwood timber. The bed of the stream is sandy, and its waters are clear and sweet; width at the mouth fifty yards. The first 20 miles of the space between this branch and the main river is occupied by sand-hills.

The next northern branch which joins the Niobrara, in longitude $100^{\circ} 23'$, is named Minich-duza-Wakpa, or Rapid creek. At its mouth it is about eight yards wide, with a valley about a quarter to a half mile wide, and a soil quite fertile; the banks are scantily fringed with small trees. It forms about the eastern border of the sand hills on the north side of the Niobrara as far as we could see. Its length is about 50 miles.

The mouth of the next stream is in longitude $101^{\circ} 18'$; it has scarcely any appreciable valley, flows between high rocky bluffs, difficult to ascend and descend; it is about five yards wide, with clear, deep, swift-running water, and is probably about 35 miles long.

The mouth of the next northern tributary is in longitude $101^{\circ} 30'$, and is called White Earth creek; it is about three-fourths the size of Rapid creek, which it resembles in every particular, and is about 25 miles long. The next, in longitude 102° , is a small spring rivulet about 26 miles long; and above this the branches are all small runs coming from the bluffs, generally dry except after rains, with scarcely any valleys to speak of.

On the south side of the Niobrara there are numerous small branches coming in between its junction with Missouri and the point where it receives the waters of the Turtle Hill river. Three of these are of considerable size, probably 35 miles long, the bluffs along nearly all of them being more or less covered with scattered pine, and their valleys occupied with clumps of cotton-wood, oak, ash, &c.

From the mouth of Turtle Hill river to that of the Wazihonska there are still a greater number of short southern branches, all containing springs of water and abounding in pine and beautiful oak groves.

Wazihonska means in Dakota tongue "the place where the pine extends far out;" and this stream, whose mouth is in longitude 100° , is probably 40 miles long, and all its bluffs and side ravines are green with pine. Its valley, though not so wide, is very similar to that of the Niobrara in this part, which has been described.

Snake river, whose mouth is in longitude $100^{\circ} 45'$, is quite a large stream, some 30 yards wide, its bluffs covered with pine, with a narrow valley like the Wazihonska.

Above this there is scarcely any branch coming in from the south deserving mention.

Niobrara is a very shallow and "swift flowing stream," as the Canadians say, *L'eau qui court*, abounding in rapids in two-thirds of its upper course, and in its middle portion filled with small islands. In the lower portion its width exceeds that of the Missonri river, and is spread out over sand bars. The bed in the broad portions is quicksand and difficult to ford. Its waters rapidly increase in volume through its middle portion, from the multitude of springs and streamlets that constantly flow into it from the foot of the bluffs and out of the ravines. It furnishes no navigation, except it might be for light flatboats during floods, and probably might be used for rafting. Logs could be driven if the timber should be found of a quality, quantity and accessibility to defray the expenses. I cannot, however, look upon it as capable of furnishing timber for the country on the Missonri, for the reason that much of the pine is too small, crooked, and knotty, and grows in places difficult to transport it from. The species is what is called the Rocky mountain pine, has a yellowish, white appearance, and abounds in resin. The distance on the Niobrara over which these pine ravines extend is about 120 miles.

A road could not be made on the bottom lands of the Niobrara; it must keep out on the high prairie so as to head the ravines. From the mouth to Turtle Hill river it would take the narrow divide between the Niobrara and Ponka rivers. It should remain on the north side of Turtle Hill river from 20 to 30 miles further, and then cross that stream, as it would thus avoid the sand at the junction of the Niobrara and Turtle Hill rivers, and cross the latter where there is a better ford or narrower stream to bridge. Turning then towards the Niobrara, this river must be crossed in longitude $101^{\circ} 20'$ to avoid the sand hills, and the route must continue on the south side to about longitude 102° , when it should again cross to the north side.

These crossings for a wagon road could easily be made at a ford or by bridging: but a proper bridge for a railroad crossing at these places would be a stupendous undertaking; for on account of the nature of the banks and ravines good approaches could not be found so as to descend to the level of the stream, and the bridge would have to be built very high. From longitude 102° west there are no difficulties beyond a scarcity of wood in reaching Fort Laramie, or continuing direct to the South Pass, and in this course abundance of excellent pine would be found near Rawhide peak.

A preferable road might be found by continuing up Turtle Hill river to its source, and then along the divide between Niobrara and White rivers, striking the former stream in longitude 102° ; but these divides are generally bad for wagon routes on account of scarcity of water, and it is not certain that we would by that route avoid the sand hills.

The area occupied by the Niobrara is about 450 miles in length from east to west, and from 40 to 60 miles in width from north to south.

The next sub-hydrographical basin, and perhaps in many respects the most important one in the Missouri valley, is that of the Platte, which flows into the Missouri river near latitude $41^{\circ} 3' 24''$. Its valley forms a natural grade for a railroad to the foot of the mountains, and already one has been constructed from Omaha City, 640 miles, and before this report will be given to the world it will doubtless be completed to the foot of the mountains. The Platte river takes its rise in the Laramie range, and flows for the greater part of its course through the more recent beds of the tertiary deposits. The area drained by this river must be at least 600 miles from east to west, and 80 to 150 from north to south. Although a wide stream, 1,000 yards or more, the water is so shallow and the channel so shifting that it can never be rendered navigable even for Mackinaw boats. Even the fur traders have never been able to rely upon it for the transportation of their furs and skins.

On the left or north side of the Missouri there are comparatively few branches, the principal of which are Milk, White Earth, James, Vermilion and Big Sioux. The three last named rise in the far north and flow through a much more rocky region and over a stony bed, and their waters, as they pour them into the Missouri, contain far less sediment than any of the others. Indeed, most of the rivers previously described flow through a more or less barren country, with a thirsty atmosphere and a still more thirsty soil, and on their way to the Missouri they lose nearly or quite all their waters. Many of these long rivers, as Grand, Cannon Ball, Cheyenne, in the autumn frequently become so dry as to cease to be running streams, while perhaps 100 miles above their mouth, if in the vicinity of some mountains, there is a full supply of water. The Muscle Shell river is a fine example. Toward the source of this river it is a fine running stream; in the dry season is lost almost entirely before reaching the Missouri. Much more might be said in this connection, but enough has been written to enable the reader to comprehend to some extent the vast geographical area drained by the Missouri river and its tributaries.

F. V. HAYDEN,
United States Geologist.

Hon. J. S. WILSON,
Commissioner of the General Land Office.

Geological Explorations in Wyoming Territory.

FORT STEEL, UNION PACIFIC RAILROAD,
September 5, 1868.

SIR: I have the honor to forward this day the first part of my preliminary report from the field. Another portion, describing my examinations from Fort Sanders to Benton Station and westward, will follow soon. In the reports I have endeavored to give all the important details, and

as they are descriptive of regions almost or quite unknown previously to the geologist, I hope they will be found of interest to you. The coal and iron mines are of the highest value and almost unlimited in extent, while indications of the precious metals have been observed in numerous localities. It is my intention to push on to Fort Bridger by way of the overland stage route, and returning along the Union Pacific railroad, so as to construct a geological section of the route, making use of the cuts in the road to give me a clearer knowledge of the different beds. It is my purpose to take as full and accurate notes of the country along the road that they can be used as a guide to travellers when they wish to study the geology of the route.

My party consists of nine persons. We have a two-horse ambulance and a four-mule covered wagon, three tents and four riding animals. I hope to return to Fort Sanders with all my party between the 1st and 10th of October. No draft has been received up to this time. All are well and in good spirits.

Very respectfully, your obedient servant,

F. V. HAYDEN,
United States Geologist.

Hon. JOSEPH S. WILSON,
Commissioner General Land Office.

SIR: I have the honor to submit the following preliminary report of my labors in the field, connected with the geological survey of Colorado and Wyoming Territories. I beg leave to state here that these notes are prepared in the field after the labors of the day are completed, far away from books and collections, and without that opportunity for mature reflection which should characterize a final report, and therefore I ask you to look with leniency on any errors that may occur, or any want of precision of statement.

My examinations properly begin at Cheyenne City, along the line of the Union Pacific railroad; but the connection of the geology eastward with that to the west will be better understood by a resumé of the structure of the country from Omaha.

At Omaha, and extending above that point along the Missouri river for about 40 miles, we find the underlying rocks to belong to the upper or barren coal measures; overlapping these are the sandstones of the cretaceous period, which first reveal themselves immediately along the Missouri, about 20 miles north of Omaha, but are found about 10 miles westward as much as 8 or 10 miles south of the Platte river.

Near the mouth of the Elkhorn the rusty sandstones of the Dakota group occupy the whole country. Near Columbus and beyond for 20 or 30 miles traces of No. 3 cretaceous are observed, but they are never conspicuous. Numbers 4 and 5 have not been seen along the Platte.

About 200 miles west of the Missouri river, along the Platte, the light clays and marls of the tertiary period commence, foreshadowed, however, by a thick superficial deposit of fine brown grit, which seems to be of post pliocene age, as it is filled with recent fresh water and land shells, *Helix*, *Planorbis*, *Pupa*, *Physa*, &c. The tertiary beds extend uninterruptedly to the margin of the Laramie range, along the line of the Union Pacific railroad. For 150 to 200 miles west of Omaha the soil is very fertile, and in an agricultural point of view can hardly be surpassed; but beyond that point there is an absence of both wood and water, which will render it impossible to cultivate the western half of the State of Nebraska successfully. As a grazing country, however, it will eventually prove

most valuable. For sheep raising it seems especially adapted. Sheep would thrive well on the short nutritious grasses, and the dry surface, strewn with drift pebbles, would be admirably adapted to preserve their feet from disease.

It seems to me that all this portion of the west may at some period be inhabited by a pastoral people, who will raise some of the finest flocks and herds in America. The soil itself is fertile enough, for the cuttings along the railroad show a depth of 6 to 12 inches of vegetable mould, but there are not streams enough to irrigate any great portion. Even the Platte is sometimes so dry as to have no running water below the junction of the forks.

The Platte valley is very broad, averaging 5 to 15 miles in width, and on the bottoms a good crop of grass grows every year, so that thousands of tons of hay are made for the use of the government and the Union Pacific railroad.

The rocks for building purposes are not abundant anywhere along the Platte east of the mountains, but the materials for making brick or artificial building stones occur in the greatest abundance, scarcely equalled in any part of the world. The vast superficial or post pliocene deposits which cover the surface are especially adapted for these purposes. At Sidney station and westward there are some rather thick beds of light brown, calcareous grit, which seems to answer an excellent purpose for buildings, and has been much used in the erection of round-houses and other buildings by the Union Pacific railroad. Near Cheyenne City these same tertiary beds yield an excellent limestone, which has been much used at that place. These tertiary rocks are rather porous but work easily, and are sufficiently durable in the absence of more compact rock.

Along the margin of the Laramie range, about 16 miles west of Cheyenne City, there are beds of white limestone, of the carboniferous age, which, when burned into lime, is of the finest quality. The walls of houses plastered with it are as white as snow, and it is a great favorite with masons. The supply is inexhaustible. As soon as we reach the mountains the building materials are as extensive as the ranges themselves. The sienites predominate and are of every quality, from a compact, fine grained quality to a coarse aggregate of quartz and feldspar, decomposing readily under atmospheric influences.

I would here call the attention especially to some beds of fine-grained compact sienite along the line of the Union Pacific railroad near the summit of the first range, which nearly equals the best Scotch sienite and resembles it very much.

The Union Pacific railroad contemplate transporting this beautiful sienite to Omaha, to construct with it the piers of the bridge across the Missouri river. A few years ago such a thought would have excited surprise and perhaps ridicule as visionary, but now it is so feasible that it ceases to be wonderful. I regard this sienite to be as durable and more elegant for building material than the Quincy granite.

One of the most important problems for solution, affecting the prosperity of this portion of the west, is the possibility of utilizing the vast quantities of coal and iron with which this country abounds. All the coals of Wyoming and Colorado appear to be of tertiary age, and so extensive are they in the west that it becomes a question whether the tertiary might not with more propriety be called the carboniferous or coal-bearing period. I have estimated the coal area north of the Arkansas and south of the Lodge Pole creek and east of the mountains at 5,000 square miles. It is quite possible that a more careful examination will show that it covers a still larger area.

In connection with this coal are large deposits of brown iron ore or limonite, which is easily reducible, and if the coal or lignite can be used in smelting these ores, the iron as well as the coal will prove a source of great revenue to the country. This iron ore occurs in the form of nodules or concretions, varying in size from an ounce to several hundred pounds in weight. It resembles very closely the iron ores of Maryland and Pennsylvania. It seems to be coextensive with the coal beds, though occurring more abundantly at some localities than at others.

About 12 miles south of Cheyenne City there are large quantities, and within a few miles beds of coal five or six feet in thickness are now worked. At South Boulder creek it occurs again in great quantities, scattered through 1,200 to 1,500 feet of sands and clays connected with the coal. It will doubtless be found in the form of a carbonate of iron beyond the reach of atmospheric influences.

The finest smelting furnace erected in Colorado was established there by Mr. Joseph Marshall, and he informed me that it required about three tons of the ore to make one ton of pig-iron. Over 500 tons of this ore have been taken from this locality, and the area occupied by it is over 50 square miles. There are many other localities on both sides of the mountains where this form of iron abounds, and it is safe to say that if this mineral fuel, which abounds everywhere, can be made useful for smelting purposes, these coal and iron ore beds will exert the same kind of influence over the progress of the great west that those of Pennsylvania do over the contiguous States. "When we reflect that we have from 10,000 to 20,000 square miles of mineral fuel in the centre of a region where, for a radius of 600 to 1,000 miles in every direction, there is little or no fuel either on or beneath the surface, the future value of these deposits cannot be over estimated."

At the source of the Chugwater, about 30 miles north of Cheyenne City, there is a vast deposit of magnetic iron ore of the best quality. Through the kindness of my friends Dr. Latham and Mr. Whitehead, citizens of Cheyenne City, I had an opportunity to visit these iron mines, and I found them much richer and more extensive than I had previously imagined. Iron boulders of this ore have been found in the valley of the Chugwater for many years. In the report of Captain Stansbury the following paragraph is found:

"In the bed of the Chugwater and on the sides of the adjacent hills were found immense numbers of rounded black nodules of magnetic iron ore, which seemed of unusual richness."

In the winter of 1859 I gathered a large number of specimens of this erratic ore, which seems to be scattered in the greatest quantity throughout the valley of the Chugwater; the snow was so deep that I could not trace these masses to their source. This season I followed these erratic masses up the valley of the Chugwater, and in the mountains, interstratified with the metamorphic rocks, probably of laurentian age, were literally mountains of this magnetic ore. Mr. Whitehead traced one of the beds a distance of $1\frac{1}{2}$ miles. It occurs in mountain-like masses similar to the ore beds on Lake Superior.

Mr. J. A. Evans, engineer of construction, who made a careful exploration of these ore beds, thinks that the ore can be transported from the Black Hills to the Laramie plains, and then smelted with the coal which is found in the greatest abundance along the line of the railroad. Professor Silliman is of the opinion that the two ores, the magnetic ore of the laurentian epoch and the brown hematites of the tertiary beds, can be more easily reduced by mixing them together. In that case Cheyenne City would be the most desirable point for the erection of a rolling mill or furnace. The Union Pacific railroad contemplates erecting several

rolling mills along the line of the road, and when this is done these ores will come into demand.

In regard to the coal of this country the evidence seems to be clear that it is probably all of the tertiary age. I have traced it over a vast area on the upper Missouri river, and it seems probable that it extends far northward towards the Arctic sea. I have also traced the lignite coal beds from the Yellowstone valley, by way of the Big Horn mountains, to the North Platte, until they pass beneath the White river tertiary beds, about 80 miles north of Fort Laramie. These beds reappear again about 10 miles south of Cheyenne City, and continue uninterruptedly to the Arkansas. On the west side of the Laramie range these beds appear again a few miles east of Rock creek, and from there continue westward to Salt Lake and perhaps further.

In Colorado these coal beds have been wrought to considerable extent. At South Boulder creek there are 11 beds of coal varying in thickness from 5 to 13 feet. The lowest bed is 13 feet in thickness, and is of excellent quality, very much resembling anthracite in appearance, though much lighter. An analysis of this coal by Dr. Torrey, of New York, shows it to contain 59.20 per cent. of carbon; water in a state of combination or its elements, 12.00; volatile matter, expelled at a red heat, forming inflammable gases and vapors, 26.00; ash of a reddish color—color sometimes gray, 2.80. As a fuel for domestic purposes, I am convinced that this coal will rank next to anthracite and prove superior to the ordinary bituminous coals.

"It is as neat as anthracite, leaving no stain on the fingers. It produces no offensive gas or odor, and is thus superior, in a sanitary point of view, and when brought into general use it will be a great favorite for culinary purposes. It contains no distinctive elements, leaves very little ash, no clinkers, and produces no more erosive effects on stoves, grates, or steam boilers, than dry wood. If exposed in the open air it is apt to crumble, but if protected it receives no special injury. Dr. Torrey thinks there is no reason why it should not be eminently useful for generating steam and for smelting ores."*

In the Laramie plains, along the line of the Union Pacific railroad, extensive beds of this coal have been opened, and the coal is used for generating steam and for fuel on the cars. It cannot be long before it will come into general use throughout the west.

August 15.—Left Cheyenne City with Dr. Curtin, an assistant on the survey, and Mr. Whitehead, a citizen of Cheyenne City, for the purpose of exploring the Chugwater valley to its head. For the first 20 miles we passed over the light-colored marls and sands of the White river tertiary. As we approached the foot of the mountains we came into a beautiful valley, ranging from three to ten miles in width, looking as though it had been scooped out, as it were, during the glacial period by forces from the mountain side.

All over this country are marked proofs of a powerful erosion at the close of the drift period, which gave to the surface of the country its present configuration. There are also terraces along the base of the mountains, as well as along the streams, and the nearer we approach the mountain slopes the more conspicuous these terraces become.

We camped, the night of the 15th, on Horse creek, a branch of the North Platte. This valley can hardly be surpassed for grazing purposes. The water is excellent and the grass good. Near the point where the creek issues from the foot-hills of the Laramie range there is a series of upheaved ridges, with a strike nearly east and west, the beds inclining from 50° to 70°. The series of strata seem to be nearly as complete as those observed southward towards Denver. The red arenaceous beds are well shown, but no gypsum was seen.

* Silliman's Journal, March, 1868.

In the valley of the Chugwater, near the point where the branches issue from the mountains, the unchanged rocks are elevated at various angles, and, by their great variety of colors, give a most picturesque appearance to the scenery.

In clearing away from the sienite nucleus, we have here, first, the red arenaceous beds, 1,000 to 1,500 feet in thickness; then 600 to 800 feet of variegated marls and clays, with layers of sandstones, all destitute of fossils or any evidence of their age. These beds incline southwest at various angles, 19° , 11° , 6° , &c. Then the cretaceous beds are quite well represented. From No. 5 I gathered *Baculites ovatus* and a species of *Inoceramus*.

Upon the cretaceous beds, but not conforming to them, rest the White river tertiary beds, inclining at a small angle, as if they had partaken of the latest upward movements of the mountain ranges.

The central portions of the mountains are composed of sienite mostly. The outer beds are rotten sienite of a dull gray color, disintegrating to such an extent that the surface is covered with a thick deposit of crystals of feldspar. As we approach the dividing ridge the beds of sienite become more compact and durable. Now and then we find thin beds of hornblendic gneiss, or white quartz. All these rocks are nearly vertical. Intercalated among these beds of sienite we found the beds of iron ore, which, though not continuous like the sienite, occur here in large quantities. The ore beds incline in the same direction with the others, with the same joints and cleavage, and the surface of many of the layers has the appearance of "slicken sides." Thousands of tons of this ore have been detached from these beds and distributed throughout the valley of the Chugwater in a more or less worn condition.

Although the amount of iron ore which we were able to discover was indefinite in extent, yet we had evidence of the existence of other beds in the mountains at the sources of all the branches of the Chugwater.

The Chugwater empties into the North Platte and has a valley about 100 miles long. It has been for many years a favorite locality for wintering stock, not only for the excellence of the grass and water, but also from the fact that the climate is mild throughout the winter. Cattle and horses thrive well all winter without hay or shelter.

The soil of the valleys of all the streams that flow into the North Platte is fertile, and when the surface can be irrigated good crops of all cereals and hardy vegetables can be raised without difficulty. While my explorations this season will be confined mostly to the plain country, yet my plans contemplate numerous side trips to interesting points in the contiguous mountains.

Within a few weeks a great excitement has been created at Fort Sanders and Laramie City, by the reported discovery of rich gold diggings, near the source of Little Laramie river. This district has a regular organization; hundreds of claims have been staked out, and the name of "Last Chance" diggings given to it. Some very large and valuable nuggets of gold have been taken from these mines, and the usually exaggerated reports of their richness were circulated everywhere.

August 20.—I started from Fort Sanders to make an examination of this district, under the auspices of Major General Gibbon, United States army, the commander of the Rocky Mountain district. We were so fortunate as to have the company of Professor James Hall, State geologist of New York. Our course was nearly southwest up the valley of the Little Laramie river to its source in the Snowy mountains. From Fort Sanders to the Little Laramie river the distance is 18 miles, over a very nearly level country, underlaid by cretaceous beds holding a horizontal position nearly.

Nos. 2 and 3 are quite well shown. No. 2, with its dark plastic clays, is first observed at the Big Laramie stage station, six miles west of Fort Sanders. In the broad level plain country west of this point, No. 3 attains a thickness of 50 to 100 feet, sometimes exhibiting its usual chalky character, but mostly composed of thinly laminated calcareous shale. All through are thin layers of fibrous carbonate of lime. The fibres are at right angles to the plane surface, and attached to these masses or layers are myriads of the little oyster, *O. congesta*. I also found a number of vertebræ of a Saurian animal. From the stage station we passed directly up the valley of the Little Laramie. On either side were long ridges covered with grass and water-worn rocks, but from their sides projected a bed of rusty sandstone which contained *inoceramus* and other marine fossils, which indicated the upper cretaceous or No. 5. These beds continued for about 15 miles to a point where the river issues from the foot-hills of the mountains, and thence to its source we follow its windings through some most beautiful and rugged scenery.

The river itself has wrought its way through a synclinal valley, caused by two separate minor ranges, projecting out from the main range of mountains, and the trend of these minor ranges is nearly north and south. One of the small ranges is quite peculiar in its character. On its east base, which fronts on Laramie plains, the upper cretaceous beds jut up against its side, and no unchanged rocks of older date are seen, while on the west side, about five miles distant in a straight line, the entire series from the carboniferous to the summit of No. 3 cretaceous are all visible, inclining at greater or less angles from the slope.

The nucleus of the mountain is sienite, of various degrees of fineness and compactness, inclining at a large angle, from 50° to 70° , toward the southeast, or nearly east. It is an important question to determine the exact relation of these metamorphic rocks, which form the central portion of all the mountain ranges, to the unchanged beds which usually incline from their sides. Do they conform to each other or not? Did the metamorphic rocks lie in a more or less inclined position prior to the deposition of the silurian or carboniferous beds upon them?

We have thus found it difficult to determine the conformability or unconformability west of the Laramie range, but on the east side of the mountains, especially near Fort Laramie, and along the eastern slope of the Big Horn and Wind River mountains, the discordant relation of the two series is very apparent.

These questions will have a most important bearing when we attempt to reconstruct the history of the physical revolutions which have occurred in the west during past geological epochs.

The sienite beds which form the nucleus of the small range of mountains between the Big and Little Laramie rivers, inclining eastward, were pushed up in such a way that the east front is almost vertical, and the cretaceous beds at the foot, which must have been borne upward in part during the elevation, have fallen abruptly down, so that in some instances they have passed the vertical position 20° to 30° .

East of the Big Laramie, and all along the western slope of the Laramie range, the entire series of unchanged rocks are visible, inclining at moderate angles from the mountain sides. On the west side of this range the slope is more gentle, and the carboniferous, triassic, jurassic, and cretaceous beds present their upturned edges clearly to the scrutiny of the geologist.

The synclinal valley here, through which the Little Laramie flows, is about five miles wide, and crossing this stream west, we find the full series inclining from the mountain eastward. The dip of the red beds is

from 40° to 60°, that of the cretaceous 40°. No fossils have been found in any of the unchanged rocks below No. 3 cretaceous, west of Fort Sanders, nor does the nature of the beds indicate that the physical conditions during their deposition were favorable for the existence of animal or vegetable life, certainly not for the preservation of its remains.

Between the well-marked cretaceous beds and the metamorphic rocks, nearly all the rocks are of a brick-red color, or tinged more or less with red from the presence of the seroxide of iron, and diffused through them there is a certain amount of gypsum; hence they have been called gypsiferous deposits. In the Black Hills, Big Horn and Wind River mountains, these red beds are largely developed, and there they contain beds of beautiful white amorphous gypsum, varying in thickness from 5 to 60 feet. Along the east slope near Pike's Peak in Colorado these formations contain valuable beds of gypsum, but in the Laramie plains I have as yet observed no regular beds. The thickness of these deposits was estimated by Professor Hall to be about 3,000 feet, while the cretaceous beds were 500 to 800 feet thick.

Camping with our wagons at the base of the main range of mountains near the source of the Little Laramie, we prepared to ascend the mountains on horseback to the gold mines. The distance was about 10 miles before we came in view of the "diggings," and to reach them we made an ascent of 2,000 feet above the bed of the creek. We were then between 10,000 and 11,000 feet above the sea, very near the elevation of perpetual snow, and where frost occurs every night of the year.

On the summit of these lofty mountains are some beautiful open spots without a tree, and covered with grass and flowers. After passing through dense pine forests for nearly 10 miles, we suddenly emerged into one of these park-like areas. Just on the edge of the forest which skirted it were banks of snow six feet deep, compact like a glacier, and within a few feet were multitudes of flowers, and even the common wild strawberry seemed to flourish. Here the mountain is filled with streams of the purest water, and for six months of the year good pasturage could be found.

The gold is sought after in the gulches that are formed by the little streams that flow from the Medicine Bow and other snowy mountains, most of which flow into the North Platte.

We labored two days to discover the quartz seams which we supposed to be the source of the stray lumps of gold, but the great thickness of the superficial drift which covers all these mountains concealed them from our view. The gold, so far as known in this district, seems to be confined to the lower glacial drift, and it was the conclusion of Prof. Hall that gold would not be found here in paying quantities. But that valuable mines will be found in these mountains at no distant day seems probable.

The geological evidence is quite conclusive—and these mountains are a continuation northward of the same range in which the rich mines of Colorado are located.

Not only in the more lofty ranges, but also in the lower mountains, are large forests of pine timber, which will eventually become of great value to this country. Vast quantities of this pine, in the form of railroad ties, are floated down the various streams to the Union Pacific railroad. One gentleman alone has a contract for 550,000 ties, all of which he floats down from the mountains, along the southern side of the Laramie plains.

The Big and Little Laramie, Rock creek, Medicine Bow river, and their branches are literally filled with ties at this time, and I am informed that in time of high water they can be taken down to the railroad from

the mountains, after being cut and placed in the water, at the rate of from one to three cents apiece. These are important facts, inasmuch as they show the ease with which these vast bodies of timber may be brought down into the plains below and converted into lumber.

Should the future settlement of the country demand it, I am inclined to believe that a peculiar class of people like the lumbermen of Maine and Michigan will some day fill these mountain regions.

There are several species of pine and one spruce or balsam fir—*Abies Douglassi*. The latter is a beautiful and symmetrical tree, rising to the height of 100 to 150 feet, and as straight as an arrow. The ties that are made from this spruce are of the best quality.

On the morning of August 25 I left Fort Sanders on a third side trip to the North Park, in company with a hunting party composed of General F. P. Blair, Colonel Dodge, United States army, and Captain Proctor, United States army. Messrs. Smith and Carson, assistants, accompanied me. The examination of the North Park being contemplated in your instructions, I regarded this as the most favorable opportunity that was likely to present itself, affording adequate protection. I was the more desirous of visiting that interesting locality from the fact that the geological character is entirely unknown. Our course from Fort Sanders was nearly southeast, up the Big Laramie river toward its source in the mountains.

The geology of the plain country through which the Big Laramie flows is similar to that of the Little Laramie river, about 15 miles to the westward. There are comparatively few exposures of the basis rocks, on account of the superficial drift which covers all the country; still we find along the banks of the river, near the stage station, the same black plastic clay of No. 2, with *Ostrea congesta* and a few remains of fishes, also the chalky marls of No. 3. About two miles above there are long high ridges on either side, extending up for several miles, composed of the rusty yellow sands and sandstones of No. 5.

The dip of these beds is very gentle—hardly perceptible to the eye.

The Big Laramie is a very clear stream, about 50 yards in width, and averaging two feet in depth, easily forded in most places. Like most of the western streams, the difference between high and low water mark is very great. In the spring and early summer, when the snows of the mountains melt, these streams become formidable rivers.

The soil along the bottoms appears to be very good; the grass grows quite heavy, and hundreds of tons of hay are cut here by the settlers for winter use.

The grazing is excellent, and numerous ranches have been started all through the valley for the purpose of raising stock. Even at this season of the year a great variety of flowers covers the surface; the *Compositæ* and *Leguminosæ* prevail in numbers, and yellow is the dominant color.

As we approached the foot-hills of the mountains the transition beds, or No. 1, appeared on the ridge, rocks of more recent date having been swept away by erosion. Fragments of pudding-stone and rusty colored masses of sandstone were scattered here and there, and beneath them were exposed about 600 feet of variegated, arenaceous layers, of uncertain age, perhaps jurassic; then a little higher up the mountain were revealed the red beds, 1,500 feet or more in thickness, presenting a wonderfully picturesque appearance. All these beds seemed to have been lifted up in a nearly horizontal position, so that they present lofty escarpments, sometimes cone-like or pyramidal in shape, revealing each layer in the order of succession. The harder layers, yielding less readily to atmospheric influences, project out from the sides, adding much to the

novelty of the view. Most of the beds incline from the flanks of the mountain at various angles, 3° , 8° , and 15° , and then continue along the river, following its windings for 25 miles among the mountains, almost to the snow-covered peaks. On either side can be seen a number of syenitic nuclei, but I could not find the unchanged rocks so clearly in contact with them that I could define their relation to each other.

Before reaching the mountains we passed a series of alkaline lakes, which are simply shallow depressions, receiving the drainage of a small area without any outlet. From these shallow lakes the water is evaporated, so that in the autumn the bottoms are dry and covered with a white incrustation, which looks much like water at a distance. One of these lakes contains water, and seems to have a fair supply at all seasons. It is about a mile in length, and half a mile in width. In the spring these lakes are quite large, and are filled by the overflow of the branches of the Big Laramie, which are greatly swollen by the melting snow. Great quantities of fish are swept into the lakes from the neighboring streams, and in the autumn the water becomes so alkaline by evaporation that the fish die in great numbers along the shores. It is a curious fact that not a single trout has been taken from any of the branches of the North Platte, unless a few have been caught in the Sweetwater, while the little branches of the South Platte are filled with them.

After entering the foot-hills of the mountains the Big Laramie and its branches wind their way through the valleys or gorges formed by the anticlinals and synclinals, produced by the upheaving of the unchanged rocks. All the lower beds are more or less arenaceous and of a brick red color, with only three layers of light gray sandstone. No fossils can be found in any of the rocks, so that it is difficult to determine their age with certainty. We believe that the lower beds are carboniferous and have received their color from the fact that the sediments were doubtless derived from the disintegration of the red syenitic rocks upon which they rest. It is also quite possible that a portion of the red beds are triassic, and also that the yellow, gray and rusty sands and sandstones alone are jurassic. Lying above the supposed jurassic, and beneath the well defined cretaceous, there is a considerable thickness of sandstones, which I have called transition beds, or No. 1, because they occupy the position of the lower cretaceous No. 1, as shown on the Missouri river and in middle Kansas. These beds are well developed and quite uniform in their lithological character, all along the mountain sides, from latitude 49° to the Arkansas, yet they have never yielded a single characteristic fossil that would determine their age. I have therefore called them, provisionally, lower cretaceous, or beds of transition from one great period of geological history to another, and the character of the sediments which compose them justify the name.

Near our camp on the Big Laramie, which was about thirty-five miles southwest of Fort Sanders, and about fifteen miles above the foot of the hills, were some singular illustrations of the dynamics of geology. On the southwest side of the stream, and inclining eastward or southeastward, the entire series of red and variegated beds are shown in their order of succession, 1,500 or 2,000 feet in height. At the foot of this escarpment is a low ridge of the red material, which is so grassed over that the connection cannot be seen with the syenitic nucleus. Then comes a belt of syenite, about 200 yards wide and three to five miles long, the jagged masses of rock reaching a height of 1,000 feet or more, and standing nearly vertical, or dipping slightly to the southeast. Between the syenitic beds and the river are two low ridges of cretaceous

Nos. 2 and 3, which seem to have been lifted up with the syenitic, but to have fallen back, past a vertical position, so that they now incline from the sienitic ridge, while on the opposite side the beds have a regular dip from the ridge. This peculiarity seems to be common in various localities, owing to the fact that the metamorphic beds, which compose the central portions of all the mountains, had suffered upheaval prior to the deposition of the unchanged beds. Therefore, in the quiet elevation of the mountain ranges, the beds are merely lifted up in the direction of the dip of the older rocks, while they are, as it were, pushed away from the opposite side, forming what may be called an abrupt or incomplete anticlinal.

On the opposite, or south side of the river, there is a gradual slope for 2,000 feet along the bed of the stream, the strata inclining 5° , until we reach the nucleus of another mountain range; so that we have here, as it were, two huge monoclinals. These monoclinals form local anticlinals, inasmuch as in some places all the beds incline, for a short distance, from a common axis.

On the north side of the river, and east for 10 to 20 miles, the flanks of the mountain ranges are covered with the unchanged rocks, which give comparatively gentle grassy slopes, owing to the readiness with which they yield to the atmospheric agencies. Through these slopes many little streams cut their way, forming huge cañons, which reveal along their sides the series of beds in their order of succession. From a point near the source, for 20 or 30 miles, the river flows through a synclinal valley, the conspicuous red beds dipping from either side. Along the valley of the river are marked deposits of drift, the result of glacial action; but the most beautiful feature is the well-defined terraces, about 50 feet high, and smoothed off like a lawn. The terraces are covered with considerable deposit of drift, but when they are cut through by streams the basis rocks are shown. The scenery on either side of the valley is beautiful beyond description. On the west side are the snow-clad peaks of the Medicine Bow range, in the distance, with numerous intervening lower ranges, ascending like steps.

The Snowy mountains are mostly destitute of vegetation, and are covered with eternal snows, but the lower mountain ridges are covered mostly with what may be called groves of pine. Indeed, the pine and grassy openings are so arranged and proportioned that the whole scene appears as if it might have been partially the work of art, and the traveller imagines himself in a sparsely settled, mountainous district, instead of the unexplored Rocky Mountain region. These openings and grassy slopes will make excellent pasture grounds, for the grass is good, and they are watered with the finest mountain streams and springs.

I would again remark, that the pine forests of these mountains must, at some future period, be an object of earnest pursuit. Even now the mountain sides are full of tie-cutters, who cut and float hundreds of thousands of ties down the mountain streams, 20 to 100 miles, to the Union Pacific railroad, where they can be transported by rail to any desired point.

In the moist ravines of the mountain sides are patches of the aspen, *Populus tremuloides*, which form a striking feature in the landscape, from its peculiar mode of growth. They grow very thickly, seldom attaining a height of more than 40 or 50 feet, and not more than 12 or 18 inches in diameter. The bodies are very smooth and nearly white, and the tops form a rounded cone-shaped mass of foliage. These aspen groves are the favorite resort of elk, deer, grouse, and all kinds of game.

On the east side, also, is the snow-clad range, which, in its southward

extension, includes Long's Peak, and numerous peaks in the vicinity. On either side of this lofty range, which often rises above the limit of vegetation, are a number of successive lower ridges which descend like steps. There is such a wonderful uniformity in the structure of these mountains that a detailed description of a portion applies for the most part to all.

Our course along the Cherokee trail was about southwest from the Big Laramie river, over ridge after ridge, and after travelling 25 miles we entered the North Park, through some of the most beautiful scenery of that interesting region. From the summit of the high ridges on the north we looked to the southward, over a series of lofty cones or pyramids, as it were, all clothed with a dense growth of pine. The metamorphic rocks, of which these are composed, disintegrate so easily that their surface is covered with a deposit of loose materials, as fine earth and fragments of rocks.

The hills have, therefore, been so smoothed down that it is difficult to see the basis rocks in continuous lines. We saw enough, however, to show us that red sienite, in its various forms, constitutes the principal rock, while now and then a bed of hornblende gneiss, white quartz, and greenstone occurs.

All through the mountain region are small open areas, sometimes on the hills and sometimes in the lower ground, forming meadow-like spots which the various kinds of animals love to frequent, to feed on the abundant grass.

The old Cherokee trail derives its name from the fact that a party of these Indians cut their way through the thick pines, about 30 years ago, with a train of about 300 wagons. The travelling was difficult at this time, owing to the ruggedness of the service and the obstruction from the fallen pines.

So far as I could ascertain, the trend of the upheaved mountain ridges of sienite was nearly east and west, and the dip nearly north.

The North Park is oval or nearly quadrangular in shape, is about 50 miles in extent, from east to west, and 30 miles from north to south, occupying an area of about 1,500 square miles. Viewing it from one of the high mountains on its border, it appears like a vast depression which might once have formed the bed of a lake. Its surface is rather rugged, yet there are broad bottoms along the streams, especially the North Platte and its branches. Scarcely a tree is to be seen over the whole extent, while the mountains which wall it in on every side are dotted with a dense growth of pine. The grass grows in the park quite abundantly, often yielding at least two tons to the acre. Streams of the purest water flow through the park, and there are some of the finest springs I have yet seen, a few of them forming good-sized streams where they issue from the ground. I am quite confident that this entire park would make an excellent grazing region for at least six or eight months of the year. Myriads of antelopes were quietly feeding in this great pasture ground like flocks of sheep.

The soil is very rich, but the seasons must be too brief for the successful cultivation of any crops. Indeed there is a frost there nearly every night, and snow falls every month in the year.

As I have before stated, the park is surrounded with lofty ranges of mountains as by gigantic walls. On the north and east side may be seen the snow-covered ranges, rising far above all the rest, their summits touching the clouds.

On the west side there is also a short snowy range. The snowy ranges on the eastern border of the park have their north sides abrupt, and the

south sides less so, as seen from a distance, as if the massive piles inclined southward.

All along the north side of the park the lower hills incline southwestward, while the higher ranges are quite steep and correspond, in the apparent dip of the beds, with the lofty snow-clad mountains on the east, which incline south or southwestward. The inclination of the metamorphic beds, composing the higher ranges, is from 60° to 80° .

On the west side of the park long ridges seem to come into the park, so that they die out in the plain, forming a sort of "en echelon" arrangement. It is due to this fact that the area enclosed receives its oval shape.

The general trend of all the continuous mountain ranges is nearly northwest and southeast on all sides, but there are many local dips and variations from this direction.

I was much interested to know whether any of the unchanged rocks which are so well developed in the Laramie plains occur in the north part. I found that the entire series of red and variegated beds, including a portion of the cretaceous strata, were fully represented, all inclining from the flanks of the mountains and gradually assuming a horizontal position, or nearly so, toward the central portion of the park.

The transition beds, or lower cretaceous No. 1, form quite conspicuous ridges, inclining 19° to the southwest. They are composed of a very beautiful pudding-stone, an aggregation of small rounded pebbles, most of them flint, cemented together with a silicious paste.

On the north side are quite large areas covered with loose sand, which is blown about by the wind, resembling the sand-hills on the Niobrara river. A close examination of the sand shows that it is composed mostly of rounded particles of quartz and feldspar. The surface sustains little or no vegetation, presenting a peculiar barren appearance, the sand moving readily with the wind.

Hitherto it has been impossible to color on any map the geological formations of any part of this mountain region, and no information has ever been given in regard to the structure of the North Park. It will be impossible even now, with the imperfect topography of any of the maps, to color the geology in detail; but these explorations will enable me to fix the outline of the formations, in a general way, with a good degree of accuracy.

FORT SANDERS, WASHINGTON TERRITORY,
September 25, 1868.

SIR: I have the honor to transmit the concluding portion of my field report of Wyoming Territory. Although written quite hastily and under pressure of other duties in the field, I am sure it must commend itself to your attention, from the fact that it is descriptive of a portion of the west rich in coal and iron, but about which there was previously very little information of a definite character.

I shall be able to color on a map the outlines of the great geological formations as far west as Fort Bridger. My collections are getting to be quite large. Professor Agassiz, who is here now, regards them as very remarkable and entirely new to science. Both the Professors, Hall and Agassiz, have given their testimony to the truthfulness of my scientific labors here in the most emphatic terms.

Colonel Smith is doing most excellent work in securing materials for a map of this portion of the west. He is now copying the map of the

Union Pacific Railroad office. He will be able to construct a map of this portion of the west which will be far in advance of any preceding one.

No draft has yet come to me from the United States treasury up to this date. I have borrowed money from bank at 12 per cent. discount, and drawn on my friends until I am very much embarrassed. I do not like to go on my Colorado work until I know something more definite.

Should you wish any more preliminary reports from the field, please mention it in your next communication. I have hurried this last one so as to get it to you before the 1st of October.

We have had a severe snow-storm, 6 inches on the plains, and 12 inches in the mountains. The mountains are now covered with snow.

Very respectfully, your obedient servant,

F. V. HAYDEN,
United States Geologist.

Hon. JOSEPH S. WILSON,
Commissioner General Land Office.

SEPTEMBER 1, 1868.

Pursuing our course westward, across the Laramie plains, from Fort Sanders, we took the overland stage road, which continues near the foot of the mountains on the south side of the plains, and usually from 5 to 15 miles south of the railroad route. I give my notes of the different routes in detail, from the fact that my explorations extended over a region almost entirely new, and also because there has existed no definite data which could be used in coloring a geological map.

As I have before remarked, the Laramie range of mountains forms one of the most complete and beautiful anticlineals seen in the Rocky mountains. This range extends from a point near the Sweetwater, southeastward, in the form of a curve, until it is lost in the main Rocky mountain range near Long's Peak. It forms a conspicuous wall, closing in the northeast and east sides of the Laramie plains.

The nucleus is red sienite for the most part, while from the margins incline, from either side, unchanged rocks belonging to the carboniferous, triassic, jurassic, cretaceous, and, in some localities, tertiary. These beds incline at different angles, depending upon the character of the elevating force.

The plains of Laramie, as this area enclosed by mountains is called, exhibit a broad undulating, almost treeless surface, about 60 miles in length from east to west, and 50 miles from north to south.

From Fort Sanders, along the stage route to Little Laramie, the distance is about 18 miles. The surface is undulating, but all the slopes are moderate in the inclination. The basis rocks are all of the cretaceous period. In the banks of the Big Laramie may be seen a small thickness of the black slates of No. 2, and here and there are isolated hills with the yellowish chalky layers of No. 3. Some of the higher ridges which extend down into the plains from the foot of the mountains, reveal here and there the rusty yellow arenaceous marls of No. 5.

From Little Laramie station to Cooper's creek it is 15 miles; over all this distance the cretaceous rocks prevail, belonging for the most part to the upper portion of that period. There are isolated patches of tertiary probably overlapping the cretaceous beds. About two miles north of the station, on the west bank of Cooper's creek, an excellent coal mine has been opened, with a bed nine feet in thickness. The coal is quite

pure, compact, but rather light. It burns very well, and though I do not think the bed will be continuous over a large area, it will yield a vast amount of fuel.

The evidence of drift action in the valley is very striking. The valley of Cooper's creek forms a triangular area about five miles wide at the base of the mountains and extending down the creek to a gorge through which the stream passes, a distance of eight to ten miles. On the south side there is a hill 500 feet high, with the summit covered with a heavy deposit of drift, and the surface literally paved with worn rocks.

On the northwest side there is a low ridge, the summit of which is composed of upper cretaceous rocks. The valley as well as the high ground is covered with the drift material. The evidence seems to be clear that much of this drift deposit is local and derived from the mountains in the immediate vicinity.

All along the base of the mountains, interrupted occasionally, is a deep valley varying from three to ten miles wide, which seems to have been scooped out as it were by forces which must have come from the mountain ranges.

At right angles to this valley and extending down into the plain are numerous other valleys of erosion, walled on each side by high narrow ridges. Upon the sides of the ridges facing the mountains are the heaviest deposits of drift, extending to the summits of the hills, while the opposite sides are smooth and usually covered with grass.

Sometimes these hills have quite gentle slopes, facing the mountain sides, and are so thickly covered with loose rocks that no vegetation can gain a foothold, while the opposite sides descend abruptly and are clothed with vegetation, with scarcely a pebble on the surface.

Whether all the drift phenomena of this region are due to these local influences I will not now attempt to decide, but we believe that the greater portion of them may be accounted for from the joint action of water and ice operating from the direction of the mountain ranges in the immediate vicinity. In my final report I shall attempt to discuss these points more in detail.

Westward from Cooper's creek 11 miles we come to the deep, wooded, and somewhat fertile valley of Rock creek.

Soon after leaving Cooper's creek west we observe the tertiary rocks beginning to overlap, and six miles distant we come to a most excellent exposure of the coal beds. The slopes are all so gentle, and the superficial drift deposits cover the surface to such an extent, that I found it difficult to secure a connected section of the beds in their order of superposition.

The rusty arenaceous marls of No. 5 seem to pass gradually up into the coal-bearing layers without any perceptible break and without a very marked change in the sediments. The lower beds of the tertiary, as seen here, are composed of a fine brown grit, very loose, but filled with irregular hard masses of rocks, sometimes in layers extending for a short distance, but usually in the form of concretions. These concretions have concentric coats, or they are composed of thin laminae which separate very readily.

Underneath the coal there is a bed of drab clay varying in thickness from three to five feet. When the coal is exposed to the atmosphere or the waters are permitted to permeate the overlying strata it has a rusty dull brown appearance, but on penetrating the earth it soon reveals its bright color and compact structure. Above the coal there is another bed of drab, indurated clay, and then over this a loose grit with layers of hard sandstone.

The clay bed above the coal is full of nodules of iron, also rusty sandy concretions. The dip is above 10° to the northeast from the mountains. About a mile west of the opening described above there is another outcropping of coal which has been wrought to some extent. This bed is divided by about two and a half feet of drab arenaceous clay. The upper portion measures about five feet, the lower six to eight feet, so that we have 10 to 12 feet of solid coal; some portions look like dull bituminous coal, others resembling anthracite very much in appearance. Over the coal is the usual drab, indurated clay filled with vegetable matter, in thin shaly layers, as if composed of the broken stems and leaves of plants. Above this also is a bed of loose, rusty brown sand, with sandstone and rusty iron-stone, and still higher up is a bed of very hard silicious rock, compact, of a lighter brown color. The inclination of these beds is not great, not more than from 3° to 5° . At the immediate entrance of this mine the dip is not more than 5° . The coal can be easily worked and the mine well drained. The roof is simply indurated clay, but this can be made firm with wooden supports.

The coal is of the best quality, close, compact, and moderately heavy. but, like most of the tertiary coals, crumbles on exposure to the atmosphere, as is shown by the great quantities which have fallen in pieces at the mouth of the mine. Even when the masses of coal have crumbled in pieces some of the fragments retain the shining black color, though most of it becomes a dull brown. I am inclined to regard this bed as the most important one in this region, and as holding the lowest position geologically. It is probably the same one that is wrought so successfully at Carbon, on the line of the Union Pacific railroad.

Nearly all the land between Cooper's creek and Rock creek has been taken possession of as coal lands, in claims of 160 acres each.

So far as I could determine, Rock Creek valley is about three to five miles wide, and is evidently a valley of erosion.

On the west side there is a high ridge, plainly tertiary, and at least 500 feet high, which slopes down to the creek.

In some places the strata dip 10° or 12° , but the average dip is not more than 5° . West of Rock creek there seems to be an unusual thickness of sandstone, or loose fine sand. For 10 miles or more to the westward there is a large area, on both sides of the stage road, covered with massive piles of sandstone, most of it concretions of a rusty-brown color.

In these sandstones are thin layers, with a small amount of calcareous matter, which have preserved great quantities of deciduous leaves. They indicate the tertiary age of these rocks, and also show that they jut far up close to the foot-hills of the mountains.

These massive sandstones give a very rugged aspect to the surface of this region.

The tertiary strata are very heavy, varying from 1,500 to 2,000 feet in thickness in the aggregate, and composed mostly of alternate beds of rusty-yellow sandstone, and greenish-gray indurated sands and clays. All the beds incline slightly from the mountains about northeast.

From Laramie river to the Medicine Bow we see no indication of the red beds, though they must exist higher up in the mountains.

On the south side of our road the slopes are very gentle, the hills rising up gradually like steps, and all the elevations, and even the gorge through which the little streams flow down from the mountains, are so covered with debris that all their rough points are smoothed off, and so covered with grass that it is difficult to find the basis rocks.

Even Elk mountain, which must rise at least 1,500 feet above the be-

of the Medicine Bow at the stage station, has been so smoothed down by drift action, and now covered with grass, that the rocks cannot well be seen.

North of the road the tertiary rocks made very rugged bad lands, and the bare surface and conical hills give to this district the same gloomy bareness but picturesque appearance of the country occupied by the same formations on the upper Missouri.

On the night of September 4th we camped on the Medicine Bow river near the foot of Elk mountain. This is quite a large stream, with clear pure water, fringed with a wide belt of bitter cotton-wood.

Elk mountain forms a short range, with the highest point facing the river, and resembles the short range with abrupt front east of the Little Laramie river.

The metamorphic rocks have been elevated, while the unchanged tertiary beds jut up against the base without the usual appearance of a series of upheaved ridges, as we find in approaching the nucleus of the mountains. This range is only 10 or 20 miles long. It forms what I have called an abrupt anticlinal—that is, on one side all the rocks seem to have been dropped down at the base and the mountain side, presenting an almost vertical escarpment, while the opposite side slopes gently down, revealing the upturned edges of all the unchanged rocks in the region, reposing upon, or inclining at, moderate angles from the metamorphic rocks.

The numerous branches which constitute the sources of the Medicine Bow river form a broad valley scooped out, evidently, from the yielding rocks, so that Elk mountain is to a certain extent an isolated range. The tertiary beds dip away from the foot of the mountain northward, and passing across the ridge we find them composed of a series of brown and dark-brown indurated clays and sands, with layers of more or less laminated rusty sandstone, very fine, but with a little lime and a strong tendency to a concretionary structure, varying in thickness from 2 feet to 10 or 12.

Sometimes these rocky layers swell out to a considerable thickness, then again diminish until they are lost in the loams, sands, and clays. They usually protect the ridges from wearing down and show more distinctly the dip of the beds, which here is 30° to 40° , about 20° west of north. Elk mountain seems to incline about northwest and to face southeast, the southeast front being abrupt, while the northwest slopes gently down so as to show clearly that portion of the anticlinal.

In the tertiary ridges just described are quite extensive beds of lignite. The first ridge, near the Medicine Bow stage station, has a bed of coal six feet thick, and the harder layers above and below the coal are filled with indistinct vegetable impressions.

The interval between the first main ridge and the second is about one and a half mile, and in that interval are shown several beds of lignite and layers of light-gray fine-grained silicious rocks.

The second main ridge inclines three to five degrees, and this is composed of a variety of beds, the general color being brown or light-drab, while the harder layers are rusty sandstone.

One bed, perhaps 50 feet in thickness, is composed of fine gray indurated sand with a greenish tinge. At the summit of this ridge is a layer of melted or baked rocks, caused by the burning out of the coal beds beneath. Impressions of deciduous leaves are found here in considerable numbers. Some of the harder layers are composed of an aggregate of the crystals of feldspar and quartz, as if the sediments were derived directly from the disintegration of the metamorphic rocks.

The concretionary rocks break in pieces in a variety of ways; some of them exfoliate as it were—that is, they are formed of concentric coats which fall off from the nucleus; others seem to split in thin laminae like cutting an apple into thin slices; others break into irregular fragments. All exhibit the same rusty-yellow color on exposure. This is doubtless due to the decomposition of the sulphuret of iron which seems to be to a greater or less extent in all the rocks. On coming in contact with the atmosphere or moisture this sulphuret of iron becomes the oxide of iron, giving to all the rocks of this region a more or less rusty-yellow color.

In the vicinity of the coal beds are found considerable quantities of brown iron ore. Large masses were found scattered over the top of one of the ridges which had been melted by the ignition of the coal. The mean trend of the upheaved ridges is about northeast and southwest.

West of the Medicine Bow the aspect of the country is that of utter barrenness and gloom; scarcely any vegetation growing except sage and grease-wood. Now and then a little lake is seen, but from the alkaline character of the water and the absence of any vegetation around their borders they only add to the dreariness of the scene. The dearth of animal life is equal to that of the vegetable. Now and then the small sage rabbit, *Lepus artemesia*; the little rock squirrel, *Tamias quadrivittatus*, or the cock of the plains, are seen.

A few miles west of Fort Halleck there is a very conspicuous hill on the south side of the road, the strata of which incline 25° , though some beds near the summit dip 35° . This is called Sheep mountain. The most conspicuous bed in this hill is a yellow-gray sandstone, 300 to 500 feet thick, the age of which I could not determine.

From Medicine Bow to Pass creek, a distance of 27 miles, the road passes through a wide valley, between two upheaved ridges, and nearly on the line between the cretaceous and the tertiary beds.

About five miles before reaching Pass creek the cretaceous beds show themselves clearly on both sides of the road. The rusty sands and sandstones of No. 5 are seen on the right side, while dipping from the flanks of Sheep mountain, on the left, are well shown the clays of No. 2, and the lighter chalky slates of No. 3.

All along Elk mountain the red beds appear high up on the flanks, visible, but not conspicuous, and they do not, as usual, color the debris at the foot of the hills. There is an unusual accumulation of cretaceous and tertiary in this region, at least 5,000 feet in thickness of each.

Very nearly north of Pass creek we have an uplift of yellow, rather fine-grained sandstone, which presents a front like a wall, built up with vertical columns of every form left after erosion.

The sandstone must have been 150 feet thick. It inclines nearly north at an angle of 19° . As we emerge from the hills near Pass creek, we come into a broad open plain, and the ridges of upheaval seem to extend off "en echelon," as it were, gently bending from the west northward, forming one side or rim of the plain. These ridges of upheaval extend off for miles like waves. They are composed of large numbers of alternate hills of loose yellow sand and indurated clay and yellow sandstone, the whole readily yielding to atmospheric influences, and then the hills as well as the valleys are covered with a great depth of fine sand, from which the harder beds of sandstone project in long lines or walls. These ridges vary in distance from 100 to 1,000 yards apart, a valley always intervening, a slope on one side and an abrupt front on the other; that is, they form monoclinals. The broad plain into which we emerge west of Elk mountain must be one of depression, or a large area not elevated with

the surrounding country, for the ridges of elevation which make so marked a feature all around it die out gradually in the plain. On the east side the ends of the ridges fade out in the level plain, but on the north border they lie along nearly parallel.

As far as the eye can reach this plain is perfectly level, no cuts or valleys of erosion to show the underlying rocks. There is a thick deposit of drift over the whole surface. This vast barren sage plain stretches far westward to Bitter creek and Green river, with very little grass or water for the traveller.

From our camp of September 4, on Pass creek, we travelled nearly north or northwest to the railroad. The long ridges seemed to dip away from the open plain. The trend of a lone ridge of greenstone was nearly east and west.

The main trend of these ridges is a little north of west, and the dip, of course, east of north.

Looking at the east or southeast side of the plain the mountains seem to rise in long ridges, step by step, and to trend about northeast and southwest, the southwest end sloping gently down into the plain. When we look at details it is almost impossible to discover any system in the trend or inclination of the beds, except in a general way. The aggregate of the mountain ranges will be found to have a definite trend, as is shown on our topographical maps. The general trend of mountain chains is nearly northwest and southeast; but if we examine the smaller ridges in detail, we shall find that the forces operate from beneath the crust in almost every direction.

It becomes therefore quite important to describe the geology of every locality with minuteness, even at the risk of repetition and tediousness. From all these detailed descriptions may be derived some important generalizations.

The rusty calcareous sandstones which compose the inner lower ridges facing the plain are undoubtedly upper cretaceous, and incline 30° to 45° . These rusty sandstones form a belt about one and a half miles wide, the intercalated beds being composed of loose yellow arenaceous material, which is covered with grass, the harder layers merely projecting above the surface in patches here and there. Very few fossils can be detected in these beds. I found an *Inoceramus*, a *Baculite*, and a species of *Ostrea*, sufficient to indicate their age. One of these ridges of cretaceous sandstone is very conspicuous, and forms a long wall on the north side of the plains, extending about five miles, and then dies out.

We have here also several synclinal and anticlinal valleys, trending nearly east and west, but there is an anticlinal valley, which commences at the foot of Elk mountain, and strikes northwestward to the Sweet-water mountains. This anticlinal valley may be seen along the Union Pacific railroad as far as Rawlings's Springs station, when it begins to fade out in that direction. It forms the chain of connection, however, of the elevating forces which raised those mountain ranges, linking the main ranges south of the plains with those of the north.

Having given in the preceding pages the details of the geological character of the country along the line of the overland stage route, as far west as Green river, we will return to Fort Sanders, and follow the line of the Union Pacific railroad to the same point. And I would here remark that so little is known even of the outline of the great formations along this route, that any information, however brief, will be of interest.

The facilities afforded by this road are bringing into this region eminent men from all portions of the world, and the singular unique geological and geographical features which meet the eye on every side excite marked attention and inquiry.

From Laramie City to Cooper's Lake station, a distance of 25.6 miles, there is a good degree of uniformity in the character of the country as we proceed westward.

On our right the Laramie range appears like a wall bending outward to the northwest and west, and finally ceases to be seen.

Near the crossing of the Big Laramie river we see on our right the red beds, which are somewhat marked; we can follow these up to the foot of the ——— by their peculiar brick red color. Here comes the cretaceous rocks, especially the upper members of the group. Very soon after crossing the Laramie river they continue to a point about five miles east of Como, where the tertiary beds overlap. Isolated patches of tertiary appear before reaching Rock creek. At the quarry the black slates of No. 2 are quite conspicuous, but the sandstones which are transported to Laramie and to Cheyenne are most probably lower tertiary. They are filled with fragments of stems and leaves, some of which are distinct enough to determine.

The surface of the country for the first 25 miles after leaving Laramie westward presents a cheerful appearance. The basis rocks are composed of the arenaceous marls and clays of the upper cretaceous period, and these, yielding readily to atmospheric agencies, are worn down so that all the hills and ridges are smoothed off and rounded, and covered with a good growth of grass. Indeed, the country is in striking contrast with that further to the west.

After leaving Cooper's Lake station, we began to approach the black clays of No. 2, and then beyond the tertiary beds; and from there to Bitter creek we pass over one of the most barren, desolate, forbidding regions I have ever seen west of the Mississippi.

From Cooper's Lake station to a point about 35 miles, the black plastic clays of the lower cretaceous prevail, giving to the surface of the country the usual dark, gloomy, sterile appearance.

Very little vegetation is to be seen; no timber; and the prevailing shrubs are the greasewood and sage.

The waters of all the streams are full of alkali, and the standing pools have the color of lye.

Between Lookout station and Rock creek are some cuts through the rocks, which revealed many beautiful cretaceous fossils, as *Ammonites*, *Baculites*, *Inoceramus*, *Belenites*, &c., all of which are characteristic of the chalk period in the west.

From a point about 10 miles east of Como to St. Mary's station, a distance of about 50 miles, the tertiary formations occupy the country with the peculiar sands and sandstone and clays, and numerous coal beds. The most marked development of the coal beds is at the Carbon station, about 80 miles west of Laramie station. The rocks incline nearly southeast, or south and east. Three entrances have been made to the mine, and the bed is nine feet thick. The openings follow the dip, and consequently descend. The mines are about 3,000 yards from the railroad, but a side track has already been laid to them. More than 1,000 tons of coal have already been taken, and the Union Pacific Railroad Company are ready to contract for any amount that can be supplied to them. The coal at Carbon is of the best quality of tertiary splint, very compact and pure. It is not as hard as anthracite, but the miners informed me that it was more difficult to work than the bituminous coals of Pennsylvania. There are many old miners here who have spent their lives in the mines of Pennsylvania and England, and inform me that this coal is superior to any of the bituminous coals, and ranks next to anthracite. It is used to a great extent on the locomotives, and the engineers

speak in high terms of it, while for domestic purposes the universal testimony is that it ranks next to anthracite. Over the coal there is what the miners call slate; this is somewhat earthy, breaking off into slabs, showing woody fibre, and much of it looking like charred wood or soft charcoal. As we pass up fragments of deciduous leaves are seen more distinctly, and finally the whole graduates into a dark drab clay. At the bottom of the coal there is also a kind of mud shale. In the beds above and below the coal are thousands of impressions of deciduous leaves, as *Populus*, *Platanus*, *Tilia*, &c. Some of the layers of rocks, two to four inches in thickness, are wholly composed of these leaves in a good state of preservation, and so perfect are they that they could not have been transported any great distance.

This western country will eventually be one of the most important coal mining regions in America.

The Union Pacific Railroad Company has placed its coal interests in charge of Mr. Thomas Wardell, an old English miner, and he is constantly employed in prospecting and opening mines the whole length of the road. At Carbon he has erected six pretty cottages as residences for the miners, and a number more are in process of building at Separation and Point of Rocks, and other little mining villages will be built up. All the apparatus for permanent and extended mining operations will be gradually introduced.

Nearly all the wood now along the line of the road has to be transported for a distance of 10 to 40 miles, and in two years from this time most of it, within a reasonable distance of the road, will have been consumed. The future success of this great thoroughfare is, therefore, wholly dependent on the supply of this mineral fuel, and its importance cannot be too highly estimated.

From St. Mary's to Rawling's springs, a distance of about 30 miles, the railroad passes over rocks of cretaceous age. No coal beds need be sought for in the immediate vicinity of the railroad, although it is quite possible that on the north side of the road isolated patches of tertiary containing coal may be found. The railroad, from a point about eight miles east of Benton to Rawling's springs, passes through one of the most beautiful anticlinal valleys I have seen in the west. On either side the rusty gray sands and sandstones dip away from the line of the road at an angle of 10 to 15 degrees. This anticlinal valley is most marked near Fort Steele, at the crossing of the North Platte. About five miles east of Fort Steele I made a careful examination of a railroad cut through a ridge of upheaval, which inclined about south or a little east of south. We have exposed here, commencing at the bottom, 1st, gray, fine-grained sandstone, rather massive, and good for building purposes, and easily worked, 80 feet thick, dip 25°; 2d, a seam two feet thick, irregular, black, indurated slaty clay, with layers of gypsum all through it; then two feet of arenaceous clay; 3d, 10 feet of rusty gray compact sandstone; 4th, eight feet clay and hard arenaceous layers, very dark color, passing up into harder layers, which split into thin laminae, the surfaces of which are covered with bits of vegetable matter; 5th, about 50 feet of rusty yellowish gray sandstone; all these sandstones contain bits of vegetable matter scattered through them; 6th, 100 to 150 feet of steel-brown indurated clay, with some iron concretions; the clay is mostly nodular in form; 7th, a dark brown arenaceous mud rock, quite hard, three feet. From bed fifth I obtained numerous species of marine shells, among them a species of *ostrea* and *inoceramus* in great numbers. The upper surfaces of the hard clay layers appeared as though crowded with impressions of seaweeds or mud markings.

In another railroad cutting, about four miles east of Rawlings's Springs, I obtained the same *inoceramus* and a large species of *ammonite*. These fossils are quite important as establishing the age of these rocks.

At Rawlings's Springs are some very interesting geological features. At this locality the elevatory forces were exerted more powerfully than at any other point along the railroad from Laramie station to Green river. The entire series of rocks are exposed here from the sienites to the cretaceous inclusive. The railroad passes through an anticlinal opening.

On the south side of the road are a series of variegated gray, brown, and reddish silicious rocks inclining southwest about 3° to 10° . Resting upon them is a very hard bluish limestone which is undoubtedly carboniferous, though I was unable to find any fossils in this region.

On the north side of the road the ridges of upheaval strike off toward the northwest, rising to a height of 1,200 to 1,500 feet above the road. If we examine these ridges with care we shall find that the red sienite is exposed in a number of places, and we have the opportunity here of studying the relations which the unchanged rock sustains to the metamorphic.

The sienitic beds dip 70° about southeast, while the unchanged beds rest upon them in nearly a horizontal position. The layers which rest directly on the sienite are a beautiful puddingstone made up of rounded quartz pebbles and feldspar; above are layers of fine silicious rock with thin intercalations of clay. The whole series have the position and appearance of Potsdam sandstone, and I am inclined to believe that we have here a representation of the lower silurian period. In all cases these rocks repose on the upturned edges of the sienite; sometimes nearly horizontal, again inclining 5° to 10° . In one or two localities these lower silurian beds are lifted up 1,000 feet or more, nearly horizontally, while on the sides of the mountain the beds are broken off so as to incline 50° to 60° , or nearly vertical.

The silicious rocks make most excellent building-stone, and are much used by the railroad company. They reach a thickness of 500 to 800 feet. There is every variety of tidal stratification, mud workings, wave and ripple-marks, &c. On these silicious beds rests the blue limestone, 30 to 40 feet thick, and above are variegated sandstones and the red beds in the distance.

From the tops of these ridges one can see numbers of synclinals and monoclinal valleys; I mean by monoclinal valleys the intervals between upheaved ridges where the beds in each ridge dip in the same direction. There is one here which stretches far to the northwest, three to five miles in width, and so smoothed by erosion that it forms a level grassy prairie.

In all these upheaved ridges the rocks afford wonderful proofs of erosion. The silurian (?) beds exhibit the combined action of water and ice in a more powerful manner than the more recent beds even.

Everywhere, however, the evidences of erosion during the drift period are on a gigantic scale. Some of the beds are smoothed off as if they had been planed; others are furrowed.

There is a fine sulphur spring here which gives the name to the station. The water issues from under the bed of blue limestone. The water is clear and possesses medicinal properties.

About four miles west of Rawlings's Springs the tertiary beds begin to overlap; but in the distance, on either side, are lofty ridges which are composed of cretaceous, and perhaps rocks of even older date.

South of Separation, 15 miles, there is a ridge that is at least 1,000 feet high, which is certainly formed of lower cretaceous, and probably

also of that great thickness of sandstones and clays which holds a position between the transition beds No. 1 (?) and the brick-red beds.

Near Separation, about 10 miles west of Rawlings's Springs, a coal mine has been opened with a bed of coal 11 feet in thickness. I am inclined to believe that it is really the same bed as the one opened at Carbon, and also near Rock creek and Cooper's creek. The strata dip nearly west about 10° . The mine has been opened from the summit of the hill and the bed followed down the inclination so that all the coal will have to be taken up the grade, and the difficulties in drainage will be greatly increased. The coal is of most excellent quality. There is above and below the coal the usual drab indurated clay. Below the clay is a bed of gray ferruginous sandstone. On the summits of the hills in the vicinity are layers of fine-grained silicious rocks with arenaceous concretions, some of them containing impressions of deciduous leaves.

The tertiary beds lie in ridges across the country, for the beds are lifted up in every direction. A more desolate region I have not seen in the west. Nothing seems to grow here but sage bushes, and in some of the valleys they grow very large.

All over the surface, on the hills, in the plains, are great quantities of water-worn pebbles.

Many of these valleys were literally scooped out by the erosive forces, not by any power now acting, but waters far in excess of the present day in this region.

Some of the widest and deepest of these valleys do not contain any running streams at this time.

The layers of fine-grained sandstone on the hills in the vicinity contain more or less impressions of leaves, like those of the *Populus* and *Platanus*, in a good state of preservation.

Continuing our course west of Separation, the dip of the tertiary beds diminishes until before reaching Creston, about 13 miles west of Separation; they lie in a nearly horizontal position, and all the surrounding country presents more the appearance of a plain. At this station the Union Pacific Railroad Company have dug a well, and at the depth of 83 feet a coal bed was struck, into which the workmen had penetrated three feet while I was there. The coal that was brought up was much of the same quality as that near Separation, and it is probably the same bed. If this should prove to be the same bed, coal must underlie the whole country at the depth of about 80 feet, over an area of at least 100 square miles. This would prove a most important discovery to the railroad company, inasmuch as it would show the inexhaustibility of a mineral upon which the very existence of the road depends in future. In digging the well beds of bluish arenaceous clay were passed through, then black clay with carbonaceous matter all through it. Just over the coal was some fine bluish indurated clay, with very distinct impressions of leaves.

The railroad cuts and the wells show very distinctly the character of the intermediate softer beds.

The erosion has been so great in this country, and all the hills and cañons are so covered with debris, that it is almost impossible to obtain a clear idea of the color and composition of the intermediate softer beds. The harder beds, as sandstones, &c., project, and are accessible to the eye without much excavation.

The tertiary formations, both marine and fresh water, occupy the whole country along the line of the railroad to Green river, and, probably, to a greater or less extent, to a point within thirty or forty miles of Salt lake.

From Creston to Bitter Creek station, a distance of 45 miles,

the beds are mostly fresh water, and hold a nearly horizontal position. West of Bitter creek we return to the marine tertiary again, and the beds dip 3° to 6° nearly east. We have therefore, between Rawlings's Springs and Green river, a soft synclinal basin, the marine tertiary dipping west about 10° on the east side, and the same marine beds inclining east 3° to 6° on the west side, while at Table Rock, Red Desert and Washakie there is a large thickness of purely fresh-water shells of the genera *Paludina*, *Unio*, *Melania*, &c. Table Rock is a square butte rising up above the level of the road about 400 feet. This is composed of beds of sandstone, which in many instances is little more than an aggregate of fresh-water shells.

After leaving Bitter Creek station the hills approach nearer the road and show the character of the marine tertiary again.

Seams of coal appear in many places, while yellow arenaceous marls, light gray sand with indurated clay beds, and more or less thick layers of sandstone occur. The dip of the beds varies from 3° to 6° east or nearly east.

At Black Butte station on Bitter creek, about 15 miles west of Bitter Creek station, there is a bed of yellow sandstone, irregular in thickness and in part concretionary. It is full of rusty concretions of sandstone of every size from an inch to several feet in diameter. They are mostly spherical in shape, and when broken open reveal a large cavity filled with yellow clay or dust of oxide of iron.

This sandstone is 150 to 200 feet in thickness, forms nearly vertical bluffs, and is now, by the action of atmospheric influences, worn into the most fantastic shapes. Above this are sands, clays, sandstones of every texture, coal-beds, &c. One of these coal-beds near the summit of the hill has been burned, baking and melting the superincumbent beds.

I found in several layers the greatest abundance of deciduous leaves, and among them a palm leaf, probably the same species which occurs in the coal beds on the upper Missouri, and named *Sabal Campbelli*. There is a seam near one of the coal beds made up of a small species of *Ostrea*. The railroad passes down the Bitter Creek valley, which has worn through the tertiary beds, and on the east side the high walls can be seen inclining at small angles as we pass down the valley toward Green river, the inclination brings to view lower and lower beds. These are all plainly marine tertiaries, while an abundance of impressions of plants are found everywhere, no strictly fresh water shells occur, but seams of *Ostrea* of various species. There are also extensive beds of hard flat table rocks which would make the best of flagging stones. On the surface are most excellent illustrations of wave ripple marks, and at one locality what appears to be tracks of a most singular character. One of the tracks appears to have been made by a soliped, and closely resembles the tracks of mules in the soft ground on the river bottom. Others seem to belong to a huge bird—another to a four-toed pachydermatous animal. I have obtained careful drawings of these tracks as well as specimens of them.

In the final report some detailed sections of these tertiary beds will be given; yet I am convinced that local sections are not important. The character of the beds are so changeable that two sections taken ten miles apart would not be identical, and in some cases not very similar. The more recent the age of formation the less persistent seem to be their lithological character over extended areas. Although the coal beds seem to be abundant everywhere along the line of the road, in the lower tertiary deposits, yet they have been wrought in few localities as yet.

Near Point of Rocks station, about forty-five miles east of Green river, one of the best coal mines I have yet seen in the west has been opened. Mr. W. Snyder, the able superintendent of the Union Pacific

railroad, has ordered a side track to be laid to it, about a quarter of a mile distant.

Within a vertical height of 80 feet 5 coal beds have been opened. The lowest is about 100 feet above the bed of the creek. They are respectively 5, 1, 4, 3 and 6½ feet in thickness. The five-foot bed is the most valuable, and as the strata are nearly horizontal, it can be worked with great ease and freedom from water. The coal is brought from the mine and thrown down the sides of the hill a hundred feet fall or more, and yet so hard and compact is the coal that it is not broken by the fall. It is also purer and heavier than any coal I have yet seen west of the Laramie mountains. The other beds already opened will yield moderately good coal. There are several other beds in these hills which have not yet been examined by the miner.

Near the summit of the hills, above the coal beds, there is a seam composed entirely of oyster shells six inches thick. It is about the size of the common edible oyster, but an extinct and probably undescribed species.

Another bed of coal has been opened about 28 miles west of Point of Rocks, at Rock spring. It is about four feet thick, with a bed of sandstone at the bottom, and a slaty-clay roof. It cannot be worked to advantage. Scattered all through the coal-bearing strata are seams and concretions of brown iron ore in great abundance. Sometimes these seams are quite persistent over extended areas, and vary from four to twelve inches in thickness. It occurs mostly, however, in a nodular form, and assumes a great variety of characters. There is much of it that can be made of economical value where there is a demand for it. There are also numerous chalybeate or sulphur springs in that region, which possess excellent medicinal properties.

In this brief account of the country lying west of the Laramie mountains and east of Green river we have shown that vast quantities of coal exist, of the best quality, and that in intimate connection with it are valuable deposits of iron ore. We also believe that within a few years these deposits of iron and coal will be found to be of infinite value to the Union Pacific railroad, and that the future success and value of the stock of this road is dependent on these minerals, especially the coal. Mr. Van Lennep, connected with the Union Pacific railroad as geologist, described more than fifty localities where the coal crops out to the surface not far distant from the line of the road. A more careful examination for practical purposes I am convinced would reveal the existence of coal and iron in hundreds of localities from Rock creek to the neighborhood of Salt Lake, and there are indications that they exist even beyond this point in different directions.

We have taken the position, also, that the coal-bearing beds of the Laramie plains are of tertiary age, although some marine fossils are found in strata connected with the coal. There may possibly be some thin seams of impure coal in the upper cretaceous beds, as if the great period of vegetation and the storing up of coal in the west was foreshadowed in the cretaceous. At any rate, the upper cretaceous beds contain a great amount of vegetable matter, but mostly too obscure for determination.

So far as I can determine, the growth of the continent forward in time from the cretaceous period seems to have been constant. I can find no break in time; no want of conformity between the tertiary and cretaceous beds; and, indeed, so gradually and imperceptibly do the cretaceous beds pass up into those of the tertiary, that I have not been able to determine the line of separation.

The lower portions of the tertiary period of the west seem to be ma-

rine in their character, as is shown by an abundance of fossil remains of the genus *Ostrea*; but the physical conditions do not seem to have been favorable for the development of a great variety of marine life. The impressions of deciduous leaves similar to those belonging to our present fruit and forest trees are very numerous throughout the tertiary beds of marine character, and they may be found in almost all localities where the character of the rocky beds is such as to favor their preservation. The marine beds gradually pass up into those of purely fresh water character.

All these facts are very important, inasmuch as they fulfil all the conditions of the growth of the continent, showing clearly all the steps of progress onward even to the present time.

There is another point of interest connected with these modern deposits of the west. There seems to have been a vastly increased deposition of sediments during both cretaceous and tertiary times in the west. The sediments are greatly deficient in calcareous matter, and show a vast preponderance of arenaceous material. I have estimated the thickness of the cretaceous beds, as shown west of the Laramie mountains, at 5,000 feet, and the tertiary the same; so that we have here 10,000 feet of rocks of comparatively modern date.

The next important question is, can all this vast area be made useful for agricultural or grazing purposes?

We have shown that the eastern slope of the mountains can be cultivated very successfully by irrigation, but west of the Laramie range the elevation above the sea is greater, and the climate much more severe in winter. Even at the Laramie river the elevation above the tide-water is 7,222 feet, nearly 3,000 feet higher than Salt Lake valley, and more than 1,000 feet above Cheyenne city near, the eastern base.

The Laramie plains are also surrounded by lofty ranges of mountains, the tops of some of which are covered with perpetual snow. The summer, therefore, in these plains must always be short, and the winter severe. It is believed, however, that east of the Medicine Bow river the principal cereals, as wheat, buckwheat, oats, and barley, can be raised successfully. Potatoes and turnips, of very good quality, have been raised this year in the valley of Rock creek, on sod ground, and with very little irrigation.

The following valuable notes were furnished me by Major General John Gibbon, United States army, commanding Rocky Mountain department, with permission to copy them entire. General Gibbon has given more attention to this subject than any other man in the Territory. He has cultivated an extensive garden at the military post, Fort Sanders, for two years past.

Vegetables which can be raised in Laramie plains:

All seed should be planted as soon after 1st of May as possible.

Potatoes.—Should be planted early in May, in rows three feet apart; thoroughly irrigated immediately after planting, and the ground between the rows frequently kept open with a cultivator. It would be better to plow out the furrows; fill them with manure or straw, and plant on that.

Peas.—Very fine; soak the seed before planting in rows three feet apart, and cultivate as above.

String beans.—The same.

Radishes.—Very fine; sow either broadcast or in rows three feet apart, thin, and then weed out to four inches apart.

Turnips.—Of all kinds, very thin in rows three feet apart, and weed out to 12 inches apart.

Parsnips.—As above, and to next spring for eating.

Carrots.—As above.

Cabbage.—Should be well and early started in a hot bed, and planted out when hard and strong.

Lettuce.—Either broadcast or in rows, thin.

Cauliflower.—Same as cabbages.

Beets.—In rows three feet apart; sowed thin and weeded out to eight or ten inches apart.

Onions.—Sowed thin in rows three feet apart; and cultivated seedlings planted in rows three feet apart, and four inches from each other.

NOTE.—Everything needs all the time it can get to grow in. The seed should, therefore, be sowed very thin, watered well until the seed comes up, and then weeded out early to give it plenty of room to grow. When the plants are left thick, they all run to heads, and when weeded out late they do not have time to grow.

Very respectfully, your obedient servant,

F. V. HAYDEN, U. S. Geologist.

Hon. JOS. S. WILSON,

Commissioner General Land Office.

No. 1.—*Tabular statement showing the number of acres of public lands surveyed in the following land States and Territories up to June 30, 1867, during the last fiscal year, and the total of the public lands surveyed up to June 30, 1868; also the total area of the public domain remaining unsurveyed within the same.*

Land States and Territories.	Area of the land States and Territories.		Number of acres of public lands surveyed up to June 30, 1867.	Number of acres of public lands surveyed during the fiscal year ending June 30, 1867, but not included in last year's report.	Number of acres of public lands surveyed within the fiscal year ending June 30, 1868.	Total of the public lands surveyed up to June 30, 1868.	Total area of public lands remaining unsurveyed, and of course unoffered and undisposed of; also, private land claims surveyed and net reported up to June 30, 1868.
	In acres.	In square miles.					
Wisconsin	34, 511, 360	53, 924	34, 511, 360	.....	.....	31, 511, 360	.....
Iowa	35, 228, 800	55, 045	35, 228, 800	.....	.....	35, 228, 800	.....
Minnesota	53, 459, 840	83, 531	22, 910, 612	44, 782	1, 068, 030	24, 023, 425	29, 436, 415
Kansas	52, 043, 520	81, 318	20, 510, 443	.....	*3, 395, 644	23, 906, 087	28, 137, 433
Nebraska	48, 636, 800	75, 995	15, 520, 249	.....	798, 656	16, 318, 905	32, 317, 895
California	120, 947, 840	188, 981	28, 711, 327	449, 388	1, 247, 710	30, 408, 426	90, 539, 415
Nevada	71, 737, 741	112, 000	6, 763, 969	25, 897	578, 560	1, 368, 426	70, 369, 315
Oregon	60, 975, 360	95, 274	6, 144, 636	498, 273	615, 529	7, 258, 438	53, 716, 922
Washington Ter.	44, 796, 160	69, 994	3, 880, 038	130, 459	440, 975	4, 451, 472	40, 344, 688
Colorado Ter.	66, 880, 000	104, 500	2, 844, 857	.....	321, 845	3, 166, 702	63, 713, 298
Utah Ter	54, 065, 075	84, 476	2, 517, 912	.....	.....	2, 517, 912	51, 547, 163
Arizona Ter	72, 906, 304	113, 916	.....	.....	.....	.....	72, 906, 304
New Mexico Ter	77, 568, 640	121, 201	2, 332, 555	.....	650, 198	2, 982, 753	74, 585, 887
Dakota Ter	96, 595, 840	150, 932	2, 663, 660	253, 519	614, 551	3, 531, 730	93, 064, 110
Idaho Ter	55, 228, 160	86, 294	.....	.....	255, 111	255, 111	54, 973, 049
Montana Ter.	92, 016, 640	143, 776	.....	.....	183, 847	183, 847	91, 832, 793
Wyoming Ter	62, 645, 120	97, 883	.....	.....	.....	.....	62, 645, 120
Missouri	41, 824, 000	65, 350	41, 824, 000	.....	.....	41, 824, 000	.....
Alabama	32, 462, 080	50, 722	32, 462, 080	.....	.....	32, 462, 080	.....
Mississippi	30, 179, 840	47, 156	31, 179, 840	.....	.....	30, 179, 840	.....
Louisiana	26, 461, 440	41, 346	23, 461, 440	.....	.....	23, 461, 440	3, 000, 000
Arkansas	33, 406, 720	52, 198	33, 406, 720	.....	.....	33, 406, 720	.....
Florida	37, 931, 520	59, 268	26, 631, 520	.....	.....	26, 631, 520	11, 300, 000
Ohio	25, 576, 960	39, 964	25, 576, 960	.....	.....	25, 576, 960	.....
Indiana	21, 637, 760	33, 809	21, 637, 760	.....	.....	21, 637, 760	.....
Michigan	36, 128, 640	56, 451	36, 128, 640	.....	.....	36, 128, 640	.....
Illinois	35, 462, 400	55, 410	35, 462, 400	.....	.....	35, 462, 400	.....
Indian territory	44, 154, 240	68, 991	.....	.....	.....	.....	44, 154, 240
Alaska	369, 529, 600	577, 390	.....	.....	.....	.....	369, 529, 600
Total	1, 834, 998, 400	2, 867, 185	485, 311, 778	1, 402, 318	10, 170, 656	496, 884, 754	1, 338, 113, 646

* Of which 1,944,594 acres are Osage lands west of Arkansas river, ceded in trust to the United States, treaty of September 29, 1865, U. S. Laws, vol. 14, page 688, and 3,922 acres, being part of Fort Riley military reservation, granted to the Republican River Bridge Company, per joint resolution of Congress, approved March 2, 1867, U. S. Laws, vol. 14, page 573.

JOS. S. WILSON, Commissioner.

No. 2.—Statement of public lands sold, of cash and bounty land scrip received therefor, number section of said act; also of land located with scrip under the Agricultural College and Mech of, and statement of incidental expenses thereon, in the first half of the fiscal year, commencing

States and Territories.	Land offices.	Quantity sold for cash and bounty-land scrip at and above the minimum price of \$1 25, and amount received for the same, for the first half of the fiscal year, ending December 31, 1867.		Exhibit of the amount paid for in cash and in bounty land scrip, respectively, for the first half of the fiscal year ending December 31, 1867, mentioned in the first column.	
		Acres.	Amount.	Cash.	Bounty land scrip.
Ohio.....	Chillicothe	74.58	\$83 90	\$83 90	.....
Indiana	Indianapolis				
Illinois	Springfield	405.11	663 52	663 52	.....
Missouri	Boonville				
Do	Ironton	6,596.70	9,845 12	9,845 12	
Do	Springfield	5,677.56	10,053 68	9,953 68	\$100 00
Total		12,274.26	19,898 80	19,798 80	100 00
Alabama	Mobile	Excess pay'ts.			
Do	Huntsville	do	198 39	198 39	
Do	Montgomery	do			
Total			198 39	198 39	
Mississippi	Jackson	Excess pay'ts.	523 15	523 15	
Louisiana	New Orleans				
Do	Monroe				
Do	Natchitoches				
Total					
Michigan	Detroit	10,386.92	13,042 03	12,917 03	125 00
Do	East Saginaw	12,354.54	17,477 59	14,996 56	2,481 03
Do	Ionia	10,114.21	34,756 42	34,756 42	
Do	Marquette	10,682.13	14,685 48	14,621 73	63 75
Do	Traverse City	14,602.74	25,449 14	25,449 14	
Total		58,140.54	105,410 66	102,740 88	2,669 78
Arkansas	Little Rock	Excess pay'ts.	28 70	28 70	
Do	Washington	do	79 38	79 38	
Do	Clarksville	do	97 55	97 55	
Total			205 63	205 63	
Florida	Tallahassee	Excess pay'ts.	123 74	123 74	
Iowa	Des Moines	739.00	941 16	941 16	
Do	Council Bluffs	378.61	689 31	689 31	
Do	Fort Dodge	2,311.83	3,479 52	3,479 52	
Do	Sioux City	2,945.22	7,070 36	7,070 36	
Total		6,374.66	12,180 35	12,180 35	
Wisconsin	Menasha	14,264.38	17,880 54	17,880 54	
Do	Falls of St. Croix	4,856.18	12,845 95	12,845 95	
Do	Steven's Point	5,136.60	6,696 69	6,361 72	334 37
Do	La Crosse	8,658.22	12,295 28	12,295 28	
Do	Bayfield	2,019.97	7,061 33	7,061 33	
Do	Eau Claire	14,791.90	18,896 14	18,896 14	
Total		49,677.43	75,675 33	75,340 96	334 37

of acres entered under the homestead law of May 20, 1862, of commissions received under sixth act of July 2, 1862, and commissions received by registers and receivers on the value thereof July 1, 1867, and ending June 30, 1868.

Quantity of land entered under homestead acts of May 20, 1862, and June 21, 1866, with aggregate of five and ten dollar payments required by section 2 of the acts; and also with aggregate of registers and receivers' commissions under section 6 of said act, and of act approved March 21, 1864, amendatory thereof for the first half of the fiscal year ending December 31, 1867.				Aggregate disposed of for cash, also bounty land scrip, and of cash under homestead act of 1862, and act amendatory.		Quantity of land located in first half of fiscal year, with scrip issued under the agricultural college & mechanic act of July 2, 1862, and registers and rec's com. on val. of land sold.		Incidental expenses.
Area in homestead entries in acres.	Fees.	Amount of registers and receivers' commissions.	Aggregate of fees and reg. & receivers' commissions.	Acres.	Amount.	Acres.	Amount.	Amount.
367.45	\$35	\$9 17	\$44 17	442.03	\$118 90			\$600 83
								663 89
				405.11	663 52			737 26
33, 298.87	2, 815	1, 011 75	3, 826 75	39, 895.57	12, 660 12	36, 780.30	\$919 42	797 56
56, 435.79	5, 032	1, 763 00	6, 795 00	62, 113.35	15, 085 68	3, 638.12	92 00	712 06
82, 734.66	7, 847	2, 774 75	10, 621 75	102, 008.92	27, 745 80	40, 418.42	1, 011 42	1, 509 62
63, 055.68		1, 575 88	1, 575 88	63, 055.68	198 39			503 98
								955 00
63, 055.68		1, 575 88	1, 575 88	63, 055.68	198 39			1, 458 98
70, 302.97		1, 757 53	1, 757 53	70, 302.97	523 15			510 46
								1, 090 00
								33 98
								139 53
								1, 263 51
8, 555.38	590	217 91	807 91	18, 942.30	13, 632 03			972 77
23, 037.82	1, 745	649 43	2, 394 43	35, 392.36	19, 222 59	325.57	12 00	1, 175 94
39, 094.72	3, 765	1, 415 94	5, 180 94	49, 208.93	38, 521 42	1, 255.00	32 00	1, 508 96
1, 865.75	130	48 71	178 71	12, 547.88	14, 815 48	17, 114.68	432 00	1, 079 48
34, 981.34	2, 805	1, 081 69	3, 886 69	49, 584.08	28, 254 14	13, 129.54	352 00	1, 739 56
107, 535.01	9, 035	3, 413 68	12, 448 68	165, 675.55	114, 445 66	31, 894.79	828 00	6, 476 71
17, 942.39		520 38	520 38	17, 942.39	28 70			695 00
20, 935.02		642 00	642 00	20, 935.02	79 38			487 84
15, 293.66		536 26	536 26	15, 293.66	97 55			753 15
54, 171.07		1, 698 64	1, 698 64	54, 171.07	205 63			1, 935 99
38, 111.82		1, 112 00	1, 112 00	38, 111.82	123 74			737 53
989.86	115	25 19	140 19	1, 728.86	1, 056 16			885 49
3, 064.48	410	149 30	559 30	3, 443.09	1, 099 31			513 46
14, 754.32	1, 555	588 74	2, 143 74	17, 066.15	5, 034 52	4, 160.00	104 00	619 22
16, 068.82	1, 340	524 00	1, 864 00	19, 014.04	8, 410 36	49, 534.85	1, 240 00	752 86
34, 877.48	3, 420	1, 287 23	4, 707 23	41, 252.14	15, 600 35	53, 694.85	1, 344 00	2, 771 03
5, 616.40	420	148 41	568 41	19, 880.78	18, 300 54	62, 400.00	1, 560 00	854 77
19, 521.02	1, 860	719 72	2, 579 72	24, 327.20	14, 705 95	2, 560.00	64 00	802 96
7, 399.04	620	186 73	816 73	12, 535.84	7, 316 09	29, 440.00	736 00	815 86
35, 833.65	3, 035	969 67	4, 004 67	44, 491.87	15, 330 28	3, 200.00	80 00	816 21
160.00	10	4 00	14 00	2, 179.97	7, 071 33	63, 520.00	1, 588 00	1, 552 52
14, 013.55	1, 120	410 96	1, 530 96	28, 805.45	20, 016 14	247, 240.00	6, 196 00	975 65
82, 543.66	7, 065	2, 439 49	9, 514 49	132, 221.11	82, 740 33	408, 960.00	10, 224 00	5, 817 97

No. 2.—Statement of public lands sold, of cash and bounty-land scrip received there

States and Territories.	Land offices.	Quantity sold for cash and bounty-land scrip at and above the minimum price of \$1 25, and amount received for the same, for the first half of the fiscal year ending December 31, 1867.		Exhibit of the amount paid for in cash and in bounty-land scrip, respectively, for the first half of the fiscal year ending December 31, 1867, mentioned in the first column.	
		Acres.	Amount.	Cash.	Bounty-land scrip.
California.....	San Francisco.....	33,354.09	\$43,740.57	\$43,740.57	.....
Do.....	Marysville.....	73,876.40	93,817.56	93,817.56	.....
Do.....	Humboldt.....	2,255.79	2,819.75	2,819.75	.....
Do.....	Stockton.....	64,003.65	81,449.16	81,449.16	.....
Do.....	Visalia.....	3,094.49	3,868.16	3,868.16	.....
Do.....	Sacramento.....	.....	.....	.....	.....
Total.....	.....	176,584.42	225,695.20	225,695.20	.....
Nevada.....	Carson City.....	2,609.58	3,530.74	3,530.74	.....
Washington Territory.	Olympia.....	3,830.35	4,787.94	4,787.94	.....
Do.....	Vancouver.....	3,399.33	4,246.61	4,246.61	.....
Total.....	.....	7,229.68	9,034.55	9,034.55	.....
Minnesota.....	Taylor's Falls.....	1,772.43	2,253.25	2,253.25	.....
Do.....	St. Cloud.....	11,182.98	14,100.95	13,975.95	\$125.00
Do.....	Winnebago City.....	1,996.34	2,954.57	2,954.57	.....
Do.....	St. Peter.....	5,569.21	8,714.22	8,714.22	.....
Do.....	Greenleaf.....	2,851.42	5,887.46	5,887.46	.....
Do.....	Du Luth.....	53.94	67.42	42.42	25.00
Total.....	.....	23,426.32	33,977.87	33,827.87	150.00
Oregon.....	Oregon City.....	3,162.21	3,952.80	3,952.80	.....
Do.....	Roseburg.....	12,103.90	15,338.48	15,338.48	.....
Do.....	Le Grand.....	160.00	200.00	200.00	.....
Total.....	.....	15,426.11	19,491.28	19,491.28	.....
Kansas.....	Topeka.....	478.73	714.47	614.47	100.00
Do.....	Junction City.....	2,090.42	3,870.26	3,770.26	100.00
Do.....	Humboldt.....	1,016.11	1,431.72	1,331.72	100.00
Total.....	.....	3,585.26	6,016.45	5,716.45	300.00
Nebraska.....	Omaha City.....	3,821.72	6,028.94	5,928.94	100.00
Do.....	Brownsville.....	4,831.30	6,039.20	6,039.20	.....
Do.....	Nebraska City.....	2,653.11	3,628.26	3,628.26	.....
Do.....	Dakota City.....	2,873.52	3,591.97	3,591.97	.....
Total.....	.....	14,179.65	19,288.37	19,188.37	100.00
New Mexico Territory	Santa Fé.....	.....	.....	.....	.....
Dakota Territory.....	Vermillion.....	4,874.08	6,092.67	6,092.67	.....
Colorado Territory.....	Denver City.....	6,575.04	8,418.81	8,418.81	.....
Do.....	Fair Play.....	.....	.....	.....	.....
Do.....	Central City.....	.....	.....	.....	.....
Total.....	.....	6,575.04	8,418.81	8,418.81	.....
Idaho Territory.....	Boise City.....	.....	.....	.....	.....
Do.....	Lewiston.....	.....	.....	.....	.....
Total.....	.....	.....	.....	.....	.....
Montana Territory.....	Helena.....	.....	.....	.....	.....
Arizona Territory.....	Prescott.....	.....	.....	.....	.....

No. 2.—Statement of public lands sold, of cash and

RECAPIT

States and Territories.	Quantity sold for cash, and bounty-land scrip at and above the minimum price of \$1 25, and amount received for the same, for the first half of the fiscal year ending December 31, 1867.		Exhibit of the amount paid for in cash and in bounty-land scrip, respectively, for the first half of the fiscal year ending December 31, 1867, mentioned in first column.	
	Acres.	Amount.	Cash.	Military scrip.
Ohio	74.58	\$83 90	\$83 90	.....
Indiana .....	.....	.....	.....	.....
Illinois	405.11	663 52	663 52	.....
Missouri	12,274.26	19,898 80	19,798 80	\$100 00
Alabama	Excess pay'ts	198 39	198 39	.....
Mississippi	do	523 15	523 15	.....
Louisiana	do	.....	.....	.....
Michigan	58,140.54	105,410 66	102,740 88	2,669 78
Arkansas	Excess pay'ts	205 63	205 63	.....
Florida	do	123 74	123 74	.....
Iowa	6,374.66	12,180 35	12,180 35	.....
Wisconsin	49,677.45	75,675 33	75,340 96	334 37
California	176,584.42	225,695 20	225,695 20	.....
Nevada	2,609.58	3,530 74	3,530 74	.....
Washington Territory	7,229.68	9,034 55	9,034 55	.....
Minnesota	23,426.32	33,977 87	33,827 87	150 00
Oregon	15,426.11	19,491 28	19,491 28	.....
Kansas	3,585.26	6,016 45	5,716 45	300 00
Nebraska	14,179.65	19,288 37	19,188 37	100 00
New Mexico Territory .....	.....	.....	.....	.....
Dakota Territory	4,874.08	6,092 67	6,092 67	.....
Colorado Territory	6,575.04	8,418 81	8,418 81	.....
Idaho Territory .....	.....	.....	.....	.....
Montana Territory .....	.....	.....	.....	.....
Arizona Territory .....	.....	.....	.....	.....
Total	381,436.74	546,509 41	542,855 26	3,654 15

To which add number of acres located with agricultural scrip, and com
Also, commissions received on homestead entries, as shown in column No. 3

bounty land scrip received therefor, &c.—Continued.

ULATION.

Quantity of land entered under homestead acts of May 20, 1862, and June 21, 1866, with aggregate of \$5 and \$10 payments required by section 2 of the acts, and also with aggregate of commissions of registers and receivers, under section 6 of said act, and of act approved Mar. 21, 1864, amendatory thereof, for the first half of the fiscal year ending December 31, 1867.				Aggregate disposed of for cash, also bounty-land scrip, and cash under homestead act of 1862, and acts amendatory.		Quantity of land located in first half of fiscal year, with scrip issued under the agric'l col. and mec. act of July 2, 1862, and reg's and rec's commissions on the value of same.		Incidental expenses.
Area in homestead entries in acres.	Ag'te in \$10 payments.	Amount of registers and receivers' commissions.	Aggregate of \$10 payments and commissions.	Acres.	Amount.	Acres.	Amount.	Amount.
367.45	\$35	\$9 17	\$44 17	442.03	\$118 90			\$600 83
89,734.66	7,847	2,774 75	10,621 75	405.11	663 52			663 89
63,055.68		1,575 88	1,575 88	102,009.92	27,745 80	40,418.42	\$1,011 42	737 26
70,302.97		1,757 53	1,757 53	63,055.68	198 39			1,509 62
107,535.01	9,035	3,413 68	12,448 68	70,302.97	523 15			1,458 98
54,171.07		1,698 64	1,698 64					510 46
38,111.82		1,112 00	1,112 00					1,263 51
34,877.48	3,420	1,287 23	4,707 23					6,476 71
82,543.66	7,065	2,439 49	9,514 49					1,935 99
60,079.85	3,910	2,129 36	6,039 36					737 53
390.97	30	14 66	44 66					2,771 03
13,061.60	855	489 32	1,341 32					5,817 97
174,852.86	14,200	5,512 38	19,712 38					9,787 82
39,864.56	2,620	1,494 96	4,114 96					570 60
66,076.32	6,045	2,319 21	8,364 21					1,791 63
137,656.41	11,180	4,371 74	15,551 74					5,011 38
27,343.99	1,730	683 60	2,413 60					2,901 09
4,960.75	395	232 91	627 91					1,952 68
								3,272 83
								761 68
								678 88
								1,780 40
1,065,087.11	68,367	33,316 51	101,693 51					
missions thereon								
of section three								
				2,712,587.17	679,850 34	1,266,063.32	31,657 42	52,992 77

JOS. S. WILSON, Commissioner.

No. 3.—Statement of public lands sold, of cash and bounty-land scrip received therefor, number section of said act; also of land located with scrip under the agricultural college and me of, and statement of incidental expenses thereon in the second half of the fiscal year commencing

States and Territories.	Land offices.	Quantity sold for cash and bounty-land scrip at and above the minimum price of \$1 25, amount received for the same, for the second half of the fiscal year ending June 30, 1868.		Exhibit of the amount paid for in cash and bounty-land scrip, respectively, for the second half of the fiscal year ending June 30, 1868, mentioned in first column.	
		Acres.	Amount.	Cash.	Military scrip.
Ohio.....	Chillicothe.....	121. 80	\$646 91	\$646 91	.....
Indiana.....	Indianapolis.....				
Illinois.....	Springfield.....	588. 68	1, 035 83	1, 035 83	.....
Missouri.....	Boonville.....	16, 823. 44	23, 932 04	17, 049 13	\$6, 882 91
Do.....	Ironton.....	4, 933. 00	6, 488 05	6, 488 05	.....
Do.....	Springfield.....	7, 035. 69	11, 631 50	11, 531 50	100 00
Total.....		28, 792. 13	42, 051 59	35, 068 68	6, 982 91
Alabama.....	Mobile.....				
Do.....	Huntsville.....	Excess pay'ts	195 38	195 38	.....
Do.....	Montgomery.....				
Total.....			195 38	195 38	.....
Mississippi.....	Jackson.....	Excess pay'ts	279 15	279 15	.....
Louisiana.....	New Orleans.....				
Do.....	Monroe.....				
Do.....	Natchitoches.....				
Total.....					
Michigan.....	Detroit.....	5, 310. 64	6, 818 32	6, 718 32	100 00
Do.....	East Saginaw.....	8, 858. 14	12, 203 54	9, 328 97	2, 874 57
Do.....	Ionia.....	19, 602. 05	34, 670 82	34, 670 82	.....
Do.....	*Marquette.....	5, 283. 01	6, 997 72	6, 997 72	.....
Do.....	Traverse City.....	7, 537. 68	19, 852 21	19, 852 21	.....
Total.....		46, 591. 52	80, 542 61	77, 568 04	2, 974 57
Arkansas.....	Little Rock.....	Excess pay'ts	43 03	43 03	.....
Do.....	Washington.....	do.....	176 77	176 77	.....
Do.....	Clarksville.....	do.....	307 89	307 89	.....
Total.....			527 69	527 69	.....
Florida.....	Tallahassee.....	Excess pay'ts	259 65	259 65	.....
Iowa.....	Fort Des Moines.....	873. 90	1, 124 90	1, 124 90	.....
Do.....	Council Bluffs.....	1, 350. 13	1, 739 71	1, 739 71	.....
Do.....	Fort Dodge.....	1, 489. 19	1, 975 04	1, 975 04	.....
Do.....	Sioux City.....	5, 429. 83	12, 299 44	12, 299 44	.....
Total.....		9, 143. 05	17, 139 09	17, 139 09	.....

* In consequence of the destruction by fire, June 11, 1868, of the archives of the land office at Mar-

of acres entered under the homestead law of May 20, 1862, of commissions received under sixth chanic act of July 2, 1862, and commissions received by registers and receivers on the value there- July 1, 1867, and ending June 30, 1868.

Quantity of land entered under the homestead acts of May 20, 1862, and June 21, 1866, with aggregate of \$5 and \$10 payments required by section 2 of the acts; and also with aggregate of commissions of registers and receivers, under section 6 of said act, and of act approved March 21, 1864, amendatory thereof, for the second half of the fiscal year ending June 30, 1868.				Aggregate disposed of for cash; also bounty-land scrip, and of cash under homestead act of 1862, and acts amendatory.		Quantity of land located in second half of fiscal year, with scrip issued under agric'l col. and mec. act of July 2, 1862, and reg's and rec's commissions on value of land sold.		Incidental expenses.
Area in homestead entries in acres.	Ag'ts in \$10 payments.	Amount of registers and receivers' com'issions.	Aggregate of \$10 payments and com'issions.	Acres.	Amount.	Acres.	Amount.	Amount.
80.00	\$10	\$14 00	\$24 00	201.80	\$656 91	.....	.....	\$643 86
.....	.....	.....	.....	.....	.....	.....	.....	250 00
.....	.....	.....	.....	588.68	1,035 83	.....	.....	811 22
62, 265.43	6, 315	2, 302 90	8, 617 90	79,088.87	30,247 04	6,040.00	\$151 00	1,349 99
42, 671.29	2,955	1,058 80	4,013 80	47,604.29	9,443 05	2,880.00	72 00	622 36
43, 391.42	3,375	1,241 00	4,616 00	50,427.11	15,006 50	320.00	8 00	887 29
148, 328.14	12,645	4,602 70	17,247 70	177,120.27	54,696 59	9,240.00	231 00	2,859 64
61, 029.47	.....	1,525 79	1,525 79	61,029.47	195 38	.....	.....	503 96
.....	.....	.....	.....	.....	.....	.....	.....	641 10
61, 029.47	.....	1,525 79	1,525 79	61,029.47	195 38	.....	.....	1,145 06
32, 521.48	.....	836 02	836 02	32,521.48	279 15	.....	.....	505 56
.....	.....	.....	.....	.....	.....	.....	.....	370 00
.....	.....	.....	.....	.....	.....	.....	.....	370 00
4, 407.91	300	135 67	435 67	9,718.55	7,118 32	.....	.....	886 59
16, 127.45	1,230	955 40	2,185 40	24,985.59	13,433 54	.....	.....	128 70
32, 671.55	3,060	1,642 31	4,722 31	52,273.60	37,750 82	.....	.....	1,399 37
2, 586.65	170	75 67	245 67	7,869.66	7,167 72	.....	.....	631 34
40, 236.95	3,340	1,715 72	5,055 32	47,774.63	23,192 21	.....	.....	1,280 71
96, 030.51	8,120	4,524 77	12,644 77	142,622.03	88,662 61	.....	.....	4,326 71
24, 244.42	.....	670 88	670 88	24,244.42	43 03	.....	.....	537 67
45, 315.32	20	1,218 06	1,238 06	45,315.32	196 77	.....	.....	813 73
59, 501.55	.....	1,692 18	1,692 18	59,501.55	307 89	.....	.....	506 16
129,061.29	20	3,581 12	3,601 12	129,061.29	547 69	.....	.....	1,857 56
77,823.99	.....	2,404 10	2,404 10	77,823.99	259 65	.....	.....	650 66
1,070.46	110	76 77	186 77	1,944.36	1,234 90	.....	.....	643 27
946.72	110	119 76	229 76	2,296.85	1,849 71	160.00	4 00	570 18
10,603.48	1,225	514 12	1,739 12	12,092.67	3,200 04	1,440.00	31 00	557 50
24,417.26	2,250	948 00	3,198 00	29,847.09	14,549 44	53,572.27	1,336 00	771 90
37,037.92	3,695	1,658 65	5,353 65	46,180.97	20,834 09	55,172.27	1,376 00	2,542 85

quette, the area of land disposed of during said month for cash and homesteads has been estimated.

No. 3.—Statement of public lands sold, of cash and bounty-land scrip received there

States and Territories.	Land offices.	Quantity sold for cash and bounty-land scrip at and above the minimum price of \$1 25, amount received for the same, for the second half of the fiscal year ending June 30, 1868.		Exhibit of the amount paid for in cash and bounty-land scrip, respectively, for the second half of the fiscal year ending June 30, 1868, mentioned in first column.	
		Acres.	Amount.	Cash.	Military scrip.
Wisconsin	Menasha	9,082.59	\$12,268.93	\$12,268.93	
Do	Falls of St. Croix	4,608.50	10,209.15	10,209.15	
Do	Stevens's Point	9,984.32	12,530.53	11,481.59	\$1,048.94
Do	La Crosse	8,467.76	11,842.81	11,842.81	
Do	Bayfield	5,098.59	7,646.84	7,646.84	
Do	Eau Claire	14,646.08	18,820.10	18,370.10	450.00
Total		51,887.84	73,318.36	71,819.42	1,498.94
California	San Francisco	30,447.59	44,745.08	44,745.08	
Do	Marysville	45,843.47	59,915.87	59,915.87	
Do	Humboldt	5,662.41	6,703.01	6,703.01	
Do	Stockton	178,182.01	225,596.77	225,596.77	
Do	Visalia	27,685.33	34,616.90	34,616.90	
Do	Sacramento				
Total		287,820.81	371,577.63	371,577.63	
Nevada	Carson City	828.91	1,055.00	1,055.00	
Do	Austin				
Do	Belmont				
Total		828.91	1,055.00	1,055.00	
Washington Territory	Olympia	9,670.21	12,087.75	12,087.75	
Do	Vancouver	6,714.76	8,386.22	8,386.22	
Total		16,384.97	20,473.97	20,473.97	
Minnesota	Taylor's Falls	2,941.84	3,692.79	3,692.79	
Do	St. Cloud	9,573.41	12,596.28	12,596.28	
Do	Winnebago City	2,546.90	3,999.35	3,999.35	
Do	St. Peter	4,965.10	9,157.52	9,157.52	
Do	Greenleaf	1,513.85	2,875.66	2,875.66	
Do	Du Luth	823.62	1,746.03	1,723.11	22.92
Total		22,364.72	34,067.63	34,044.71	22.92
Oregon	Oregon City	1,051.34	1,314.20	1,314.20	
Do	Roseburg	12,909.35	16,286.74	16,286.74	
Do	Le Grand	1,718.46	2,148.07	2,148.07	
Total		15,679.15	19,749.01	19,749.01	
Kansas	Topeka	2,126.02	5,201.01	5,201.01	
Do	Junction City	1,249.00	1,945.06	1,945.06	
Do	Humboldt	1,870.52	2,593.61	2,593.61	
Total		5,245.54	9,739.68	9,739.68	
Nebraska	Omaha City	7,175.40	11,833.52	11,733.52	100.00
Do	Brownsville	17,231.10	21,603.94	21,603.94	
Do	Nebraska City	5,056.26	9,405.30	9,405.30	
Do	Dakota City	6,720.55	8,400.78	8,400.78	
Total		36,183.31	51,243.54	51,143.54	100.00
New Mexico	Santa Fé				

No. 3.—Statement of public lands sold, of cash and bounty-land scrip received there

States and Territories.	Land offices.	Quantity sold for cash and bounty-land scrip at and above the minimum price of \$1 25, amount received for the same, for the second half of the fiscal year ending June 30, 1868.		Exhibit of the amount paid for in cash and bounty-land scrip, respectively, for the second half of the fiscal year ending June 30, 1868, mentioned in first column.	
		Acres.	Amount.	Cash.	Military scrip.
Dakota Territory.....	Vermillion.....	4,890.39	\$6,113 07	\$6,113 07	.....
Colorado Territory...	Denver City.....	4,004.28	5,255 33	5,255 33	.....
Do.....	Fair Play.....		196 19	196 19	.....
Do.....	Central City.....	156.95	196 19	196 19	.....
Total.....	.....	4,161.23	5,451 52	5,451 52	.....
Idaho Territory.....	Boise City.....	2,784.61	3,284 24	3,284 24	.....
Do.....	Lewiston.....				.....
Total.....	.....	2,784.61	3,284 24	3,284 24	.....
Montana Territory...	Helena.....	35.93	190 00	190 00	.....
Arizona Territory....	Prescott.....				.....

No. 3.—Statement of public lands sold, of cash and

RECAPIT

States and Territories.	Quantity sold for cash and bounty-land scrip at and above the minimum price of \$1 25. and amount received for the same, for the second half of fiscal year ending June 30, 1868.		Exhibit of the amount paid for in cash and bounty-land scrip, respectively, for the second half of the fiscal year ending June 30, 1868, mentioned in first column.	
	Acres.	Amount.	Cash.	Military scrip.
Ohio	121. 80	\$646 91	\$646 91	.....
Indiana .....	.....	.....	.....	.....
Illinois	588. 68	1, 035 83	1, 035 83	.....
Missouri	28, 792. 13	42, 051 59	35, 068 68	\$6, 982 91
Alabama	Excess pay'ts	195 38	195 38	.....
Mississippi	do.....	279 15	279 15	.....
Louisiana .....	.....	.....	.....	.....
Michigan	46, 591 52	80, 542 61	77, 568 04	2, 974 57
Arkansas	Excess pay'ts	527 69	527 69	.....
Florida	do.....	259 65	259 65	.....
Iowa	9, 143. 05	17, 139 09	17, 139 09	.....
Wisconsin	51, 887. 84	73, 318 36	71, 819 42	1, 498 94
California	287, 820. 81	371, 577 63	371, 577 63	.....
Nevada	828. 91	1, 055 00	1, 055 00	.....
Washington Territory	16, 384. 97	20, 473 97	20, 473 97	.....
Minnesota	22, 364. 72	34, 067 63	34, 044 71	22 92
Oregon	15, 679. 15	19, 749 01	19, 749 01	.....
Kansas	5, 245. 54	9, 739 68	9, 739 68	.....
Nebraska	36, 183. 31	51, 243 54	51, 143 54	100 00
New Mexico Territory .....	.....	.....	.....	.....
Dakota Territory	4, 890. 39	6, 113 07	6, 113 07	.....
Colorado Territory	4, 161. 23	5, 451 52	5, 451 52	.....
Idaho Territory	2, 784. 61	3, 284 24	3, 284 24	.....
Montana Territory	35. 93	190 00	190 00	.....
Arizona Territory .....	.....	.....	.....	.....
Total	533, 504. 59	738, 941 55	727, 362 21	11, 579 34

To which add number of acres located with agricultural scrip and commissions
Also, commissions received on homestead entries as shown in column three of

bounty-land scrip received therefor, &c.—Continued.

ULATION.

Quantity of land entered under homestead acts of May 20, 1862, and June 21, 1866, with aggregate of \$5 and \$10 payments required by section 2 of the acts; and also with aggregate of commissions of regist'rs and reciv'rs, under section 6 of said act, and of act approved March 21, 1864, amendatory thereof, for the second half of the fiscal year ending June 30, 1868.				Aggregate disposed of for cash, also bounty-land scrip, and cash under the homestead act of 1862, and acts amendatory.		Quantity of land located in second half of fiscal year with scrip issued under the agric'l col. and mec. act of July 2, 1862, and reg's and rec's' commis's on value of same.		Incidental expenses.
Area in homestead entries in acres.	Ag'te in \$10 payments.	Amount of registers and receivers' com'issions.	Aggregate of \$10 payments and com'issions.	Acres.	Amount.	Acres.	Amount.	Amount.
80.00	\$10	\$14 00	\$24 00	201.80	\$656 91			\$643 86
								250 00
				588.68	1,035 83			811 22
148,328.14	12,645	4,602 70	17,247 70	177,120.27	54,696 59	9,240.00	\$231 00	2,859 64
61,029.47		1,525 79	1,525 79	61,029.47	195 38			1,145 06
32,521.48		836 02	836 02	32,521.48	279 15			505 56
								370 00
96,030 51	8,120	4,524 77	12,644 77	142,622.03	88,662 61			4,326 71
129,061.29	20	3,581 12	3,601 12	129,061.29	547 69			1,857 56
77,823.99		2,404 10	2,404 10	77,823.99	259 65			659 66
37,037.92	3,695	1,658 65	5,353 65	46,180.97	20,834 09	55,172.27	1,376 00	2,542 85
72,443.60	5,950	3,106 58	9,156 58	124,331.44	79,268 36			5,379 72
28,718.55	2,045	1,618 22	3,663 22	316,539.36	373,622 63	470,333.49	11,768 00	9,072 41
717.04	55	33 00	88 00	1,545.95	1,110 00			521 10
13,178.05	840	722 73	1,562 73	29,563.02	21,313 97			2,054 00
163,575.27	13,965	7,427 31	21,392 31	185,939.99	48,032 63	11,200.00	280 00	3,919 13
39,085.31	2,530	1,468 87	3,998 87	54,764.46	22,279 01	2,720.00	68 00	2,903 84
92,899.48	8,625	4,366 70	12,991 70	105,145.02	18,364 68	21,280.00	532 00	2,288 30
186,970.20	15,635	6,510 03	22,145 03	223,153.51	66,878 54	106,880.00	2,672 00	3,169 19
								250 00
69,203.99	3,846	1,789 21	5,635 21	74,094.38	9,959 07			686 94
1,793.95	140	82 27	222 27	5,955.18	5,591 52			1,254 68
6,337.90	430	258 00	688 00	9,122.51	3,714 24			1,686 66
				35.93	190 00			664 78
1,263,836.14	78,551	46,530 07	125,181 07	1,797,340.73	817,492 55	676,825.76	16,927 00	49,822 87
thereon				676,825.76	16,927 00			
section three				46,530 07				
				2,474,166.49	880,949 62			

JOS. S. WILSON, Commissioner.

No. 4.—Summary for the fiscal year ending June 30, 1868, showing the number of acres and March 21, 1864, with aggregate of \$10 homestead payments and homestead commissions;

States and Territories.	Quantity sold for cash and bounty-land scrip at and above the minimum price of \$1 25, and amount received for the same, for the fiscal year ending June 30, 1868.		Exhibit of the amount paid in cash and in bounty-land scrip, respectively, for the fiscal year ending June 30, 1868, mentioned in first column.	
	Acres.	Amount.	Cash.	Military scrip.
Ohio	196.38	\$730 81	\$730 81	.....
Indiana .....	.....	.....	.....	.....
Illinois	993.79	1,699 35	1,699 35	.....
Missouri	41,066.39	61,950 39	54,867 48	\$7,082 91
Alabama .....	.....	393 77	393 77	.....
Mississippi .....	.....	802 30	802 30	.....
Louisiana .....	.....	.....	.....	.....
Michigan	104,732.06	185,953 27	180,308 92	5,644 35
Arkansas .....	.....	733 32	733 32	.....
Florida .....	.....	383 39	383 39	.....
Iowa	15,517.71	29,319 44	29,319 44	.....
Wisconsin	101,565.29	148,993 69	147,160 38	1,833 31
California	464,405.23	597,272 83	597,272 83	.....
Nevada	3,438.49	4,585 74	4,585 74	.....
Washington Territory	23,614.65	29,508 52	29,508 52	.....
Minnesota	45,791.04	68,045 50	67,872 58	172 92
Oregon	31,105.26	39,240 29	39,240 29	.....
Kansas	8,830.80	15,756 13	15,456 13	300 00
Nebraska	50,362.96	70,531 91	70,331 91	200 00
New Mexico Territory .....	.....	.....	.....	.....
Dakota Territory	9,764.47	12,205 74	12,205 74	.....
Colorado Territory	10,736.27	13,870 33	13,870 33	.....
Idaho Territory	2,784.61	3,284 24	3,284 24	.....
Montana Territory	35.93	190 00	190 00	.....
Arizona Territory .....	.....	.....	.....	.....
Total	914,941.33	1,285,450 96	1,270,217 47	15,233 49

To which add number of acres located with agricultural scrip and commissions
Also, commissions received on homestead entries, as shown under head of com-

disposed of for cash, with bounty-land scrip, by entry under the homestead laws of May 20, 1862, also, locations with agricultural college and mechanic scrip, under act of July 2, 1862.

Quantity of land entered under homestead acts of May 20, 1862, and June 21, 1866, with aggregate of \$5 and \$10 payments required by section 2 of the acts, and also with aggregate of commissions of registers and receivers under section 6 of said act, and of act approved March 21, 1864, amendatory thereof, for the fiscal year ending June 30, 1868.				Aggregate disposed of for cash; also bounty-land scrip, and of cash under the homestead act of 1862, and acts amendatory.		Quantity of land located in the fiscal year with scrip issued under agricultural college and mechanic act of July 2, 1862, and registers and receivers' commissions on value of land sold.		Incidental expenses.
Aggregate in homestead entries in acres.	Aggr'te in \$10 payments.	Am't of registers and receivers' commissions.	Aggregate of \$10 payments and commis'ns.	Acres.	Amount.	Acres.	Amount.	Amount.
447.45	\$45	\$23 17	\$68 17	643.83	\$775 81			\$1,244 69
238,062.80	20,492	7,377 45	27,869 45	993.79	1,699 35			913 89
124,085.15		3,101 67	3,101 67	279,129.19	82,442 39	49,658.42	\$1,242 42	1,548 48
102,824.45		2,593 55	2,593 55	124,085.15	393 77			4,369 26
				102,824.45	802 30			2,604 04
								1,016 02
203,565.52	17,155	7,938 45	15,093 45	308,297.58	203,108 27	31,824.79	828 00	1,633 51
183,232.36	20	5,279 76	5,299 76	183,232.36	753 32			10,803 42
115,935.81		3,516 10	3,516 10	115,935.81	383 39			3,793 55
71,915.40	7,115	2,945 88	10,060 88	87,433.11	36,434 44	108,867.12	2,720 00	1,397 19
154,987.26	13,015	5,546 07	18,671 07	256,532.55	162,008 69	408,960.00	10,224 09	5,313 88
88,798.40	5,955	3,747 58	9,702 58	553,203.63	603,237 83	580,572.30	14,524 00	11,197 69
1,108.01	85	47 66	132 66	4,546.50	4,670 74			18,860 23
26,239.65	1,695	1,212 05	2,907 05	49,854.30	31,203 52			1,091 70
338,528.13	28,165	12,939 69	41,104 69	384,319.17	96,210 50	143,520.00	3,588 00	3,845 63
78,949.87	5,150	2,963 83	8,113 83	110,055.13	44,390 29	5,760.00	144 00	8,930 51
165,975.80	14,670	6,685 91	21,355 91	174,806.60	30,426 13	148,760.00	3,674 00	5,804 93
324,626.61	26,815	10,881 77	37,696 77	374,989.57	97,346 91	464,966.45	11,640 00	4,240 98
								6,442 02
96,547 98	5,576	2,472 81	8,048 81	106,312.45	17,781 74			250 00
6,754 70	535	315 18	850 18	17,490.97	14,405 33			1,448 62
6,337 90	430	258 00	688 00	9,122.51	3,714 24			1,933 56
				35.93	190 00			1,686 66
								2,445 18
3,328,923.25	146,918	79,846 58	216,874 58	3,243,864.58	1,432,368 96	1,942,889 08	48,584 42	102,815 64
received thereon				1,942,889.08	48,584 42			
missions of registers and receivers					79,846 58			
				5,186,753.66	1,560,799 96			

JOS. S. WILSON, Commissioner.

SWAMP LANDS.

No. 5.—Statement exhibiting the quantity of land selected for the several States under the acts of Congress approved March 2, 1849, September 28, 1850, and March 12, 1860, up to and ending September 30, 1868.

States.	Fourth quarter of 1867.	First quarter of 1868.	Second quarter of 1868.	Third quarter of 1868.	Year ending June 30, 1868.	Total since date of grant.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Ohio						54,438.14
Indiana						1,354,732.50
Illinois						3,267,470.65
Missouri						4,604,448.75
Alabama						479,514.44
Mississippi						3,070,645.29
Louisiana, (act of 1849)						10,774,978.82
Louisiana, (act of 1850)						543,339.13
Michigan						7,273,724.72
Arkansas						8,652,432.93
Florida						11,790,637.46
Wisconsin						4,200,669.58
Iowa						2,583,509.72
California		44,256.57	2,600.00		47,174.04	889,686.54
Oregon						753,160.00
Minnesota						
Total		44,256.57	2,600.00		47,174.04	60,293,388.67

No. 6.—Statement exhibiting the quantity of land approved to the several States under the acts of Congress approved March 2, 1849, September 28, 1850, and March 12, 1860, up to and ending September 30, 1868.

States.	Fourth quarter of 1867.	First quarter of 1868.	Second quarter of 1868.	Third quarter of 1868.	Year ending June 30, 1868.	Total since date of grant.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Ohio						25,640.71
Indiana		40.00	40.00		80.00	1,263,733.28
Illinois		483.05	280.00		763.05	1,489,628.07
Missouri	12,269.95	3,679.93			15,949.88	4,330,540.35
Alabama						2,595.51
Mississippi						3,068,642.51
Louisiana, (act of 1849)						8,192,305.64
Louisiana, (act of 1850)						237,949.09
Michigan	80.00				80.00	5,691,598.66
Arkansas						7,283,763.13
Florida						10,901,007.76
Wisconsin			4,667.57		4,667.57	3,024,128.77
Iowa	3,780.64	1,374.44	1,240.81		6,395.89	844,814.19
California		18,491.00		2,900.82	117,692.50	346,069.84
Oregon						
Minnesota						725,034.13
Total	16,130.59	24,068.42	6,228.38	2,900.82	145,628.89	47,426,851.44

No. 7.—Statement exhibiting the quantity of land patented to the several States under the acts of Congress approved September 28, 1850, and March 12, 1860, and also the quantity certified to the State of Louisiana under act approved March 2, 1849.

States.	Fourth quarter of 1867.	First quarter of 1868.	Second quarter of 1868.	Third quarter of 1868.	Year ending June 30, 1868.	Total since date of grant.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Ohio.....						25,640.71
Indiana.....						*1,256,367.56
Illinois.....			438.05		438.05	1,448,169.98
Missouri.....		12,269.95	2,551.55		14,821.50	3,151,052.90
Mississippi.....						2,681,383.16
Louisiana, (act of 1849).....						8,192,305.64
Louisiana, (act of 1850).....						199,598.07
Michigan.....		80.00		40.00	80.00	5,817,084.89
Arkansas.....						6,011,357.03
Florida.....						10,644,468.04
Wisconsin.....		713,639.94			713,639.94	12,962,856.51
Iowa.....	61,301.54	80,805.16	400.00		142,506.70	1,064,018.12
California.....			18,491.00		202,777.68	202,777.68
Minnesota.....						717,383.57
Total.....	61,301.54	807,595.05	21,880.55	40.00	1,074,263.87	44,374,463.86

* 4,839.20 acres of this contained in indemnity patents under act of March 2, 1855.

† 34,910.75 acres of this contained in indemnity patents under act of March 2, 1855.

‡ 307,930.49 acres of this contained in indemnity patents under act of March 2, 1855.

JOS. S. WILSON, *Commissioner.*

DEPARTMENT OF THE INTERIOR, *General Land Office, Nov. 5, 1868.*

No. 8.—Statement showing the condition of the State selections under the act of September 4, 1841, on the 30th day of June, 1868.

INTERNAL IMPROVEMENT GRANT.

States.	Number of acres to which each State was entitled under the eighth section of the act of September 4, 1841.	Number of acres approved up to June 30, 1868.	Number of acres remaining to each State to be selected on the 1st of July, 1868.
Illinois.....	209,085.50	*209,060.05	25.45
Missouri.....	500,000.00	500,000.00	.....
Alabama.....	97,469.17	*97,469.17	.....
Mississippi.....	500,000.00	500,000.00	.....
Louisiana.....	500,000.00	482,166.97	17,833.03
Michigan.....	500,000.00	498,638.54	1,361.46
Arkansas.....	500,000.00	499,880.03	119.97
Florida.....	499,990.00	450,823.82	49,166.18
Iowa.....	500,000.00	500,000.00	.....
Wisconsin.....	500,000.00	499,973.87	26.13
California.....	500,000.00	205,159.51	294,840.49
Kansas.....	500,000.00	495,552.20	4,447.80
Minnesota.....	500,000.00	252,028.60	247,971.40
Oregon.....	500,000.00	196,099.03	303,900.97
Nevada.....	500,000.00	.....	500,000.00
Nebraska.....	500,000.00	.....	500,000.00
Total.....	7,306,544.67	5,386,851.79	1,919,692.88

* The States of Illinois and Alabama received grants under prior acts, which, with the quantities here given, make up the quantity of 500,000 acres.

JOS. S. WILSON, *Commissioner.*

DEPARTMENT OF THE INTERIOR,
General Land Office, November 5, 1868.

No. 9.—Condition of bounty land business under acts of 1847, 1850, 1852, and 1855, showing the issues and locations from the commencement of operations under said acts to June 3, 1868.

Grade of warrants.	Number issued.	Acres embraced thereby.	Number located.	Acres embraced thereby.	Number outstanding.	Acres embraced thereby.
<i>Act of 1847.</i>						
One hundred and sixty acres.....	80, 637	12, 901, 920	78, 445	12, 551, 200	2, 192	350, 720
Forty acres.....	7, 582	303, 280	7, 005	280, 200	577	23, 088
Total.....	88, 219	13, 205, 200	85, 450	12, 831, 400	2, 769	373, 808
<i>Act of 1850.</i>						
One hundred and sixty acres.....	27, 437	4, 389, 920	26, 479	4, 236, 640	958	153, 280
Eighty acres.....	57, 707	4, 616, 560	55, 515	4, 441, 200	2, 192	175, 360
Forty acres.....	103, 962	4, 158, 480	99, 504	3, 980, 160	4, 458	178, 280
Total.....	189, 106	13, 164, 960	181, 498	12, 658, 000	7, 608	506, 960
<i>Act of 1852.</i>						
One hundred and sixty acres.....	1, 222	195, 520	1, 178	188, 480	44	7, 040
Eighty acres.....	1, 698	135, 840	1, 643	131, 440	55	4, 400
Forty acres.....	9, 063	362, 520	8, 838	353, 520	225	9, 000
Total.....	11, 983	693, 880	11, 659	673, 440	324	20, 440
<i>Act of 1855.</i>						
One hundred and sixty acres.....	107, 052	17, 128, 320	96, 116	15, 378, 560	10, 936	1, 749, 760
One hundred and twenty acres.....	96, 613	11, 593, 560	86, 885	10, 426, 200	9, 728	1, 167, 360
One hundred acres.....	6	600	5	500	1	100
Eighty acres.....	49, 258	3, 940, 640	45, 903	3, 672, 240	3, 355	268, 400
Sixty acres.....	358	21, 480	285	17, 100	73	4, 380
Forty acres.....	532	21, 280	441	17, 640	91	3, 640
Ten acres.....	5	50	3	30	2	80
Total.....	253, 824	32, 705, 930	229, 638	29, 512, 270	24, 186	3, 193, 660
<i>Summary.</i>						
Act of 1847.....	88, 219	13, 205, 200	85, 450	12, 831, 400	2, 769	373, 808
Act of 1850.....	189, 106	13, 164, 960	181, 498	12, 658, 000	7, 608	506, 960
Act of 1852.....	11, 983	693, 880	11, 659	673, 440	324	20, 440
Act of 1855.....	253, 824	32, 705, 930	229, 638	29, 512, 270	24, 186	3, 193, 660
Total.....	543, 132	59, 769, 970	508, 245	55, 675, 110	34, 887	4, 094, 868

JOS. S. WILSON, *Commissioner.*

DEPARTMENT OF THE INTERIOR.
General Land Office, November 5, 1868.

No. 10.—Agricultural selections within certain States, and also scrip locations under agricultural and mechanic act of July 2, 1862, and supplements of April 14, 1864, and July 23, 1866.

Land districts.	Quantity selected to June 30, 1868.	Quantity located to June 30, 1868.	Quantity located in July and August, 1868.
MINNESOTA.			
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Taylor's Falls	3,000.00	1,120.00
St. Cloud	120,031.60	2,524.09
Winnepago City
St. Peter	2,463.00	.....
Greenleaf	11,892.22	.....
Du Luth	2,536.94	.....
Total	140,923.76	3,644.09
WISCONSIN.			
Menasha	62,279.00	.....
Falls of St. Croix	2,674.60	.....
Stevens's Point	27,795.66	.....
La Crosse	3,066.54	.....
Bayfield	63,898.76	.....
Eau Claire	240,688.36	.....
Total	400,402.92	.....
KANSAS.			
Topeka	7,743.20	.....
Junction City	24,118.88	160.00
Humboldt	114,584.78	3,669.12
Total	146,446.86	3,829.12
NEBRASKA.			
Omaha City	123,697.68	2,880.00
Brownsville	181,725.01	640.00
Nebraska City	62,954.66	6,400.00
Dakota City	12,261.91	4,313.37
Total	380,639.26	14,233.37
MISSOURI.			
Boonville	6,686.52	160.00
Ironton	39,660.30	.....
Springfield	3,952.66	.....
Total	50,299.48	160.00
MICHIGAN.			
Detroit
East Saginaw	325.57	.....
Ionis	1,255.10	.....
Marquette	17,114.68	.....
Traverse City	17,264.75	13,129.54	.....
Total	17,264.75	31,824.89	.....

No. 10.—*Agricultural selections, &c.*—Continued.

Land districts.	Quantity selected to June 30, 1868.	Quantity located to June 30, 1868.	Quantity located in July and August, 1868.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
IOWA.			
Fort Des Moines.....			
Council Bluffs.....		160.00	
Fort Dodge.....		18,536.87	160.00
Sioux City.....		102,038.16	9,592.97
Total.....		120,735.03	9,752.97
OREGON.			
Oregon City.....			
Roseburg.....		5,724.53	320.00
Le Grand.....			
Total.....		5,724.53	320.00
CALIFORNIA.			
San Francisco.....			320.00
Marysville.....			
Humboldt.....		4,175.14	320.00
Stockton.....		504,755.90	74,334.98
Visalia.....		70,818.98	44,236.67
Sacramento.....			
Total.....		579,750.02	119,211.65

RECAPITULATION.

Minnesota.....		140,923.76	3,644.09
Wisconsin.....		400,402.92	
Kansas.....		146,446.86	3,829.12
Nebraska.....		380,639.26	14,233.37
Missouri.....		50,299.48	160.00
Michigan.....	17,264.75	31,824.89	
Iowa.....		120,735.03	9,752.97
Oregon.....		5,724.53	320.00
California.....		579,750.02	119,211.65
Total.....	17,264.75	1,856,746.75	151,151.20

JOS. S. WILSON, *Commissioner.*DEPARTMENT OF THE INTERIOR,
General Land Office, November 5, 1868.

No. 11.—Statement exhibiting land concessions by acts of Congress to States and corporations, for railroad and military wagon-road purposes, from the year 1850 to June 30, 1868.

States.	Date of laws.	Statutes.	Page.	Name of road.	Mile limits.		Number of acres certified under the grants, up to June 30, 1867.	Number of acres certified for the year ending June 30, 1868.	Estimated quantities inuring under the grants.
Illinois	Sept. 20, 1850	9	466	Illinois Central	6 and 15		2,595,053.60		2,595,053.00
Do	do	9	466	Mobile and Chicago	6 and 15				
Mississippi	do	9	466	Mobile and Ohio River	6 and 15		737,130.29		404,800.00
*Do	Aug. 11, 1856	11	30	Southern railroad	6 and 15		171,550.00		1,004,640.00
Do	do	11	30	Gulf and Ship Island railroad	6 and 15				404,800.00
Alabama	Sept. 20, 1850	9	466	Mobile and Ohio River	6 and 15				652,800.00
*Do	May 17, 1856	11	15	Alabama and Florida	6 and 15		419,528.44		230,400.00
Do	do	11	15	Alabama and Tennessee	6 and 15		394,522.99		419,520.00
Do	June 3, 1856	11	17	Northeastern and Southwestern	6 and 15		440,700.16		481,920.00
Do	do	11	17	Coosa and Tennessee	6 and 15		289,535.58		691,840.00
Do	do	11	17	Will's Valley	6 and 15		67,784.96		132,480.00
Do	do	11	17	Mobile and Girard	6 and 15		171,920.51		206,080.00
Do	do	11	17	Coosa and Chattanooga	6 and 15		504,145.86		840,880.00
Do	do	11	17	Tennessee and Alabama Central	6 and 15				150,000.00
Do	Aug. 11, 1856	11	32	(No map filed.)	6 and 15				576,000.00
*Florida	May 17, 1856	11	15	Florida railroad	6 and 15		281,984.17		442,542.14
Do	do	11	15	Alabama and Florida	6 and 15		165,688.00		165,688.00
Do	do	11	15	Pensacola and Georgia	6 and 15		1,275,212.93		1,568,729.87
Do	do	11	15	Florida, Atlantic and Gulf Central	6 and 15		37,583.29		183,153.99
*Louisiana	June 3, 1856	11	18	Vicksburg and Shreveport	6 and 15		353,211.70		610,880.00
Do	do	11	18	New Orleans, Opelousas and Great Western	6 and 15		719,193.75		967,840.00
Do	Aug. 11, 1856	11	32	(No map filed.)					
Arkansas	Feb. 9, 1853	10	155	Memphis and Little Rock	6 and 15		127,238.51		438,646.89
Do	July 28, 1866	14	338	Memphis and Little Rock	Additional.	5			365,539.00
Do	Feb. 9, 1853	10	155	Cairo and Fulton	6 and 15		1,115,408.41		1,100,067.40
Do	July 28, 1866	14	338	Cairo and Fulton	Additional.	5			966,722.00
Do	Feb. 9, 1853	10	155	Little Rock and Fort Smith	6 and 15		550,520.18		550,525.34
Do	July 28, 1866	14	338	Little Rock and Fort Smith	Additional.	5			458,771.00
Do	July 4, 1866	14	83	Iron Mountain railroad	10 and 20				864,000.00
Missouri	June 10, 1852	10	8	Hannibal and St. Joseph's	6 and 15		493,821.35		781,944.83
Do	do	10	8	Pacific and Southwestern Branch	6 and 15		1,158,073.54		1,161,235.07
Do	Feb. 9, 1853	10	155	Cairo and Fulton	6 and 15		63,540.11		219,262.31
Do	July 28, 1866	14	338	Cairo and Fulton	Additional.	5			182,718.00
Do	July 4, 1866	14	83	Iron Mountain, (from Pilot Knob to Helena, Arkansas)	10 and 20				400,000.00
Iowa	May 15, 1856	11	9	Burlington and Missouri River	6 and 15		287,046.34		948,643.66

* Grants to Mississippi, Alabama, Florida, and Louisiana, under acts of May 17, June 3, and August 11, 1856, having expired, application will be made to Congress to extend the time for the completion of the railroads in said States.

States.	Date of laws.	Statutes.	Page.	Name of road.	Mile limits.	Number of acres certified under the grants up to June 30, 1867.	Number of acres certified for the year ending June 30, 1868.	Estimated quantities inuring under the grants.
Iowa	June 2, 1864	13	95	Burlington and Missouri River				
Do	Feb. 10, 1866	14	349	Time extended for completion of road		20		101, 110. 67
Do	May 15, 1856	11	9	Mississippi and Missouri	6 and 15	481, 774. 36		1, 144, 904. 90
Do	June 2, 1864	13	95	Mississippi and Missouri				116, 276. 70
Do	May 15, 1856	11	9	Cedar Rapids and Missouri River	6 and 15	775, 717. 67		1, 298, 739. 00
Do	June 2, 1864	13	95	Cedar Rapids and Missouri River				123, 370. 00
Do	July 2, 1864	13	363	Sioux City and Pacific		20		580, 000. 00
Do	May 15, 1856	11	9	Dubuque and Sioux City		10		
Do	June 2, 1864	13	98	Authorized change of route from Fort Dodge to Sioux City	6 and 15	1, 226, 163. 89		1, 226, 163. 05
Do	March 2, 1868			Time for completion of road extended to 1st January, 1872				
Do	May 12, 1864	13	72	McGregor and Western	10 and 20			1, 536, 000. 00
Do	do	13	72	Sioux City and St. Paul	10 and 20			256, 000. 00
Michigan	June 3, 1856	11	21	Port Huron and Milwaukee	6 and 15	6, 468. 68		312, 384. 32
Do	do	11	21	Detroit and Milwaukee	6 and 15	30, 998. 75		355, 420. 19
Do	do	11	21	Amboy, Lansing, and Traverse Bay				
Do	July 3, 1866	14	78	Time extended seven years	6 and 15	719, 386. 23		1, 052, 469. 19
Do	March 2, 1867	14	425	Time extended for completion of first twenty miles				
Do	June 3, 1856	11	21	Flint and Pere Marquette				
Do	July 3, 1866	14	78	An act to change the western terminus of the road	6 and 15	511, 425. 90		586, 828. 73
Do	June 3, 1856	11	21	Grand Rapids and Indiana				
Do	June 7, 1864	13	119	Grand Rapids and Indiana, (from Ft. Wayne to G'd Rapids, &c.)	6 and 15	629, 182. 32	20	629, 182. 62
Do	June 3, 1856	11	21	Bay de Noquet and Marquette	6 and 15	218, 881. 10		531, 200. 00
Do	March 3, 1865	13	521	Bay de Noquet and Marquette			200 sect's	218, 880. 87
Do	June 3, 1856	11	21	Marquette and Ontonagon	6 and 15	216, 919. 19		128, 000. 00
Do	March 3, 1865	13	521	Marquette and Ontonagon				309, 315. 24
Do	June 3, 1856	11	21	Chicago, St. Paul and Fond du Lac, (branch to Ontonagon)	6 and 15	46, 086. 45	20	243, 200. 00
Do	May 20, 1868	Printed Laws		Concerning certain lands granted to Marquette and Ontonagon railroad, by act of March 3, 1865.		174, 020. 41		208, 062. 59
(Resolution.)				Chicago, St. Paul and Fond du Lac, (branch to Marquette)	6 and 15	162, 044. 46		188, 507. 24
Michigan	June 3, 1856	11	21	Chicago and Northwestern	6 and 15			375, 680. 00
Do	July 5, 1862	12	620					
(Joint res.)								
Michigan	March 3, 1865	13	521	Chicago and Northwestern	Additional	5		188, 800. 00
Wisconsin	June 3, 1856	11	21	Tomah and Lake Superior, (formerly La Crosse and Milwaukee)	6 and 15	324, 943. 38		894, 907. 81
Do	May 5, 1864	13	66	Tomah and Lake Superior			10 and 20	675, 000. 00
Do	June 3, 1856	11	21	St. Croix and Lake Superior	6 and 15	524, 718. 15		524, 714. 25
Do	May 5, 1864	13	66	St. Croix and Lake Superior			10 and 20	350, 000. 00
Do	June 3, 1856	11	21	Branch to Bayfield	6 and 15	318, 740. 80		318, 737. 74
Do	May 5, 1864	13	66	Branch to Bayfield			10 and 20	215, 000. 00
Do	June 3, 1856	11	21	Chicago and Northwestern	6 and 15	211, 143. 02		600, 000. 00
Do	April 25, 1869	19	618	Changes line of route				

No. 11.—Statement exhibiting land concessions by acts of Congress to States and corporations, &c.—Continued.

States.	Date of laws.	Statutes.	Page.	Name of road.	Mile limits.		Number of acres certified under the grants up to June 30, 1867.	Number of acres certified for the year ending June 30, 1868.	Estimated quantities inuring under the grants.
Michigan . . .	March 3, 1863	12	797	From Fort Wilkins, Copper harbor, Michigan, to Fort Howard, Green bay, Wisconsin.	3 and 15				221, 013. 27
Do	June 8, 1868	Printed Laws		Time extended for completion to March 1, 1870					
Do	June 20, 1864		13	140	From Saginaw City, Michigan, by the shortest and most feasible route, to the Straits of Mackinaw.	6			
Do	do	13	140	From Grand Rapids, through Newaygo, Traverse City, and Little Traverse, to the Straits of Mackinaw.					
Oregon	July 2, 1864	13	355	From Eugene City, by way of Middle Fork of Willamette river, and the most feasible pass in the Cascade range of mountains, near Diamond Peak, to the eastern boundary of the State.	3			19, 153. 73	720, 000. 00
Do	July 4, 1866	14	86	From Corvallis to the Acquina bay	3				76, 800. 00
Do	July 5, 1866	14	89	From Albany, by way of Cahon City and the most feasible pass in the Cascade range, to the eastern boundary of the State.	3				460, 000. 00
Do	Feb. 25, 1867	14	409	From Dalles City, on the Columbia river, to Fort Boise, on the Snake river.	3				556, 800. 00

RECAPITULATION.

States.	Estimated number of acres granted for wagon roads.	Number of acres certified and patented under the grants.	Estimated number of acres granted.
Illinois		2, 595, 053. 00	2, 595, 053. 00
Mississippi		908, 680. 29	2, 062, 240. 00
Alabama		2, 288, 138. 50	3, 729, 120. 00
Florida		1, 760, 468. 39	2, 360, 114. 00
Louisiana		1, 072, 405. 45	1, 578, 720. 00
Arkansas		1, 793, 167. 10	4, 744, 271. 63
Missouri		1, 715, 435. 00	3, 745, 160. 21
Iowa		2, 770, 702. 26	7, 331, 207. 98
Michigan		2, 715, 413. 49	5, 327, 930. 99
Wisconsin		1, 379, 545. 35	5, 378, 360. 50
Minnesota		2, 315, 298. 12	7, 783, 403. 69
Kansas			7, 783, 000. 00

California			2,060,000.00
Oregon			1,660,000.00
Corporations: Pacific railroads		21,314,306.95	58,108,581.40
Wagon roads: Wisconsin		164,801.48	124,000,000.00
Michigan	250,000.00	148,935.67	
Oregon	1,718,613.27	19,153.73	3,782,213.27
	1,813,600.00		
Total		21,647,198.83	185,890,794.67

DEPARTMENT OF THE INTERIOR, *General Land Office, November 5, 1868.*

JOS. S. WILSON, *Commissioner.*

No. 12.—*Statement exhibiting land concessions by acts of Congress to States for canal purposes from the year 1827 to June 30, 1868.*

States.	Date of laws.	Statutes.	Page.	Name of canal.	Total No. of acres granted.
Indiana	Mar. 2, 1827	4	236	Wabash and Erie canal	1,439,279
Do.....	Feb. 27, 1841	5	414		
Do.....	Mar. 3, 1845	5	731		
Ohio	Mar. 2, 1827	4	236	Wabash and Erie canal	266,535
Do.....	June 30, 1834	4	716		
Do.....	May 24, 1828	4	305		
Do.....	May 24, 1828	4	306	Miami and Dayton canal.....	333,826
(5th sec.)				General canal purposes.....	500,000
Illinois	Mar. 2, 1827	4	234	Canal to connect the waters of the Illinois river with those of Lake Michigan	290,915
Wisconsin	June 18, 1838	5	245	Milwaukee and Rock River canal	125,431
Do.....	April 10, 1866	14	30	Breakwater and harbor and ship canal	200,000
Michigan	Aug. 26, 1852	10	35	St. Mary's ship canal	750,000
Do.....	Mar. 3, 1865	13	519	Portage Lake and Lake Superior ship canal	200,000
Do.....	July 3, 1866	14	81	Portage Lake and Lake Superior ship canal	200,000
Do.....	July 3, 1866	14	80	Ship canal to connect the waters of Lake Superior with the lake known as Lac la Belle	100,000

RECAPITULATION.

Indiana	1,439,279
Ohio	1,100,361
Illinois	290,915
Wisconsin	325,431
Michigan	1,250,000
Total number of acres granted.....	4,405,986

DEPARTMENT OF THE INTERIOR, *General Land Office, November 5, 1868.*

JOS. S. WILSON, *Commissioner.*

No. 13.—*Estimates of appropriations required for the office of the Commissioner of the General Land Office for the fiscal year ending June 30, 1870.*

Heads or titles of appropriations.	Estimates of appropriations required for the service of the fiscal year ending June 30, 1870.	Estimates of balances of appropriations unexpended June 30, 1869, which may in part be applied to the service of the next fiscal year.	Appropriations for the service of the fiscal year ending June 30, 1869.
For salary of Commissioner of the General Land Office, per act of July 4, 1836, (5 Laws, page 111, sec. 10)	\$3,000		
For salary of recorder, per same act, and act of March 3, 1837, (5 Laws, pages 111, 164)	2,000		
For salary of chief clerk, per act of March 3, 1853, (10 Laws, page 211)	2,000		
For salary of three principal clerks of public lands, private land claims and surveys, per act of July 4, 1836, at \$1,800 each, (5 Laws, page 111)	5,400		
For salary of three clerks of class four, per act of March 3, 1853, (Laws, page 211, sec 3)	5,400		
For salary of twenty-three clerks of class three, per same act, and act of April 22, 1854, (10 Laws, pages 211, 276) ..	36,800		
For salary of forty clerks, class two, per same acts	56,000		
For salary of forty clerks, class one, per same acts	48,000		
For salary of draughtsman, at \$1,600, and assistant draughtsman, at \$1,400, per act of July 4, 1836, (5 Laws, page 112,) and act of April 22, 1854, (10 Laws, page 276) ..	3,000		
For salary of five messengers, one chief messenger at \$1,000, and four assistant messengers at \$840 each, per act of July 4, 1836, and joint resolution of August 18, 1856, and act of July 23, 1866, (Laws, page 207, sec. 7)	4,360		
For salary of two packers at \$720 each, per act of July 4, 1836, act of September 30, 1850, joint resolution of August 18, 1856, and act of July 23, 1866, (Laws, page 207, sec. 7)	1,440		
For salary of seven laborers, per joint resolution of August 18, 1856, (11 Laws, page 145,) act of June 23, 1860, act of June 25, 1864, (13 Laws, page 160,) and act of July 23, 1866, (Laws, page 207)	5,040		
For salary of seven night watchmen, per same resolution and same acts	5,040		
For salary of one day watchman, per act of June 2, 1858, act of June 25, 1864, and act of July 23, 1866, (Laws, page 207)	720		
Total	178,200	.....	\$178,200

Estimates of appropriations under military act of March 3, 1855, and heretofore provided per act of August 18, 1856, making appropriations, &c., and subsequent appropriation laws.

Heads or titles of appropriations.	Estimates of appropriations required for the service of the fiscal year ending June 30, 1870.	Estimates of balances of appropriations unexpended June 30, 1869, which in part may be applied to the service of the next fiscal year.	Appropriations for the service of the fiscal year ending June 30, 1869.
For salary of one principal clerk, as director.....	\$2,000		
For salary of one clerk of class three	1,600		
For salary of four clerks of class two	5,600		
For salary of forty clerks of class one	48,000		
For salary of two laborers, per joint resolution of August 18, 1856, (11 Laws, page 145,) act June 25, 1864, and act of July 23, 1866, (Laws, page 207, sec. 7)	1,440		
Total	58,640	.....	\$58,640

Provided, That the Secretary of the Interior, at his discretion, shall be, and he is hereby, authorized to use any portion of said appropriation for piece-work, or by the day, week, month, or year, at such rate or rates as he may deem just and fair, not exceeding a salary of twelve hundred dollars per annum.

JOS. S. WILSON, *Commissioner*.

GENERAL LAND OFFICE, *November 5, 1868.*

Estimates of appropriations required to meet contingent expenses of the office of Commissioner of the General Land Office for the fiscal year ending June 30, 1870.

Heads or titles of appropriations.	Estimates of appropriations required for the service of the fiscal year ending June 30, 1870.	Estimates of balances of appropriations unexpended on June 30, 1869, which may be applied to the service of the next fiscal year.	Appropriations for the service of the fiscal year ending June 30, 1869.
For cash system, maps, diagrams, stationery, furniture and repairs of the same; miscellaneous items, including two of the city newspapers, to be filed, bound, and preserved for the use of the office; for advertising and telegraphing; for miscellaneous items on account of bounty lands and military patents under the several acts, and for contingent expenses under swamp-land act September 28, 1850	\$10,000	.....	\$10,000

JOS. S. WILSON, *Commissioner*.

GENERAL LAND OFFICE, *November 5, 1868.*

Estimates of appropriations required to meet expenses of collecting the revenue from the sales of public lands in the several States and Territories for the fiscal year ending June 30, 1870.

State.	Land office.	Salaries and commissions.	Incidental expenses.	Total.
Ohio	Chillicothe	\$1,200	\$100	\$1,300
Indiana	Indianapolis	1,200	100	1,300
Illinois	Springfield	1,200	100	1,300
Missouri	Boonville	6,000	500	13,900
	Ironton	3,000	200	
	Springfield	4,000	200	
	Detroit	3,000	200	
Michigan	East Saginaw	4,000	200	24,000
	Ionia	5,000	200	
	Marquette	5,000	200	
	Traverse City	6,000	200	
Iowa	Des Moines	3,000	150	14,600
	Council Bluffs	2,000	150	
	Fort Dodge	3,000	150	
	Sioux City	6,000	150	
Wisconsin	Menasha	6,000	150	26,900
	Falls St. Croix	4,000	150	
	Stevens's Point	4,000	150	
	La Crosse	4,000	150	
	Bayfield	2,000	150	34,800
Minnesota	Eau Claire	6,000	150	
	Taylor's Falls	4,000	200	
	St. Cloud	6,000	200	
	Winnebago City	6,000	200	30,200
	Greenleaf	5,000	200	
	St. Peter	6,000	200	
	Du Luth	2,000	200	
California	Alexandria	4,000	600	15,000
	San Francisco	6,000	500	
	Marysville	6,000	500	
	Humboldt	3,000	200	
	Stockton	6,000	400	17,600
	Visalia	4,000	200	
	Sacramento	3,000	400	
Oregon	Oregon City	6,000	400	
	Roseburg	6,000	300	13,300
	Le Grand	2,000	300	
Kansas	Topeka	5,000	200	
	Humboldt	6,000	200	
	Junction City	6,000	200	11,200
Alabama	Montgomery	6,000	500	
	Huntsville	3,000	300	
	Mobile	3,000	500	
Arkansas	Little Rock	4,000	400	9,300
	Clarksville	3,000	400	
	Washington	3,000	400	
Louisiana	New Orleans	4,000	500	
	Natchitoches	2,000	400	6,500
	Monroe	2,000	400	
Florida	Tallahassee	6,000	500	
Mississippi	Jackson	4,000	500	
Nevada	Carson City	4,000	400	11,700
	Austin	2,000	400	
	Belmont	2,000	400	
	Aurora	2,000	500	
Nebraska	West Point	4,000	500	25,100
	Beatrice	6,000	500	
	Lincoln	6,000	500	
	Dakota City	3,000	200	
	Grand Island	4,000	400	

Estimate of appropriations required to meet expenses, &c.—Continued.

State.	Land office.	Salaries and commissions.	Incidental expenses.	Total.
Washington Ter.	Olympia	\$6,000	\$300 }	12,600
	Vancouver	6,000	300 }	
Colorado Ter....	Denver	5,000	400 }	12,200
	Central City	4,000	400 }	
	Fair Play	2,000	400 }	
Idaho Ter.....	Boise City	2,000	500 }	5,000
	Lewiston	2,000	500 }	
Dakota Ter	Vermillion	5,000	300	5,300
Montana Ter	Helena	3,000	500	3,500
Arizona Ter	Prescott	3,000	500	3,500
Utah Ter	Salt Lake City	4,000	500	4,500
New Mexico.....	Santa Fé	1,200	100	1,300
	Totals	287,800	22,600	310,400

JOS. S. WILSON, *Commissioner.*GENERAL LAND OFFICE, *November 5, 1863.*

No. 14.—*Estimates of appropriations required for the surveying department for the fiscal year ending June 30, 1870.*

Objects of appropriation.	Estimates by the surveyor general.	Estimates of appropriations required for the service of the fiscal year ending June 30, 1870.	Estimates of the balances of appropriations unexpended June 30, 1869, which in part may be applied to the service of the next fiscal year.	Appropriations for the service of the fiscal year ending June 30, 1869.
<i>For compensation of the surveyors general and their clerks, in addition to the unexpended balances of former appropriations for the same objects.</i>				
1. For compensation of the surveyor general of Minnesota, per act of May 18, 1796—1 Statutes, page 464, section 10, and act of March 3, 1857—11 Statutes, page 212, section 1.....	\$2,000 00	\$2,000 00	.....	\$2,000 00
2. For compensation of the clerks in the office of the surveyor general of Minnesota, per act of May 9, 1836—5 Statutes, page 26, section 1, and act of March 3, 1857—11 Statutes, page 212, section 1.....	6,300 00	6,300 00	.....	2,500 00
3. For compensation of the surveyor general of the Territory of Dakota, per act of March 2, 1861—12 Statutes, page 244, section 17.....	2,000 00	2,000 00	.....	2,000 00
4. For compensation of the clerks in the office of the surveyor general of Dakota, per act of March 2, 1861—12 Statutes, page 244, section 17.....	6,300 00	6,300 00	.....	2,500 00
5. For compensation of the surveyor general of Kansas, per act of July 22, 1854—10 Statutes, page 309, section 10.....	2,000 00	2,000 00	.....	2,000 00
6. For compensation of the clerks in the office of the surveyor general of Kansas, per act of July 22, 1854—10 Statutes, page 309, section 10.....	6,400 00	6,300 00	.....	4,000 00
7. For compensation of the surveyor general of Colorado, per act of February 28, 1861—12 Statutes, page 176, section 17.....	3,000 00	3,000 00	.....	3,000 00
8. For compensation of the clerks in the office of the surveyor general of Colorado, per act of February 28, 1861—12 Statutes, page 176, section 17.....	6,800 00	4,000 00	.....	4,000 00
9. For compensation of the surveyor general of New Mexico, per act of July 22, 1854—10 Statutes, page 308, section 1.....	3,000 00	3,000 00	.....	3,000 00
10. For compensation of the clerks in the office of the surveyor general of New Mexico, per act of July 22, 1854—10 Statutes, page 308, section 1.....	5,200 00	4,000 00	.....	.....
11. For compensation of the surveyor general of California and Arizona, per act of May 30, 1863—12 Statutes, page 410, section 9, and act of March 2, 1867—14 Statutes, page 543, section 4.....	3,000 00	3,000 00	.....	3,000 00
12. For compensation of the clerks in the office of the surveyor general of California and Arizona, per act of March 3, 1853—10 Statutes, page 245, section 2.....	17,900 00	11,000 00	.....	4,500 00
13. For compensation of the surveyor general of Idaho, per act of June 29, 1866—United States Laws, volume 14, page 77.....	3,000 00	3,000 00	.....	3,000 00
14. For compensation of the clerks in the office of the surveyor general of Idaho, per act of June 29, 1866—United States Laws, volume 14, page 77.....	3,300 00	4,000 00	.....	4,000 00
15. For compensation of the surveyor general of Nevada, per act of July 4, 1866—United States Laws, volume 14, page 86.....	3,000 00	3,000 00	.....	2,500 00
16. For compensation of the clerks in the office of the surveyor general of Nevada, per act of July 4, 1866—United States Laws, volume 14, page 86.....	9,400 00	4,000 00	.....	4,000 00

17. For compensation of the surveyor general of Oregon, per act of May 30, 1862—12 Statutes, page 410, section 10.....	2,500 00	2,500 00	2,500 00
18. For compensation of the clerks in the office of the surveyor general of Oregon, per act of September 27, 1850—9 Statutes, page 496, section 2.....	5,400 00	4,000 00	4,000 00
19. For compensation of the surveyor general of Washington Territory, per act of May 30, 1862—12 Statutes, page 410, section 9.....	2,500 00	2,500 00	2,500 00
20. For compensation of the clerks in the office of the surveyor general of Washington Territory, per act of March 3, 1855—10 Statutes, page 674, section 6.....	5,900 00	4,000 00	4,000 00
21. For compensation of the surveyor general of Nebraska and Iowa, per act of August 8, 1846—9 Statutes, page 79, section 1, and act of July 28, 1866—United States Laws, volume 14, page 448.....	2,000 00	2,000 00	2,000 00
22. For compensation of the clerks in the office of the surveyor general of Nebraska and Iowa, per act of August 8, 1846—9 Statutes, page 79, sec. 1, and act of July 28, 1866—United States Laws, vol. 14, p. 344.....	7,500 00	6,300 00	4,000 00
23. For compensation of the surveyor general of Montana, per act of March 2, 1867—United States Laws, vol. 14, p. 542.....	3,000 00	3,000 00	3,000 00
24. For compensation of the clerks in the office of the surveyor general of Montana, per act of March 2, 1867—United States Laws, vol. 14, p. 542.....	7,000 00	4,000 00	3,000 00
25. For compensation of the surveyor general of Utah Territory, per act of July 16, 1868—United States Laws, 1867-'68, p. —, sec. 1.....		3,000 00	
26. For compensation of the clerks in the office of the surveyor general of Utah Territory, per act of July 16, 1868—United States Laws, 1867-'68, p. —, sec. 1.....		4,000 00	
27. For compensation of clerks in the offices of the surveyors general, to be apportioned to them according to the exigencies of the public service, and to be employed in transcribing field-notes of surveys, for the purpose of preserving them at the seat of government.....		15,000 00	
28. For compensation of the recorder of land titles in Missouri, per act of March 2, 1805—2 Statutes, p. 326.....		500 00	500 00
Total.....		117,700 00	
<i>For contingent expenses of the offices of the surveyors general of different surveying districts, in addition to the unexpended balances of former appropriations for the same objects.</i>			
29. For rent of office for the surveyor general of the Territory of Dakota, fuel, books, stationery, and other incidental expenses, per act of March 2, 1861—12 Statutes, p. 244, sec. 17.....	2,000 00	2,000 00	1,000 00
30. For rent of office for the surveyor general of Kansas, fuel, books, stationery, and other incidental expenses, per act of July 22, 1854—10 Statutes, page 310, sec. 10.....	2,000 00	2,000 00	1,000 00
31. For rent of office for the surveyor general of the Territory of Colorado, fuel, books, stationery, and other incidental expenses, per act of February 28, 1861—12 Statutes, page 176, sec. 17.....	2,000 00	2,000 00	1,000 00
32. For rent of office for the surveyor general of New Mexico, fuel, books, stationery, and other incidental expenses, per act of July 22, 1854—10 Statutes, p. 308, sec. 1.....	1,200 00	1,200 00	
33. For rent of office for the surveyor general of California and Arizona, fuel, books, stationery, and other incidental expenses, per act of March 3, 1853—10 Statutes, p. 245, sec. 2.....	6,000 00	6,000 00	2,000 00
34. For rent of office for the surveyor general of Oregon, fuel, books, stationery, and other incidental expenses, per act of September 27, 1850—9 Statutes, p. 496, sec. 2.....	2,000 00	2,000 00	1,000 00
35. For rent of office for the surveyor general of Washington Territory, fuel, books, stationery, and other incidental expenses, per act of July 17, 1854—10 Statutes, p. 306, sec. 7.....	2,000 00	2,000 00	1,000 00
36. For rent of office for the surveyor general of Nevada, fuel, books, stationery, and other incidental expenses, per act of July 4, 1866, United States Laws, vol. 14, p. 86.....	4,700 00	4,000 00	1,500 00
37. For rent of office for the surveyor general of Idaho, fuel, books, stationery, and other incidental expenses, per act of June 29, 1866—United States Laws, vol. 14, p. 77.....	3,000 00	2,500 00	1,000 00
38. For rent of office for the surveyor general of Nebraska and Iowa, fuel, books, stationery, and other incidental expenses, per act of June 12, 1838—5 Statutes, p. 243.....	2,000 00	2,000 00	1,500 00

Objects of appropriation.	Estimates by the surveyor general.	Estimates of appropriations required for the service of the fiscal year ending June 30, 1870.	Estimates of the balances of appropriations unexpended June 30, 1869, which in part may be applied to the service of the next fiscal year.	Appropriations for the service of the fiscal year ending June 30, 1869.
39. For rent of office for the surveyor general of Montana, fuel, books, stationery, and other incidental expenses, per act of March, 2, 1867—United States Laws, vol. 14, p. 542.....	\$3,000 00	\$3,000 00	.....	\$1,000 00
40. For rent of office for the surveyor general of Utah Territory, fuel, books, stationery, and other incidental expenses, per act of July 16, 1868—United States Laws, 1867-'68.....	.....	2,000 00	.....	.....
Total.....	.....	30,700 00	.....	.....

EXPLANATION OF THE FOREGOING ESTIMATES.

27. \$15,000 is estimated to make up deficiencies, the organic acts fixing the amounts for compensation of clerks in several surveying districts having proved insufficient, special estimates have been submitted for that purpose from time to time, and apportionments made according to absolute requirements of the service.
 29, 30, 31, 32, 34, 35, 36, 37, 3E, 39, and 40. The organic acts of Congress provide for the respective surveying districts \$1,000 for incidental expenses of the surveyors general offices. The amount having proved inadequate to maintain the offices, special estimates have been submitted from year to year and appropriations made according to the actual necessities.

JOS. S. WILSON, *Commissioner.*

DEPARTMENT OF THE INTERIOR,
General Land Office, November 5, 1868.

No. 15.—Estimates of appropriations required for surveying the public lands for the fiscal year ending June 30, 1870.

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Objects of appropriation.	Estimated by the surveyor general.	Estimates of appropriations required for the service of the fiscal year ending June 30, 1870.	Estimates of the balances of appropriations unexpended June 30, 1869, which in part may be applied to the service of the next fiscal year.	Appropriations for the service of the fiscal year ending June 30, 1869.
1. For surveying the public lands in Minnesota, at rates not exceeding \$10 per mile for standard lines, \$7 for township, and \$6 for section lines.....	\$25,000 00	\$25,000 00	.....	\$22,000 00
2. For surveying the public lands in Dakota Territory, at rates not exceeding \$10 per mile for standard lines, \$7 for township, and \$6 for section lines.....	25,000 00	15,000 00	.....	20,000 00
3. For surveying the public lands in Montana Territory, at rates not exceeding \$15 per mile for standard lines, \$12 for township, and \$10 for section lines.....	51,534 00	25,000 00	.....	20,000 00
4. For surveying the public lands in Nebraska, at rates not exceeding \$10 per mile for standard lines, \$6 for township, and \$5 for section lines.....	80,304 00	40,000 00	.....	40,000 00
5. For surveying the public lands in Kansas, at rates not exceeding \$10 per mile for standard lines, \$6 for township, and \$5 for section lines.....	56,184 00	40,000 00	.....	40,000 00
6. For surveying the public lands in Colorado Territory, at rates not exceeding \$15 per mile for standard lines, \$12 for township, and \$10 for section lines.....	123,550 00	30,000 00	.....	40,000 00
7. For surveying the public lands in Nevada, at rates not exceeding \$15 per mile for standard lines, \$12 for township, and \$10 for section lines.....	59,300 00	40,000 00	.....	50,000 00
8. For surveying the public lands in Idaho Territory, at rates not exceeding \$15 per mile for standard lines, \$12 for township, and \$10 for section lines.....	40,140 00	20,000 00	.....	15,000 00
9. For surveying the public lands in New Mexico Territory, at rates not exceeding \$15 per mile for standard lines, \$12 for township, and \$10 for section lines.....	30,264 00	5,000 00	.....	5,000 00
10. For surveying the public lands in Arizona Territory, at rates not exceeding \$15 per mile for standard lines, \$12 for township, and \$10 for section lines.....	30,000 00	5,000 00	.....	5,000 00
11. For surveying the public lands in California, at rates not exceeding \$15 per mile for standard lines, \$12 for township, and \$10 for section lines.....	150,000 00	50,000 00	.....	50,000 00
12. For surveying the public lands in Oregon, at rates not exceeding \$15 per mile for standard lines, \$12 for township, and \$10 for section lines.....	49,400 00	40,000 00	.....	40,000 00
13. For surveying the public lands in Washington Territory, at rates not exceeding \$15 per mile for standard lines, \$12 for township, and \$10 for section lines.....	51,486 00	15,000 00	.....	15,000 00
14. For surveying the public lands in Utah Territory, at rates not exceeding \$15 per mile for standard lines, \$12 for township, and \$10 for section lines.....	30,000 00	10,000 00	.....	20,000 00
15. For surveying the public lands in Wyoming Territory, at rates not exceeding \$15 per mile for standard lines, \$12 for township, and \$10 for section lines.....	25,000 00	15,000 00	.....	.....
16. For the survey of that part of the eastern boundary of Colorado Territory which lies between the 37th and 40th parallels of north latitude, estimated 210 miles, at not exceeding \$12 per mile.....	.....	2,520 00	.....	.....
17. For the survey of the northern boundary of Nevada, estimated 310 miles, at not exceeding \$25 per mile.....	.....	7,750 00	.....	.....
Total.....	.....	385,270 00	.....	.....

EXPLANATION OF THE FOREGOING ESTIMATES.

1. \$25,000 here estimated is to be applied to the survey of pine lands on the Upper Mississippi river, and other public lands required for immediate settlement.
 2. \$15,000 is estimated for the survey of the public lands in the valleys of the Missouri, Dakota, Big Sioux, and Red River of the North.
 3. \$25,000 is submitted for the extension of standard lines, township and subdivisional lines in the regions of the country required by settlers and miners.
 4. \$40,000 is estimated for surveys of the public lands along the Platte river, within the limits of congressional grant, to the Union Pacific railroad, and other parts of the State.
 5. \$40,000 is estimated for the survey of the public lands required for actual settlement, and to enable railroad companies to select alternate sections granted by Congress.
 6. \$30,000 is submitted for the extension of standard lines, township and sections in the Parks of the Rocky mountains, and along Pacific railroad routes.
 7. \$40,000 is estimated for surveys of standard lines, township and section lines in the valleys of Humboldt, Ruby, Carson, and Walker rivers, and within the limits of the Central Pacific railroad grant.
 8. \$20,000 is submitted for extension of the lines of the public surveys in agricultural and mineral regions of the Territory.
 9. \$5,000 is estimated for the survey of the public lands in the valleys of Gila, Pecos, and Canadian rivers, required by actual settlers.
 10. \$5,000 is estimated for the extension of the lines of the public surveys, to localities occupied by actual settlers and miners.
 11. \$50,000 is submitted for surveys within the Central Pacific railroad grant, also to meet the requirements of the 8th section act of Congress of July 23, 1866, vol. 14, page 220.
 12. \$40,000 is submitted for the surveys in John Day's, Umpqua, and Smith's River valleys, along Oregon Central Military road, and other places actually settled upon.
 13. \$15,000 is estimated for surveys in the valleys of Yakama and Columbia rivers, also in those of Colville, Chehalis, and other agricultural districts.
 14. \$10,000 is submitted to cover the expense of retracing and restoring obliterated former lines of public surveys and along the Union Pacific railroad, to enable the company to select the lands granted by Congress.
 15. \$15,000 is estimated for the survey of standard and other lines of public surveys lying in the southern part of the Territory, along the Union Pacific railroad.
 16. \$2,520. 17. \$7,750. These respective sums are estimated for surveying and determining astronomically the boundaries of States and Territories, and marking them conspicuously so as to afford limits of several political jurisdictions, and to close the lines of public surveys thereon; mining interests, and adjudication thereof by courts, requiring the survey thereof.
- NOTE.—No estimates are here submitted for the survey of Indian and other reservations contemplated by the 6th section of the act of Congress approved April 8, 1864, (U. S. Statutes, vol. 13, page 41.) as such estimates should more appropriately emanate from the Office of Indian Affairs, whose province it is to determine the localities and extent of such reservations, as that office was advised by letter of October 6, 1868, from the Commissioner of the General Land Office.

JOS. S. WILSON, *Commissioner*.

DEPARTMENT OF THE INTERIOR,
General Land Office, November 5 1868.

No. 16.—*Estimate of appropriations required for the surveying department, to supply deficiency, for the fiscal year ending June 30, 1869.*

Objects of appropriation.	Amount.
1. For compensation of the clerks in the office of the surveyor general of California and Arizona Territory.....	\$6,500
2. For compensation of the clerks in the office of the surveyor general of Kansas.....	2,300
3. For compensation of the clerks in the office of the surveyor general of Minnesota.....	3,800
4. For compensation of the clerks in the office of the surveyor general of Montana Territory....	1,000
5. For compensation of the clerks in the office of the surveyor general of Nebraska and Iowa....	1,256
	14,856
6. For rent of office for the surveyor general of Washington Territory, fuel, books, stationery, and other incidental expenses.....	1,000
7. For rent of office for the surveyor general of Dakota Territory, fuel, books, stationery, and other incidental expenses.....	1,000
8. For rent of office for the surveyor general of Nevada, fuel, books, stationery, and other incidental expenses.....	1,500
9. For rent of office for the surveyor general of Montana Territory, fuel, books, stationery, and other incidental expenses.....	2,500
10. For rent of office for the surveyor general of California and Arizona Territory, fuel, books, stationery, and other incidental expenses.....	1,200
	7,200

EXPLANATION OF THE FOREGOING DEFICIENCY ESTIMATES.

1. The organic act authorizes not exceeding \$11,000; (*vide* United States Statutes, vol. 10, page 245.) General Land Office estimate of that amount, absolutely required for the service, was reduced by Congress, during the last session, to \$4,300—thereby occasioning the deficiency.
2. The organic act authorizes not exceeding \$6,300; (*vide* United States Statutes, vol. 10, page 309.) General Land Office estimate of that amount, absolutely required for the service, was reduced by Congress, during the last session, to \$4,000—thereby occasioning the deficiency.
3. The organic act authorizes not exceeding \$6,300; (*vide* United States Statutes, vol. 5, page 26, and vol. 11, page 212.) General Land Office estimate of that amount, absolutely required for the service, was reduced by Congress, during the last session, to \$2,500—thereby occasioning the deficiency.
4. The organic act authorizes not exceeding \$4,000; (*vide* United States Statutes, vol. 9, page 496, and vol. 14, page 542.) General Land Office estimate of that amount, absolutely required for the service, was reduced by Congress, during the last session, to \$3,000—thereby occasioning the deficiency.
5. The organic act authorizes not exceeding \$6,300; (*vide* United States Statutes, vol. 5, page 26, and vol. 14, page 314.) General Land Office estimate of that amount, absolutely required for the service, was reduced by Congress, during the last session, to \$4,000—thereby occasioning the deficiency.
6. The organic act authorizes \$1,000; (*vide* United States Laws, vol. 10, page 366.) The amount having proved insufficient, \$2,000 was submitted as absolutely necessary, but was reduced by Congress, during the last session, to \$1,000—thereby occasioning the deficiency.
7. The organic act authorizes \$1,000; (*vide* United States Laws, vol. 2, page 244.) The amount having proved insufficient, \$2,000 was submitted as absolutely necessary, but was reduced by Congress, during the last session, to \$1,000—thereby occasioning the deficiency.
8. The organic act authorizes \$1,000; (*vide* United States Laws, vol. 14, page 86.) The amount having proved insufficient, \$2,000 was submitted as absolutely necessary, but was reduced by Congress, during the last session, to \$1,500—thereby occasioning the deficiency.
9. The organic act authorizes \$1,000; (*vide* United States Laws, vol. 14, page 254.) The amount having proved insufficient, \$3,000 was submitted as absolutely necessary, but was reduced by Congress, during the last session, to \$1,000—thereby occasioning the deficiency.
10. The organic act authorizes \$10,000; (*vide* United States Laws, vol. 10, page 245.) The sum of \$5,000 was estimated, but reduced by Congress, during the last session, to \$2,000—thereby occasioning the deficiency.

JOS. S. WILSON, *Commissioner.*DEPARTMENT OF THE INTERIOR,
General Land Office, November 5, 1868.

No. 17 A.

SURVEYOR GENERAL'S OFFICE,
St. Paul, Minnesota, September 15, 1868.

SIR: In compliance with your instructions, I have the honor to submit my annual report of the field and office work performed in this surveying district, since the last annual report, together with the usual tabular statements relating thereto. All the field work undertaken at the date of my last annual report was satisfactorily executed within the time named in the contracts, and the notes returned to this office. These contracts embraced the subdivision of 50 townships, and the running of over 700 miles of standard and township lines.

The notes of all the above-mentioned surveys have been carefully and critically examined, and diagrams, plats, and transcripts of field-notes have been made and transmitted.

The field work for the last season was prosecuted mainly in the western part of the State—desirable agricultural lands—and yet settlements are rapidly being made beyond and in advance of these surveys.

The deputies sent into the field this season, so far as heard from, are making good progress, and from their known competency and energy, no doubt is entertained of their ability to complete their contracts in a satisfactory manner, and within the time fixed therein.

As timber agent, I caused a thorough examination of the pine regions to be made early in the spring, and have the satisfaction of being able to say that trespasses on the public lands were less last winter than formerly, and but little disposition seems manifest to purposely commit depredations on those lands. Much of the timber cut on government lands was through ignorance of the lines of the public surveys.

As a very full report as to the material interests of the State, her resources, agricultural, mineral, manufacturing, &c., was submitted as a supplement to my last annual report, it is not deemed necessary to repeat what was then given, as anything I could now say would only be a repetition of the former report. In the mean time the State has increased rapidly in population and wealth, and the season just closing has probably been the most favorable one to the husbandman, in particular, of any since its settlement. All the staple crops, wheat, oats, corn, rye, barley, &c., are excellent. The wheat crop will average at least 20 bushels per acre throughout the State, and probably more.

I give, in addition to the information contained in the tables accompanying this report, the following statements:

The original notes of 3,530 miles of subdivisional surveys, including meanders of lakes and rivers, have been critically examined, platted, and transcribed, the contents of the fractional lots calculated and designated on the maps, and the plats and transcripts transmitted.

The notes of 600 miles of standard and township lines have been examined and placed on file; diagrams of same made and transmitted, with transcripts of field-notes.

Two thousand eight hundred pages of transcripts and records have been made, compared, and indexed, with title-page to each township.

Ninety-six descriptive sheets, giving the establishment of exterior and interior corners, with description of soil, timber, &c., have been prepared, compared with the original notes, and transmitted to the local land offices, or filed in this office.

One hundred and fifty-two township plats have been made, including the originals, Commissioner's, and the registers'.

The usual amount of miscellaneous business has been performed; such as preparing contracts and bonds, (in quadruplicate,) with instructions and diagrams of the exterior boundaries of their surveys, for deputies, making and recording of accounts, the general correspondence of the office, and recording the same, &c., all of which occupies a large amount of time, but of which no detailed statement can well be given. This report has been delayed a few days, in order that the entire office work of the surveys of last season might be completed and reported.

The several statements, estimates, &c., accompanying this report, are as follows:

A.—Amount, character, locality, and present condition of the surveys in the field.

B.—Original, Commissioner's, and registers' plats, made and copied, with date of transmission.

C.—Estimate of appropriation for surveys for fiscal year ending June 30, 1870.

D.—Estimate of appropriation for salaries for fiscal year ending June 30, 1870.

E.—Abstract account of the incidental expenses of the office, from July 1, 1867, to June 30, 1868.

F.—Sketch of public surveys.

G.—Statement showing the number of townships surveyed, and acres of land therein.

I am, very respectfully, your obedient servant,

L. NUTTING,
Surveyor General.

Hon. JOS. S. WILSON,

Commissioner General Land Office, Washington, D C.

A.—Statement showing the amount, character, locality, and present condition of the surveys in Minnesota, uncompleted at and undertaken since the date of the last annual report.

Names of deputies.	Date of contract.	Character of work.	Amount and locality.	Present condition.
Geo. R. and Geo. E. Stuntz	Mar. 12, 1867	Standard & township lines.	The 3d guide meridian, from the intersection of the 10th standard parallel therewith, due north 48 miles; the 6th and 7th correction lines from the independent meridian to the 3d guide meridian, and the township lines between the 6th and 7th correction lines, and between the independent and 3d guide meridian.	Surveys completed; approved, and notes and plats transmitted.
Jewett and Howe.....	Apr. 6, 1867	Subdivisions.....	Townships 109, 110, 111, and 112 north, ranges 39, 40, 41, 42, and 43 west of the 5th principal meridian.	Do. do. do.
Geo. B. Wright.....	Apr. 6, 1867	do.....	Townships 121, 122, 123, and 124 north, ranges 39 and 40 west, and townships 123 and 124 north, range 41 west 5th principal meridian.	Do. do. do.
David Watson.....	Apr. 8, 1867	do.....	Township 114 north, ranges 41 and 42 west, and townships 113, 114, and 115 north, range 43 west 5th meridian.	Do. do. do.
Oscar E. Garrison.....	Apr. 8, 1867	do.....	Township 127 north, ranges 33 and 34 west 5th principal meridian.	Do. do. do.
Thos. B. Walker.....	Apr. 17, 1867	Township lines & subdivisions.	Township lines between the south boundary of the State and the 1st standard parallel from the 5th guide meridian to the western boundary of the State; subdivisions of township 105, 106, 107, and 108 north, range 44 west, and township 105 north, range 45 west 5th principal meridian.	Do. do. do.
Geo. R. and Geo. E. Stuntz (instructions.)	Aug. 1, 1867	Subdivisions.....	Township 54 north, ranges 24, 25, and 26 west, and township 55 north, ranges 25 and 26 west 4th principal meridian.	Do. do. do.
Oscar E. Garrison.....	Aug. 5, 1867	Township lines & subdivisions.	Township lines between townships 49 and 50 north, ranges 26 and 27 west. Range lines between ranges 25 and 26, 26 and 27, in township 49 north. Subdivisions of township 49 north, ranges 26 and 27 west of 4th principal meridian, and township 140 north, range 25 west of the 5th principal meridian.	Do. do. do.
Oscar E. Garrison.....	May 25, 1868	Township lines & subdivisions.	Township lines between townships 50 and 51, 51 and 52 north, ranges 26 and 27 west of 4th principal meridian. Range lines between ranges 25 and 26, 26 and 27 west, of townships 50 and 51 north. Subdivisions of townships 50 and 51 north, of ranges 26 and 27 west of 4th principal meridian.	Deputy in the field; no notes received.
Isaac A. Banker.....	July 3, 1868	Township lines & subdivisions.	Township lines between townships 49 and 50 north, ranges 16 and 17 west of 4th principal meridian. Range lines between ranges 16 and 17, 17 and 18 west, of township 49 north. Subdivisions of township 49 north, of ranges 16 and 17 west of 4th principal meridian.	Do. do.
Geo. B. Wright.....	Aug. 1, 1868	Subdivisions.....	Townships 123, 124, 125, and 126 north, of ranges 42 and 43 west of 5th principal meridian.	Do. do.
Theodore H. Barrett and Orville Smith.	Aug. 1, 1868	do.....	Townships 127 and 128 north, ranges 42, 43, 44, and 45 west of 5th principal meridian; townships 129 and 130 north, ranges 43, 44, 45, and 46 west of 5th principal meridian.	Do. do.
R. H. L. Jewett and Geo. C. Howe.	Aug. 3, 1868	do.....	Townships 101, 102, 103, and 104 north, ranges 39, 40, 41, and 42 west of 5th principal meridian.	Do. do.

Nathan Butler.....	Sept. 11, 1868	Township lines & subdivisions.	Township lines between townships 46 and 47 north, of range 29 west of 4th principal meridian. Range lines between ranges 28 and 29, 29 and 30, of township 46 north. Subdivision of township 46 north, range 29 west; townships 54 and 55 north, range 27 west of 4th principal meridian; township 134 north, range 30 west of 5th principal meridian.	Deputy just preparing for the field.
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SURVEYOR GENERAL'S OFFICE, St. Paul, September 15, 1868.

L. NUTTING, *Surveyor General.*

B.—Statement of original, Commissioner's, and registers' plats made and copied, date of transmission to the General Land Office and the local land offices.

Description.	Land office.	Original.	Commissioner's.	When transmitted.	Registers.	When transmitted.	Total.
Townships 135 and 136, range 32.....	St. Cloud.....				2	July 17, 1868	2
Townships 135 and 136, range 33.....	do.....				2	July 17, 1868	2
Township 137, range 33.....	do.....	1	1	Sept. 13, 1867	1	July 17, 1868	3
Townships 131 and 132, range 40.....	do.....				2	Aug. 20, 1868	2
Township 124, range 39.....	do.....				1	Aug. 20, 1868	1
Township 124, range 40.....	do.....				1	Aug. 20, 1868	1
Township 105, range 44.....	Winnebago City.....	1	1	Oct. 12, 1867	1	Sept. 15, 1868	3
Township 106, range 44.....	St. Peter.....	1	1	Oct. 12, 1867	1	Sept. 15, 1868	3
Townships 107 and 108, range 44.....	do.....	2	2	Nov. 29, 1867	2	Sept. 15, 1868	6
Townships 105, range 45.....	Winnebago City.....	1	1	Nov. 29, 1867	1	Sept. 15, 1868	3
Townships 109, 110, and 111, range 39.....	St. Peter.....	3	3	Aug. 21, 1867	3	Sept. 15, 1868	9
Township 112, range 39.....	do.....	1	1	Oct. 10, 1867	1	Sept. 15, 1868	3
Townships 109, 110, and 111, range 40.....	do.....	3	3	Oct. 10, 1867	3	Sept. 15, 1868	9
Township 112, range 40.....	do.....	1	1	Nov. 7, 1867	1	Sept. 15, 1868	3
Townships 109 and 110, range 41.....	do.....	2	2	Nov. 7, 1867	2	Sept. 15, 1868	6
Township 111, range 41.....	do.....	1	1	Feb. 5, 1868	1	Sept. 15, 1868	3
Township 112, range 41.....	do.....	1	1	Feb. 14, 1868	1	Sept. 15, 1868	3
Townships 109 and 110, range 42.....	do.....	2	2	Nov. 7, 1867	2	Sept. 15, 1868	6
Township 111, range 42.....	do.....	1	1	Apr. 21, 1868	1	Sept. 15, 1868	3
Township 112, range 42.....	do.....	1	1	Feb. 14, 1868	1	Sept. 15, 1868	3
Townships 109, 110, and 112, range 43.....	do.....	3	3	Apr. 21, 1868	3	Sept. 15, 1868	9
Township 111, range 43.....	do.....	1	1	Feb. 5, 1868	1	Sept. 15, 1868	3
Township 114, range 43.....	do.....	1	1	Oct. 23, 1867	1	Sept. 15, 1868	3
Township 113, range 43.....	do.....	1	1	Oct. 23, 1867	1	Sept. 15, 1868	3
Townships 114 and 115, range 43.....	do.....	2	2	Apr. 30, 1868	2	Sept. 15, 1868	6
Townships 121 and 122, range 39.....	St. Cloud.....	2	2	Dec. 11, 1867	2	Aug. 20, 1868	6
Township 123, range 39.....	do.....	1	1	Jan. 9, 1868	1	Aug. 20, 1868	3
Township 121, range 40.....	do.....	1	1	Dec. 11, 1867	1	Aug. 20, 1868	3
Townships 122 and 123, range 40.....	do.....	2	2	Jan. 9, 1868	2	Aug. 20, 1868	6
Townships 123 and 124, range 41.....	do.....	2	2	Sept. 20, 1867	2	Aug. 20, 1868	6
Township 137, range 33.....	do.....	1	1	Sept. 13, 1868	1	July 17, 1868	3
Township 437, range 34.....	do.....	1	1	Sept. 13, 1867	1	July 17, 1868	3
Township 140, range 25.....	do.....	1	1	Mar. 14, 1868	1	June 16, 1868	3
Township 49, range 26.....	do.....	1	1	Mar. 14, 1868	1	June 16, 1868	3
Township 49, range 27.....	do.....	1	1	Mar. 14, 1868	1	June 16, 1868	3
Township 54, range 24.....	do.....	1	1	May 20, 1868	1	July 3, 1868	3
Township 54, range 25.....	do.....	1	1	Jan. 31, 1868	1	July 3, 1868	3
Township 55, range 25.....	do.....	1	1	June 11, 1868	1	July 3, 1868	3
Township 54, range 26.....	do.....	1	1	May 20, 1868	1	July 3, 1868	3
Township 55, range 26.....	do.....	1	1	June 11, 1868	1	July 3, 1868	3

L. NUTTING, Surveyor General.

SURVEYOR GENERAL'S OFFICE, St. Paul, September 15, 1868.

C.—Estimate of appropriation required for continuing the public surveys in Minnesota for the fiscal year ending June 30, 1870.

For completing the survey of the township lines between the 6th guide meridian and the western boundary of the State south of the seventh standard parallel, estimated at.....	\$3,000 00
Subdivision of thirty townships of agricultural land in the western part of the State	12,000 00
Township lines between the 4th and 5th correction lines.....	1,450 00
Subdivision of nineteen townships on the Upper Mississippi and St. Louis rivers.....	8,550 00
For the incidental expenses of the surveyor general's office, including office rent, pay of messengers, fuel, stationery, &c.....	2,000 00
	<hr/>
	27,000 00

L. NUTTING, Surveyor General.

SURVEYOR GENERAL'S OFFICE, St. Paul, September 15, 1868.

D.—*Estimate of appropriation required for the salaries of the surveyor general and the regular clerks in his office for the fiscal year ending June 30, 1870.*

For the salary of surveyor general.....	\$2,000
For the salary of chief clerk.....	1,500
For the salary of chief draughtsman.....	1,300
For the salary of assistant draughtsman.....	1,200
For the salary of transcribing clerk.....	1,200
For the salary of transcribing clerk.....	1,100
	<hr/>
	8,300

L. NUTTING, *Surveyor General.*

SURVEYOR GENERAL'S OFFICE, *St. Paul, September 15, 1868.*

E.—*Abstract statement of the incidental expenses of the surveyor general's office from June 30, 1867, to June 30, 1868.*

For quarter ending September 30, 1867.....	\$551 40
For quarter ending December 31, 1867.....	363 92
For quarter ending March 31, 1868.....	327 55
For quarter ending June 30, 1868.....	463 23
	<hr/>
	1,706 10

L. NUTTING, *Surveyor General.*

SURVEYOR GENERAL'S OFFICE, *St. Paul, September 15, 1868.*

G.—*Statement of townships surveyed from the 1st day of July, 1867, to the 30th day of June, 1868.*

	Acres.
1. Township 109, range 39.....	23,075.63
2. Township 110, range 39.....	22,772.64
3. Township 111, range 39.....	22,552.45
4. Township 112, range 39.....	22,084.50
5. Township 109, range 40.....	22,732.10
6. Township 110, range 40.....	23,053.76
7. Township 111, range 40.....	22,987.03
8. Township 112, range 40.....	22,335.56
9. Township 109, range 41.....	22,686.14
10. Township 110, range 41.....	23,102.04
11. Township 111, range 41.....	22,689.15
12. Township 112, range 41.....	22,399.96
13. Township 109, range 42.....	22,016.90
14. Township 110, range 42.....	22,684.05
15. Township 111, range 42.....	23,062.08
16. Township 112, range 42.....	22,530.91
17. Township 109, range 43.....	22,288.94
18. Township 110, range 43.....	22,770.86
19. Township 111, range 43.....	22,591.73
20. Township 112, range 43.....	22,314.55
21. Township 105, range 44.....	23,006.06
22. Township 106, range 44.....	23,004.09
23. Township 107, range 44.....	22,998.97
24. Township 108, range 44.....	22,885.66
25. Township 105, range 45.....	23,434.99
26. Township 114, range 41.....	22,520.40
27. Township 114, range 42.....	22,885.24
28. Township 113, range 43.....	22,944.81
29. Township 114, range 43.....	22,939.80
30. Township 115, range 43.....	22,278.18
31. Township 121, range 39.....	23,221.24
32. Township 122, range 39.....	21,901.46
33. Township 123, range 39.....	22,700.04

	Acres.
34. Township 124, range 39.....	22,262.23
35. Township 121, range 40.....	23,102.12
36. Township 122, range 40.....	23,019.49
37. Township 123, range 40.....	22,967.29
38. Township 124, range 40.....	21,072.00
39. Township 123, range 41.....	22,914.97
40. Township 124, range 41.....	22,219.46
41. Township 137, range 33.....	22,856.44
42. Township 137, range 34.....	22,543.89
43. Township 140, range 25.....	22,631.89
44. Township 49, range 26.....	21,003.88
45. Township 49, range 27.....	14,074.57
46. Township 54, range 24.....	22,594.22
47. Township 54, range 25.....	20,519.06
48. Township 55, range 25.....	21,847.95
49. Township 54, range 26.....	19,645.44
50. Township 55, range 26.....	18,032.07
1, 157 previously reported.....	22,879,715.70
Total acres surveyed.....	<u>23,992,493.27</u>

L. NUTTING, *Surveyor General.*

SURVEYOR GENERAL'S OFFICE, *St. Paul, September 15, 1868.*

No. 17 B.

SURVEYOR GENERAL'S OFFICE,
Yancton, D. T., August 20, 1868.

SIR: I have the honor to submit the following report of the field and office work performed in this surveying district since the date of my last annual report, together with the usual statements relating thereto, and marked A, B, and C.

SURVEYS.

1. The 11th standard parallel has been extended west from Red river to the southwest corner of township No. 145 north, range No. 52 west; the seventh guide meridian from the 11th standard parallel to the 16th standard parallel or the line of 49° north latitude, which is the international boundary; the 15th standard parallel from the Red river west to the southwest corner of township No. 161 north, range No. 55 west; the 16th standard parallel or international boundary from Red river to the line between ranges 56 and 57 west, amounting to 206 miles, 61 chains, 12 links.

2. All the proper township and range lines north of the 15th standard parallel, and between the Red River of the North, and the line between ranges 56 and 57 west, amounting to 186 miles 42 chains and 32 links.

3. The following named 25 townships and fractional townships have been subdivided into sections, viz: townships 95, 96, 97, 98, 99, 100 north of ranges 53 and 50 west; townships 95, 96, 97, 98, 99 of range 60 west; townships 98 and 99 of ranges 61 and 62 west; townships 163 and 164 of range 51 west; townships 163 and 164 of ranges 54 and 55 west, and township 163 of range 56 west; all west of the fifth principal meridian, in the Territory of Dakota, amounting to 1,531 miles 13 chains and 82 links.

OFFICE WORK.

1. The field-notes of all the above described surveys have been carefully examined and approved.

2. A diagram has been made, and the field-notes transcribed of the

survey of the above described township lines, standard parallels, and guide meridian, and transmitted to the General Land Office.

3. The field-notes of the above described 28 townships of subdivisions have been protracted, triplicate maps of each one thereof constructed, and the maps filed and transmitted as required by law.

4. Transcripts have been prepared and transmitted of the entire field-notes of each of the 28 townships last above named, all of which have been carefully compared with the original, and each has been prefaced by an index diagram.

5. Lists descriptive of the land and all the corners of the above-named townships have been made, carefully compared with the original field-notes, certified and transmitted to the local office at Vermillion.

6. The usual amount of miscellaneous business has been performed, such as preparing contracts and bonds, (in quadruplicate,) with instructions and diagrams of the exterior boundaries of their surveys, for the use of deputies, making out and recording their accounts and the accounts with the government, the general correspondence of the office and recording the same, together with other work, all of which occupies a large amount of time, but of which no regular or detailed statement can be given.

MISCELLANEOUS.

Since the date of my last annual report, the surveys of the public lands in the Territory of Dakota, south of the parallel of $43^{\circ} 30'$ north latitude, and north of the Missouri river, have been completed, except the subdivision of 10 townships, and some fractional townships bordering on the Yancton Indian reservation, which cannot be done until the said reservation is resurveyed.

Surveys have also been extended to the settlements along the Pembina river, near the line of the British possessions, by extending the 11th standard parallel from its intersection with the Red River of the North, in the State of Minnesota, west to the west line of range 52; thence extending the seventh guide meridian, north to the line of the British possessions; also the survey of the township lines of 23 townships and fractional townships north of the 15th standard parallel, (which includes the larger portion of the settlements,) and the subdivision of seven townships and fractional townships.

More subdivisions are required in that vicinity, which I shall contract for as soon as practicable.

The appropriation for surveys in the Territory of Dakota for the last fiscal year has been expended, and the necessity for extending the surveys of the public lands in this Territory is constantly increasing, caused by large emigration to the Territory.

In my annual report of last year I estimated the amount of population that would be added to the Territory during the last fiscal year. The estimate has been more than realized, and the ratio is still increasing.

I shall contract for the expending of the \$20,000 appropriated for surveys in this Territory for the present fiscal year as soon as practicable, and after that is expended it will require the full amount asked for in my estimate for surveys for the fiscal year ending June 30, 1870, in order to keep the surveys in advance of the settlements.

In making my estimate for the surveying service in this district for the next fiscal year, I did not take into consideration the want of surveys in the Territory of Wyoming, supposing that the law passed by Congress for organizing said Territory provided for a separate surveying district. I now understand that no separate surveying district was pro-

vided for. If such is the fact, and the said Territory still forms a part of this surveying district, I would recommend that an appropriation of at least \$25,000 be made for surveys in that Territory, along the line of the Pacific railroad, which is now being constructed through the country known as the Black Hills and the south pass of the Rocky mountains, where recently, it is credibly reported to me, silver mines, coal mines, iron, and gold mines have been discovered by actual settlers, almost as surprising as is the rapidity with which said railroad is being completed, which astonishes and startles as it were the commercial and scientific world. Assays of silver have already been made showing a value of \$300 per ton, and in that same country, which in my last annual report I referred to as my belief would increase in population 10,000, has no doubt in the last fiscal year increased to triple that number, with a prospect of quadrupling in the next fiscal year, and I really believe that the appropriation of \$25,000 recommended in this report for surveys in that direction is a very low estimate for the necessities of the people and the benefit of the general government.

In my annual report of last year, I commented at considerable length on the resources of the Territory of Dakota, and I do not deem it necessary for me at this time to reiterate anything I then said, or to enlarge on the subject.

Papers accompanying and forming a part of this report.

- A.—Estimates for the surveying service in this district.
 B.—Abstract account of the incidental expenses of the surveyor general's office for the year ending June 30, 1868.
 C.—Statement showing the number of townships surveyed in Dakota and area of land therein.

I am, very respectfully, your obedient servant,

WILLIAM TRIPP,
Surveyor General.

HON. JOSEPH S. WILSON,
Com. General Land Office, Washington, D. C.

A.—Estimate of appropriations required for continuing the public surveys in the Territory of Dakota, for salaries of the surveyor general and the clerks in his office, (as per act of March 2, 1861,) and for the incidental expenses of the office, for the fiscal year ending June 30, 1870.

For survey of township lines.....	\$10,000 00
For subdividing 40 townships.....	15,000 00
Total for surveys.....	25,000 00
For incidental expenses of office.....	\$2,000 00
For salary of surveyor general.....	\$2,000 00
For salary of chief clerk.....	1,600 00
For salary of draughtsman.....	1,300 00
For salary of assistant draughtsman.....	1,200 00
For salary of two clerks.....	2,200 00
Total for surveyor general and clerks.....	8,300 00

WILLIAM TRIPP, *Surveyor General.*

SURVEYOR GENERAL'S OFFICE, *Yancton, D. T., August 20, 1868.*

B.—Abstract statement of the incidental expenses of the surveyor general's office for the fiscal year ending June 30, 1868.

For the quarter ending September 30, 1867.....	\$375 18
For the quarter ending December 31, 1867.....	416 60
For the quarter ending March 31, 1868.....	314 35
For the quarter ending June 30, 1868.....	318 80
	1,434 05

WILLIAM TRIPP, *Surveyor General.*

SURVEYOR GENERAL'S OFFICE, *Yancton, D. T., August 20, 1868.*

C.—List of townships surveyed in the Territory of Dakota from July 1, 1867, to June 30, 1868.

No.	Township.	Range.	Area.	No.	Township.	Range.	Area.
1	102 N.	51 W.	22,957.32	19	95 N.	60 W.	23,110.79
2	103 N.	51 W.	22,598.15	20	96 N.	60 W.	23,111.86
3	104 N.	51 W.	22,234.96	21	97 N.	60 W.	22,898.81
4	102 N.	52 W.	62,643.97	22	98 N.	60 W.	22,996.23
5	103 N.	52 W.	22,566.82	23	99 N.	60 W.	22,930.83
6	104 N.	52 W.	19,355.53	24	98 N.	61 W.	23,082.07
7	95 N.	58 W.	23,034.35	25	99 N.	61 W.	22,961.45
8	96 N.	58 W.	22,999.75	26	99 N.	62 W.	23,038.30
9	97 N.	58 W.	22,907.81	27	99 N.	62 W.	22,993.42
10	98 N.	58 W.	23,012.11	28	163 N.	51 W.	12,548.71
11	99 N.	58 W.	22,779.15	29	164 N.	51 W.	2,459.92
12	100 N.	58 W.	18,865.86	30	163 N.	54 W.	22,925.17
13	95 N.	59 W.	23,100.10	31	164 N.	54 W.	5,617.94
14	96 N.	59 W.	23,041.15	32	163 N.	55 W.	22,968.95
15	97 N.	59 W.	22,997.68	33	164 N.	55 W.	5,615.74
16	98 N.	59 W.	23,030.50	34	163 N.	56 W.	22,972.10
17	99 N.	59 W.	22,974.21				
18	100 N.	59 W.	18,759.07				701,990.78

178 townships previously reported..... 2,829,774.29
 Total acres surveyed..... 3,531,765.07

WILLIAM TRIPP, *Surveyor General.*

SURVEYOR GENERAL'S OFFICE,
Yancton, Dakota Territory, August 20, 1868.

No. 17 C.

SURVEYOR GENERAL'S OFFICE,
Plattsmouth, Nebraska, August 29, 1868.

SIR: I have the honor to submit the following report of the survey of the public lands in this district for the year ending this day:

All work contracted for at the date of my last annual report was completed in the field and returned to this office within the time specified in the contracts, except that of Messrs. Park and Campbell for surveying standard lines. This district extended over a large tract of country, then traversed, or threatened, by bands of hostile Indians, to be protected against which an escort was asked for and obtained. This

afforded them the protection desired, but proved to be such a hindrance in the execution of the work that after running and establishing the second guide meridian from the third to the fourth standard parallel, the fourth standard parallel from the first to the second guide meridian west, the third guide meridian from the second to the third standard parallel north, and the third standard parallel north from the second to the third guide meridian west, they became convinced that they could not complete their contract without great pecuniary loss. They therefore asked to be relieved from the further execution of their contract. Their request was granted, and, by your instructions, so much of their contract as remained at that time unsurveyed was cancelled. A new contract was entered into with these deputies and a district assigned, nearer the settlements, which was immediately entered upon and completed before the close of the surveying season.

The standard lines established amount to 145 miles 15 chains and 80 links.

The townships and range lines of townships 13, 14, 15, and 16 north, ranges 9, 10, 11, and 12 west, and so much of the line between ranges 15 and 16 west as extends from the left bank of the Platte river to its intersection with the second standard parallel north, amounting in all to 170 miles 67 chains and 40 links.

The following named 33 townships, and fractional townships, have been subdivided into sections, viz: Township 8, range 19; townships 5, 6, 7, and 8, ranges 17 and 18; fractional township 8, ranges 15 and 16; townships 5 and 6 north, ranges 12, 13, 14, 15, and 16; townships 13, 14, and 15, ranges 9, 10, 11, and 12, all north of the base line and west of the 6th principal meridian, amounting to 4,017 miles 70 chains and 53 links.

Out of the appropriation of \$15,000, by act of Congress approved July 26, 1866, for surveying the public lands in Nebraska for the year ending June 30, 1867, the surveyor general of Kansas and Nebraska had used \$3,096 48. The remainder, \$11,903 52, was used in prosecuting the above named surveys, and \$662 93 from the appropriation of \$15,000, by act of Congress approved March 2, 1867, for surveying the public lands in Nebraska for fiscal year ending June 30, 1868, which left a balance of \$14,337 07 to be expended prior to the 30th day of June last.

It was my earnest wish to have prosecuted the surveys to the extent of my appropriation and to have made my returns prior to the close of the past fiscal year, but with the return of spring came the renewal of Indian depredations, marked by greater hostility. The experience of the past year had taught the deputies that to depend upon escorts was to insure almost a certain loss of money in the execution of their contracts. I found no deputies of any experience willing to undertake a contract until after the Indians were quieted by the treaties made with the peace commissioners. For this reason I have not been able to extend the standard lines and the work along the Union Pacific railroad as I have desired. The present cessation of Indian attacks seems now to promise permanent peace, and I shall not fail to push forward the surveys at a pace commensurate with the increased and rapidly increasing demands of settlement.

No important mineral discovery in this district has come to my knowledge during the past year. The existence of peat beds in different parts of the State seems well established, but of this and kindred matters Professor Hayden, in his geological survey, will doubtless make report. The development of our agricultural wealth, however, has been rapidly going on. Immigration is unprecedentedly large; crops abundant. The

season, though unusually hot, is healthful and the State is rapidly advancing in a substantial and permanent prosperity.

On the 25th of May last I closed a contract with William J. Allason for surveying township, range, and section lines of townships 9, 10, 11, and 12 north, ranges 17 and 18 west, which has been completed in the field and returns made to this office. Also, on the 26th of May last, I entered into a contract with Messrs. Park and Burch for surveying township 16 north, ranges 9, 10, 11, and 12 west; this work has been completed and the field-notes returned, approved, and transmitted; also for the survey of the exterior boundary lines of townships 13, 14, 15, and 16 north, ranges 13, 14, 15, and 16 west, the field-notes have been returned, transcribed, diagrams constructed and transmitted; and for the survey of the interior section lines of townships 13, 14, 15, and 16 north, ranges 13, 14, and 15 west, township 13 north, range 16 west, the field-notes of which have been returned to this office.

In addition to the above I have made a contract with Messrs. Paul and Davis for extending the second guide meridian from the 4th to the 5th standard parallel north; the 5th standard parallel from the 1st to the 2d guide meridian west; the exterior boundary lines of townships 17, 18, 19, and 20 north, ranges 9, 10, 11, 12, 13, 14, 15, and 16 west; the section lines of townships 17, 18, 19, and 20 north, range 9 west. These deputies are now in the field, and this work when completed will nearly exhaust the appropriation for fiscal year ending June 30, 1868.

By your letter of the 12th of February last, I was directed to cause an examination to be made of an alleged change in the Missouri river in the vicinity of township 29 north, range 9 east of the 6th principal meridian, in this State. And, in obedience therewith, on the 28th day of April I despatched a deputy to the field with full instructions to ascertain the true condition of the river, who, after a careful examination, reported that the river had entirely and permanently left its former bed and had straightened its channel by cutting across a narrow peninsula of land in township 89 north, range 47 west, in Dakota Territory, thereby throwing several thousand acres of land from Dakota Territory under the jurisdiction of this State.

OFFICE WORK.

The field-notes of the above described standard, township, and range lines have been returned, examined, transcribed, and approved, duplicate diagrams of the same constructed and transmitted to the General Land Office.

The field-notes of the following named 37 townships have been protracted, triplicate maps of each one thereof constructed, and the maps and field-notes transmitted as required by law, viz: Township 8, range 19; townships 5, 6, 7, and 8, ranges 16 and 17; fractional township 8, ranges 15 and 16; townships 5 and 6, ranges 12, 13, 14, 15, and 16; and townships 13, 14, 15, and 16, ranges 9, 10, 11, and 12.

A carefully drawn diagram representing the change in the channel of the Missouri river, also a transcript of the report made by the deputy surveyor, both of which with my own report on the same subject, were transmitted. A diagram of the Fort Kearney military reservation, showing the islands for 15 miles above and below the fort, was constructed, in duplicate, from the original field-notes in this office, one copy of which was furnished the United States district attorney for the district of Nebraska, the other furnished the Commissioner in obedience to request.

Transcripts of the entire 37 townships have been made, accurately paged, each prefaced with an index diagram, all carefully compared with the original field-notes, and transmitted.

Lists descriptive of the land and all the corners of the above named townships have been made, carefully compared, and transmitted to the local land offices to which they belong.

The usual amount of miscellaneous business has been performed, such as the draughting of contracts and bonds, (in quadruplicate,) with special instructions to accompany the same, and diagrams of the exterior boundaries of their surveys for the use of the deputies; making out and recording their accounts, as well as the salary and incidental expense accounts; answering correspondence and giving detailed directions to county surveyors respecting the manner of re-establishing lost corners and the subdividing of sections, all of which require a large amount of time, but of which no detailed statement can be made.

In estimating for the appropriation for fiscal year ending June 30, 1870, I have simply provided for the extension of the surveys within the 20-mile limits, embracing the lands reserved for the benefit of the Union Pacific railroad and required by them to be surveyed.

PAPERS ACCOMPANYING AND FORMING A PART OF THIS REPORT.

A.—Schedule showing the condition of the surveys under the apportionment for fiscal year ending June 30, 1867.

B.—Schedule showing the condition of the surveys under the apportionment for the fiscal year ending June 30, 1868.

C.—Schedule showing the condition of the surveys under the apportionment for fiscal year ending June 30, 1869.

D.—Statement showing the salary and incidental expense accounts for fiscal year ending June 30, 1868.

E.—Statement showing the number of townships surveyed and areas of land therein.

F.—Estimates of sums required for the extension of surveys in the State of Nebraska for fiscal year ending June 30, 1870.

G.—Diagram showing progress and proposed extension of surveys.

H.—Estimates of sums required for salary and incidental expenses for fiscal year ending June 30, 1869.

All of which is respectfully submitted.

P. W. HITCHCOCK,
Surveyor General.

Hon. JOS. S. WILSON,
Commissioner General Land Office, Washington, D. C.

A.—Schedule showing the condition of the surveys under the appropriation for the fiscal year ending June 30, 1867.

Name of deputy.	Date of contract.	Character of work.	Amount and locality of work.	Present condition.
Josiah B. Park and Henry C. Campbell.	July 2, 1867	Standard lines	The 2d guide meridian west, from 3d to 4th standard parallels north; the 3d, 4th, and 5th guide meridians west, from 2d to 4th standard parallels north; the 2d standard parallel north, through ranges 25 to 40, inclusive; the 3d standard parallel north, through ranges 17 to 40, inclusive, and the 4th standard parallel north, through ranges 9 to 40, inclusive. All north of the base line and west of the 6th principal meridian.	The 2d guide meridian, from 3d to 4th standard parallels; the 3d guide meridian, from 2d to 3d standard parallels; 3d standard parallel, from 2d to 3d guide meridian; and 4th standard parallel, from 1st to 2d guide meridian, was completed in the field, returns made, approved, and transmitted. The balance of contract cancelled by request of deputies and consent of Commissioner.
William Hardin	July 12, 1867	Subdivisions	Townships 5 and 6 north, ranges 12, 13, 14, 15, and 16 west, of the 6th principal meridian.	Completed in the field, notes approved, and plats and transcripts transmitted.
James McBride	July 31, 1867	Subdivisions, and township and range lines.	Townships 5, 6, and 7, ranges 17 and 18; and township 8, ranges 15, 16, 17, 18, and 19 west, of the 6th principal meridian.	Completed in the field, and approved, and transcripts and plats transmitted.
Josiah B. Park and Henry C. Campbell.	Sept. 30, 1867	Township and range lines and subdivisions.	Townships 13, 14, 15, and 16 north, ranges 9, 10, 11, and 12 west; townships 13, 14, and 15 north, ranges 9, 10, 11, and 12 west.	Completed in the field, notes returned and approved, and transcripts and plats transmitted.

B.—Schedule showing the condition of the surveys under the appropriation for the fiscal year ending on the 30th day of June, A. D. 1868.

Name of deputy.	Date of contract.	Character of work.	Amount and locality of work.	Present condition.
Josiah B. Park, (special instructions.)	Apr. 28, 1868	Examination	Examining change in Missouri river in township 29, range 9 east; township 89, range 47 west.	Report returned copied, and with diagrams transmitted.
William J. Allason	May 25, 1868	Township and range lines and subdivisions.	Townships 9, 10, 11, and 12 north, ranges 17 and 18 west	Completed, and field-notes returned.
Josiah B. Park and John F. Burch.	May 26, 1868	Township and range lines and subdivisions.	Townships 13, 14, 15, and 16 north, ranges 13, 14, 15, and 16 west. Township 16, range 9, 10, 11, and 12 west	Completed, returned, approved, and transmitted. Do. do.
Nicholas J. Paul and Oscar F. Davis.	June 6, 1868	Standard lines	Townships 13, 14, 15, and 16 north, ranges 13, 14, and 15 west; and township 13, range 16 west.	Completed, and notes returned.
		Township and range lines and subdivisions.	Second guide meridian from 4th to 5th standard parallels; 5th standard parallel from 1st to 2d guide meridian. Townships 17, 18, 19, and 20, ranges 9, 10, 11, 12, 13, 14, 15, and 16 west; townships 17, 18, 19, and 20, range 9 west.	Parties in the field. Do.

C.—Schedule showing the condition of the surveys under the appropriation for the fiscal year ending on the 30th day of June, A. D. 1869.

Name of deputy.	Date of contract.	Character of work.	Amount and locality of work.	Present condition.
Allen J. Currence and W. Scott Humason.	Aug. 8, 1868	Subdivisions	Townships 1, 2, 3, and 4, ranges 17, 18, and 19 west; township 4, ranges 20 and 21 west.	Parties in the field.
Josiah B. Park	Aug. 8, 1868	Township and range lines and subdivisions.	Townships 9, 10, 11, and 12, ranges 19 and 20 west	Do.
Miles T. Woolley	Aug. 8, 1868	Subdivisions	Townships 17, 18, 19, and 20, ranges 10 and 11; townships 19 and 20, range 12.	Do.
William Hardin	Aug. 10, 1868	Subdivisions	Townships 17 and 18, range 12; townships 17, 18, 19, and 20, ranges 13 and 14.	Do.
William J. Allason	Aug. 17, 1868	Township and range lines and subdivisions.	Townships 9, 10, 11, and 12, ranges 21 and 22 west	Do.

SURVEYOR GENERAL'S OFFICE, Plattsmouth, Nebraska, August 29, 1868.

P. W. HITCHCOCK, Surveyor General.

D.—*The United States in account with the office of the surveyor general of Iowa and Nebraska on account of salaries and incidental expenses for the fiscal year ending June 30, 1868.*

SALARY ACCOUNT.

Out of the appropriation approved March 2, 1867, for compensation of surveyor general and clerks:

	Dr.	Cr.
By unexpended balance June 30, 1867		\$6,296 90
To 1st quarter ending September 30, 1867	\$1,225 00	
To 2d quarter ending December 31, 1867	1,416 30	
To 3d quarter ending March 31, 1868	1,645 05	
To 4th quarter ending June 30, 1868	1,669 23	
Unexpended balance June 30, 1868	341 32	
	6,296 90	6,296 90
By unexpended balance June 30, 1868		\$341 32

INCIDENTAL EXPENSE ACCOUNT.

Out of appropriation approved March 2, 1867, for office rent, fuel, books, stationery, &c.:

	Dr.	Cr.
By unexpended balance June 30, 1867		\$1,374 46
To 1st quarter ending September 30, 1867	\$490 02	
To 2d quarter ending December 31, 1867	335 00	
To 3d quarter ending March 31, 1868	172 19	
To 4th quarter ending June 30, 1868	316 27	
Unexpended balance June 20, 1868	60 98	
	1,374 46	1,374 46
By unexpended balance June 30, 1868		\$60 98

P. W. HITCHCOCK,
Surveyor General.

SURVEYOR GENERAL'S OFFICE,
Plattsmouth, Nebraska, August 29, 1868.

E.—*List of townships subdivided showing the area and amount of the surveys.*

Number of townships.	Description.		Number of acres.	Amount of surveys.		
	T. N.	R. W. of 6th P.M.		Miles.	Chains.	Links.
1.....	13	9	23,069.35	60	4	36
2.....	14	9	23,041.39	60	.....	69
3.....	15	9	21,814.75	68	20	92
4.....	13	10	22,891.90	62	20	08
5.....	14	10	21,950.60	72	74	36
6.....	15	10	21,831.96	78	33	67
7.....	13	11	22,073.15	73	23	41
8.....	14	11	22,992.25	59	76	41
9.....	15	11	22,662.00	68	03	51
10.....	5	12	23,043.90	60	02	05
11.....	6	12	22,986.28	59	77	13
12.....	13	12	22,257.92	76	26	12
13.....	14	12	22,987.87	59	74	86
14.....	15	12	22,960.46	59	72	28
15.....	5	13	22,989.73	59	75	37

E.—List of townships subdivided, &c.—Continued.

Number of townships.	Description.		Number of acres.	Amount of surveys.		
	T. N.	R. W. of 6th P. M.		Miles.	Chains.	Links.
16.....	6	13	23, 024. 85	59	77	23
17.....	5	14	23, 065. 10	60	02	81
18.....	6	14	23, 086. 41	60	03	95
19.....	5	15	23, 044. 39	59	77	15
20.....	6	15	23, 004. 24	59	75	84
21.....	8	15	1, 108. 64	3	62	58
22.....	5	16	23, 018. 56	59	78	43
23.....	6	16	22, 929. 36	59	69	99
24.....	8	16	5, 144. 04	18	16	32
25.....	5	17	24, 932. 22	62	36	64
26.....	6	17	24, 939. 87	62	36	16
27.....	7	17	24, 946. 36	62	38	73
28.....	8	17	19, 000. 74	68	08	39
29.....	5	18	23, 006. 69	59	76	33
30.....	5	18	22, 956. 20	59	70	53
31.....	7	18	22, 938. 98	59	68	60
32.....	8	18	19, 110. 26	77	77	05
33.....	8	19	19, 083. 78	83	48	58

P. W. HITCHCOCK,
Surveyor General.

SURVEYOR GENERAL'S OFFICE,
Plattsmouth, Nebraska, August 29, 1868.

F.—Estimates of sums required for the extension of surveys in the State of
Nebraska for the fiscal year ending June 30, 1870.

Surveys estimated.	Miles.	Rate.	Cost.
For running the exterior boundary lines of townships nine, ten, eleven, and twelve, of ranges twenty-five to forty, inclusive; townships thirteen, fourteen, fifteen, and sixteen, of ranges seventeen to fifty-six, inclusive.....	2, 184	\$6	\$13, 104
For running the interior section lines of townships nine, ten, eleven, and twelve, of ranges twenty-five to forty, inclusive; townships thirteen, fourteen, fifteen, and sixteen, of ranges seventeen to fifty-six, inclusive.....	13, 440	5	67, 200
Total.....	15, 624		80, 304

P. W. HITCHCOCK,
Surveyor General.

SURVEYOR GENERAL'S OFFICE,
Plattsmouth, Nebraska, August 29, 1868.

H.—*Estimate of office expenses for fiscal year ending June 30, 1870.*

Salary of surveyor general.....	\$2,000
Salary of chief clerk.....	1,600
Salary of principal draughtsman.....	1,300
Salary of assistant draughtsman.....	1,200
Salary of accountant.....	1,200
Salary of two copyists at \$1,100 each.....	2,200
Office rent, messenger, stationery, fuel, and other expenses.....	2,000
Total.....	11,500

P. W. HITCHCOCK,
Surveyor General.

SURVEYOR GENERAL'S OFFICE, *Plattsmouth, Nebraska, August 29, 1868.*

No. 17 J.

SURVEYOR GENERAL'S OFFICE,
Eugene City, Oregon, July 20, 1868.

SIR: I have the honor to transmit herewith the usual annual report, and accompanying statements, to wit:

A.—Statement showing the condition of contracts not closed June 30, 1867.

B.—Statement of original plats of public surveys, copies transmitted to the general and local land offices, since June 30, 1867.

C.—Statement showing the number of townships surveyed since June 30, 1867, with area of public lands.

D.—Statement of salaries paid the surveyor general and clerks, for fiscal year ending June 30, 1868.

E.—Statement of incidental expenses for fiscal year ending June 30, 1868.

F.—Estimate for surveying office expenses for fiscal year ending June 30, 1870.

G.—Diagram of Oregon, showing the extent of the public surveys, and proposed surveys for fiscal year ending June 30, 1869.

The public surveys in this district, during the past year, have been prosecuted to the full extent of the appropriation, and have been located mainly in northeastern Oregon, and on the coast in the vicinity of Yaquina bay, and Coquille and Smith's rivers. The guide meridian between ranges 39 and 40 east was extended to the south boundary of township 35 south, and a standard parallel extended east from that point 42 miles, thus furnishing a basis for exteriorizing and subdividing all the land east of the Blue mountains, which includes the principal mining districts of Oregon.

On account of the limited appropriation, the danger from Indians, and the difficulty of obtaining escorts, no contracts were entered into for the extension of surveys on the line of the Oregon Central military road in southeastern Oregon. Special attention will be given to surveys in this section during the present year, and a liberal portion of the appropriation will be expended in the vicinity of this road.

A contract was made, including the extension of the base line to intersect Snake river, but the deputy, on attempting the survey of this line, found it to be impracticable, and it was abandoned.

I have heretofore called attention to the fact that there is a large amount of surveying in this district needing to be done, which I cannot induce deputies to undertake at the present rate per mile. I allude to the forest lands. Settlements are penetrating them on all sides, and heavy milling enterprises are making inroads upon the timber, and it is greatly to the interest of the government, as well as the settlers, that these lands be surveyed. It was with some difficulty that I succeeded in having 17 fractional townships surveyed in the Yaquina bay, Smith's and Coquille river country, and yet the larger portion of these townships are settled, and the residents have been petitioning for years to have them subdivided. I would therefore recommend that some provision be made by which these forest lands may be surveyed, and would respectfully suggest that the surveyor general be authorized to contract for the survey of these lands at a rate not exceeding \$20 per mile for exteriors and standard parallels, and \$15 per mile for subdivisions. I would also recommend the addition of \$1,000 to the appropriation for incidental expenses of this office, to enable the surveyor general to examine the field in person, and determine for himself the townships and localities which should come under the provisions of the higher maximum, and for other purposes necessary to the most judicious extension of the surveys.

Very respectfully, your obedient servant,

E. L. APPLGATE,
Surveyor General of Oregon.

Hon. JOS. S. WILSON,
Commissioner of General Land Office.

A. —Statement showing the condition of contracts not closed June 30, 1867.

Contract.		Contractors.	Description of lines.	Estimated distance.	Amount surveyed.		Price per mile.			Gross amount.	Remarks.	
No.	Date.				Guide and standard.	Exteriors.	Subdivisions.	Guide and standard.	Exteriors.			Subdivisions.
116	Dec. 12, 1866	J. W. Meldrum	Exterior and subdivisonal lines of townships 27 and 28 south, range 13 west; 26 and 28 south, 14 west; 21, 29, 30, and 31 south, 11 west; 29 south, 12 west; 20 and 30 south, 10 west.	Miles. 260	.....	17 40 00	160 13 26	.....	\$12 00	\$10 00	\$1,811 65	Contract closed; account transmitted and reported for payment.
117	Jan. 5, 1867	George Mercer.	Exterior lines of township 10 south, ranges 9 and 10 west; 11 south, 9, 10, and 11 west; subdivisions of 10 south, 8, 9, and 10 west; 11 south, 9, 10, and 11 west.	272	.....	59 38 91	232 68 39	.....	12 00	10 00	3,006 38	Contract closed; account transmitted and reported for payment in the sum of \$3,053 84.
119	Feb. 15, 1867	Thompson & Pengra.	Exterior and subdivisonal lines of townships 1 and 2 north, range 19 east; 2 north, 20 and 21 east; 1 and 2 north, 22, 23, and 24 east; 1 and 2 south, 24, 25, and 26 east.	862	.....	211 30 77	926 16 70	.....	12 00	10 00	11,798 69	Contract closed; account transmitted and reported for payment.
120	May 27, 1867	Odell & Gray.....	Exterior and subdivisonal lines of township 1 north, ranges 38, 40, 43, 44, 45, and 46 east; 1 south, 43, 44, 45, and 46 east; 3 and 4 south, 37 east; subdivisions of 1 north, 39 east; base line to Snake river; guide meridian between ranges 39 and 40 east to southeast corner of 35 south, 39 east; seventh standard parallel south, between townships 35 and 36 south, to southeast corner of 35 south, 46 east.	1,050	102 00 00	154 68 40	795 51 95	\$15 00	12 00	10 00	11,344 75	Contract closed; account transmitted and reported for payment in the sum of \$11,326 75.
121	May 27, 1867	J. J. Henderson.....	Exterior and subdivisonal lines of township 1 north, range 18 east; 1 south, 18, 19, and 20 east; 2 south, 18 east	348	.....	38 38 84	233 46 67	.....	12 00	10 00	2,797 65	Contract closed; account transmitted and reported for payment.
122	June 10, 1867	Thompson & Pengra.	Exterior and subdivisonal lines of townships 1 and 2 north, range 25 east; 1 south, 27 east; 2 south, 20, 21, 22, and 23 east; 3 south, 21, 22, 23, 24, and 25 east.	840	.....	144 37 07	720 29 61	.....	12 00	10 00	8,937 26	Contract closed; account transmitted and reported for payment to the amount of \$8,050.

B.—Statement of original plats of public surveys and copies transmitted to the general and local land offices since June 30, 1867.

Contract.		Contractors.	Date of voucher.	Lines.	Townships.	Ranges.	Plats made.				Remarks.
No.	Date.						Original.	Sent to Commissioner.	Sent to Register.	Total.	
116	Dec. 12, 1866	John W. Meldrum ...	Sep. 28, 1867	Exteriors	20 south	10 west	1	1	...	2	Commissioner's copies accompanied by transcripts of field-notes.
					20, 21, 29, 30, and 31 south ..	11 west					
				Subdivisions	29 south	12 west	4	4	4	12	
					28 south	13 west	3	3	3	9	
					20 and 21 south	10 and 11 west	1	1	1	3	
					29, 30, and 31 south	11 west	3	3	3	9	
					29 south	12 west	1	1	1	3	
117	Jan. 5, 1867	George Mercer	Dec. 10, 1867	Exteriors	27, 28, and 29 south	13 west	3	3	3	9	
					10 and 11 south	9 and 10 west	1	1	1	3	
				Subdivisions	11 south	11 west	3	3	3	9	
					10 south	8, 9 and 10 west	1	1	1	3	
					11 south	9, 10, and 11 west	3	3	3	9	
119	Feb. 15, 1867	Thompson & Pengra.	Sep. 10, 1867	Exteriors	1 and 2 north	19, 22, 23, and 24 east ..	1	1	...	2	
					2 north	20 and 21 east					
				Subdivisions	2 south	24 east	8	8	8	24	
					1 and 2 south	25 and 26 east	2	2	2	6	
					1 and 2 north	19, 22, 23, and 24 east ..	6	6	6	18	
					2 north	20 and 21 east	1	1	1	3	
120	May 27, 1867	Odell & Gray	Feb. 7, 1868	Guide meridian	Through 26 to 35 south	24, 25, and 26 east	1	1	...	2	
					Standard parallel	Between 39 and 40 east					
				Exteriors	Between 35 and 36 south ..	Through 41 to 46 east	2	2	2	6	
					1 north	40, 43, 44, 45, and 46 east ..	1	1	1	3	
					2 north	46 east	1	1	1	3	
					1 south	44, 45, and 46 east	2	2	2	6	
					2 south	45 and 46 east	1	1	1	3	
					3 south	37 and 45 east	7	7	7	21	
				Subdivisions	1 north	38, 39, 40, 43, 44, 45, and 46 east.	1	1	1	3	
					2 north	46 east	4	4	4	12	
					1 south	43, 44, 45, and 46 east	2	2	2	6	
					2 south	45 and 46 east	2	2	2	6	
					3 south	37 and 45 east	2	2	2	6	
121	May 27, 1867	J. J. Henderson	Oct. 7, 1867	Exteriors	1 north	18 east	1	1	...	2	
					1 and 2 south	18 east					
				Subdivisions	1 south	20 east	2	2	2	6	
					1 and 2 north	18 east	2	2	2	6	
					1 south	18 east	2	2	2	6	
					1 and 2 south	18 east	2	2	2	6	
					1 south	19 and 20 east	2	2	2	6	

122	June 10, 1867	Thompson & Pengra.	Nov. 7, 1867	Exteriors.....	1 and 2 north	25 east.....	}	1	1	.....	2
					2 and 3 south	21, 22, and 23 east.....					
					3 south	24 and 25 east.....					
					1 and 2 south	27 east.....					
				Subdivisions.....	1 and 2 north	25 east.....		2	2	2	6
					2 south	20 east.....		1	1	1	3
					2 and 3 south	21, 22, and 23 east.....		6	6	6	18
					3 south	24 and 25 east.....		2	2	2	6
					1 and 2 south	27 east.....		2	2	2	6
						Total plats made					218

C.—Statement showing the number of townships surveyed since June 30, 1867, with area of public lands.

Number.	Description.		Acres.	By whom surveyed.	
	Townships.	Ranges.			
1	20 south	10 west	3,469.87	John W. Meldrum.	
2	21 south	10 west	2,095.28		
3	20 south	11 west	830.40		
4	21 south	11 west	5,039.72		
5	29 south	11 west	8,120.00		
6	30 south	11 west	1,360.00		
7	31 south	11 west	1,320.00		
8	29 south	12 west	5,222.61		
9	27 south	13 west	3,484.17		
10	28 south	13 west	3,938.52		
11	29 south	13 west	1,361.38	George Mercer.	
12	10 south	8 west	11,072.20		
13	10 south	9 west	7,743.72		
14	11 south	9 west	15,704.18		
15	10 south	10 west	3,209.20		
16	11 south	10 west	16,002.20		
17	11 south	11 west	6,634.98		
18	1 north	19 east	22,152.58		Thompson & Pengra.
19	2 north	19 east	21,662.20		
20	2 north	20 east	23,343.51		
21	2 north	21 east	23,510.15		
22	1 north	22 east	23,361.46		
23	2 north	22 east	23,810.58		
24	1 north	23 east	23,260.45		
25	2 north	23 east	23,183.22		
26	1 north	24 east	23,351.90		
27	2 north	24 east	23,371.70		
28	1 south	24 east	11,484.83	Odell & Gray.	
29	2 south	24 east	23,025.27		
30	1 south	25 east	23,065.66		
31	2 south	25 east	22,946.83		
32	1 south	26 east	23,125.96		
33	2 south	26 east	23,005.42		
34	1 north	38 east	11,520.00		
35	1 north	39 east	20,485.56		
36	1 north	40 east	22,987.81		
37	1 north	43 east	23,014.61		
38	1 north	44 east	23,008.32	J. J. Henderson.	
39	1 north	45 east	23,023.92		
40	1 north	46 east	22,996.61		
41	2 north	46 east	22,944.00		
42	1 south	43 east	12,206.40		
43	1 south	44 east	23,064.50		
44	1 south	45 east	23,007.99		
45	1 south	46 east	11,517.27		
46	2 south	45 east	23,028.31		
47	2 south	46 east	7,711.58		
48	3 south	37 east	22,394.96	Thompson & Pengra.	
49	3 south	45 east	3,835.20		
50	1 north	18 east	23,364.17		
51	2 north	18 east	11,453.36		
52	1 south	18 east	20,450.04		
53	2 south	18 east	10,108.30		
54	1 south	19 east	3,031.06		
55	1 south	20 east	18,510.79		
56	1 north	25 east	23,443.15		
57	2 north	25 east	23,421.11		
58	2 south	20 east	3,669.94		
59	2 south	21 east	20,929.30		

C.—Statement showing the number of townships surveyed, &c.—Continued.

Number.	Description.		Acres.	By whom surveyed.
	Townships.	Ranges.		
60	3 south.....	21 east.....	20,873.54	
61	2 south.....	22 east.....	23,213.73	
62	3 south.....	22 east.....	21,218.98	
63	2 south.....	23 east.....	23,129.93	
64	3 south.....	23 east.....	23,268.94	
65	3 south.....	24 east.....	22,820.44	
66	3 south.....	25 east.....	23,010.34	
67	1 south.....	27 east.....	23,208.39	
68	2 south.....	27 east.....	23,017.73	
	Total acres		1,113,162.42	

D.—Salaries paid the surveyor general and clerks for the fiscal year ending June 30, 1868.

Name.	Occupation.	Nativity.	Time of service.	Amount paid.
E. L. Applegate.....	Surveyor general	Missouri...	Entire year	\$2,500 00
Joel Ware.....	Chief clerk.....	Ohio.....	do.....	1,600 0
John T. Bloomfield.....	Draughtsman.....	Indiana.....	do.....	1,400 00
William H. Haley.....	Clerk.....	Kentucky..	7 months, 15 days.	751 65
William W. Parsons.....	Clerk.....	Indiana....	9 months.....	900 00
Total.....				7,151 65

E.—Statement of incidental expenses for year ending June 30, 1868.

Date of voucher.	For what expended.	Amount.
September 30, 1867.	Rent of office.....	\$75 00
	Messenger.....	150 00
	Postage.....	9 00
	Drawing paper.....	14 00
	Map cases.....	12 00
December 31, 1867.	Rent of office.....	75 00
	Messenger.....	73 36
	Do.....	76 64
	Wood.....	100 00
	Drawing paper.....	86 00
March 31, 1868.....	Map cases, &c.....	29 00
	Postage.....	7 00
	Rent of office.....	75 00
	Messenger.....	150 00
	Rent of office.....	75 00
June 30, 1868.....	Messenger.....	150 00
	Stationery.....	138 74
	Postage.....	7 00
	Total.....	1,302 74

F.—*Estimate of surveying and office expenses for year ending June 30, 1870.*

OFFICE EXPENSES.

For compensation of surveyor general.....	\$2,500 00	
For compensation of chief clerk.....	1,600 00	
For compensation of draughtsman.....	1,400 00	
For compensation of two clerks, at \$1,200.....	2,400 00	
Office rent, messenger, and incidentals.....	2,000 00	
		\$9,900 00

SURVEYING SERVICE.

For surveying 40 miles guide meridian, at \$15 per mile.....	\$600 00	
For surveying 280 miles standard parallel, at \$15 per mile.....	4,200 00	
For surveying 800 exteriors, at \$12 per mile.....	9,600 00	
For surveying 3,500 miles subdivisions, at \$10 per mile.....	35,000 00	
		49,400 00
Total		59,300 00

Supplemental report to accompany the report of the surveyor general of Oregon, for the year ending June 30, 1868.

SURVEYOR GENERAL'S OFFICE,
Eugene City, Oregon, September 15, 1868.

SIR: Your letter of August 25, 1868, requesting a supplemental report in regard to the progress in the development of the natural resources, such as agricultural, mineral, and other products, during the past three years within this district, is received.

Referring to my report of 1865, you say, "In your report of 1865 the character and resources of the country were creditably shown," &c., and also that "It is not advisable to reproduce reports of former years, in order that the country may be kept advised of the importance of that vast range of country on the Pacific coast." I will, therefore, briefly recount the general "description of the country, its productions," &c., as set forth in that report, and, in addition, note the improvement in agriculture, the development of natural resources, the progress of mining discovery, the advancement of settlement, and the increased knowledge of the interior country, as derived from the explorations of miners and pioneers, the campaigns of the military, the United States deputy surveyors in the field, and the travels and observations which I have personally made during the last three years. For the convenience of description it is necessary to institute, or observe, certain grand divisions of country in this great State.

There is a great range of mountains through which the Columbia river passes called the Cascade range. This range runs the full length of the State from north to south, and divides the country into eastern and western Oregon. There is a marked difference in the climate and natural productions of the two sections. Western Oregon is a warmer country than eastern Oregon. There is far more falling weather in the winter, but perhaps no more in the summer. It is this western Oregon, particularly the Willamette valley, which is noted for incessant rains in the winter. The summers are equally distinguished for being clear and settled; perhaps the most reliable for haying and harvesting, and for the drying of fruits, fish, &c., in the sun, of any other section in the United States.

About the last of September, or the beginning of October, we usually—yes, always: it has been so for the past twenty-five years, to my own personal knowledge—have some ten days, more or less, of rain, good,

strong rain, not beating, but just about right, and sufficient to thoroughly wet the ground. It then clears off splendidly; the fire has been extinguished in the mountains, and, the smoke and vapor having disappeared, the atmosphere is perfectly clear. The grass immediately springs up, and the valleys and hills are, in a very short time, clothed in green. This is regarded by all persons as the most beautiful and pleasant season of the year, and is an active time for agriculture—for ploughing and sowing; and the grain springs up immediately from the warm, moist soil, and makes a rapid growth during the fine weather of the fall. This weather continues with but little modification up to the setting in of the rains of winter, which usually take place about the middle of December, and continue with disagreeable continuity to the beginning of March, when all manner of weather, summer and winter, sunshine and storm, may occur in a single day. But it is frequently the case that no snow falls in the valleys west of the Cascade mountains during the winter, and the weather is sufficiently open all winter for ploughing and sowing.

In the early times of Oregon, and to within a short time ago, when the prairies were unfenced and open to the cattle of all alike, no person thought of making preparations for the feeding of stock, and now when persons have pasturage enclosed so that they may limit the stock to a reasonable number, the natural grass is sufficient to keep cattle, horses, and sheep in fine plight the year round. But in the valleys of the Willamette, Umpqua, and Rogue rivers, the settlements have become much more compact than they were at the time my general report was made in 1865. As a consequence of this, and from other causes, the style of agriculture has been greatly improved. More attention has been paid to the cultivation of hay and the economical methods of the feeding and keeping of stock. When the outside range failed from excessive accumulation of cattle and sheep it was felt that the good old days of Oregon had departed, but this deprivation is being amply compensated for in the improvement of all manner of stock which economy demands when provision for their support depends upon labor.

Great advancement has been made in these sections of Oregon in the use of improved agricultural machinery. Gang-ploughs and patent harrows, for seeding, and reapers, headers, and threshers, for harvesting and cleaning grain, are certainly a vast improvement on the condition of affairs of but a few years ago, when the ploughing was done with the wooden mould-board, "the seed dragged in with a brush," the grain cut with the cradle and threshed with a band of wild horses, and winnowed in the wind.

This Willamette valley is a large country, sufficient of itself for a State. The plains of this valley, lying on either side of the river, embrace an area of about 3,600 square miles, while the rolling country, or oak hills, lying on either side of these plains, and next to the mountains, the Cascades on the east and the Coast range on the west, are about equal in extent to the plains, making in the aggregate about 7,200 square miles. This is a country of almost uniformly rich land, and susceptible of a dense population, with almost no clearing of timber for the purpose of agriculture and grazing. Without encroaching on the mountains and great forests upon the tributaries of the Willamette river, that encircle this valley region, we have a country every acre of which is capable of being made useful to the farmer and stock raiser, more extensive than the aggregate area of the States of Connecticut and Delaware; and when we include the splendid timbered bottoms upon these tributaries, where the land is of the richest possible character, we have an area on the waters of the Willamette equal to the great State of Massachusetts. In addi-

tion to this we have heavy spurs of mountains running down between these tributaries from the main dividing ridges of the Coast range and Cascade mountains, covered with forests of fir, pine, cedar, hemlock, spruce, &c., of the finest growth in the world, which we can throw in for quantity and good measure.

The valleys of the Umpqua and Rogue rivers do not abound in such extensive tracts of level lands as the Willamette valley. The hill country prevails to a greater extent. As a whole they are better adapted to stock-raising than to farming. Yet in Rogue River valley there is a large amount of first-rate farming land, and, in its agricultural appliances, has been for many years in advance of any other section of Oregon. It is a better corn (maize) country than the Willamette, being equal in this respect to many of the best corn-growing States in the Union. Being protected better from the fresh air from the ocean, melons and peaches and all manner of garden vegetables flourish here better than in the Willamette or Umpqua valleys; in fact, this is a good grape and tobacco country.

The Umpqua is better suited to the raising of sheep than any other purpose. The valleys, however, among the hills, are very rich and productive, and agriculture is carried on there with the most improved appliances, and vast quantities of grain and hay are raised. This is essentially a hilly country; these hills are round and regular in form, and are covered with the most beautiful black-oak trees. The soil of these hills is very rich, and scarcely a stone anywhere can be found projecting above the ground. Timothy will succeed among these trees, even on the summits of the hills, and orchard grass flourishes as though it had found its special adaptation.

The most valuable lands of the valleys of western Oregon have been taken up by settlers, and there is but little to be found vacant in the vicinity of the road passing through these valleys, and communicating with California. Emigrants, therefore, unable to purchase land from these private land owners, will be compelled to retire toward the foot of the mountains. But for new beginners and poor people there is great advantage in this, as abundance of natural pasturage may yet be found by retreating back some distance from the more closely settled districts. Persons coming to this country with means may purchase land and choose their homes almost to suit themselves. A large proportion of the lands of this great natural division of Oregon which I have been describing was taken up in 640-acre claims, by pioneers; and the closing in of settlements and the fencing up of lands are contrary to their tastes, and in many cases almost insupportably repugnant to their feelings, and they are ready to sell out when a good offer is made. They feel, however, that they should have a decent price for their homes; that, having opened this great country to settlement, and having defended the early growth of civilization here against the assaults of savage men and the ravages of wild beasts, and having triumphed over and almost destroyed both, they feel that they are entitled to a respectable little fortune for what they have so amply earned. In fact, it was but an act of justice on the part of Congress to donate these lands, and it has been this promise of title that has caused many of these pioneers to remain upon their claims until the progress of civilization has overtaken them. The sentiment of these people to find new country and new pasturage is very strong; and many of them spend much of their time exploring the new valleys of eastern Oregon, and, on their return home, disturb the repose of their neighbors by rehearsing their descriptions of these new districts. The wearied hay-makers of the "fenced-up" districts dwell with interest upon the

stories of vast grazing advantages in the valleys of the Klamath, Sprague's river, Goose lake, Malheur, and Ochoco. Those desiring to sell out would do so generally with the design of taking homesteads in these new valleys, and this disposition has received new impulse lately from the successful operations of the military in clearing eastern and southern Oregon of hostile Indians, and the consequent safety now with which settlements may be planted in any part of this great country. The prices asked for these homes, which are finished and prepared for the abode of the most civilized and refined people, to whom the advantages and pleasures of society are indispensable, are not unreasonably high. For example, I know a beautiful place in the hill country of the Umpqua, on which the proprietor has been residing for some fifteen years. The house, a frame cottage, neatly painted, and other buildings, are worth a thousand dollars; about a thousand acres of land, held with a sound and direct title from the government, and all under a good and substantial fence. It is situated in a cove at the head of a small creek, which is skirted with splendid alder trees, and fine spring branches come in from among the hills on the right and left. There is perhaps about fifty acres of farming land in the bottom. On this class of lands almost anything known to temperate regions may be grown; from three to four tons of timothy to the acre, 50 bushels of wheat, 80 bushels of oats, 60 or 70 bushels of corn, and all kinds of garden vegetables succeed well upon such bottoms; the nine hundred and fifty acres, therefore, are hill lands, suitable for the raising of sheep. The soil among these hills is soft, moist, and sandy. They never become muddy or sticky, and are firm under foot in the rainy season. The native grass grows on these hills the year round, and orchard grass, when once set, will do the same. Sheep, cattle, and horses will grow, flourish, and increase here as by spontaneous production, and with no other feed than what they pick from the ground, and with no other shelter than that afforded by the hills and trees. On such a place as this, a person could keep ten head of horses, 50 head of cattle, and 1,000 sheep, and, with light labor, can secure an income of two thousand dollars per year. Such a place as this can be bought for about \$4,000; the owner of this place which I have described asks just that sum. He longs for a new country, not aware that he has the elements of a fortune in his hands, and that he ought to be one of the most happy and contented of men in the world. A great many such places as this may be found in the hilly districts of Willamette, Umpqua, and Rogue rivers, and can be bought at even low figures when we consider their intrinsic value and the increased value which must take place in the not far off future. And from the causes hinted at, and from others which I shall explain, the most valuable grain and hay lands of this extensive section of western Oregon may be bought at comparatively low prices, ranging from five to fifteen dollars per acre.

Large quantities of grain are raised in the Willamette valley; the flour goes to the mining camps of the mountains or to San Francisco, from where it is sent to Nevada and the vast interior at great speculation, or shipped abroad to different parts of the world. But the amount which this country now produces is but a fraction of what it could or would produce if internal facilities of transportation were better, and if Oregon had independent means of transportation abroad; or if, from the improvement of the vast facilities for manufacture here, a greater home consumption demanded it. The statement may as well be made right in this connection, and relied on by the commercial and business interest of the world, that Oregon may always be safely depended upon for immense quantities of grain. Crops in this country never fail. We hear of drought,

blight, smut, and rust ruining the grain crops in other parts of the world. It never happens here. As sure as the farmer ploughs and sows, he has harvest; and the bounty of that harvest is in proportion to the skill and faithfulness of his work. The seasons and the soil always do their duty.

Taking into consideration the vast hill countries of these valleys, the favorable climate, the superior quality of the soil and their natural adaptation to all manner of grasses, it is evident that their capabilities for the production of wool, mutton, beef, butter, and cheese are beyond all calculation. These great resources have been considerably improved upon in the last few years, but the progress which has been made only serves to indicate what tremendous resources of wealth they would become if circumstances should demand their complete development.

The Umpqua country has a harbor at the mouth of the Umpqua river, and when the light-house is in operation, large schooners, and even ocean steamers may enter there with comparative safety, and at the head of tide-water they have a commercial emporium on a small scale, called Scottsburg. It is chiefly distinguished for the rugged abruptness of the mountain walls around it, the splendor and fragrance of its myrtle groves, and its lack of houses and population. From this point goods are hauled in wagons to the interior towns of Oakland and Roseburg, where an extensive and profitable business is transacted. It is at these places the people dispose of their wool, wheat, oats, barley, bacon, butter, eggs, cheese, fruit, and other produce, which is sent to the emporium by the same means of conveyance that brought up the goods, and thence shipped for San Francisco. In the Umpqua country they have many saw-mills, flouring mills, distilleries, and breweries. They also manufacture considerable leather of a superior quality, and some salt, and sorghum sirup. The Umpqua mines, which are located on the tributaries of the South Umpqua, and also on the head-waters of the North Umpqua river, give employment to a few miners and create a market for the produce of adjacent farmers.

The agriculture of Rogue River valley is mainly sustained by the mines of that section and the city of Yreka, located south of the Siskiyou mountains in California. Their goods are hauled in wagons either from Red Bluffs, in California, or from Crescent City, on the coast, 120 miles west of Jacksonville. Yet, notwithstanding its interior location, its mines having been good and extensive, giving employment to a large number of miners who were always well supplied with the "dust," with which to pay liberally for all they desired, the farmers in this section flourished to an extraordinary degree, and all departments of business brought into requisition partook of their prosperity. But in time the capacity of agriculture preponderated over the capability of the mines to consume, and a comparative stagnation in business was the result. The lack of market was seriously felt, and an outlet for their surplus produce seemed to be a necessity; and considerable money was spent by enterprising citizens in attempting to build wagon roads over the Cascade mountains to reach distant mining camps. Some sought a solution of the difficulty in the manufacture of such articles as drained the country of money by being brought with great expense from abroad, such as leather, lime, whiskey, wine, tobacco, vinegar, soap, candles, and sorghum sirup. They have in this valley many fine saw and grist mills, distilleries, and appliances for the preparation of the various articles which have been mentioned. They manufacture wagons and fine furniture. They have here lime, coal, and marble; and at the town of Ashland there is a mill for the cutting of marble, and at this locality the enterprising citizens have contracted for a large woollen factory, which is nearly ready to com-

mence operations. Situated as they are there, the manufacture of woollen goods and the making up of clothing ought to be profitable and go far towards sustaining business in that country.

The Rogue River mines, as has been explained heretofore, are the oldest mines in Oregon, having been discovered in the summer of 1849, the next season after the discovery of gold in California. At the time of the discovery of gold here, this valley was inhabited by the most warlike and resolute savages found anywhere on this coast, and had it not been for the gold and its influence they would have been able to resist the advancement of settlements for a great many years, and undoubtedly would have cost the government immense sums of money above what it did cost to subdue them. But the attractive power of gold, and the natural desirableness of the country, brought an enterprising class of people who were willing to brave all the dangers for the sake of the advantages of a pleasant and healthy climate, where rich soil and good gold mines lay in close proximity. This country was prospected under the most serious difficulties, and in the face of many dangers. In the interior, surrounded by unexplored and almost impenetrable mountains, traversed by only an emigrant trail which was wholly unfit for the purpose of heavy teaming, the pack train had to be depended upon mainly for all purposes of transportation. Flour reached \$1 25 per pound, and luxuries, such as bacon, sugar, coffee, tobacco, and whiskey, perfectly fabulous prices. The "brave '49-er" traversed all this country, his pick and shovel in one hand, and his trusty rifle in the other. But many of these adventurous heroes paid with their lives the penalty of their daring enterprise, and their bones were left bleaching in the cañons and mountain gorges of the wilderness. But after two general wars with the tribes of that country they were subdued and removed to a reservation 200 miles away; so that persons living at a distance, who have been deterred from coming here to try their fortune in the mines, because of their dread of the savages, may now come with perfect safety and impunity. These mines have been better prospected and tested than any others in Oregon, and that they are good, reliable, and extensive is conceded by all who are acquainted with them and experienced in the business. They are distributed along the main channel of the river from Gold Hill, located near the lower end of the upper plains, and not far below the mouth of Bear, or Stewart's creek, all the way to the coast, and on the tributaries from Ashland on the south side of the valley, and in all the streams on the north side of the river coming in below Gold Hill, westward to the mouth of the river. Gold deposits have been found in paying quantities.

Besides these river, creek, and ravine mines which usually occupy the attention of miners because of the convenience of water, which is indispensable to mining operations, there are known to exist extensive tracts of "pay dirt," which it would require immense cost to put water upon. These mines will lie here to interest the great capitalist in the future; meanwhile miners will continue to whittle away upon them with the water of the gulches during the showers of winter. By the expenditure of a few hundred thousand dollars, water could be brought into the banks of pay dirt in the vicinity of Jacksonville, and when once there it would command the banks and ridges of the same deposits for many miles; and that the dust is there in paying quantities has been amply demonstrated by mining operations which have been carried on there for nearly twenty years. There are other districts in this Rogue River country similar to this which I have just described, which in the future will be developed into great mines. Many ledges of gold-bearing quartz have been found

here, and some of them are being worked with profit; and many more of them will be opened and worked when the fever to prospect for the ledges in which the gold is supposed to predominate over the rock gradually cools off, and capitalists become more contented to embark in mining operations with moderate prospects before them. It was in this valley that the celebrated Gold Hill was discovered, from which some of the first wagon loads of rock taken yielded several thousand dollars to the ton. But not continuing the richness first promised, and the proprietor meeting with a discouraging detachment in the ledge, the company broke down and the hill was abandoned. Saying nothing of the "big lumps" and "big strikes" that are continually stumbled upon in these mines, and which would start the miners to a new discovery for a thousand miles around, a large number find profitable work here, and many a "lucky miner" makes his "pile" and strikes for other parts of the world with a heavy wallet.

There are four natural divisions of western Oregon, caused by mountain ranges. The Willamette is separated from Umpqua by the Callapooya mountains, the structure of which appears mainly to be an upheaval of stratified formations and sedimentary rocks or old ocean bed. Soil rich, sandy, and moist, producing hazle, elder, and alder, and immense fir and cedar trees. Much of this is rolling table land, sufficiently even for agriculture. A number of townships of it are surveyed, are vacant, and open to private entry at a dollar and a quarter per acre.

The Umpqua is separated from the Rogue River valley by the Umpqua mountain, a much more lofty and rugged ridge than the Callapooya. Basalt, granite, and quartz appear here, the basalt in stupendous masses; and about the summits of the most elevated ridges, in many places, it shoots up in tall peaks many hundreds of feet above the surrounding forests. This mountain is cut in two by the great Umpqua cañon, discovered by the South Road Company in the spring of 1846. It was opened so that wagons could pass the fall after its discovery; and through it at that time came the first wagons that ever rolled into Umpqua or the Willamette valley. It was much improved at an early day under the supervision of Major Alvord, now General Alvord; and was subsequently still further improved by Colonel Hooker, since the distinguished Major General Hooker.

This cañon is twelve miles in length; and the road is now kept in repair by means of an incorporated company.

The Siskiyou mountain runs east and west from the Coast mountains to the Cascade range, and constitutes the southern wall of Rogue River valley, and also serves as a sort of natural boundary between Oregon and California. It is a lofty and rugged range, and at some points it piles up to the point of eternal snow. Over this mountain there is a very good graded road, constructed wholly by private enterprise, and through a route first opened in the spring of 1849.

This mountain exhibits immense upheavals of granite and a great variety of kindred rocks and quartz.

The soil on the south side of the valley, made from the washings of this mountain, may be denominated as granite land, and it is undoubtedly the nicest land for cultivation in the world. But at many localities about the lower summits are points and crags of basalt rock. Pilot Rock is one of this character, and stands on the summit of the mountain a few miles west of the stage road. With a base of three or four hundred feet it rises up with perpendicular walls to a great height, what is estimated to be a thousand feet. There are also to be found about the lower summits of this mountain, within the pass of the stage road, and perhaps

500, feet above the level of the sea, great masses of old ocean bed, showing in the rock the forms of a great variety of sea shells.

About the foot of this mountain on the Oregon side are some hot mineral springs, the finest for bathing purposes imaginable. The effect of this warm mineral water on the skin is declared by all to be pleasant and beneficial and it is resorted to for the sure cure of cutaneous diseases. There are also fine soda springs here—the sharpest and most delicious and refreshing soda-water ever drank, and large quantities of it, there being a number of cold springs. Here nature in her great internal laboratory sets at defiance man's most refined skill in chemistry. Great numbers of people throng here to indulge in drinking this water, and it is believed to exercise a beneficial effect upon all parts of the system.

The fourth division of western Oregon is the coast country; it is separated from those districts which have been described by the Coast range of mountains, which run parallel with the Cascade range and the coast. The summit of this ridge is at an average distance of twenty-five miles from the sea-shore, and bold spurs from the main range run out at many points far into the ocean, forming high and rugged promontories. This strip of country presents a rugged aspect in its general features, yet its average altitude is far less than that of the Cascades, and upon exploration it is found to contain vast quantities of land sufficiently even for cultivation and of the richest and most productive character. Its characteristics and natural productions are similar to the land described in the Callapooya mountains. In fact this whole belt of thirty or forty miles broad, and running the full length of the Oregon coast, may be set down as a forest country, excepting, of course, some comparatively small districts, such as the Clatsops plains and the prairies of Chehalem, Tillamoot, Siletz, Taquina, Alsey, Sinselaw, Smith river, Umpqua, Coos, Coquille, and Rogue rivers. This mountain is cut through by the Umpqua and Rogue rivers, and south of the Umpqua the mountains of this belt become more detached and irregular, affording larger districts, in compact form, sufficiently even for agricultural purposes. It has been exceedingly difficult to extend the surveys in this section of country on account of the dense undergrowth and the heavy timber. At various points along this coast country there are established heavy lumbering interests, and vast quantities of valuable timber are being swept from unsurveyed lands. The valuable classes of timber are fir, pine, redwood, maple, myrtle, and cedar. Stock flourishes here, feeding upon wild peavine in the woods, and clover and grass in the swales and glades, and without any preparation being made for feeding in the winter. Orchard grass, timothy and clover grow luxuriantly; corn and all kinds of grain do well, and the potato crop is unsurpassed by any country. In fact, all varieties of garden vegetables and fruit, such as apples, pears, plums, and cherries, succeed first-rate. The Coos, Coquille, and Rogue river sections have one specialty superior to any other portion of Oregon: it is in honey. The adaptation of this country to bees and the production of honey is extraordinary. There is a succession of bloom in that country which affords bee pasturage during the whole summer; but foremost among all these is the bloom of the mountain huckleberry, which abounds in these woods; and as it blooms later and later up the sides of the hills and mountains, it furnishes materials for bees for many weeks. The honey made in this country is of the most delicate and delicious flavor, and almost transparent. There are oyster beds along this coast particularly in the Yaquina bay, where large quantities of oysters are gathered for commerce. A great many varieties of fine fish are to be found along this shore; even codfish and the salmon, which abound here and run up

these coast streams in vast quantities in certain seasons of the year, are pronounced by travellers and all competent judges to be the finest ever found. At many points on these numerous streams emptying into the ocean and into the Columbia river are a great many favorable situations where magnificent fisheries could be established, and in the aggregate possess a capacity equal to the demands of a continent. Some of these facilities have been improved and considerable quantities of fish are taken and prepared for home consumption, and for market abroad; and to the extent it has been followed has proven a lucrative business. On the southern portion of this coast large coal deposits have been found, and some of these beds have been opened and extensively worked for the purposes of trade and commerce. Coal has also been struck at various points elsewhere along this coast as far north as the Tillamook, but not sufficiently developed to demonstrate either its quantity or quality.

The coast mines consist chiefly of the beach mines, distributed all along between the mouth of the Coquille and Rogue rivers and extending several miles north of the Coquille. It is believed that the "dust" is driven up from the ocean by the action of the surf, for claims that have been worked out have subsequently been found renewed. This is the celebrated gold beach that once created intense excitement. They are said to be "too even a thing" to suit miners generally; they do not contain the necessary "lumps" to keep up the interest; but wages in the coal mining and lumbering business being as good or better than these mines will yield they are not worked extensively, but are regarded, such as they are, as inexhaustible. Some day, perhaps, when people in that section come to be contented with two or three dollars per day, these mines will be extensively worked; or, perhaps, when some cunning Yankee shall invent an ingenious machine by which the precious dust may be separated from the grosser material with greater facility than with any of the appliances used here, this gold beach may become as substantial and important as its elegant name would indicate.

Iron ore has been found in extensive beds in this State, particularly in the vicinity of Portland. A company was formed for the purpose of manufacturing iron in this State on the 24th day of February, 1865, and established heavy works for this purpose near the town of Oswego, a few miles above the city of Portland. The organization is known as the "Oregon Iron Company," and is established upon a capital stock basis of \$500,000, but reached its first run of iron ore on the 24th day of August, with an expenditure of \$126,000. The works, if pressed to three runs per day, 24 hours, will yield from nine to twelve tons per day. The ore possesses about 55 per cent. of iron, and by iron men is pronounced rich and profitable. It is believed by those who have examined and prospected the bed that it will prove even richer as it is worked into. The iron made from this mine has been proven to be of the finest grain and the most superior quality. In fact, it is said to answer for machinery from the first casting, just as it runs from the ore. This extraordinary iron bed begins near the town of Oswego and curves around to the vicinity of St. Helen's, on the Columbia river, and has been traced some 25 miles. It is favorably located for working, as the country through which it runs is covered with a heavy forest of fir, out of which to prepare coal.

The Willamette mines are located high up among the spurs of the Cascade mountains, in a belt of country which runs along with the range, in which the granite and quartz makes its appearance. Gold dust has been discovered upon the headwaters of Molalla, but the most northern point west of the Cascade where gold mines have been worked are those

located upon the mountain tributaries of the Santiám river. A number of heavy ledges of gold-bearing quartz have been found here. Some of the samples of rock are extremely rich. A joint-stock company has been organized to work these mines and have constructed a powerful mill and crushed considerable of the quartz, but the yield of the precious metal fell far short of expectations. These veins are of that class in which the gold is irregularly distributed in patches at intervals, called chimneys. Quartz containing these chimneys may have a certain percentage of gold distributed very evenly through it and the chimneys exist in addition, but in this class that even percentage is usually very low, and therefore involves the crushing of large quantities of poor rock between the profitable patches. This class of rock is very deceptive and often leads to serious and disastrous disappointments among the inexperienced, for accurate assays may be made from specimens of the ledge, the calculations per ton from which will vastly exceed what can ever be reached by working the rock. This appears to have been the case in these mines. After the quartz has been crushed, the separating the gold from it requires a degree of scientific knowledge and experience which perhaps has never been brought in requisition in these mines, but which, if applied, might develop great sources of wealth, for the material is here to work upon. At this time, however, the mining operations of this camp are under the shadow of discouragement.

A number of large veins and ledges of gold-bearing quartz have been found among the mountains on the waters of the Kenzie river. There has also been some "pay dirt" found here. No important mining operations, however, have been attempted in this locality. No company has as yet been organized to work any of these ledges. Specimens and samples from a number of the different ledges have been carefully assayed by competent chemists, and the calculations of quantity of gold per ton range from \$60 to \$4,500. The style of operations here are of the most simple, cheap, and primitive character. They prospect around the ledges, some of which are very large, being from three to four feet thick and distinctly traceable for several thousand yards, and peck out detached fragments, from which they sort the richer specimens and pound them up by hand in mortars. This process of mining is said to be safe; not exposing the miner to the danger of losing the fortune that he has nor to the sudden getting of one. And yet it is declared that many of these miners are getting rich.

Still further south, in this same range of country and on the headwaters of the coast fork, is a district of placer mines. Considerable pay dirt has been found distributed among the mountain streams here; but neither the love of fortune nor the spur of necessity have sufficed to cause the owners of the principal claims to develop these mines. These mines are mainly held by farmers and other persons who live in the valley below, and with whom mining is not a business, and they are contented to do, or have done for them, only just such an amount of work as is necessary to hold their claims, saving them, as they facetiously remark, "for after a while, when gold will be worth something."

The Bohemia mines are located upon the summit of the Callapooya mountain, where it rises up into a sharp ridge and connects with the main Cascade range. These mines are of comparatively recent discovery, but having fortunately fallen into the hands of intelligent persons, who interested capital and procured the services of experienced prospectors, the character of the mines is already pretty satisfactorily ascertained. It proves to be a heavy quartz district. Within the circuit of a few miles a number of veins of gold and silver-bearing quartz have been

found. It is believed that these are destined to be great mines, both for gold and silver. The quartz in one of the large ledges has been tested to some extent with the *arrastra*, and the results have been not only satisfactory, but justify the very highest expectations. "Gold bricks," as they are called, have been passing around in attestation of the reliability of Bohemia, and companies are being organized for the purpose of beginning operations there on a large scale.

Eastern Oregon is separated from the western natural division of the State by the Cascade range of mountains. It is a vast region, bounded on the south by California and Nevada; on the east by the Territory of Idaho, and on the north by Washington Territory. It is a different country in its physical appearance and structure from western Oregon. The circumstances of its geological history have evidently been different, and its present condition in this respect is manifestly of a radical dissimilarity. The natural productions are therefore, in many respects, different, even where it would not be demanded by the difference of climate; but as an illustration of this important fact, there is not an oak tree on the east side of the dividing grounds of the Cascade ridge.

A considerable portion of this interior tract presents the evidences of the most awful volcanic commotions, and that too of a far more recent date than there are any indications of in western Oregon. The mountains of this section are irregular, there being no connected ranges of any considerable length, but appear to have been piled about in the utmost disorder and confusion, yet not to say excessively rugged, numerous, or high. Many of them rise up from a plain, in perfect cone shape, from little round hills of a hundred feet high to the respectable altitude of 3,000 feet. From about the summits of these lesser hills a point of black or dark red lava will project; but the larger hills have evidently been built up from the action of craters. In the central portion of this region, off east from Diamond peak, and rising up abruptly from the east side of the Deschutes valley, there is an elevated table land which is called the "desert." It extends eastward from this point until it breaks down at the western rim of the valley of Harney lake, and from near the northern end of Lake Abert, northward to the valley of Crooked river, being about 80 miles east and west, by 40 miles north and south.

The eastern portion of this desert is rock, sand, and sage. The western portion is covered with pumice, called volcanic ashes, and is almost as white as snow. It is the hardened form which has been blown out and spread over this section from the great volcanic cauldrons which have one day boiled in this country, and the awful rents in the earth and craters from which it is supposed to have issued still yawn at different points hereabouts in silent and grim attestation of this theory. The only vegetable production of any note that appears upon the western line of this desert plain is a dwarf pine of only a few feet in height, while vast stretches of the plain are perfectly barren and desolate. The pumice covering the surface of the earth here is of about the fineness of ground tan-bark, and when dry possesses no more specific gravity, although throughout its structure there are found beautiful crystals of silicious sand.

Northern Oregon is that part of this great eastern portion of the State which lies between the Cascade range and the Blue mountains, and extends northward from the desert to the Columbia river or boundary line between Oregon and Washington. It includes the country bordering upon the Columbia, the valley of the Umatilla, and all the vast region drained by the John Day, the Deschutes, and Crooked rivers. It is a large country, almost or quite as extensive as the State of Massachusetts.

This is mainly a grazing country, and abounds in the celebrated bunch grass. It is a country of a "thousand hills," and as many valleys, and as there is comparatively little falling weather the snow seldom interferes with grazing. The valleys among the hills and bordering upon the streams are, some of them, of considerable size. There are quite extensive settlements in many of them, where agriculture is carried on with system, success, and profit. Corn does well here, and it is claimed that melons do better in this country than in the Willamette valley.

The Umatilla is a fine country, both for grazing and for agriculture. It is also very favorably situated for business and trade, having mines on the east and south and the Columbia river for navigation. In all the appliances of agriculture, mills, &c., this section of country is as well advanced as any other portion of the State.

The John Day country contains some very fine valleys for agriculture, and quite extensive settlements are established in the valley below Canyon City, where farming is carried on extensively. Many settlements have been made among the valleys along the Deschutes and in the Crooked river country. The Ochoes and a number of other valleys in this section are of recent exploration. Here is certainly a fine field for the emigrant. He may, in fact, choose his own occupation, to be either a herdsman or a farmer, or both. It is almost needless to say that a country like this is well adapted to the raising of sheep; and that wool is destined to be a great staple of this country is most evident. The country is well watered, and in most parts is sufficiently supplied with timber.

The climate here is preferred by a great many people to that of the Willamette. There is much more clear weather in the winter months, while in the summer it is claimed there are more showers, and that this is the secret of the superior success of corn and many of the garden vegetables. This is also a fine fruit country. Game is abundant; elk, deer, bear, and antelope abound, and fowl and fish. To the man who is master of the fine art of trout-fishing, this is certainly a paradise. All the streams abound in the finest varieties of trout, from one to five pounds' weight, and in the lake they are even more plentiful. About the headwaters of the Deschutes river there are some fine lakes of from six to eight miles in extent. Here in these beautiful lakes, the waters of which are as clear as crystal, it is believed the finest kind of trout may be taken by even the unskillful.

East Oregon is designed to embrace the most eastern part of eastern Oregon, and is that portion, essentially, which I have heretofore denominated as "eastern Oregon." It includes Grand Ronde, Powder River, Harney Lake, and Alvord valleys, and, on the southern border, all the country east of Christmas lakes. The climate and productions of this country are similar to northern Oregon. Grand Ronde and Powder River valleys are extensive agricultural sections, and agriculture in all its departments is carried on here with the same appliances as are used in other parts of the world. A large amount of these valleys have been surveyed, embracing the principal portions of the main valleys. This section embraces all the country east of the Blue mountains and sloping down to Snake river. There are vast quantities of grazing country here, and many valleys suitable for agriculture are to be found among the hills on the streams. There is plenty of timber and water. Harney Lake valley has been found to be very extensive, and to contain a vast amount of agricultural, grazing, and haylands. It is a vast basin, and without any outlet. Settlers and those who follow herds are just beginning to go in there; and, from all sources of information, it is destined to become

before long an important section of country. It is said to be 30 by 40 miles in extent, water and soil in abundance, and great plains of waving grass and clover. The only difficulty complained of is the scarcity of timber. The streams of this valley flow into Harney lake, a body of water of considerable magnitude, with broad and extensive marshes bordering upon the eastern shore. This point is favorably located for the raising of beef, as it is within driving distance of heavy mining interests in almost every direction.

The country about the Christmas lake is narrow, but of considerable length, and in character the country is similar to the Harney Lake valley. What here has been regarded as one long lake turns out to be a long string of small lakes, but connected, as it would appear, by broad marshes. Many of these lakes possess that singular feature which some writers have discovered of Klamath Lake—the *possessing of no water!* Some of these lakes, though of considerable extent, are very shallow, the depth varying from one to three feet, with an extremely rich soil at the bottom, which produces every year a powerful growth of cone grass, flags, and bulrushes. At the season of the year when these are standing there is no lake, or it is one of those remarkable lakes with no water in it; but when this vegetation has fallen, or dried and burnt off the surface, and the water has appeared, then it is a lake, and has the water in it just like other lakes. Indeed, many disputes and misunderstandings among travellers and explorers have occurred through means of this circumstance.

Alvord valley embraces the upper waters of the Owyhee river, including the Jordan creek country, and is located in the southeast corner of the State. There is considerable farming land in this section, and the grazing is extensive. Settlements have been established here for a number of years, notwithstanding the danger from hostile savages. That country is repeating the history of Rogue River valley, and has just reached that point of progress at which the red man was conquered. Agriculture and trade in this section is sustained by its mines, and its point of mercantile supply is in the direction of the Central Pacific railroad, and when the railroad reaches the north bend of the Humboldt river, it will be near enough to establish and vitalize this important country. But the mines adjacent to this valley are located mainly in the Owyhee mountains, east of the boundary line between Oregon and Idaho.

The country in the immediate vicinity of Snake river consists of elevated ridges and table lands, or is cut up into deep and rugged cañons from 100 to 1,000 feet deep, and produces but little grass, and but a poor quality of even sage brush. The principal part of the country intervening between the localities which I have described is pretty much of the same character, and only fit for the abode of lizards and horned toads.

The Blue mountains are an irregular pile of mountains intervening between the head-waters of the Umatilla and Grand Ronde rivers. This particular section, however, partakes more of the nature of a chain or range than the portions further south. There is a heavy spur runs down westward, parallel to the Columbia river, and also similar spurs between the three principal branches of the John Day river and between the south fork of the John Day and Crooked river, while still another point is projected southwestwardly, dividing the waters of Crooked river from those of Harney Lake valley and finally connecting with the desert table land. Similar spurs run out between the rivers on the eastern side, and gradually widen out into high sage plains as they approach the Snake river. This extensive pile of mountains is covered with a fine forest of pine, fir, hemlock, and cedar; it abounds in water-power,

and has considerable rich land, sufficiently even for cultivation. It is also a gold and silver country; gold having been found in many places, deposited both in rock and in the earth. Mining is carried on here in a number of different localities with all the works, machinery, and appliances of the most permanently established and profitable of mines. Yet the aggregate yield of the country is not equal to what it was a few years ago when the cream of the placer deposits was being taken off. In fact the extraction of gold from its original sources seems to require everywhere the application of a constantly increasing amount of labor and skill, and that a constant augmentation of the forces applied will be found necessary, whether of men, machinery, or scientific knowledge; in order to keep up the yearly production of the precious metals to a given quantity; and of all the powers that can be brought into requisition none are so important as an understanding of the elements and principles of the natural sciences upon which are founded those processes which are indispensable to the most perfect and successful mining. A large number of extensive and well-defined gold and silver-bearing quartz veins have been discovered here, examined, and tested; and some of the gold ledges are being worked, but in a country abounding in placer mines the progress of quartz mining must be slow. Placer mines require less capital and less skill, and the investments made upon them are far less hazardous than the quartz. The principal mining localities of east Oregon are the Grand Ronde, Powder river, Burnt river, Willow creek, and the Malheur; the principal localities on the other side in northern Oregon are the Umatilla, John Day, Granite City, and Canyon City mines.

This is a very extensive mining country, capable of giving employment to a vast number of miners. There is also presented here an inviting field for the investment of capital.

Southeastern Oregon embraces a country about 100 miles long from east to west, running eastward from the Cascades towards the Christmas Lake valley, and from the head-waters of the Klamath marsh, and the desert on the north, southward to the California line. There is country enough here for a State. The climate is similar to northern and east Oregon. It embraces the Klamath Lake valley, which stretches along the eastern base of the Cascade mountains to the dividing grounds between the waters of the Klamath and Deschutes. The outlet of this valley is the Klamath river, which breaks through the Cascades just south of the southern boundary of the State.

Klamath Lake valley contains a large amount of agricultural and grass lands. There has been some dispute about this being a suitable country for agriculture on account of altitude. But demonstration is the best of all proof. They have the productions there to show—timothy with stocks nearly six feet long; corn, like that of Missouri; wheat of the heaviest kind; and barley 100 bushels to the acre. In J. Ross Browne's report the important fact is noted that the Klamath lake *has no water in it*; that what water there is, is very shallow; that it principally consists of extensive marshes or savannahs, and could be easily drained for cultivation: This is true of the lower Klamath lake, though in the upper end there is considerable open and deep water. But miles and miles of it are just as described, and could be effectually drained by a few hundred yards of excavation in the bed of the Klamath river just where it leaves this vast plain. A little sharp ridge of hills runs across the valley above the lower lake, and above this ridge is the Big Klamath lake. It is about 20 miles long and 12 miles broad; it is open and deep water, and the waves roll on it like they do on an inland sea. It has an outlet

into the lower Klamath lake called Sink river. This river is perhaps three-quarters of a mile long, and is a cascade its entire length. When it turns over the rock rim from the upper lake, it is about 300 feet broad. The difference in altitude between the two lakes is considerable; it has never been measured. This is undoubtedly one of the most perfect of sites for the application of water-power. There can be no floods here. The lake acts as a regulator, and the rise and fall of the lake does not exceed a couple of feet at the most. Perhaps the greatest change in the rise and depression of the water here is caused by the direction and force of the wind. A singular phenomenon of this character was witnessed upon a certain occasion; the wind was blowing a fresh breeze from the south, and the effect was so great upon the waters of the lake that Sink river for a short time almost ceased to flow. There are upon the margin of these waters some large marsh plains like those which prevail in what is styled the lower Klamath lake, and much the same as those which predominate in the great marsh country above.

This big lake is literally alive with the finest of fish. They are a large scale fish, weighing from 5 to 25 pounds, and resembling in form what are called the buffalo fish of the western rivers of the Mississippi valley. In fact, what is said of this lake in regard to fish may be said with equal truth of Goose lake and all the principal waters of south-eastern Oregon; and for trout, it is an unsettled point whether the rivers and streams of this country are surpassed by the waters of northern Oregon.

The marsh is located at the head of this valley next to the foot of the desert plateau which sets in towards the northeast, leaving a belt of forest country perhaps 20 miles wide between this desert elevation and the foot of the Cascade mountains. In the northern portion of this marsh is located what is called the Upper lake. A large proportion of this marsh is similar to the savannahs of the lower lakes. There are extensive portions of it, however, sufficiently dry for cultivation, broad, level, and rich like the prairies of Illinois. Williamson's river winds through this marsh, and at the south end of it breaks out over a rim of rocks similar to those at the southern extremities of the Big and Lower lakes, and it would take but little outlay of labor to drain the whole vast plain. It is in this Upper lake that the celebrated wocus is gathered by the Indians. Until within a few years it has been regarded as a species of wild rice, and for flour and nutritiousness has been much prized by trappers and mountain men. It turns out, however, not to belong to any such variety of plants, but is the production of a species of water lily. Thousands of bushels of it may be gathered and with but little labor. It grows in water from one to three feet deep; it has three leaves upon the stem which spread out on the surface of the pond, and the pod containing the seed is about the size of an apple, and is elevated a foot or so above these large floating leaves by which it is sustained.

Williamson's river runs southward down this Klamath valley and empties into the northeastern part of Big Klamath lake. On the plain near the mouth of this river is located the agency of the Klamath Indian reservation, where agriculture is carried on extensively and successfully. About 12 miles above the mouth of this river is the junction of Sprague's river, which comes in from the east.

Sprague's River valley is about 60 miles long and is one of the finest valleys in Oregon. It contains a vast quantity of agricultural land, and 12 or 13 townships of it have been surveyed; it is vacant, open to settlement, and safe from savages. The climate and soil is much the same as

that of the Klamath Lake valley; it is claimed to be much warmer, however, on account of being less under the influence of the Cascade mountains. A low divide at the head of Sprague's river leads into the great valley of the Goose lake. Timothy, wheat, oats, and barley have grown, flourished, and matured in both these valleys, and the assertion that they are unfit for agriculture is as erroneous as that the Klamath Lake has no water in it.

Goose Lake valley is a large country, which, for the distribution of agricultural lands, timber, and water is unsurpassed by any portion of Oregon. It is, except a portion on the east side of the lake believed to be in California, in its pristine or Eden simplicity, fresh from the hand of nature, and on the conclusion of the Indian war, a week ago, has become safe for settlers. It extends northward and connects with the fine valley of the Che-wa-can, which spreads out on the west side of Lake Abert, and runs up north to the foot of the desert.

There is but little of this vast southeastern country but that is capable of being useful to the purpose of civilization, for timber, for grazing, or for agriculture. The principal varieties of timber are fir, pine, cedar, and juniper, and the most noteworthy of the natural productions are the wild flax and plum. Some of these natural plum orchards are of considerable extent, and the fruit for size and flavor will bear favorable comparison with many of the cultivated varieties. The most remarkable feature known of the Che-wa-can valley is the copiousness of its honeydew, which has been found hardened and crystallized upon the leaves of the bushes to the thickness of an eighth of an inch, so that they looked as white as frost.

If this country could be tapped, if it had railroad communication with other parts of the world, it would very soon become an important section of country. But until something of that kind can be done it must languish as an interior region, which is unapproachable by navigation. Its nearest point of access to the Pacific railroad will be at the north bend of the Humboldt, which will be about 100 miles from the southeastern line of this section under consideration. The route of the proposed branch Pacific railroad lies through the heart of this country, to come direct on a northwest course from the bend of the Humboldt to the east side of Goose lake; thence westward, bearing north across the centre of this valley; thence down the valley of Sprague's river to a point about southeast of the Upper Klamath marsh. From this point there is a difference of opinion about which way the branch should go. Some contend that it should go westward from here and cross the Cascades into Rogue River valley, thence down and across that valley and the Umpqua valley to Eugene City, thence down the Willamette valley to Portland. But the originators of the enterprise, who have spent some years in exploring and examining the mountains, propose to proceed from the point above mentioned on Sprague's river, in a northwest course through a heavy forest of yellow and sugar pine some 20 miles to the marsh, at a point below the upper lake and where the Illinois-like plains intervene; thence across these plains, pursuing pretty much the same course, and through the great forest-covered gorge intervening between the desert plateau and the Cascade mountains, and down and across the valley of the Upper Deschutes, and pass the Cascade mountains near Diamond Peak, and through a gap several hundred feet lower than where Lieutenant Williamson crossed; thence descending on pretty much the same general course, and through a grand forest to and down the bottom of the Middle Fork to the great prairie plains of the Willamette, and to Portland.

The Cascade range abounds in magnificent forests as much superior to those on the Sierra Nevada as juniper surpasses sage brush. The dividing ridge of this great range of mountains traverses the country at a distance of about 120 miles from the coast and parallel therewith. Its great spurs and ridges project from the western side. Almost all the rugged region, which is from 30 to 40 miles broad, is covered with heavy forest. The wider portion is towards the Columbia; the narrowest point is where the old "south road" crossed, between lower Klamath lake and head-waters of Bear creek, in Rogue River valley. The forest of the northern portion consists chiefly of fir, hemlock, spruce, and cedar. Through the Middle Fork or Diamond Peak pass it is fir, cedar, yellow pine, sugar pine, silver pine, black pine, spruce, hemlock, laurel, cottonwood, ash, maple, alder, dogwood, and yew. On the southern portion of this mountain the yellow and sugar pine predominates in the forest. East of Diamond Peak the forest extends across the valley of the Deschutes, interrupted only by intervening prairie bottoms along the streams; and the same class of country stretches off to the Klamath marsh, and down the eastern base of the Cascades, on the western border of the Klamath valley, southward to the boundary of the State. The ridge of this mountain is very high and singularly unbroken. By Diamond Peak is the lowest pass in the ridge, unless the mountain be lower towards the southern extremity of the range. There are, however, a number of routes through the mountain, or over it, as the South road, the Rogue River road, the Middle Fork road, the McKenzie road, the Santiam road, and the old Mount Hood and Barlow road. This grand wall is surmounted and relieved by a number of snow-capped peaks. Beginning at the south end of the line is Mount McLaughlin, Diamond Peak, the Three Sisters, Mount Jefferson, and Mount Hood; and also a number of other snow peaks of almost equal altitudes, which have no names. They have all, so far as examined, been built from craters. None of them, however, have made any manifestations within the memory of the oldest inhabitants, except old Hood, who has a time or two lit his pipe and given a few leisurely puffs, apparently just enough to keep it from going entirely out. They have all been, of course, active volcanoes, belching forth smoke and fire. All now, except Hood, appear to be perfectly dead. The smoke of their torments being long since passed, they stand now silent and breathless, wrapped in the white habiliments of winter. But, notwithstanding, this mountain range is lofty about the summits of the main dividing ridge, and the most elevated spurs running out from the divide, it contains a vast amount of even, level country, river and creek bottoms, benches and flats, and the land is extremely rich and productive; and water-power is roaring and thundering everywhere.

Water-power is to be found in all parts of the State. There is not a stream in Oregon that is not a mill stream. This is true of both creeks and rivers. Even the Willamette river, which is navigable for steamboats to Springfield, above Eugene City, is a large mill stream, and is already dammed by nature, at Oregon City, and ready for use. Here are a hundred rivers, with their thousand tributaries, all powerful mill streams. Water abounds here. We have the largest springs on the continent, and all of them ever found afford water-power, except the largest one, which is located in the valley of Williamson's river, a few miles above Big Klamath lake. It rises up in a great pool as clear as crystal, and moves off in a branch which is six chains in width, and nine feet deep. But there are other springs which perhaps afford as much water, but being swift, are not so wide and deep, that afford great opportunities for the applica-

tion of water-power. The western branch of the Deschutes boils up furiously from a large spring, and rushes off a perfect torrent 70 feet broad. There is a large warm spring which rushes up from the foot of the desert table land on the west side of Harney Lake valley; it runs off in a swift branch 30 feet broad. But it will not do to attempt details; it would take a volume. Suffice it to say that this resource of Oregon is inexhaustible. The almost boundless uses for it are also here, both it and its purposes waiting, as it were, to be applied to the benefit of man.

Here is a mighty forest which is to supply a vast material—a half dozen States to be supplied with lumber; here are the hundreds of gold and silver quartz ledges, and beds of iron to be worked; it is here also, to manufacture wool, not only the product of a thousand hills, but of ten thousand hills, and to manufacture the grain and materials produced upon these vast agricultural lands. But can all these mighty resources be vitalized and brought into active requisition through the motions of ox-team communication, or through the instrumentality of a few old rotten tubs and hulks, beating and battering around our sea-coast? Will the little navigation which the Willamette river affords suffice? Oregon is deficient in internal navigation and means of communication and transportation; its waters are adapted to the driving of machinery, no matter how extensive or heavy, but are not suited to the purposes of navigation. The navigation of Oregon consists of the bays, harbors, inlets, and up some of the rivers a short distance along the coast. The Columbia river on the northern border, but only the Willamette river and a few miles on its tributaries, give outlet to the vast interior. This much, however, has had a marked effect upon the progress of business, production, and manufacture. The manufacture of this Willamette country consists chiefly of iron, woollen goods, lumber, flour, leather, and whiskey; and paper, soap, and linseed oil are manufactured, and also furniture, wagons, carriages, harness, ploughs, &c. There are four large woollen factories in successful operation in this valley, and companies are organizing for the construction of others. The production of the raw material of all kinds far exceeds the established means of manufacture; yet, however, this is but the smallest fraction of what could be produced. Large quantities of grain above home consumption and use are sent to Portland, a sort of process by which it is made to pay the expenses of getting out of the farmer's way. From that point it is sent to San Francisco, when some old vessel, which has been everywhere else first, sees fit to come up and get it. The Oregon farmer will get 40 cents a bushel for as genuine wheat as ever grew. It will be ground and the flour sold, by the California dealers, to the miners of Nevada for from \$5 to \$7 per hundred; and to still keep the price of Oregon productions down in order to pocket the very last cent of the profits, and to create a pretext and lever by which to perpetuate the practice, these speculators continue to quote as low as possible "Oregon cockle wheat," and "Oregon burr wool," when there never were either burrs or cockle in this country. This but gives a clue to the oppressed situation of affairs when the trade and commerce of a State are under the absolute control of a single point. This situation of affairs has been the occasion of great discouragement in this State, and explains the reason why so many persons owning lands here desire to sell and move to other parts. If the farmer can sell his land for money, he can invest that in stock and move to a grass country adjacent to the mines, where he can sell his stock himself and put the proceeds in his own pocket, instead of wearing out his life working for others. Many people here do not believe that this is to be the hopeless destiny of a country possessing such tremendous natural resources as

Oregon. These considerations naturally bring up the paramount questions: What does Oregon want? What does it need? What thing is demanded to be done in order to bring these mighty resources into requisition and fill the country with the hundreds of thousands and even millions of people which it could employ? The answer is plain and self-evident; it is direct communication with the great trans-continental railroad, with the same kind of communication with the Puget sound, where the great city and commercial emporium of the northwest *must be built*. This will open the shortest line of communication with China, whose trade has built up empires for the last thousand years. Oregon possesses the natural resources necessary to produce the varied materials to sustain that trade. When these things are accomplished Oregon will cease to bring up the rear of progress, but will rise up as by a mighty impulse, and assume a commanding position in the business transactions of the world.

Very respectfully, your obedient servant,

E. L. APPLGATE,

Surveyor General of Oregon.

Hon. JOS. S. WILSON,

Commissioner of the General Land Office.

No. 17 K.

SURVEYOR GENERAL'S OFFICE,
Olympia, Washington Territory, July 31, 1868.

SIR: I have the honor to submit the following report, in duplicate, of the progress of the public surveys in this district, and other operations of this office during the fiscal year ending June 30, 1868, together with such information in regard to the topography, climate, soil, resources, and productions of this Territory, as is at present within my reach.

I also forward tabular statements of the business appertaining to this surveying district, to accompany the report, as follows, viz:

A.—Statement showing the condition of contracts which were not closed at the date of the last annual report.

B.—Statement showing the amount, character, and condition of the public surveys contracted for since the date of the last annual report.

C.—Statement showing the original plats made in this office, and the number of copies transmitted to the General Land Office and the local land offices since the date of the last annual report.

D.—Statement showing the number of lineal miles run, rate per mile, and the total cost of surveys in this district during the fiscal year ending June 30, 1868.

E.—Statement showing the number of acres of land surveyed in this district during the fiscal year ending June 30, 1868.

F.—Estimate of expenses incident to the survey of the public lands in this district for the fiscal year ending June 30, 1870.

The estimate for the survey of 258 miles of meridian and standard parallel lines proposes the extension of the 6th standard parallel east from the Columbia guide meridian, 54 miles; the 2d standard parallel east of the Willamette meridian, 12 miles; a new guide meridian from the 6th standard parallel north through the Colville valley, 96 miles; the survey of the 7th, 8th, and 9th standard parallels, respectively, east and west from the new Colville guide meridian, an aggregate distance of 96 miles; the survey of 16 townships in the Colville valley; the survey of

24 townships in the Yakima and Columbia River valleys; the survey of 6 townships in the Willopah valley; the survey of 3 townships on the waters of the Chehalis river; the survey of 6 townships on the waters of the Cowlitz river; the survey of 10 townships on the waters of Puget sound.

It will be seen that 246 miles of the meridian and standard parallel lines proposed to be run are for the purpose of reaching the Colville valley, and preparing for dividing that valley and the adjacent country into townships and the regular subdivisions.

It is perhaps unnecessary to call special attention to the condition of that large section of country, or to endeavor to show the necessity for surveys in that quarter. The facts of the case were set forth in my report for 1866, and are as true and pertinent to-day as they were then.

Should a liberal appropriation for public surveys in this Territory be made at the next session of Congress, I shall feel it my duty to expend a considerable portion thereof in the region indicated.

The Yakima River valley contains a large scope of country suitable for settlement and cultivation; and although much work has been done there, much remains to be done in order to bring the farming lands within the reach of the settlers. I have, therefore, estimated for the survey of 24 townships in that valley and neighboring valley of the Columbia.

I have again named six townships in the Willopah valley as requiring to be surveyed, in order to accommodate old residents as well as the increased number of settlers gathering into that desirable vicinity.

The remaining surveys, for which the estimates have been made, are designed to be distributed upon the waters of the Chehalis and Cowlitz rivers and Puget sound, according to the exigencies of occupation and settlement.

The recent railroad movements—the one trans-continental, and the other starting from Portland, Oregon, and both looking to Puget sound for their western and northern termini, having directed public attention to Washington Territory, and stimulated and accelerated emigration in the same direction, render accurate information in regard to the climate, soil, topography, and productions of the Territory very desirable.

I have endeavored to collect data and statistics upon these points, but have not been as successful as I expected or desired.

The subjoined statements, however, may be relied on as correct, being the results of my own observation during the past 12 years, and the concurrent experience of many other old settlers in the Territory.

It is impossible to describe the climate, topography, and productions of this Territory, without dividing it by a north and south line drawn parallel with and through the summits of the Cascade mountains, into two unequal parts, and treating of each separately. For while our area extends over but little more than three degrees of latitude, the Cascade mountains, extending north and south through the Territory, mark the limits of two distinct and dissimilar classes of climate, topography, and production. I shall, therefore, be compelled to notice these divisions separately.

EASTERN WASHINGTON.

This region, extending from the Columbia river and the 46th parallel of north latitude on the south to British Columbia on the north, and from the 117th to the 121st meridian of west longitude, embraces the northern and western portion of the great valley, plain, or basin of the Columbia, and contains about 40,000 square miles. Like the Great Salt Lake basin, this region is entirely surrounded by mountains and high-

lands, and has no drainage to the ocean, except by the Columbia river, which has literally torn down the Cascade mountains in its effort to reach the sea. The general altitude of this basin is from 1,000 to 2,000 feet, while the mountains on either side, and the ranges of hills scattered through it, are much higher.

The formation is basaltic, columnar in some places, but generally irregular, covered with a soil of varying depth of a light grayish yellow, easily reducible to an impalpable powder, and, in many places, strongly impregnated with alkaline matter, which crystallizes upon the surface in the process of evaporation, and remains during the dry season as an efflorescence. This soil, so light in some localities as to be easily and frequently moved about by the atmospheric currents, supports a heavy growth of bunch grass, and produces the cereals abundantly wherever the moisture can be retained long enough to mature them.

The whole country, from the southern boundary of the Territory north to the Spokane river, a distance of nearly 150 miles, is one vast unbroken prairie, save the upper slopes of the mountains, which are more or less densely covered with evergreens, and the margins of the water-courses, which are fringed with deciduous trees, such as cottonwood, alder, willow, ash, &c.

The surface is high, rolling, and irregular, with occasional plains, where the irregularities seem to have been shaved off and deposited in huge parallel windrows at one side. This applies peculiarly to the country between Snake and Spokane rivers, which bears the evidences of powerful glacial action, the soil for many miles having been scraped from the underlying rock and carried along for considerable distances by the force of the moving sea of ice, and deposited in immense piles, resembling, at a distance, huge oblong stacks of hay, often a mile or two in length, and from 200 to 400 feet high.

The force which has thus removed the soil has scoured the rocks, broken off their projections, accumulated these broken fragments, and deposited them in heaps at irregular intervals all over this tract of country.

Wherever this glacial action has taken place, the processes of decomposition have not yet supplied the loss of the earlier soil, and the growth of grass is more stunted and the bunches are at greater intervals, while the vegetation upon the soil heaps is much more luxuriant and abundant.

The Columbia river, coming down from British America, crosses the Territory in a southerly direction until it reaches the 46th parallel of latitude, where, bending sharply to the westward, it forms the southern boundary of the Territory; thence to the ocean.

This river, in its course through the Territory, receives numerous tributaries on either side, which take their rise in the mountains and highlands which constitute the run of this great basin. They generally run in gorges or cañons from 1,000 to 1,500 feet deep, and are skirted by narrow strips of alluvion, which remain sufficiently moist to render them very fertile.

The contrast between the scenery in these cañons and upon the adjacent table-lands is very striking. While in the former the traveller may readily conceive himself in the midst of gigantic and interminable mountains, but on ascending to the table lands the cañons disappear, and he beholds, as far as the eye can reach, a vast rolling prairie, covered with a waving sea of bunch grass.

The formation being basaltic, and the soil loose, the water from the melting snows and moderate rains of spring rapidly percolates through and sinks into the vertical fissures of the rock. Springs, which in coun-

tries where the stratification is horizontal are often numerous and perennial, in this region are rare, and often go dry during the autumn months. Travellers are compelled to regulate their movements and be controlled in their camping places by this fact.

Watering places are often 10 and 20, and sometimes 50 miles apart. I am not aware of any efforts having yet been made to obtain water by deep boring. But if the commonly received theory be true, that the water from artesian wells is deposited upon the neighboring mountains, and sinks beneath, upheaved, impervious strata, until it is distributed beneath the plain below, where it is retained by the compactness of the formation above it, then it would seem that deep borings could never be successful in these basaltic regions, where the whole substratum of rock is divided into an endless succession of columns by vertical fracture.

Artificial irrigation has not been attempted on any considerable scale. Indeed, the gorges through which most of the streams flow are so deep, and the streams themselves so far below the general level of the plain, that canals or ditches of great length would be required to tap them at sufficient elevation to distribute the water over the table-lands.

Agriculture, so far as is now known, can be only moderately successful in very many localities, owing to the aridity of the climate, and the many obstacles in the way of irrigation by means of the water-courses.

Should my conjecture prove true in regard to deep boring for water, it is difficult to perceive how a large portion of this region is ever to be made available for the purposes of cultivation. In such event, stock-raising must become the leading vocation of the population. But there are large districts of country unavailable at present for this purpose.

Domestic animals cannot profitably graze at a greater distance from water than three or four miles, and in much of this country water cannot be found at intervals of less than 10 to 30 miles. Areas of seven or eight miles in diameter around springs and pools, and strips of land three or four miles wide on either side of water-courses, seem to be the only portions of the country at present available for the purposes of stock-raising.

Notwithstanding present appearances and obvious difficulties, it is impossible for any one who has travelled over this vast and magnificent region, rich in soil and possessed of a most salubrious climate, to believe that the greater portion of it was destined to remain forever uninhabited—a vast and unreclaimable wilderness in the midst of population, wealth, civilization and material progress.

At the Spokane river, the geology, topography, and climate undergo a sudden and remarkable change. The formation changes at once from basalt to slate, quartz and limestone, and the surface becomes broken into hills and valleys, and is generally timbered, with the exception of occasional small prairies. The climate here is more seasonable, rains occurring at intervals until mid-summer, and returning earlier in the fall than in the basin proper.

West of the Columbia and north of the Spokane, however, the open and arid region continues well up to our northern boundary—the Columbia itself, running here nearly south, forming the dividing line between the high, open, hot, and arid region to the west, and the hilly, timbered, and seasonable country on the east.

It is a matter of curious observation to stand upon the high lands near this great river in the early summer, and mark the well defined boundary between the constant, bright sunshine and cloudless sky on the one hand, and the alternations of cloud and clear sky, rain and sunshine, on the other. And during showers upon the eastern side of the river, the strong breezes which almost constantly draw up it during the

summer months, often deflected from their course by the spurs of hills on either hand, drive into the rain clouds and set them into eddying commotion, like a current of air driven into a volume of steam. The exceeding dryness of these currents causes them to lap up the moisture and dissipate the clouds wherever they impinge upon them.

The country west of the Columbia and thence to the Cascade range is high and rolling, with numerous fertile valleys interspersed.

The Yakima river, the principal western tributary of the Columbia, drains an area of near 5,000 square miles, nearly all of which is available either for grazing or cultivation. Large tracts of arable land are found upon the main Yakima and the Satass, Topenish, Atahnam, Nachess, and Kititass, its principal tributaries. These valleys, with the high, rolling grass lands adjacent, constitute very desirable localities for the farmer and stock-grower.

The Yakima Indian reservation, containing 1,400 square miles, and larger than the State of Rhode Island, covers a large portion of the best lands in this region. Being almost entirely destitute of game, it is valuable to the natives only for grazing and cultivation. Perhaps 500 families congregate within its limits once a year, while its permanent population does not exceed one fourth that number. This gives 7,000 acres to each family of the resident population, and about 1,800 acres to each family of the resident and migratory population.

It is perhaps to be regretted that so large a district of first-rate land should have been reserved from survey and settlement, to lie waste and unoccupied for years to come. It would promote the interest of that rapidly populating district to diminish the area of this reservation to the reasonable requirements of the local tribes, and open the remainder to occupation by white settlers.

CLIMATE.

The climate of eastern Washington is generally clear and cold in winter, and dry and hot in summer. North of the Spokane river, snow sometimes lies to the depth of four feet, while south of that line it rarely exceeds two and one half feet, more commonly averaging from 15 to 24 inches. Meteorological observations made at Fort Walla-Walla, in latitude 46° , gives the average temperature of the four seasons as follows: spring 52° , summer 73° , autumn 53.6° , and winter 34° ; yearly mean 53.2° , being very similar to the temperature of Washington city, in latitude 39° . This will illustrate the temperature of the great basin generally. North from Walla-Walla the winter temperature is constantly lower to the British line, but at Colville, near our northern boundary, it does not average lower than that of Cleveland, Ohio.

This moderate winter temperature is attributable in part to prevailing southerly winter winds, and the proximity of the basin to the various modifying influences of the coast region, which will be alluded to in treating of that division of the Territory.

The rain-fall during the year is slight compared with the coast regions. The Cascade mountains, extending along the western border, are high and greatly modify the meteorological conditions of the basin. The rain clouds brought landward by the prevailing southwest winds of winter, late autumn and early spring, are arrested by this lofty range, deflected in their course to the northwest and deprived of most of their moisture in these elevated regions; while but a thin stratum escapes over the summits to distribute moisture over the valleys and plains beyond. Hence it is a common occurrence to pass in a single day from the protracted

rains of the coast districts to the clear weather and dry atmosphere of the interior.

The passage through the mountains by the gorge of the Columbia is about 25 miles in length and occupies about four hours' time. Coming up the river by steamer in a heavy settled rain, the traveller carries the same weather into the gorge to the very centre of the mountain range. As he passes on towards the eastern base, he finds that the rain has become sensibly lighter. The clouds are broken and the rain descends in light and fitful showers.

As he advances, the showers gradually cease, and he finds himself enveloped in banks of mist which spread out, fold together, roll up in vast volumes, or drive along horizontally, as they may be controlled by the eddying, whirling currents of air passing through the gorge.

Approaching the foot-hills of the eastern slopes, these banks of mist become thinner, gradually ascend, gather in little cloudlets and finally disappear, leaving the traveller in the pure, serene, and exceedingly transparent atmosphere of the great basin. These changes are the experience of three or four hours of time, and beautifully illustrate the effects of mountain chains upon atmospheric conditions.

PRODUCTIONS.

The productions of the Columbia basin include wheat, oats, barley, maize, peas, potatoes, and other vegetables, melons and the fruits of the temperate zone. All these grow vigorously and produce abundantly wherever there is sufficient moisture to mature vegetation.

The cultivated portions hitherto have been mainly confined to the margins of water-courses, or other low tracts of land where the moisture is retained later in the season than upon the uplands. In the Walla-Walla country, the foot-hills of the Blue mountains are found sufficiently moist for cultivation, and large tracts of those lands have been taken and are yielding abundant returns for the labor of the husbandman. The rolling uplands in the same region have, to some extent, been broken up and planted, and the results thus far have been highly gratifying.

It speaks well for the agricultural resources of this great basin when it is known that, besides the extensive business of stock-raising, which is the principal occupation of the population, the settlers of the Walla-Walla district, consisting of a mere handful of people, last year sent down the Columbia, over two portages, to Portland, San Francisco, and thence to Boston and New York, hundreds of tons of wheat and flour, the growth and manufacture of that valley.

Whatever may be the ultimate result of cultivation on the higher lands of the basin, there can be no doubt that the area of arable land is sufficiently great to support a very large pastoral and urban population, and yet afford a surplus for exportation.

But the crowning glory of the vegetable kingdom in the basin is the "bunch grass," popularly so called from its growth in bunches or tufts, between which the surface is naked and more or less depressed according to the nature of the soil, the light particles having been scooped up and driven away by the prevailing winds. Prevailing in greatest abundance everywhere, rich and nutritious above all other grasses, and retaining its nutritive qualities after being dried up by the heats and droughts of the climate, it already affords sustenance to thousands of horses, cattle, and sheep, which may be increased to millions without overstocking the country. This at present is the great resource of the basin, and the Columbia valley has been termed, not inaptly, the grazier's paradise.

WESTERN WASHINGTON

This division of the Territory extends from the Columbia river on the south to the British possessions on the north, and from the summit of the Cascade mountains to the Pacific ocean, and contains an area of about 28,000 square miles. It has three water sheds and three principal valleys, lying upon the Columbia, the Chehalis, and Puget sound. The country along the Columbia and back from the river bottoms is generally high and broken, but the soil, being a mixture of clay and loam, is well adapted to the production of domestic grasses. The river bottoms are very fertile, but being rather low are subject to overflow, and that too in the very inconvenient month of June.

The freshets of the Columbia are caused by the melting snows in the mountains at its sources, and not by the rains of winter. Hence the high waters do not usually come until after the middle of June.

The water sheds of the Chehalis river and of Gray's harbor, into which it empties, include an area of about two thousand square miles.

This is one of the best bodies of land in the Territory, and comprises bottoms, hills, and table-lands, and is equally valuable to the agriculturist and the stock grower. It is steadily filling up with a permanent and thrifty population.

South of Gray's harbor is Shoalwater bay, which, with its tributaries, drains an area of 700 square miles. Much good land exists here, particularly upon the Willopah, a considerable stream entering the bay from the east.

From Gray's harbor north to the Straits de Fuca, and west of the Olympic mountains, the country is almost wholly unknown. There are no settlements, and but few explorations have been made.

Numerous small streams of clear, cold water take their rise in the mountains, and empty by separate mouths into the ocean. Among these the principal is the Quinault, upon which the Indian reservation of that name is located, and which affords the finest salmon upon the Pacific coast. Much of the country is believed to be suitable for settlement and cultivation, and the mountains are known to contain gold, silver, copper, and iron.

The valley of Puget sound embraces an area of twelve thousand square miles. The soil is generally gravelly except along the numerous water-courses, where it is composed of alluvium, and is very rich. Lying between two ranges of very high mountains, the whole valley is well watered by numerous streams coursing through it, some of which are of considerable size, and navigable for some distance.

The most important of these are the Des Chute, Nisqually, Puyallup, D'wamish, Snohomish, Stilakahamish, Skagit, and Nooksahk.

Power for the propulsion of machinery may be obtained from these streams and their tributaries, at various places, and unlimited in amount. The whole of western Washington is a heavily timbered country, with numerous small prairies scattered through it, and will require a long period of time to bring it into a high state of cultivation.

But western Washington does not depend alone or chiefly upon its agricultural resources for its present prosperity or future greatness.

The Strait of San Juan de Fuca constitutes the noblest entrance from the sea, and Puget sound the finest series of harbors upon the Pacific coast. Free from rocks, shoals, or other obstructions, and deep enough in all their ports for the heaviest shipping, these magnificent interior waters, surrounded by one thousand six hundred miles of coast line, form the most remarkable net-work of straits, inlets, channels, canals.

bays, and harbors anywhere to be found in the United States, or perhaps in the world. Extending inland one hundred and eighty miles, and branching off in every possible direction, these waters render each square mile of the whole Puget Sound valley readily accessible to the natural highways of commerce. Almost every farmer finds a market for his products at his own door, and vessels come alongside to take it away. Thus, what may be lost in average richness of soil, is more than compensated by facilities for transportation.

Bordering upon Admiralty Inlet and Puget sound are extensive forests of timber suitable for ship-building and domestic purposes; and in many of the harbors mills are busy in cutting this timber into lumber, lathes, and shingles for exportation. Fleets of merchantmen are seen anchored almost in the forests, their tall spars looking like branchless trees in the distance, all taking in the products of these mills, and destined to ports in all parts of the world.

Coal mines, easily accessible, inexhaustible in quantity, and of the best quality yet found on the coast, exist in various localities, some of which are being profitably wrought upon an extensive scale.

Western Washington points to commerce, manufactures, and mines as the main sources of her present prosperity and future greatness; while these industries, stimulated as they must be in the future, will consume the products of additional thousands of farms, giving the producers home markets and remunerative prices.

CLIMATE.

The climate of Washington Territory, west of the Cascade range, is essentially different from the eastern portion, already described, being more equable in temperature and much more humid. The seasons, in reality, are but two, the wet and the dry, influenced and largely controlled by the semi-annual monsoons, which prevail with much regularity.

From November to May the southwest winds prevail, which, striking the highlands of the coast and the higher Cascade range further in the interior, are bent in their course and deflected to the west of north, from which circumstance they are generally regarded as south and southeast winds. Coming from the vast inter-tropical regions of the Pacific ocean, these atmospheric currents are warm and heavily charged with vapor. As they reach the cooler regions of our high northern latitude, and impinge upon our lofty mountain ranges, their moisture is condensed and descends in frequent and copious showers of rain.

Occasionally the temperature is cold enough to congeal the moisture and produce snow storms, and upon one occasion during the past twelve years snow fell to the depth of two feet. The prevalence of southerly winds during the winter months greatly modifies the weather and gives a higher temperature than is due to this latitude, as compared with the central and eastern portions of the continent.

From May to November the prevailing winds are from the northwest. Coming from the cooler regions of the north, where the processes of evaporation are slow, these winds are cool and dry, giving but a comparatively slight rainfall and a moderate temperature during the summer.

The following statement of the mean temperature of the four seasons; made up from four years' observations at Fort Steilacoom, and which gives a fair average for western Washington, will illustrate the influence of atmospheric currents upon the climate of this region: Spring, 49°; summer, 63.4°; autumn, 52°; winter, 39°. Rain fall: Spring, 9 inches; summer, 2 inches; autumn, 18 inches; winter, 20 inches. Total, 49 inches.

It will be seen from the foregoing that there is a difference of only 24 degrees between the mean summer and winter temperature of the Puget Sound valley.

The winter mean is seven degrees above the freezing point, and the summer mean is only thirty-one degrees above the same point.

The winters here will be better understood by the general reader, by comparing their mean temperature with that of other localities.

Thus, the mean winter temperature of Portland, Maine, is 24°; Boston, 28°; New York city, 31°; Baltimore, 32°; Puget Sound valley, 39°. By this it will be seen that Portland, Maine, four degrees of latitude south of Fort Steilacoom, has a mean winter temperature averaging seven degrees colder.

The nights of this region are always cool, and however exhausting may have been the labors and heats of the day, when the sun sets all oppressiveness ceases, and the laborer, the professional man, and the sick look to the night as a period of coolness and refreshing rest. Sunstroke, with its disease-producing and fatal results, is unknown.

The productions of western Washington are the same as the eastern division, except that maize and melons do not thrive well, the cool nights before referred to being unfavorable to their thrifty growth and early maturity. But little bunch grass is found in this division, its place being filled by the ever-present fir tree, a timber universally used in all departments of industry, and rapidly coming into great favor for purposes of ship-building.

It is now conceded that fir timber, for all purposes of naval construction, possesses the strength and durability of white oak, and holds a fastening better. The forests of this timber are very extensive, and the trees often attain a great size, many of them shooting their spires upward to a height of three hundred feet.

The cereals, except maize, the fruits, except peaches, and culinary vegetables of the temperate zone thrive in this region and yield abundantly.

The fact that a large proportion of the population are engaged in commerce and manufactures, and are consumers but not producers, creates a home market for the entire agricultural surplus of the country, and as a consequence the exports of agricultural products from this section of the Territory are very small.

POPULATION, WEALTH, PRODUCTIVE INDUSTRIES, ETC.

The total white population of the Territory does not much exceed 20,000, but is now more than ever before on the increase. The remoteness of the locality from the sources of population, the Indian troubles of former years, and the dense forests of very large trees, rendering the clearing of land laborious and expensive, have all contributed to retard settlement; but the forests, which were formerly regarded as an unmitigated curse to the country, are beginning to be looked upon as a blessing, and are already becoming one of the chief sources of wealth to the Territory.

The value of the real and personal property of the Territory is about \$10,000,000, averaging each inhabitant, man, woman, and child, about \$500.

The exports of eastern Washington are flour, wheat, live-stock, and gold. Those of western Washington, lumber, spars, piles, and coal.

The principal productive industries are agriculture, stock-growing, milling, ship-building, gold and coal mining, and commercial pursuits; and in each of these the field for active enterprise is unlimited.

The subjoined statement in regard to the agricultural interests of the Territory is as nearly correct as can be made from the imperfect statistics in existence:

Whole number of farms in the Territory.....	3,000
Annual production of wheat, in bushels.....	245,000
Annual production of corn, in bushels.....	35,000
Annual production of oats, in bushels.....	275,000
Annual production of barley, in bushels.....	45,000
Annual production of potatoes, in bushels.....	330,000
Annual production of peas, in bushels.....	30,000
Annual production of fruit, in bushels.....	70,000
Annual production of hay, in tons.....	18,000
Annual production of wool, in pounds.....	120,000
Whole number of acres under fence.....	245,000

The following are the statistics of the lumber business as nearly as can be ascertained, viz:

Number of saw-mills in the Territory.....	38
Amount of rough lumber produced, in feet.....	138,000,000
Amount of planed lumber produced, in feet.....	11,000,000
Amount of piles produced, in lineal feet.....	900,000
Amount of laths produced.....	17,500,000
Amount of shingles produced.....	4,500,000
Number of spars produced.....	800
Value of annual products of the forest.....	\$1,370,000

Seven eighths of this entire amount are produced by 10 mills, the other 23 mills producing but little for exportation. The lumber business is rapidly on the increase. New mills are being erected, and the demand for Puget sound lumber is more active than ever before.

Ship-building is rapidly on the increase, and is destined soon to become one of the most important branches of industry in the Territory. The very favorable report of the San Francisco board of underwriters, recently made, covering both the quality of material and cost of construction upon Puget sound, has very materially stimulated this branch of industry. The keels of 24 vessels have been laid during the past year, and 19 vessels completed and launched, several of which are of 200 tons burden and upwards, some of them reaching 600 tons.

Such of the coal mines of the Territory as have been opened and are now in working order are said to be capable of producing 50,000 tons annually, and they will probably be worked up to that figure during the year. This branch of industry is capable of unlimited expansion, as coal is found in numerous localities in the vicinity of the navigable waters of the Territory.

The extent of the commerce of Puget sound will be understood by reference to the following statement of the number and class of vessels which arrived during the past year, as follows: Ships, 113; barks, 491; brigs, 45; schooners, 87; sloops, 181; steamers, 226—total, 1,143; being an average of 22 per week. Of these 1,143 vessels, 166 American and 56 foreign bottoms were engaged in the foreign trade. The remainder were in the coasting trade.

The progress of settlement in this Territory, although slow when compared with many other sections of the Union, has been more rapid during the past year than ever before. During the 12 months preceding the 30th of June last, 61,117.40 acres of land were taken under the various

acts of Congress, an amount largely exceeding the operations of any previous year since the organization of the Territory. This absorption of the public domain gives no correct idea of the increase of population, for a larger percentage of the inhabitants of this Territory is engaged in commercial and manufacturing pursuits than of any new State or Territory in the Union.

All of which is most respectfully submitted.

S. GARFIELD,

Surveyor General Washington Territory.

Hon. JOS. S. WILSON,

Commissioner General Land Office, Washington, D. C.

A.—Statement showing the condition of contracts which were not closed at the date of the last annual report.

Contract.		Name of deputy.	Character of work.	Remarks.
No.	Date.			
88	Sept. 24, 1866.	Jesse Richardson.	3d standard parallel north, through range 17 east Willamette meridian. Exterior lines, townships 12 north, of ranges 16, 17, and 18 east; 11 and 12 north, ranges 28, 29, and 30 east, and 9 north, ranges 23 and 24 east. Subdivisions, townships 6 and 7 north, range 30 east, and 9 north, ranges 23 and 24 east.	Closed. Surveys all completed. Plats and copies of field notes transmitted except township 12 north, range 16 east, deemed worthless for all practical purposes, and hence abandoned.
89	Sept. 22, 1866.	J. V. & E. M. Meeker.	Subdivisions, townships 20 and 21 north, ranges 3 east.	Closed. Plats, &c., transmitted.
90	Dec. 27 1866.	Edw'd Giddings	Resurvey of 1st standard parallel through ranges 20, 21, 22, 23, 24, and 25 east Willamette meridian. Exterior, townships 5 and 6 north, ranges 28 and 29 east; 3 north, ranges 20 and 21 east; 4 north, ranges 20, 21, 22, 23, 24, and 25 east; 5 north, ranges 24, 25, 26, and 27 east; 14, 15, and 16 north, ranges 20 and 21 east; 14 north, range 19 east, and 18 north, ranges 19 and 20 east Willamette meridian. Subdivisions, township 3 north, range 21 east; 4 north, ranges 22, 23, 24, and 25 east; 5 north, range 30 east, and 5 and 6 north, ranges 28 and 29 east.	Closed. Plats and copies of field notes transmitted. Some of the work originally named in this contract was changed by permission and under instructions, and other work substituted therefor. The work here mentioned embraces the substituted work and surveys as completed.
91	Jan. 2, 1867.	Edwin Richardson.	4th standard parallel through ranges 30 to 19 inclusive, west of the Columbia guide meridian, 71 miles 43 chains and 35 links.	Closed. Plat and copy of field notes transmitted to General Land Office. This contract originally embraced other work, but in consequence of hostile manifestations of the Indians in the designated locality, the deputy was permitted to surrender the undertaking.
92	Jan. 5, 1867.	J. V. & E. M. Meeker.	Subdivisions, township 22 north, range 5 east.	Closed. Plat and copy of field notes transmitted to General Land Office and local land office.
93	Feb. 13 1867.	Alfred H. Simons.	Exterior lines, township 13 north, range 28 east, and townships 13, 14, 15, and 16 north, ranges 24, 25, 26, and 27 east.	Closed. Plats and copies of field notes transmitted to General Land Office.
94	May 4, 1867.	Albert J. Treadway.	Exterior lines, townships 13, 14, 15, and 16 north, ranges 22 and 23 east. Subdivisions, township 14 north, range 24 east, and townships 14 and 16 north, range 27 east.	Closed. Plats and copies of field notes transmitted to General Land Office and local land office.

B.—Statement showing the amount, character, and condition of the public surveys contracted for since the date of the last annual report, 1867.

Contract.		Name of deputy.	Surveys embraced in contract.	Estimated number of miles.	Rate per mile.	Am't of contract.	Remarks.
No.	Date.						
95	July 8, 1867.	E. M. Meeker . .	West boundary, township 21 north, range 4 east. Subdiv'ns, township 21 north, ranges 3, 4, and 5 east.	6	\$12	\$72	Not completed. Deputy now in the field.
96	Aug. 3, 1867.	Simmons and Cock,	Exteriors, township 3 north, range 12 east; 9 north, ranges 25 and 26 east; 3 and 4 north, ranges 17, 18, and 19 east; 10, 11, and 12 north, ranges 23, 24, 25, and 26 east. Subdivis'ns, township 3 north, range 12 east; 4 north, ranges 17 and 18 east.	140	10	1,400	
96	Aug. 3, 1867.	Simmons and Cock,	Exteriors, township 3 north, range 12 east; 9 north, ranges 25 and 26 east; 3 and 4 north, ranges 17, 18, and 19 east; 10, 11, and 12 north, ranges 23, 24, 25, and 26 east. Subdivis'ns, township 3 north, range 12 east; 4 north, ranges 17 and 18 east.	178	12	2,136	Closed. Plats and copies of field notes of all transmit'd, except those of township 3 north, range 12 east.
97	Aug. 23, 1867.	Edwin Richardson.	Exteriors, townships 11 and 12 north, range 27 east. Subdivis'ns, townships 11 and 12 north, ranges 27 and 28 east; 5 north, ranges 24, 25, 26, and 27 east; 3 north, ranges 17, 18, 19, and 20 east.	170	10	1,700	
97	Aug. 23, 1867.	Edwin Richardson.	Exteriors, townships 11 and 12 north, range 27 east. Subdivis'ns, townships 11 and 12 north, ranges 27 and 28 east; 5 north, ranges 24, 25, 26, and 27 east; 3 north, ranges 17, 18, 19, and 20 east.	18	12	216	Closed. Plats, &c., transmitted.
98	Dec. 2, 1867. Aug. 14, 1867.	Lewis P. Beach Henry S. Gile..	Subdiv'ns, township 15 north, range 1 west. Subdivis'ns, township 9 north, range 9 west.	540	10	5,400	
98	Dec. 2, 1867. Aug. 14, 1867.	Lewis P. Beach Henry S. Gile..	Subdiv'ns, township 15 north, range 1 west. Subdivis'ns, township 9 north, range 9 west.	60	10	600	Do. do.
98	Dec. 2, 1867. Aug. 14, 1867.	Lewis P. Beach Henry S. Gile..	Subdiv'ns, township 15 north, range 1 west. Subdivis'ns, township 9 north, range 9 west.	24	10	240	Closed. Plats, &c., transmitted. Work done under special instructions.

C.—Statement showing original plats made in the office of the surveyor general of Washington Territory, and number of copies transmitted to the General Land Office and the local land offices, since the date of the last annual report.

No. of townships and character of surveys.		Description of plats.	Original.	General Land Office.	District land offices.	Total.	When transmitted.
Exterior boundaries.	Subdivisions.						
17	1	Township 22 north, range 5 east, Willamette meridian.....	1	1	1	3	July 22, 1867.
		Fourth standard parallel, through ranges 19 to 30 east, inclusive.....	1	1		2	July 24, 1867.
		First standard parallel, (resurvey,) through ranges 20 to 25 east, inclusive.....	1	1		2	Aug. 31, 1867.
		Townships 13, 14, 15, and 16 north, ranges 24, 25, 26, and 27 east, and township 13 north, range 28 east.....	1	1		2	Aug. 31, 1867.
	1	Township 3 north, range 21 east.....	1	1	1	3	Aug. 31, 1867.
	4	Township 4 north, ranges 22, 23, 24, and 25 east.....	4	4	4	12	Aug. 31, 1867.
	1	Township 5 north, range 30 east.....	1	1	1	3	Aug. 31, 1867.
	2	Townships 14 and 16 north, range 27 east.....	2	2	2	6	Sept. 16, 1867.
	1	Township 14 north, range 24 east.....	1	1	1	3	Sept. 16, 1867.
	4	Townships 11 and 12 north, ranges 29 and 30 east.....	1	1		2	Sept. 28, 1867.
	5	Townships 13, 14, 15, and 16 north, range 23 east, and 13 north, range 22 east.....	1	1		2	Sept. 28, 1867.
	2	Townships 14 and 15 north, range 21 east.....	2	2	2	6	Oct. 30, 1867.
	2	Township 12 north, ranges 17 and 18 east.....	2	2	2	6	Oct. 29, 1867.
	9	Townships 14, 15, and 16 north, ranges 20 and 21 east; township 14 north, range 19 east, and 18 north, ranges 19 and 20 east.....	1	1		2	Nov. 2, 1867.
	2	Township 17 north, ranges 19 and 20 east, and extension of fourth standard parallel in range 19 east 36 chns. 70 lks.....	1	1		2	Nov. 5, 1867.
	1	Township 14 north, range 19 east.....	1	1	1	3	Nov. 25, 1867.
	3	Townships 14, 15, and 16 north, range 20 east.....	3	3	3	9	Nov. 25, 1867.
1	Township 21 north, range 5 east.....	1	1	1	3	Dec. 20, 1867.	
1	Township 9 north, range 9 west.....	1	1	1	3	Jan. 4, 1868.	
2	Township 5 north, ranges 26 and 27 east.....	2	2	2	6	Jan. 14, 1868.	
2	Townships 11 and 12 north, range 28 east.....	4	4	2	10	Jan. 31 and Feb. 4, 1868.	
2	Townships 11 and 12 north, range 27 east.....	2	2	2	6	Feb. 8, 1868.	
3	Townships 3 north, range 19 east, and 5 north, ranges 24 and 25 east.....	3	3	3	9	Mar. 21, 1868.	
14	Townships 10, 11, and 12 north, ranges 23, 24, 25, and 26 east, and 9 north, ranges 25 and 26 east.....	1	1		2	Mar. 20, 1868.	
6	Townships 3 and 4 north, ranges 17, 18, and 19 east.....	1	1		2	Mar. 20, 1868.	
1	Township 15 north, range 1 west.....	1	1	1	3	Mar. 31, 1868.	
2	Township 4 north, ranges 17 and 18 east.....	2	2	2	6	April 11, 1868.	
3	Township 3 north, ranges 17, 18, and 20 east.....	3	3	3	9	June 16, 1868.	
63	35	DONATION CLAIM PLATS.	46	46	35	127	
		Township 6 north, range 35 east.....	1	1	1	3	May 28, 1868.
		Township 2 north, range 4 east.....	1	1	1	3	May 28, 1868.

Township 22 north, range 5 east.....	1	1	1	3	
Township 15 north, range 1 west.....	1	1	1	3	April 15, 1868.
MAPS.					
General maps, (Territorial)	1	2		3	July 20, 1868.
Miscellaneous maps, tracings, and diagrams, for registers, deputy surveyors, &c.....				26	
Total	51	52	39	168	

D.—Statement showing the number of lineal miles run, rate per mile, and the total cost of surveys in Washington Territory during the fiscal year ending June 30, 1868.

Descriptive.	Distance.			Rate per mile.	Amount.
	Miles.	Chains.	Links.		
Standard parallels.....	103	8	45	\$15 00	\$1,546 59
Exterior boundaries.....	773	10	5	12 00	9,277 51
Section and meander lines.....	1,668	33	49	10 00	16,684 19
Total.....	2,544	51	99	37 00	27,508 29

Balance of unexpended appropriation, as per accounts rendered, at the close of the fiscal year ending June 30, 1868.....	\$3,571 44
Deduct estimated amount for unfinished work.....	1,924 00
Estimated balance to appropriation fund of 1869.....	1,647 44

E.—Statement showing number of acres of lands surveyed in Washington Territory during the fiscal year ending June 30, 1868.

No. of townships surveyed.	Description of townships surveyed.	Areas.	Donation claims.	Military reserves.	Indian reserves.	Errors in computation.	Total.
1	Township 3 north, range 17 east.....	10,679.57					10,679.57
2	Township 3 north, range 18 east.....	12,964.56					12,964.56
3	Township 3 north, range 19 east.....	20,176.07					20,176.07
4	Township 3 north, range 20 east.....	15,793.47					15,793.47
5	Township 3 north, range 21 east.....	6,300.02					6,300.02
6	Township 4 north, range 17 east.....	23,048.64					23,048.64
7	Township 4 north, range 18 east.....	23,054.38					23,054.38
8	Township 4 north, range 22 east.....	18,011.21					18,011.21
9	Township 4 north, range 23 east.....	8,862.89					8,862.89
10	Township 4 north, range 24 east.....	4,030.04					4,030.04
11	Township 4 north, range 25 east.....	286.50					286.50
12	Township 5 north, range 24 east.....	23,061.85					23,061.85
13	Township 5 north, range 25 east.....	16,233.02					16,233.02
14	Township 5 north, range 26 east.....	8,771.68					8,771.68
15	Township 5 north, range 27 east.....	8,711.53					8,711.53
16	Township 5 north, range 30 east.....	263.65					263.65
17	Township 11 north, range 27 east.....	23,063.92					23,063.92
18	Township 11 north, range 28 east.....	20,718.21					20,718.21
19	Township 12 north, range 17 east.....	8,647.73					8,647.73
20	Township 12 north, range 18 east.....	3,905.28					3,905.28
21	Township 12 north, range 27 east.....	15,334.39					15,334.39
22	Township 12 north, range 28 east.....	20,788.85					20,788.85
23	Township 14 north, range 19 east.....	23,045.29					23,045.29
24	Township 14 north, range 20 east.....	23,077.30					23,077.30
25	Township 14 north, range 21 east.....	22,989.34					22,989.34
26	Township 14 north, range 24 east.....	23,026.08					23,026.08
27	Township 14 north, range 27 east.....	20,145.84					20,145.84
28	Township 15 north, range 20 east.....	23,075.69					23,075.69
29	Township 15 north, range 21 east.....	23,019.92					23,019.92
30	Township 16 north, range 20 east.....	23,088.82					23,088.82
31	Township 16 north, range 27 east.....	22,941.27					22,941.27
32	Township 21 north, range 5 east.....	22,399.51					22,399.51
33	Township 22 north, range 5 east.....	22,686.64	265.90		1.52		22,686.64
34	Township 9 north, range 9 west.....	6,164.40					6,164.40
35	Township 15 north, range 1 west.....	23,059.71	1,867.27			33	23,059.71
	Township 6 north, range 35 east.....		1,332.11			7.40	1,332.11
	Total.....	571,427.27					572,759.38

F.—*Estimate of expenses incident to the survey of the public lands in Washington Territory for the fiscal year ending June 30, 1870.*

For salary of surveyor general	\$2, 500
For salary of chief clerk	1, 800
For salary of draughtsman	1, 500
For salary of assistant draughtsman	1, 400
For salary of clerk	1, 200
For office rent, fuel, wages of messenger, and other incidental expenses	2, 000
For 258 miles meridian and parallel lines, at \$15	3, 870
For 768 miles township exterior lines, at \$12	9, 216
For 3,840 miles section and meander lines, at \$10	38, 400
	61, 886
Total estimate	61, 886

S. GARFIELD, *Surveyor General, W. T.*

SURVEYOR GENERAL'S OFFICE,

Olympia, Washington Territory, July 31, 1868.

No. 17 L.

SURVEYOR GENERAL'S OFFICE,

Helena, Montana, September 30, 1868.

SIR: I have the honor to submit to you my annual report of the proceedings had in this surveying district both with reference to field and office work, together with such information as I have been able to collect concerning the resources and prosperity of Montana. I also forward statements concerning the business, as follows, to wit:

A.—Diagram of Montana, showing the present condition of the surveys.

B.—Diagram of Cañon mining district, showing the position of mineral claims therein, on unsurveyed lands, under act of Congress July 26, 1866.

C.—Diagram of Belt Mountain mining district, showing the position of mineral claims therein, on unsurveyed lands, under act of Congress July 26, 1866.

D.—Statement showing the condition of contracts under the appropriations made by Congress.

E.—Statement showing the condition of contracts for survey of mineral lands under act of Congress July 26, 1866.

F.—Statement showing the township plats furnished register at Helena.

G.—Statement showing the condition of appropriation for the survey of public lands.

H.—Statement showing the condition of appropriation for the surveyor general's salary.

I.—Statement showing the condition of appropriation for the clerks of surveyor general's office.

K.—Statement showing the condition of appropriation for the office rent and incidental expenses of surveyor general's office.

L.—Statement showing the amount of deposits made under act of Congress July 26, 1866.

My last annual report having been made soon after the inception of the public surveys in Montana, and contract No. 1 for the survey of the principal meridian and base line having just been completed, I included all the work done up to that time, and now only give a synopsis of such as was therein mentioned.

The employés in this office, in addition to the foregoing statements, have been engaged in the following duties, viz:

1. Keeping up and copying the correspondence.
2. Making out contracts in quadruplicate.
3. Making out instructions to deputies for survey of private mineral land claims in duplicate.
4. Making out special instructions to deputies for survey of public lands in duplicate.
5. Examination of field notes of private mineral land claims as surveyed under contract.
6. Examination of field notes of public surveys as returned by deputies.
7. Making sketches to accompany the contracts of public surveys.
8. Keeping in order the records, plats, and field notes of public and private surveys and making returns of transcripts to General Land Office.
9. Making out accounts and bonds of deputy surveyors for surveys executed.
10. Making out quarterly accounts and vouchers.
11. Posting the books and accounts of the records in this office.
12. Making out in triplicate the annual report with the necessary statements.

With my communication to you of July 16th, ultimo, I submitted the following estimate for the fiscal year ending June 30, 1870:

For standard lines.....	\$4,950 00
For township lines.....	10,584 00
For section and meander lines.....	36,000 00
For rent of office and other incidentals.....	3,000 00
For salary of surveyor general.....	3,000 00
For clerks in office of surveyor general.....	7,000 00
	<hr/>
Total.....	64,534 00
	<hr/> <hr/>

The estimates for field work I consider moderate in comparison with the calls constantly being made by settlers for the survey of their several localities, who are awaiting the lines to be run and marked, that they may make permanent improvements with the assurance of no future disturbance.

The more important regions needing attention are the full survey of the Gallatin, Madison, Jefferson, and Missouri valleys, a portion of each being now under contract.

Deputy Johnson has the extension of the base line west included in his contract, which is expected to be of future service in surveying the Bitter Root valley should the reservation therein be at any time set aside by the authorities, in addition to the opening up of the Big Hole valley, an important region. He also has the survey of the extension of the first standard parallel north until it reaches the west side of the Deer Lodge valley, and from this line a guide meridian is to run down the Deer Lodge valley, thus opening up for townshipping and section-alizing that portion of Montana, which is very valuable as farming land, and I am informed that when surveyed will be at once purchased by the settlers.

Deer Lodge county is the most populous of any in the Territory, and surveys are greatly needed there, as much attention is paid to farming and stock business.

There are also valuable mines in the mountains on either side of this valley, the claimants of which when desiring surveys under the act of Congress, July 26, 1866, can readily have them connected with the regular system of surveys.

I would suggest the following surveys as now most important :

The principal meridian should be extended south 18 miles, and from it both the first and second standards south run west to the territorial limits, thus opening up for survey the numerous settlements on the Madison, Jefferson, Stinking Water, Beaver Head, and Big Hole rivers, and their tributaries.

The second standard parallel north should be extended from its present terminus east to accommodate the settlements on Deep creek and its affluents, from which a guide meridian can readily be run and the adjacent country surveyed.

In each of the valleys I think it would be necessary to run a guide meridian from a standard line whenever extended thereto, as it will be impossible to make the connections by township lines across the ranges of mountains. This, while facilitating the progress of surveys, will act as a check upon the liability to error.

After the proposed surveys heretofore mentioned have been started, it would be of service to extend the principal meridian north beyond Sun river, so as to include that portion of country, and to there run the necessary standard and township lines, that subdivisional work may be commenced. That being on the road between this place and Fort Benton, and quite valuable as a farming country, the lands are being fast settled up and would be rapidly purchased by incoming and resident settlers. The vicinity of the road especially is looked upon as of considerable value. Another inducement—Fort Shaw, a United States garrison, being also located there, settlers naturally congregate in its vicinity, where ample protection is afforded.

AGRICULTURE.

During the time since our valleys were first cultivated to the present, it has been shown that actual experience in farming in this country is necessary for success.

The Jesuits, in commencing to cultivate the soil in the Bitter Root valley about 25 years ago, could raise scarcely anything, but experiments soon showed them the true course, and the grounds in that region which at one time refused to yield are now prolific with splendid crops, the incoming settlers having profited by the experience of others. Such has been the result that from that valley we receive the largest and finest specimens displayed in the market; as each year passes the system becomes more perfect.

Montana has this season yielded bountifully in her harvests of wheat, oats, and barley, while the production of vegetables, such as potatoes, turnips, carrots, beets, cabbage, and other esculents, is very large, making us now a self-sustaining people.

Corn is successfully raised for table use in all parts of the Territory, but only ripens in the Bitter Root valley, where also watermelons and tomatoes have been successfully cultivated, and quite a supply of them can be daily seen on the streets of Helena.

In the valley of the Prickly Pear, near Helena, the crops of wheat have been enormous and almost beyond precedent; one field of twenty-three acres, in particular, has produced an average of fifty-seven and three fourths bushels to the acre.

The yield of wheat throughout the Territory is unusually large, and

will in all probability exceed the average of any other State or Territory. From reliable information I estimate it reasonably at 40 bushels per acre.

The three large flouring mills in the Gallatin valley convert the grain of that section into a full supply of merchantable produce, whence it is shipped to the different mining camps and cities, where it finds a ready market at paying prices. One of these mills is situated at the base of the mountains, almost at the source of a bold never-freezing stream, and can keep in operation during the entire year. There are other similar mills in the different agricultural regions, all of which are in operation.

The foot-hills are each year being more extensively cultivated, and experience is now proving them to be the best for agricultural purposes where they can be conveniently irrigated, as the frost is not so liable to affect the crops as on the lower ground.

The methods of irrigating here are similar to those of other countries; the source of the streams being quite high, no difficulty is found in getting water on all the arable land.

Frequently large ditches are constructed by a number of settlers and used by the neighborhood, but generally each one builds his own, which is found to cost but little.

It has been found best to saturate the ground well with water after ploughing and before planting, and afterwards to use but a limited quantity of water. In this way labor is saved and the productions are of a more solid nature.

This season has been remarkable for the almost total disappearance of grasshoppers, which in some localities have heretofore been quite a pest.

The weather has been such that the farmers are hopeful of the destruction of these insects, which have done no harm whatever recently to the crops, and but little fears are now entertained for their future appearance.

Heretofore neither wheat or other grains, nor any of the vegetables, have escaped when attacked by them, and now that they are about to be annihilated our prospects brighten for large and more certain crops.

Fruit raising has not yet been sufficiently tried to prove it a success, but a growing interest prevails among the farmers in this branch. There are, however, in various parts of the Territory, orchards of apples, pears, quinces, &c., planted, and many of them in a thriving condition.

The trees, young and strong, are mostly brought from Oregon and Washington Territory, and, by their present appearance, no doubt is entertained but that we will soon be supplied with such fruits as will meet the demands for home consumption.

At present our people make purchases of apples, pears, plums, &c., in Salt Lake, and transport them by wagon, causing them to be quite expensive.

There is an abundance of wild fruits, such as raspberries, gooseberries, currants, and plums, which are used for the table and found to be delicious, equal to similar cultivated fruits of the States.

An agricultural fair, with liberal premium lists, and handsomely improved grounds, will soon be held near this city and promises to be largely attended by both exhibitors and visitors. It will, no doubt, be the means of collecting and disseminating more knowledge of the products and resources of Montana than any other movement of our citizens.

Could we have a foreign market, such as a railroad only can supply, much more attention would be paid to agriculture, and the beautiful valley, now comparatively untouched, would be rapidly filled up with an enterprising class of citizens, who could not help but prosper from their bountiful harvests, as those now here are doing.

TIMBER.

Since my last report there has not been the needless destruction of timber as heretofore, but there are still persons thoughtless and negligent, and, again, others maliciously disposed, who destroy a vast amount of timber for which we will soon find use in mining, building, &c.

The only protection to be afforded these lands is their survey and sale.

Purchasers at good prices could readily be found by the government, and when in private hands self-interest would save this wholesale destruction.

Although our timber is of excellent quality and remarkably well diversified throughout the Territory, there is still none to spare, and if wasted but a short time will elapse before the country will perceptibly feel the loss.

I would therefore recommend for your consideration the immediate survey of the timber lands, and that they be exposed at public sale at the earliest day practicable.

For their survey, however, augmented prices will be required to those now paid, as none of the deputies will at present contract for the survey of such lands, they being generally of a rugged character.

COAL.

Since the date of my last report coal of good quality has been found at or near Bannock City, with indications of there being a large body of it.

It also exists on the Big and Little Blackfoot to the west of the Rocky mountains, and on the headwaters of the Judith and Muscleshell rivers, east of the Belt range.

It has also long been known to exist on the Missouri and Yellowstone rivers.

Two attempts have been made at mining, one on the Missouri river, at a point about 12 miles below Fort Benton, where some enterprising men have been getting out coal for the use of the steamboats, and at the Boseman Pass, in the vicinity of Fort Ellis. At this place the vein of coal is about 20 feet wide with occasional clay seams, which, however, diminish at a greater depth.

The pit is about 45°, and at the present depth the coal is nearly solid. Some was sent to this place, where it was used in making gas, with highly satisfactory results.

Most of the coal hitherto found is of the variety called brown coal or lignite, but some of it is undoubtedly bituminous, and of good quality; all of it can be used.

At present there is no demand for it, as the difficulties of transportation make the price too high; but a few years will elapse, however, before it will be of great value to supply the place of the timber, which will be rapidly exhausted at the present rates of consumption, and to meet the demands of smelting furnaces and ultimately of railroads.

Referring to the acts of Congress, July 1, 1864, and March 3, 1865, "for the disposal of coal lands and town property in the public domain," I would respectfully recommend the passage of an amendment by which actual settlers and workers on such lands should have the right of pre-emption.

Could such security be given to them many enterprising men would devote time and labor to develop these mines, but at present the dis-

coverers endeavor to cover up as much as possible the surface indications of coal, thus rendering it impossible for the deputies to report them, and expect to pre-empt such lands as agricultural, although they would be willing to pay the price of coal lands could they have an assurance of a substantial claim after having made improvements on them. Such an amendment would give a great impetus to the mining and industrial interests of the Territory, as most of the silver mines are composed of argentiferous galena, and cheap fuel is a great necessity for the use of furnaces. Many coal discoveries now unknown would be at once announced.

No new discoveries of iron ore have been made since my last report.

COPPER.

There are two localities where copper lodes (properly so called) have been discovered, one of which is east of the Missouri at the head of the Muscleshell, and the other at Butte City, on Silver Bow creek.

A shaft 70 or 80 feet deep was sunk on one of the lodes on the Muscleshell, but the hostilities of the Indians caused the work to be abandoned, and nothing has been since done.

At Silver Bow two furnaces were erected and some smelting was done, as an experiment, with good success.

It was the intention of one of the owners to send some of the ore to Swansea, in England, in order to be thoroughly tested.

There are excellent lodes of gold, silver, and copper in this district, but it does not seem to have attracted much attention.

SILVER.

The chief points at which silver mining has been carried on are Argenta, near the Beaver Head river, and at the towns of Phillipsburg and Georgetown, on Flint creek, and Jefferson City, in Jefferson county. At Argenta the ores are generally argentiferous galena, while in the Flint Creek district they are sulphurets and chlorides of silver.

At neither place are the works erected as yet in regular and constant operation for the reduction of the ores, but many of the lodes have been sufficiently developed to prove their permanency, and enough silver has been obtained to show the great richness of the ores and the readiness with which they can be worked.

At Argenta there are two furnaces now building, and one (Mr. Esler's) has been in operation for some time and seems to have met with success.

I learn from a very reliable source that their last run of 17 days produced 165 pounds (troy) of very fine silver, and the expenses did not reach \$1,000.

A recent run of the mill at Phillipsburg on rock, from the Poor Man's Joy lode, situated in Flint Creek district, and owned principally by Cole Saunders, has given near 400 pounds of silver from 49 tons of ore.

Furnaces or smelters have been erected at other points in the Territory where argentiferous galena abounds, but I have not heard of any results from them.

The want of skill, experience, and means, and the high prices of labor, and of all necessary articles, will for some time yet prevent their successful or continuous working. The price of fuel, however, is the main obstacle.

The opening of coal mines near any of these mining districts would set numberless furnaces to work and be a boon to the industry of the country second only to the advent of the Northern Pacific railroad.

GOLD.

Placer mining has been prosecuted this year with very good success. No discoveries of great richness have been made, but several new camps of fine promise have been opened, while a number of small gulches have been worked, and much gold has been taken out.

The placer mining in the Territory in many instances partakes of the character of regular mining, as in many of the gulches deep shafts are required to reach the bed rock, and machinery is necessary to hoist out the dirt and rocks.

It becomes more and more evident that gulch mining will not be exhausted for years, but will become a source of permanent prosperity, and give greater yield as the country becomes more self-sustaining and the prices of provisions and labor are reduced.

Even at present there are numbers of placers abandoned by miners, or "worked out," as it is termed, and also many gulches which it will not pay individuals to work, but could be taken in hand by companies with capital sufficient to bring in ditches and put up the necessary works, and made to yield enormous profits.

Quartz mining for gold may be said to have been very successful this year, and a great deal of money has been added to the general circulation from this source. Many mines are now being worked in a regular manner by practical men who have had experience in this or other mining countries, and there is a fair prospect that our mines will receive a thorough development, and prove their immense value, as some have already done.

During the last few years many companies have been formed at the east for working mines in this Territory which were generally failures from the fact that their mines were untried, the superintendents ignorant of their duties, and the expenditures neither economical nor judicious.

At present mining property is sold on its merits as developed, and the general tendency is towards development rather than speculation. Men who have no capital but their labor are now vigorously at work on their lodes, and the favorable results will soon be evident; particularly as this kind of work, unlike placer mining, can be prosecuted in winter.

Among the lodes most prominently successful has been the Atlantic Cable lode, situated on the range between the Deer Lodge river and Flint creek. Three months ago it had a width of 39 feet, and I have been credibly informed that since the month of July last the average yield has been about \$5,000 a week in gold.

The Whitlatch Union No. 2, mentioned in my report of last year, still holds its own as a good paying mine. There are now three companies, each keeping a mill constantly employed at work on it, all of which are doing well, and shafts are being sunk on other portions of it. An extension of this lode has been recently discovered, and a patent applied for. It also promises well.

In Madison county, near Virginia City and Sterling, mining is going on actively, and mills are running with good returns. At Rochester gulch, on the Jefferson river, Mr. Hendrie's mill has been running for some time on ore from the Watseka lode, and has been remarkably successful.

At Highland district there are several well developed lodes, and Professor Swallow, of St. Louis, is working on the Ballarat lode, and has a capacious mill erected for both silver and gold.

There are also several arastras, erected at or near Highland, at work on different lodes. The one connected with the Only Chance lode has

been highly successful, and some runs have yielded at the rate of \$100 per ton.

In the Ten-mile district, about 20 miles from this city, there are a number of lodes of both gold and silver now being developed, which promise exceedingly well. A gold mill is being erected there, and will soon be in working order. Some of the silver veins are immensely rich, and a few have been found with a width of from 12 to 30 feet.

The estimate of the gold yield submitted by me last year having been the subject of some comment and dispute, I would here say that my information was derived from the most reliable sources at hand, which, at best, are not very definite. I have now no reason to change the opinion then submitted, and have taken especial pains to inform myself upon the amount produced this season.

From the bankers their universal report is that fully 25 per cent. more gold has been taken out than last year, their business having increased at that rate; and Wells, Fargo & Co., express forwarders, and the principal carriers of bullion from this Territory, have shipped over 50 per cent. more than during the same months last season.

The water has universally held out better and the mining camps have yielded more steadily than heretofore, their increase being gradual.

THE NORTHERN PACIFIC RAILROAD.

In view of the immense importance which a railroad would be to the country, I have taken pains to gather such information personally or by deputies that could be used to advantage in forming a judgment as to the best route for such a railroad to pursue, and shall endeavor to impart such information as briefly as possible, and will confine my remarks to the route between the Yellowstone and Missouri laid down on the map published with the report of Edwin F. Johnson, esq., chief engineer of the Northern Pacific railroad.

The general direction of the road from the mouth of the Owahtaroup river, where it is represented as passing, being nearly due west, it would encounter two principal obstacles to be overcome before reaching the waters of the Columbia—the Belt mountain to the east and the Rocky mountains to the west of the Missouri river at its second crossing. The Belt mountains, rising at the mouth of Deep river on the Missouri, extend south and southeasterly for 130 miles to the bend of the Yellowstone, whence between that river and the Muscleshell it subsides into a rolling, elevated plateau. To avoid these mountains or to pass them the road could take one of three directions:

1. It could pass down the Yellowstone river, along the edge of said plateau, to the mouth of Shield's river, at the Big Bend of the Yellowstone; thence over the Boseman Pass into the Gallatin valley, and down the East Gallatin to the Three Forks of the Missouri, which can be crossed with a single bridge; and thence up the Jefferson and Big Hole river to the Deer Lodge Pass of the Rocky mountains; and thence down the Deer Lodge river to the Hellgate. This route is an eminently practicable one as regards grades, the two passes mentioned being the lowest in the Rocky mountains, and never impassable on account of snow; but is out of direction.

2. To pass over the rolling plateau mentioned above the head of the Muscleshell, and thence cross the Belt mountains at the head of Duck creek, a tributary of the Missouri, where the Muscleshell wagon road passes; cross the Missouri near that point, and thence cross the Rocky mountains either at the head of Ten-mile creek or by Mullan's Pass.

and thence down the Hellgate river. This is the most direct route, and is evidently practicable, but has not yet been thoroughly examined. The divide between the Muscleshell and Deep creek is a broad, open pass, with gentler descents both ways. On this route there would probably be at least two tunnels through the Belt and Rocky mountains, with grades of 90 or 100 feet on either side of each for about 10 miles; and the difficulties of construction would be greater than either of the above lines.

A third line would proceed from the head of Muscleshell down Deep creek (on Smith's river) to the Missouri, and cross the Rocky mountains at Lewis and Clarke's or Cadotte's Pass. This is a very favorable line; would require one tunnel through the Rocky mountains, and has been pretty thoroughly explored.

There are in the Rocky mountains, within 30 miles of either side of the direct line of the road, five known passes, viz., Lewis and Clarke's, Cadotte's, Mullan's, head of Ten-mile, and head of a branch of North Boulder creek. These passes would average not over 6,000 feet above the level of the sea, have good hill-side approaches, and would probably require a mile of tunnelling, speaking in general terms.

There are other points within these limits not yet explored where it is almost certain other practicable passes exist.

The amount of snow which remains on the ground during the winter is surprisingly small. At this point the depth of snow never exceeded one foot.

A gentleman connected with the office, who had occasion to travel much during the winter and spring, gave me the following list of measurements of the snow at different points: Summit of Belt mountains and divide of head of Muscleshell, in month of January, one foot; head of Ten-mile creek at Frenchwoman's Pass, Rocky mountains, March 15, two feet; no snow in the valley of Mullan's Pass; ten days after, very little snow—ground bare in many places; head of Fish creek, near Red Mountain City, March 27, three feet. This was a deep gorge, thickly wooded. Head of North Boulder, in April, no snow, except in patches on the southern exposure of the hills; on the 15th March the valleys were entirely free from snow.

I am indebted for much of the above information to Colonel De Lacy, who is a civil engineer by profession; has lived nine years in this country, and whose statements I have always found remarkably accurate and exact. Many of his explorations and examinations have been with an eye to collecting data on these points.

I have made no allusion to the route north of the Missouri river, explored by the late gallant General Stevens, as every point of it has been exhaustively treated upon in his admirable report published in 1858. Both routes have their advantages, which will no doubt be considered and acted upon when the road will be definitely located.

In conclusion, allow me to say that I have the most unbounded confidence in the future of Montana.

Our people are enterprising, thrifty, and prosperous, constantly opening up new fields for the farmer, mechanic, miner, and merchant. With a population of about 40,000, and constantly increasing; with a taxable property, as returned, of nearly \$10,000,000, (supposed to be rated at half its value;) with an annual yield of the precious metals amounting to \$20,000,000; with good schools and churches in all neighborhoods, where even a small group willingly gives them support; with endless numbers of valuable mines scattered throughout the Territory, and new discoveries daily being made; with an agricultural country that defies

all others with its productions ; with a climate that for the health and vigor it imparts is unsurpassed ; with an energy among the citizens able to overcome any obstacle, Montana, offering more inducements to the laborer and capitalist than any other new country, cheerfully and cordially invites all to come and partake of her prosperity, and lend a helping hand to her future greatness.

I am, very respectfully, your obedient servant,

S. MEREDITH,

Surveyor General of Montana.

Hon. JOS. S. WILSON,

Commissioner General Land Office, Washington, D. C.

Statement showing condition of surveys contracted by the United States surveyor general of Montana, under appropriations by Congress, for the fiscal year ending June 30, 1868.

Contract.		Name of deputy.	Character and location of work.	Amount of contract.	Remarks.
No.	Date.				
1	Aug. 1, 1867	B. F. Marsh.....	Base and principal meridian from initial point.....	\$2,490 00	Completed—plats, &c., transmitted to General Land Office.
2	Oct. 23, 1868	B. F. Marsh.....	1st standard parallel north, 36 miles; 2d standard parallel north, 42 miles; exterior of townships 1, 2, 3, 4, 5, 6, 7, 8 north, range 1 east; of townships 9 and 10 north, range 1, 2, 3 and 4 west; subdivisinal lines of townships 9 and 10 north, range 2 and 3 west.	5,726 97	Completed—plats, &c., forwarded to General Land Office.
5	Mar. 24, 1868	J. H. Featherston and C. L. Jewett.	Exteriors of townships 5 north, range 2 east, 1 north, range 2, 3 and 4 east, and subdivisinal lines of townships 4 and 5 north, range 1 east, 5 north, range 2 east, and township 1 north, range 1, 2, 3 and 4 east.	.....	Returns made to General Land Office of subdivisinal of townships 4 and 5 north, range 1 east, deputy in the field.
7	April 21, 1868	Walter W. Johnson....	Extension of pine meridian north through township 11 north; exteriors of township 11 north, range 1, 2, and 3 west, and subdivisinal lines of township 11 north, range 3 west; extend the base line west from corner to sections 32 and 33, township 1 north, range 6 west to the territorial limits, estimated 74 miles. To extend the 1st correction line northeast from standard corner to townships 4 and 5 north, range 3 and 4 west, estimated 48 miles across the Deer Lodge Valley, a guide meridian north from 1st standard north down Deer Lodge Valley, estimated 42 miles to Little Blackfoot river.	.....	Returns made to this office for extension of meridian; exteriors of township 11 north, range 1, 2, and 3 west, and section lines of township 11 north, range 3 west, deputy in the field.
8	April 22, 1868	B. F. Marsh.....	1st standard parallel south through range 1, 2, 3, 4 and 5 east, exteriors of townships 1, 2, 3, 4 and 5 south, range 1, 2, 3, 4 and 5 east; subdivisinals of township 1 south, range 1, 2, 3, 4 and 5 south; township 2 south, range 4 and 5 east; township 3 south, range 5 east; the subdivisinal lines of township 10 north, range 4 west, given in lieu of township 1 south, range 2 east.	.....	Notes of subdivisinal of township 10 north, range 4 west, returned to this office, deputy in the field.

E.—Statement showing condition of contracts made for survey of mineral lands in Montana, under act of Congress July 26, 1866, during the fiscal year ending June 30, 1868.

Contract.		Name of deputy.	No. of district.	Extent of district.	No. of final surveys made.	Remarks.
No.	Date.					
3	Feb'y 28, 1868	B. F. Marsh....	.....	Owyhee Park mining district.	2	Contract cancelled. All surveys made under private de- posits.
4	March 18, 1868	Geo. B. Foote..	2	Counties of Lewis and Clarke, Jefferson, Meagher, and Choteau.	8	
	March 18, 1868	John L. Corbett	1	Madison, Gallatin, and Big Horn.	.....	Do do
9	May 2, 1868	William Epler.	3	Deer Lodge and Missoula....	.....	Do do

F.—Statement showing the description of land for which township plats and descriptive lists have been furnished to the Helena land district, Helena, Montana, during the year ending June 30, 1868.

Township.	Range.	Area.	Triplicate plats—when transmitted.	Descriptive lists—when transmitted.
10 north...	2 west..	22, 938. 79	June 25, 1868	June 25, 1868.
10 north...	3 west..	22, 918. 79	June 25, 1868	June 25, 1868.

G.—Statement showing the condition of the appropriation for the survey of public lands in Montana, for the fiscal year ending June 30, 1868.

DR.				CR.			
1867. Oct. 23	To Benjamin F. Marsh, deputy, contract Aug. 1, 1867.	\$2,490 00		1867. July 1	By appropriation as per act of Congress July 2, 1864...	\$10,000 00	
1868. Jan. 23	To Benjamin F. Marsh, contract Oct. 23, 1867.....	900 00		July 1	By appropriation as per act of Congress July 24, 1866..	15,000 00	
Feb. 7	To Benjamin F. Marsh, contract Oct. 23, 1867.....	1,437 67					
April 18	To Benjamin F. Marsh, contract Oct. 23, 1867.....	1,631 27					
June 15	To Featherstone & Jewett, deputies, contract March 24, 1868.....	1,199 29					
	Balance		\$7,658 23				
			17,341 77				
			25,000 00				\$25,000 00
				1868. July 1	By balance	17,341 77	

H.—Statement showing the condition of the appropriation for the salary of surveyor general of Montana, for the fiscal year ending June 30, 1868.

DR.				CR.			
1867-'68.	1st quarter, to account as rendered.....	\$750 00		1867. July 1	By balance.....	\$2,480 77	
	2d quarter, to account as rendered.....	750 00		1868. July 1	By balance.....	519 23	
	3d quarter, to account as rendered.....	750 00					
	4th quarter, to account as rendered.....	750 00					
			\$3,000 00				\$3,000 00
1868, July 1	To balance.....	519 23					

I.—Statement showing the condition of the appropriation for the clerks in office of surveyor general of Montana, for the fiscal year ending June 30, 1868.

DR.

CR.

1867-'68.	1st quarter, to Henry C. Meredith, chief clerk..... Benjamin F. Marsh, draughtsman..... Walter W. De Lacy, draughtsman.....	\$391 30	\$717 39	1867. July 1	By appropriation as per act of Congress July 26, 1866 ..	\$5,000 00	
		77 45					
		248 64					
		450 00					
2d quarter, to Henry C. Meredith, chief clerk..... Walter W. De Lacy, draughtsman..... George B. Foote, clerk.....	375 00	951 35	1867. July 1	By appropriation as per act of Congress July 26, 1866 ..	\$5,000 00		
	126 35						
	450 00						
3d quarter, to Henry C. Meredith, chief clerk..... Walter W. De Lacy, draughtsman..... Charles L. Jewett, clerk.....	375 00	870 33	1867. July 1	By appropriation as per act of Congress July 26, 1866 ..	\$5,000 00		
	45 33						
	450 00						
4th quarter, to Henry C. Meredith, chief clerk..... Walter W. De Lacy, draughtsman..... Charles L. Jewett, clerk..... Guy W. McGriff, clerk.....	375 00	1,055 76	1867. July 1	By appropriation as per act of Congress July 26, 1866 ..	\$5,000 00		
	123 62						
	107 14						
	3,594 83						
1868. July 1	Balance	1,405 17	1868. July 1	By balance	1,405 17	\$5,000 00	

K.—Statement showing the condition of the appropriation for rent of office, fuel, books, stationery, and other incidental expenses, including pay of messenger, for the fiscal year ending June 30, 1868.

DR.

CR.

1867-'68.	1st quarter, to amount paid, as per account rendered.. 2d quarter, to amount paid, as per account rendered.. 3d quarter, to amount paid, as per account rendered.. 4th quarter, to amount paid, as per account rendered..	\$1,492 64	\$4,184 10	1867. July 1	By appropriation, as per act of Congress July 26, 1866. By appropriation applicable thereto, as per Commissioner's letter .. By appropriation applicable thereto, as per Commissioner's letter.....	\$3,000 00	
		874 24					
		827 25					
		989 97					
1868. July 1	Balance	48 65	4,232 75	1868. July 1	By balance	48 65	\$4,232 75

The amount of deposits made for field and office work and publication of notice, under act of Congress July 26, 1866, during the fiscal year ending June 30, 1868, was as follows: office work, \$424; field work, \$260; publication of notice, \$286; total, \$970. None of the above deposits were drawn upon during the fiscal year.

No. 17 D.

SURVEYOR GENERAL'S OFFICE,
Leavenworth, Kansas, September 5, 1868.

SIR: In accordance with your instructions of April 29, 1868, I herewith submit my annual report, in duplicate, showing the condition of surveys and the operations of the office in the district of Kansas, during the fiscal year ending June 30, 1868.

1. Names, duties and salaries of persons employed in the office of the surveyor general during the year ending June 30, 1868.
2. Sums expended for salaries of surveyor general and clerks during the year ending June 30, 1868.
3. Expenditures of the office during the fiscal year ending June 30, 1868.
4. Amount of revenue tax paid by the surveyor general and clerks during the year ending June 30, 1868.
5. Number and area of townships of which plats and descriptive lists have been transmitted to the department and local land offices during the year ending June 30, 1868.
6. The extent and cost of surveys executed during the year ending June 30, 1868.
7. Estimate of sums required for the extension of surveys during the fiscal year ending June 30, 1870.
8. Estimate of sums required for office expenses during the fiscal year ending June 30, 1870.

CONDITION OF PUBLIC SURVEYS.

All surveys contracted for out of appropriations approved July 28, 1866, and March 2, 1867, have been completed.

Five contracts have been entered into out of appropriation approved July 20, 1868.

In letting said contracts I have been governed by your instructions of August 5, 1868.

The different surveying parties have, doubtless, before this time reached their field of operations, but owing to the lateness of the season and the hostile attitude of the Indians, it may not be possible for deputies to complete their work until the early spring months.

OFFICE WORK.

Diagrams and transcripts of field-notes of 237 miles 20 chains and 30 links of standard lines have been made and transmitted to the department. Diagrams and transcripts of field-notes of 810 miles 77 chains and 65 links of exterior lines have been made and transmitted to the department.

Transcripts of field-notes and township plats of 76 townships of subdivisinal lines have been made and transmitted to the department and the proper local land office.

Seventy-six descriptive lists have been made out and transmitted to the proper local land office.

Transcript of field-notes and plat of special survey of the meanders of right bank of Kansas river through section 32, township 11 south, of range 23 east, 6th principal meridian, have been made and transmitted to the department and the proper local land office.

Diagram and transcript of field-notes of special survey of that portion of the Fort Riley military reservation lying between the Smoky Hill and Republican rivers have been made out and transmitted to the department.

EXTENSION OF PUBLIC SURVEYS.

Immigration to this State has been greater this year than has ever been known in any one single year.

The Union Pacific railroad has already been completed beyond the line of the surveys contracted for this season.

Therefore, the interests of immigration and the Union Pacific railroad require the extension of the public surveys.

Very respectfully, your obedient servant,

H. S. SLEEPER,
Surveyor General of Kansas.

Hon. JOS. S. WILSON,
Commissioaer General Land Office.

No. 1.—Statement showing the names, duties, nativity, whence appointed, and rate of compensation per annum of persons employed in the surveyor general's office of Kansas, during the year ending June 30, 1868.

Names.	Duty.	Nativity.	Whence appointed.	Term of service.	Salary per annum.
H. S. Sleeper.....	Surveyor general.....	New York....	Kansas....	Entire year..	\$2,000
Henry C. Fields.....	Chief clerk.....	Virginia....	Kansas....	Entire year..	1,600
William B. Covel.....	Principal draughtsman.	New York....	Kansas....	Entire year..	1,300
Henry S. Burr.....	Accountant.....	Ohio.....	Kansas....	Entire year..	1,200
James F. Taylor.....	Copyist.....	New York....	Kansas....	Entire year..	1,100
James Bicknell.....	Messenger.....	England....	Kansas....	Entire year..	600

No. 2.—Statement showing the amount expended for salaries of surveyor general and clerks during the year ending June 30, 1868.

Quarter ending September 30, 1867.....	\$1,800 00
Quarter ending December 31, 1867.....	1,800 00
Quarter ending March 31, 1868.....	1,800 00
Quarter ending June 30, 1868.....	1,800 00
	7,200 00

No. 3.—Statement showing the amount expended for rent of office and incidental expenses during the year ending June 30, 1868.

Quarter ending September 30, 1867.....	\$509 22
Quarter ending December 31, 1867.....	367 26
Quarter ending March 31, 1868.....	377 80
Quarter ending June 30, 1868.....	333 78
	1,588 06

RECAPITULATION.

Salaries of surveyor general and clerks during the year.....	\$7,200 00
Rent of office and incidental expenses during the year.....	1,588 06
	8,788 06

No. 4.—Statement showing the amount of revenue tax paid by the surveyor general and clerks during the year ending June 30, 1868.

Quarter ending September 30, 1867.....	\$27 50
Quarter ending December 31, 1867.....	27 50
Quarter ending March 31, 1868.....	27 50
Quarter ending June 30, 1868.....	27 50
	110 00

No. 5.—Statement showing description of lands, and area of same, for which township plats and descriptive lists have been furnished to the western land district, Junction City, Kansas, during the year ending June 30, 1868.

Township.	Range.	Area.	Triplicate plats; date when transmitted.	Descriptivelists; date when transmitted.
11 south	9 west	22, 973. 51	January 20, 1868	January 20, 1868.
12 south	9 west	23, 225. 38	do	Do.
13 south	9 west	23, 074. 03	do	Do.
11 south	10 west	22, 854. 38	do	Do.
12 south	10 west	22, 881. 63	do	Do.
13 south	10 west	23, 021. 75	do	Do.
11 south	11 west	22, 868. 16	do	Do.
12 south	11 west	22, 879. 46	do	Do.
13 south	11 west	22, 950. 22	do	Do.
11 south	12 west	23, 022. 96	December 31, 1867	December 31, 1867.
12 south	12 west	22, 987. 80	do	Do.
13 south	12 west	22, 988. 93	January 20, 1868	January 20, 1868.
9 south	13 west	22, 948. 87	February 10, 1868	February 10, 1868.
10 south	13 west	22, 974. 45	do	Do.
11 south	13 west	22, 918. 12	December 31, 1867	December 31, 1867.
12 south	13 west	22, 944. 70	do	Do.
13 south	13 west	23, 044. 31	September 3, 1867	September 13, 1867.
14 south	13 west	22, 887. 01	do	Do.
15 south	13 west	23, 100. 94	do	Do.
9 south	14 west	22, 910. 01	February 10, 1868	February 10, 1868.
10 south	14 west	22, 949. 63	do	Do.
11 south	14 west	22, 934. 72	December 31, 1867	December 31, 1867.
12 south	14 west	22, 943. 24	do	Do.
13 south	14 west	22, 922. 95	September 3, 1867	September 13, 1867.
14 south	14 west	23 015. 14	do	Do.
16 south	14 west	22, 976. 19	do	Do.
9 south	15 west	22, 984. 95	February 10, 1868	February 10, 1868.
10 south	15 west	23, 040. 45	do	Do.
11 south	15 west	22, 966. 01	do	Do.
12 south	15 west	22, 964. 69	December 31, 1867	December 31, 1867.
13 south	15 west	23, 081. 81	September 3, 1867	September 13, 1867.
14 south	15 west	23, 061. 81	do	Do.
15 south	15 west	23, 074. 20	do	Do.
9 south	16 west	22, 839. 17	February 10, 1868	February 10, 1868.
10 south	16 west	22, 978. 67	do	Do.
11 south	16 west	23, 017. 53	do	Do.
12 south	16 west	22, 922. 90	September 3, 1867	September 13, 1867.
13 south	16 west	22, 917. 92	do	Do.
14 south	16 west	23, 161. 20	do	Do.
15 south	16 west	23, 032. 41	do	Do.
11 south	17 west	23, 218. 18	October 29, 1867	October 29, 1867.
12 south	17 west	23, 031. 17	do	Do.
13 south	17 west	23, 005. 03	do	Do.
14 south	17 west	23, 032. 32	do	Do.
15 south	17 west	23, 045. 68	do	Do.
11 south	18 west	23, 194. 27	do	Do.
12 south	18 west	22, 991. 28	do	Do.
13 south	18 west	23, 019. 83	do	Do.
14 south	18 west	22, 958. 92	do	Do.
15 south	18 west	23, 004. 09	do	Do.
11 south	19 west	23, 119. 22	November 29, 1867	December 4, 1867.
12 south	19 west	22, 951. 82	do	Do.
13 south	19 west	22, 925. 98	do	Do.
14 south	19 west	22, 979. 78	do	Do.
15 south	19 west	23, 051. 07	do	Do.
13 south	20 west	22, 973. 01	do	Do.
14 south	20 west	23, 001. 02	do	Do.
15 south	20 west	23, 028. 15	do	Do.
13 south	21 west	22, 906. 28	do	Do.
14 south	21 west	22, 991. 00	do	Do.
15 south	21 west	23, 057. 43	do	Do.
13 south	22 west	22, 993. 22	do	Do.
14 south	22 west	23, 031. 42	do	Do.
15 south	22 west	23, 014. 60	do	Do.
13 south	23 west	22, 996. 76	do	Do.
14 south	23 west	22, 983. 44	do	Do.
15 south	23 west	23, 006. 41	do	Do.
13 south	24 west	22, 983. 84	do	Do.
14 south	24 west	23, 022. 23	do	Do.
15 south	24 west	23, 031. 83	do	Do.
Total		1, 609, 791. 49		

No. 6.—Statement showing the extent and cost of surveys executed in Kansas during the year ending June 30, 1868.

No. of contract.	Name of deputy.	Standard lines.	Township lines.	Section lines.	Date of appropriation.	Date of contract.	Rate.	Amount for mileage.
324	Armstrong & McClure.....			779 54 04	July 28, 1866.	Jan. 12, 1867.	\$5	\$3,898 37
	Do.....			425 77 73	Mar. 2, 1867..	Jan. 12, 1867..	5	2,129 85
								6,028 22
325	Deifendorf and Smith.....		613 55 30		Mar. 2, 1867..	Jan. 14, 1867..	6	3,682 14
	Do.....	237 20 30			July 28, 1866.	Jan. 14, 1867..	10	2,372 53
								6,054 67
326	James W. Thomas.....			603 48 57	Mar. 2, 1867..	Jan. 17, 1867..	5	3,018 03
328	Sleeper & Taylor.....			1200 53 87	July 28, 1866.	April 10, 1867..	5	6,003 36
329	Angell & Armstrong.....			962 00 91	Mar. 2, 1867..	April 13, 1867..	5	4,810 05
	Do.....			197 22 35	Mar. 2, 1867..	April 13, 1867..	6	1,183 67
								5,993 72
330	George W. Goodrich.....			604 18 41	July 28, 1866.	April 20, 1867..	5	3,021 15
	Total.....	237 20 30	810 77 65	457 613 53				30,119 15

No. 7.—Estimate of sums required for the extension of surveys in the State of Kansas for the fiscal year ending June 30, 1870.

Surveys estimated.	Miles.	Rate.	Cost.
For running the fifth guide meridian west, from the base line to the fourth standard parallel south; the first, second, third, and fourth standard parallels south, from the fourth to the fifth guide meridian west.....	312	\$10 00	\$3,120 00
For running the exterior lines as shown on the accompanying diagram.....	1,794	6 00	10,764 00
For running the subdivisional lines as shown on the accompanying diagram.....	8,460	5 00	42,300 00
			56,184 00

No. 8.—Estimate of sums required for office expenses for the fiscal year ending June 30, 1870.

Salary of surveyor general.....	\$2,000
Salary of chief clerk.....	1,600
Salary of principal draughtsman.....	1,300
Salary of assistant.....	1,200
Salary of one accountant.....	1,200
Salary of one copyist.....	1,100
Messenger, rent, and other incidental expenses.....	2,000
	10,400

SURVEYOR GENERAL'S OFFICE,
Leavenworth, Kansas, May 23, 1868.

SIR: I have the honor to acknowledge the receipt of your letter of the 6th instant, requesting a report of the manufacture of permian limestone into architectural forms for building purposes, &c.; also, as to information as to hedge planting, &c., in this district.

Geological investigations in this State have developed the location of the system of permian rocks, commencing at the Republican river and crossing the State from north to south in an irregular belt of about 50 miles in width, to the headwaters of Walnut river in the valley of the Arkansas. Professor G. C. Swallow, late State geologist of Kansas, gives about 20 varieties of magnesian limestone, varying in color, quality, and thickness. The centre of the system of rocks is in the vicinity of Fort Riley, where they form bold bluffs on both sides of the Kansas river for many miles above and below. The public buildings at Fort Riley are constructed of this material and have stood the test for many years. The State house at Topeka is being constructed of this stone; and the transportation of manufactured and unmanufactured material from the vicinity of Junction City to points east is already an important item for the Union Pacific railway, eastern division. Enclosed I send you a letter from Colonel McClure, register at Junction City, who, I believe, inaugurated the manufacture of this material into architectural forms. Also, a synopsis of a partial geological survey made by Professor G. C. Swallow in 1865, and, in addition, by this day's mail, two pieces of magnesian limestone from Junction City, Kansas. The square piece I sawed, using a common handsaw, on two sides, from a slab of the same. The section of moulding was dressed into its present shape by a common moulding plane. A process has been adopted to fill the interstices of the stone. The dust from the saw is mixed with gum shellac and rubbed on with a hard pressure. In a short time the compound is of equal hardness and durability with the balance of the stone, presenting a smooth surface. The magnesian limestone of central Kansas will undoubtedly come into general use for building material, and in point of cheapness and durability will be of inestimable value to the State.

The legislature of this State at its last session enacted a law to encourage hedge planting; giving to every person planting and cultivating a hedge for three years successfully 20 cents per rod. The only kind of hedge grown here is the Osage orange. From 12 years of observation of hedge growing in Iowa, Missouri, and Kansas, I am of the opinion that Osage orange can only be relied upon south of the 40th^o of north latitude, and that its certainty increases to the south of this line. Southern Kansas seems better adapted to this than northern Kansas, although there are mature hedges in all parts of the State. Within the last few years the growing of Osage orange has become quite an important item, and under the inducements of legislation will probably become still more so. The process most generally adopted to grow a hedge is to break up the ground the year previous, of sufficient width to protect from prairie fires. In the following spring replough the ground and plant out the hedge in a single row. About the first of July following cut back within four inches of the ground; and on the first of October recut within two inches of the former. Before the ground freezes, turn a slight quantity of soil up to the hedge to protect from frost. The manner of protecting from stock, when grown in the open prairie, the best I have noticed, is to lay a common fence rail close to the row on each side, as stock injure a young hedge only by trampling on the plants; browsing of the plants being more beneficial than otherwise. The only serious drawback to hedge

growing is the prairie fires and pocket gopher. The one can be guarded against by cultivating a strip of sufficient width to stop the fire, while the other must be exterminated either by digging or by poisoning. The cost of planting and cultivating an Osage orange hedge for three years is not to exceed 50 cents per rod.

We have no data by which to judge of the extent of hedge planting in this State. In this locality, however, it is considerable. When the broad prairies become settled sufficiently to stop the prairie fires which now so often sweep over whole sections, consuming in an hour the labor of years, Osage orange hedge will be adopted as the economical fence of this region, cheaper than stone wall, and, with slight attention, almost as permanent.

Very respectfully, your obedient servant,

H. S. SLEEPER,
Surveyor General.

Hon. JOS. S. WILSON,
Commissioner General Land Office, Washington, D. C.

LAND OFFICE, JUNCTION CITY,
May 20, 1868.

DEAR SIR: Your letter of the 18th instant, asking for information as to magnesian limestone in this part of the State, is received. This quality of stone is found in the bluffs along the valley of the Kansas, Smoky Hill, and Republican rivers. The finest and best stone yet discovered is at this place, in the range of bluffs extending from the Smoky Hill to the Republican. The stone deteriorates in quality in all directions as you leave this range. When first taken from the quarry the stone is white and very soft, then gradually assumes a yellowish appearance, and hardens by exposure to the atmosphere. In the quarries now opened the stone is found in regular strata, and averages from five to seven feet in thickness, and can be obtained any length desired and in inexhaustible quantities. It can be cut with a saw or plane as easily as wood. I have known the stone to be in use for building purposes for the past 14 years, without being in any way affected by the weather or presenting any appearance of decay. In my opinion it is the most valuable stone for building purposes in the United States. The company organized at this place to saw this stone clearly demonstrated the fact that the stone can be sawed as rapidly as wood, but owing to the enterprise being an experiment and mismanagement, it proved a failure financially. The railroad company have erected extensive works some three miles west of town to saw stone to be used in the erection of their machine shops at Lawrence, and for buildings at other points on the line of their road. If I have not given you the kind of information desired, I will be pleased to answer any other questions on this subject you may wish to ask.

I am, general, very respectfully, your obedient servant,

J. McCLURE, *Register.*

Hon. H. S. SLEEPER,
Surveyor General of Kansas.

No. 17 E.

SURVEYOR GENERAL'S OFFICE,
Santa Fé, New Mexico, July 17, 1868.

SIR: I have the honor to submit herewith my annual report of the operations of this office, with tabular statements marked A to D, inclusive.

SURVEYS.

The statement marked A exhibits in detail the surveys executed during the fiscal year ending June 30, 1868. There are no unfinished or outstanding contracts.

Plats of all the surveys as above have been transmitted to the General Land Office, and copies of the township plats, with descriptive notes, will soon be ready to be delivered to the register of the land office at Santa Fé. These surveys are shown upon the enclosed diagrams marked E and F.

No applications have been made to this office during the year for the survey of private claims under the act of Congress of June 2, 1862; nor for surveys of public lands under the act of May 30, 1862; nor for the survey of mineral claims under the act of July 26, 1866, except in one case, the diagram and accompanying certificates in which have been withdrawn, because of the filing with the register of the land office of an adverse claim. No special deputy has therefore been appointed or contract made for the survey of this class of lands.

PRIVATE LAND CLAIMS.

In former reports and communications to your office, and especially in my last annual report, I have urged that Congress should provide, by additional legislation, for the early settlement of claims to land in this district under Spanish and Mexican grants, and have shown the inefficiency of the laws and regulations now in force regarding the adjustment of these claims, the hardships upon the claimants, and the injustice liable to be done to them, as also to the government, in the settlement of titles under them.

I have not unduly magnified the importance to the government and to the people of the Territory of an early settlement of these claims. The tide of emigration is setting strongly in this direction. Controversies are constantly arising between new settlers and claimants under these unadjusted titles. Thus immigration is discouraged, the progress of settlement checked, and the development of the resources of the Territory delayed.

I therefore again call your attention to this subject, in the hope that something may speedily be done to remedy these evils.

INDIAN RESERVATIONS.

In pursuance of a treaty lately concluded with the Navajo Indians the reservation at Bosque Redondo, on the Pecos river, has been abandoned, and the Indians settled upon a reservation set apart to their use upon the San Juan river, defined by the treaty as follows, viz:

"Bounded on the north by the 37th degree of north latitude; south by an east and west line passing through old Fort Defiance in Cañon Bonito; east by the parallel of longitude which if prolonged south would pass through old Fort Lyon on the Ojo de Oso, Bear Spring; and west by a meridian of longitude about 109° 30' west of Greenwich, provided it embraces the outlet of Cañon de Chelly, which cañon is to be all included in this reservation."

Under the treaty the Indians surrender to the United States all claim to the country formerly occupied by them, as follows:

"In consideration of the advantages and benefits conferred by this treaty and the many pledges of friendship by the United States, the tribe

who are parties to this agreement hereby stipulate that they will relinquish all right to occupy any territory outside their reservation as herein defined, but retain the right to hunt on any unoccupied lands contiguous to their reservation so long as the large game may range thereon in such numbers as to justify the chase."

Should this treaty be ratified the country on the San Juan river east of the reservation will be thrown open to settlement, and the public surveys should be extended over it at an early day.

The order setting apart the Bosque Redondo reservation—now abandoned—should be rescinded, so that that part of the valley of the Pecos may also be opened to settlement.

I am informed that during the year settlements have been made and a town called Grant City laid out upon the abandoned reservation of the Gila Apaches on the Gila river. Whether, in the absence of a military post at that point, the settlers will be enabled to maintain their settlement against the roving bands of Apaches, is questionable. They would make a greater effort to do so if they could acquire title to the lands upon which they have settled.

In my last annual report the questions relating to the continuance of this reservation were discussed. The settlements now made upon the lands furnish an additional reason why the reservation should be declared by the department abandoned, and the lands restored to the public domain.

PACIFIC RAILWAY.

During the past year the Union Pacific Railway, Eastern Division, under the direction of General William J. Palmer and General W. W. Wright, made extensive railroad surveys from a point on the main line of their road near the west boundary of Kansas, through Colorado, New Mexico, Arizona, and California, to the Pacific at San Diego and San Francisco. The engineers making these surveys, taking into account climate, gradients, alignment, and distance, claim that this has greatly the advantage over any other railway route between the Atlantic and Pacific; and the company propose to construct one branch of their road in this direction. If their plans shall be carried out increased appropriations for surveying the public lands in the vicinity of the line of the road will be necessary. I have marked the line surveyed on the enclosed diagram marked E as accurately as practicable from the data at my command.

A telegraph line from Denver to Santa Fé, the first and only one in New Mexico, was completed on the 8th instant, connecting this ancient city with the national capital, and furnishing gratifying evidence of the enterprise and progress of the people of this Territory.

MINES AND MINING.

Considerable progress has been made during the year in the development of the mining interests of New Mexico. It is estimated that between two and three thousand persons are now at work in the mines of the Moreno district, northeasterly of Taos. A very small portion, however, of the ground known to be rich in gold can be worked for want of water; but a ditch nearly 40 miles long is being constructed to divert the waters of the Rio Colorado (a branch of the Rio Grande) to the mines. The parties engaged in the work expect to complete it by the first of October next, and to deliver at the placers a sufficient supply of water for the full development of that mining district; and it is anticipated that a large amount of gold will be washed out before the winter terminates their labors for the season.

The gold product from these and other mines in New Mexico has been considerable during the past year, variously estimated at from \$200,000 to \$800,000. There being no assay office, banks of deposit, nor other special agency for the refining, safe-keeping or purchase of the gold produced, or for its transmission to market, it has been found impossible to collect any reliable statistics of the amount.

I have applied to the owners and superintendents of mills and other business men best informed at the placer mines near Santa Fé, at Pinos Altos, and at the Moreno mines, for information as to the actual amount of bullion produced; but the answers so far received are so unsatisfactory, that I have not deemed them worthy of insertion here. Should returns be received which I shall consider reliable and complete, I will make them the subject of a future communication to your office.

GEOLOGICAL SURVEY.

Although the settlements upon the Rio Grande are as old as those upon the Delaware, yet the geological character of the nearest mountains is unknown to the most intelligent of the people—attributable partly to the absence of that kind of scientific knowledge among them, but mainly to the presence of the Ishmaelitic Navajo and Apache, who for 200 years have been their foe and scourge, and have made these mountains their stronghold. The construction of railroads and the progress of settlements promise to change this state of things, and to open the country to individual exploration and examination. It is known generally that nearly all the mountain ranges in the Territory are mineral-bearing; but, until a geological survey is made, the greater part of the mineral resources of this vast region must lie dormant. The government could make no investment that would yield so large a return to the nation as a few thousand dollars spent in a scientific survey of this portion of the Rocky Mountain system.

I therefore earnestly recommend that an appropriation be made for a geological survey of New Mexico.

COUNTY BOUNDARIES.

I have to call your attention to the change in the boundaries of the counties of Socorro and Doña Ana, and to the new county of Grant, as shown by the enclosed diagram, marked E.

ACCOMPANYING DOCUMENTS.

The documents accompanying this report are as follows, viz:

- A.—Statement of surveys executed during the fiscal year ending June 30, 1868.
- B.—Estimate of appropriations required for the surveying service for the fiscal year ending June 30, 1870.
- C.—Statement of expenditures for salaries for the fiscal year ending June 30, 1868.
- D.—Statement of incidental expenses during the same period.
- E.—Diagram of New Mexico.
- F.—Connected diagram of surveys executed during the two years ending June 30, 1868.

I am, very respectfully, your obedient servant,

JOHN A. CLARK,
Surveyor General of New Mexico.

Hon. JOS. S. WILSON,
Comm'r of the General Land Office, Washington, D. C.

A.—Statement of the surveys of public lands made during the fiscal year ending June 30, 1868.

Contract.		Deputy.	Character of work.	Miles.	Chains.	Links.	Cost.
No.	Date.						
29	June 3, 1867.....	Robert B. Willison.....	Subdivisional lines of township 11 south, ranges 13 and 14 east; townships 9 and 10 south, range 16 east; township 14 south, ranges 9 and 10 east; township 15 south, ranges 9 and 10 east.....	480	44	80	\$4,805 58
30	June 3, 1867.....	Hiram C. Fellows.....	Exterior lines of township 11 south, ranges 18, 19, 20, 21, 22, 23 and 24 east; township 10 south, range 17 east; township 10 south, range 24 east.....	126	27	31	1,516 09
31	June 11, 1867.....	Isaac C. Stuck.....	Subdivisional lines of township 10 south, ranges 17 and 24 east; township 11 south, ranges 17, 22, 23, and 24 east.....	360	25	18	3,603 14
			Exterior lines of township 14 south, range 4 west.....	1	55	62	20 34
32	June 11, 1867.....	Isaac C. Stuck.....	Subdivisional lines of township 14 south, range 5 west; township 16 south, range 13 west; township 17 south, ranges 12 and 13 west; township 18 south, range 10 west; township 19 south, range 10 west; township 20 south, ranges 10 and 11 west, including closings on parallels.....	458	22	84	4,654 95
			Subdivisional of township 14 south, ranges 4 and 5 west.....	78	54	50	786 80
33	February 1, 1868.....	Robert B. Willison.....	Second correction line south.....	3	15	.....	47 81
			Exterior lines of township 12 south, range 21 east; townships 12 and 13 south, ranges 22 and 23 east; township 11 south, range 24 east; townships 11 and 12 south, range 25 east; township 11 south, range 26 east.....	42	9	49	505 41
			Subdivisional lines of township 11 south, ranges 17, 18, 19, 21 and 25 east; township 12 south, ranges 22 and 23 east.....	362	21	43	3,622 65
				1,913	36	17	19,562 77

SURVEYOR GENERAL'S OFFICE, Santa Fé, New Mexico, July 27, 1868.

JOHN A. CLARK, Surveyor General.

B.—Estimate of appropriations required for the fiscal year ending June 30, 1870.

Object of appropriation.	Amount.
For salary of the surveyor general.....	\$3,000 00
For salary of the translator.....	2,000 00
For salary of the draughtsman.....	1,800 00
For salary of the copying clerk.....	1,400 00
For rent of office, fuel, stationery, &c.....	1,200 00
For public surveys—continuing the survey of base, meridian, township, and subdivisional lines.....	30,264 00
Total.....	39,664 00

SURVEYOR GENERAL'S OFFICE, Santa Fé, New Mexico, July 27, 1868.

JOHN A. CLARK, Surveyor General.

C.—Statement of expenditures for salaries for the fiscal year ending June 30, 1868.

Name.	Duty.	Rate of salary.	Time employed.		Amount.
			From— inclusive—	To— inclusive—	
John A. Clark	Surveyor General	\$3,000	July 1	June 30	\$8,000 00
David J. Miller	Chief clerk and translator	2,000	July 1	June 30	2,000 00
Isaac C. Stuck	Draughtsman	1,500	July 1	July 9	36 68
John Lambert	do	1,500	August 19	December 10	464 67
Cyrus H. DeForrest	do	1,500	November 11	June 30	957 88
Robert B. Willison	do	1,500	December 12	February 2	217 50
Isaac C. Stuck	do	1,500	January 21	February 1	49 43
					6,726 16

JOHN A. CLARK, Surveyor General.

SURVEYOR GENERAL'S OFFICE, Santa Fé, New Mexico, July 27, 1868.

D.—Statement showing the incidental expenditures during the fiscal year ending June 30, 1868.

Fiscal quarter.	Name.	Consideration.	Time.		Amount.	Remarks.
			From— inclusive—	To— inclusive—		
First	John A. Clark	Sundries			\$99 37	Per vouchers accompanying account.
First	Mary Vincent	Office rent	July 1	September 30	66 00	
Second	John A. Clark	Sundries			198 65	Per vouchers accompanying account.
Second	Luis Gold	Office rent	October 1	December 31	100 00	
Third	John A. Clark	Sundries			42 90	Per vouchers accompanying account.
Third	Luis Gold	Office rent	January 1	March 31	100 00	
Fourth	Bidwell & Farwell	Stationery			132 51	Account sent to General Land Office May 25. Per vouchers accompanying account.
Fourth	John A. Clark	Sundries			71 92	
Fourth	Luis Gold	Office rent	April 1	June 30	100 00	
					911 35	

JOHN A. CLARK, Surveyor General.

SURVEYOR GENERAL'S OFFICE, Santa Fé, New Mexico, July 27, 1868.

SURVEYOR GENERAL'S OFFICE,
Santa Fé, New Mexico, June 25, 1868.

SIR: In answer to your letter of March 18, 1868, requesting information as to the extent of the "barrens" or "desert lands" in this district, the means of irrigating and reclaiming them, &c., I have to state that, properly so-called, there are neither barren nor desert lands to any great extent in New Mexico. The Territory is properly divided between valleys, which can be irrigated by the streams flowing through them, mesas or table-lands, under which designation I would class all the lands not mountain or irrigable valleys, and mountains.

In a communication to your office dated August 15, 1866, I estimated the arable lands of this district at 1,000,000 acres. The term arable was used as synonymous with irrigable, as no lands can be cultivated here with any certainty of raising a crop without irrigation. There is a considerable rain-fall during the months of July and August, but there is so little rain during April, May, and June, that without irrigation crops will ordinarily perish.

The method of irrigating is as follows: Ditches or canals are excavated, and the water conveyed from the stream with just fall enough to preserve the full volume or quantity deemed necessary, and diverging from the stream as the surface of the lands will permit, so as to include all the lands below, that is, between the greatest elevation to which the ditch can be carried along the tract to be irrigated and the stream. The land is prepared for planting by laying it off in beds or lots varying in size according as the surface is level or otherwise, from a sixteenth part of an acre to two or three acres. Around each of these beds, which are required to be level or nearly so, there is raised a light embankment six or eight inches above the level, leaving a shallow ditch between, through which the water is drawn, and from which the land is flooded to the depth of two or three inches as often as required for the growth of the crop. The water being let through the embankment as above, and the beds covered to the proper depth, the embankment is again closed and the water left to be absorbed by the soil. The small irrigating ditches above described communicate with the main ditch, (*acequia madre*), but the water is only suffered to flow in them when needed for the irrigation of the land which they divide or to which they lead.

To mature a crop of corn, wheat, barley, or oats, the land should be irrigated ordinarily once in 10 to 14 days; vegetables a little oftener; but during the months of July and August the rains supply much of the necessary moisture, so that irrigation during those months or a portion of them is often unnecessary. It may be proper to state that the amount of irrigable lands is only limited by the amount of water in the streams; even the Rio Grande might all be used in the irrigation of the lands in its valley. The water supplied by irrigation not only affords the necessary moisture for the growth of vegetation, but also enriches the soil by depositing the sedimentary matter held in solution, and thus lands in this vicinity, which have been under annual cultivation for more than 200 years, still produce excellent crops without ever having been manured or restored by other means.

It will be observed that to prepare land for planting, and to cultivate it properly by means of irrigation, requires very much more labor than where Providence sends the early and latter rain, but it has its advantages also. If the farmer has a never failing stream of water with which to irrigate his land, his crop need not be cut short by drouth, nor injured by excessive rains.

The mesas or table-lands include fully two thirds and perhaps three quarters of the entire surface of New Mexico. The greater part of these

lands produce excellent grass for pasturage, and with irrigation and cultivation would produce all of the cereals and vegetables equally well with the valleys, but for the most part they have so great an elevation above the streams that if there were surplus water after irrigating the valleys they could not be reached by irrigating canals. The only hope therefore of reclaiming the table-lands of New Mexico is by means of artesian wells.

The government in 1858, 1859, and 1860, under the direction of Captain (now Major General) John Pope, then of the topographical engineers, undertook to obtain water by boring at a point on the Llano Estacado, near the south east corner of this Territory, and also on the mesa about 25 miles south from Santa Fé, but was unsuccessful at both places in obtaining a flow of water to the surface.

I have been unable to procure a copy of Captain Pope's report, but am informed that it contains many interesting facts and well-considered theories upon the subject of reclaiming the waste lands of this and the adjoining Territories. I suppose it may be found among the executive documents of 1860 or 1861, as Colonel J. J. Abert reports November 14, 1860, that Captain Pope was then engaged in making his report.

No other attempt has been made in New Mexico to obtain water by sinking artesian wells, and the question as to the practicability of obtaining water for irrigation by this means is yet to be decided.

The soil upon the greater part of these table-lands, or plains, as they are sometimes called, is good. The vegetable growth is gama grass of two or three varieties, the palmetto, amole, or soap weed, many varieties of the cactus, and in places the artemisia. Scattering piñon and cedar, and in the south a species of the live-oak, cover considerable districts, connecting generally with the forests of the mountains.

I have delineated approximately these mesas, table-lands, or plains on the enclosed diagram, as requested. The division, however, of all the lands in the Territory into three classes as above, viz: into valleys, mesas or table-lands, and mountains, taking the map accompanying my last annual report as a guide, will give a much more correct idea of the extent of the uncultivable lands (without irrigation) of this district than the diagram enclosed.

I am, respectfully, your obedient servant,

JOHN A. CLARK,
Surveyor General.

Hon. JOS. S. WILSON,
Commissioner of the General Land Office.

No. 17 F.

SURVEYOR GENERAL'S OFFICE,
Denver, Colorado Territory, July 27, 1868.

SIR: I have the honor to submit the report of the official operations of this office for the year ending June 30, 1868, together with an estimate for surveys of the year ending June 30, 1870.

Statement marked A shows the surveys made during the year ending June 30, 1868.

Statement marked B contains the surveys made under the 10th section of the act of May 30, 1862.

Statement marked C contains the names and number of mineral claims surveyed under the act of July 26, 1866.

Statement maked D contains the amount of salaries paid the surveyor general and clerks for the year ending June 30, 1868.

Statement marked E contains the number of townships surveyed during the year ending June 30, 1868, and the area of public land contained in the same.

Estimates for surveys for the year ending June 30, 1870.

Estimates for surveys in the mountains:	
498 miles of standard lines, at \$25 per mile....	\$12,450 00
1,200 miles of township lines, at \$20 per mile..	24,000 00
600 miles of subdivisinal lines, at \$18 per mile	10,800 00
	<hr/>
Total for surveys in mountains.....	\$47,250 00
Estimates for surveys on the plains:	
500 miles of standard lines, at \$15 per mile...	\$7,500 00
2,400 miles of township lines, at \$12 per mile..	28,800 00
4,000 miles of subdivisinal lines, at \$10 per mile	40,000 00
	<hr/>
Total for surveys on plains.....	76,300 00
	<hr/>
Total for surveys in Colorado.....	123,550 00
Estimate for surveys in Utah.....	30,000 00
Estimate for office expenses:	
Salary of surveyor general.....	\$3,000 00
Salary of chief clerk.....	2,000 00
Salary of principal draughtsman.....	1,800 00
Salary of assistant draughtsman.....	1,500 00
Salary of transcribing clerk.....	1,500 00
	<hr/>
Total for salaries.....	9,800 00
Incidental expenses.....	2,000 00
	<hr/>
Total expenses.....	11,800 00
	<hr/>
Total expenses for the year ending June 30, 1870...	165,300 00
	<hr/> <hr/>

The entire amount named in this estimate for the service will in my opinion be required. The increasing population of the Territories, and the demand for lands for entry and settlement, by the large number of emigrants who are constantly arriving, render it an absolute necessity to give to the increasing population an opportunity to acquire title to lands held by them, and also to enable the railroad companies whose grants are within the limits of this district to designate their lands. Also, to protect in the mountains the depleting of the government lands of their timber, which, if not surveyed in a short time, will be completely depleted of their timber and the land rendered comparatively of little or no value. The Union Pacific railroad runs through a small portion of Colorado, while their grant of lands extends along the whole northern boundary of the Territory.

In Utah extensive surveys will be required to enable the railroad company to designate their lands.

The Union Pacific, eastern division, is completed to within a short distance of the eastern boundary of Colorado, and a great portion of their grant will require surveying during the year ending June 30, 1870.

COLORADO.

Under the act of July 26, 1866, I have appointed three deputy mineral surveyors in this Territory, and final surveys have been made of nine

lodes during the year ending June 30, 1868. The imperfect knowledge of the law among the miners has prevented more surveys being made; but during the present year they will largely increase, and the amount of work thrown in this office will render the employment of an assistant draughtsman necessary.

During the past year the mining interests have improved very much, and the increase of precious metals has been very large.

During the year ending June 30, 1868, the shipments eastward by express amounted to \$2,000,000, while it is fair to presume that a like amount went on by private hands.

The consumption of gold in the manufacture of jewelry is considerable, and five manufactories alone in the city of Denver consumed during the year ending June 30, 1868, 670 ounces of gold, valued at \$14,740; while the amount produced during the month of July, 1868, will not be less than \$500,000.

Colorado has the finest pastoral and agricultural land in the world, and fine food for cattle; horses and sheep can be had in abundance all the year. Already large herds of cattle and horses are raised on its fine lands, and in a few years the stock-raising will be of immense value to the country. The lands capable of irrigation produce wheat finely, and the common product is from 40 to 60 bushels per acre. Last year the grasshoppers made their appearance in some parts of the Territory and caused immense damage to the crops. This year, however, they have not as yet made their appearance, and it is to be hoped they will not, in which case the crops of Colorado will be very fine.

The coal deposits are large and inexhaustible, and recent developments show an extensive coal basin existing in this Territory. The seams vary from three to eleven feet in thickness. They can be traced along the base of the foot-hills from the Cache la Poudre on the north to the Arkansas on the south, and the basin evidently extends to Bijou creek on the east, giving a length of 150 miles, and a breadth of 60 miles. This, with large deposits of iron ore, will prove of great value.

UTAH.

No appropriation for surveys in this Territory was made by Congress for the year ending June 30, 1868.

A large amount of land is under cultivation, and the inhabitants are anxious to acquire title to the land which many of them have occupied for the last 15 years.

In this Territory an immense amount of labor has been done in bringing the land under cultivation.

Fruits of all kinds are raised with success, and, indeed, a great number of the valleys are perfect gardens.

The Union Pacific railroad is rapidly approaching the Territory, and with a favorable season will be probably completed to Great Salt Lake City during the present year.

Coal abounds along the Weber river and is similar to the coal found in Colorado. In my report last year I recommended the survey of the northern and eastern boundary of Colorado. I again recommend it and believe it necessary.

Hoping this may meet with your approval, I am, very respectfully, your obedient servant,

W. H. LESSIG,

Surveyor General of Colorado and Utah.

Hon. JOS. S. WILSON,

Commissioner General Land Office, Washington, D. C.

A.—Statement of the surveys made under the appropriation for the fiscal year ending June 30, 1868.

No. of contract.	Names of deputies.	Miles.	Chains.	Links.	Cost.	Remarks.
30	William Ashley	57	77	94	\$419 82	Subdivisional lines.
37	C. A. Deane	24	.....	.....	240 00	Standard lines.
		108	15	36	865 53	Township lines.
38	William Ashley	54	.....	.....	810 00	Standard lines.
		523	30	97	4,187 10	Township lines.
		418	25	92	2,928 25	Subdivisional lines.
39	George H. Hill.....	210	16	76	3,138 37	Standard lines.
40	D. H. Goodwin.....	5	78	.....	.....	Township lines.
		59	72	31	467 13	Subdivisional lines.
42	F. M. Case	45	40	.....	682 50	Standard lines.

B.—Statement of surveys made under the act of Congress of May 30, 1862.

No. of contract.	Names of deputies.	Miles.	Chains.	Links.	Cost.	Remarks.
43	C. A. Deane.....	120	76	88	\$1,041 67	Subdivisional lines.
45	F. F. Brune.....	17	76	70	143 67	Township lines.

C.—Statement of the names and numbers of mineral claims surveyed under the act of July 26, 1866.

Name of lode.	No. of survey.	No. of district.	County.	Remarks.
Ellieth.....	37	1	Illpin.....	Adverse claim filed.
Peck and Thomas.....	38	1	.....do.....	Approved and forwarded.
Columbia.....	39	1	.....do.....	Do.
Shaft.....	40	1	.....do.....	Do.
Sapyre.....	41	1	.....do.....	Do.
Wabash.....	42	1	.....do.....	Do.
Stark County.....	43	1	.....do.....	Do.
Gibson.....	44	1	.....do.....	Do.
Minnesota.....	45	1	.....do.....	Do.

D.—Statement showing the amount of salaries paid surveyor general and clerks for the fiscal year ending June 30, 1868; also incidental expenses for same period.

Name.	Occupation.	Nativity.	Whence appointed.	Time of service.	Am't paid.
W. H. Leasig..	Surveyor general	Pennsylvania..	Pennsylvania.....	Entire year.....	\$3,000 00
E. M. Ashley	Chief clerk.....	Ohio.....	Colorado.....	.....do.....	1,800 00
R. Fisher.....	Draughtsman	Rhode Island..	.....do.....	.....do.....	1,500 00
T. W. Russell	Transcribing clerk..	Pennsylvania..	.....do.....	Three months	375 00
J. A. Leasig ..	.....do.....	.....do.....	.....do.....	Nine months.....	1,125 00
Total.....					7,800 00

Incidental expenses.

Expended 1st quarter.....	\$500 00
Expended 2d quarter.....	353 13
Expended 3d quarter.....	583 11
Expended 4th quarter.....	343 75
Total.....	1,780 50

E.—Statement showing the number of townships surveyed during the fiscal year ending June 30, 1868, and the area of public land contained in the same.

Description.		Area.	Remarks.
Township.	Range.		
6 south	61 west	23,628.43	Surveyed by William Ashley, contract No. 30.
1 north	65 west	22,987.54	
2 north	do	22,901.75	Surveyed by William Ashley, contract No. 38.
1 south	do	22,548.57	
2 south	do	22,889.57	Surveyed by D. H. Goodwin, contract No. 40.
3 south	do	22,954.70	
2 south	66 west	22,942.74	Surveyed by William Ashley, contract No. 30.
3 south	do	22,927.74	
10 south	67 west	22,962.22	Surveyed by C. A. Deane, contract No. 41.
8 north	68 west	22,884.71	
3 south	71 west	23,087.33	Surveyed by C. A. Deane, contract No. 43.
4 south	do	23,289.29	
3 south	72 west	23,483.25	Acres surveyed in 1868.
		299,487.84	
		2,807,009.56	134 townships previously reported.
Total		3,106,497.40	Acres surveyed in Colorado.

No. 17 G.

UNITED STATES SURVEYOR GENERAL'S OFFICE,
Virginia City, Nevada, July 31, 1868.

SIR: In compliance with your instructions I herewith submit my annual report in duplicate in reference to the surveys executed in the State of Nevada, and other operations of this office during the year ending June 30, 1868. I also forward statements of the business appertaining to the surveying department to accompany the reports, as follows, to wit:

A.—Statements of contracts entered into by the United States surveyor general for Nevada, with the number of miles surveyed, during the fiscal year 1867 and 1868.

B.—List of mineral claims surveyed in the State of Nevada during the fiscal year 1867 and 1868.

C.—List of lands surveyed in the State of Nevada during the fiscal year 1867 and 1868.

D.—Statement of the plats made in the office of the United States surveyor general of Nevada for the fiscal year 1867 and 1868.

E.—Estimate of surveying service in the district of Nevada for the fiscal year ending June 30, 1870.

F.—Statement of account of appropriation for the compensation of the United States surveyor general and the employés in his office during the fiscal year 1867 and 1868.

G.—Statement of account of appropriation for the survey of public lands in Nevada during the fiscal year 1867 and 1868.

H.—Statement of account of appropriation for the rent of office, fuel, books, stationery, and other incidental expenses, including pay of messenger, during the fiscal year 1867 and 1868.

In addition to the office work as set forth in the foregoing statement, the employés, consisting of a chief clerk, draughtsman, messenger, and a

portion of the time a copying clerk, have been engaged in the following duties:

1. Making plats for the surveyor general's office.
2. Making plats and copying field notes for the General Land Office at Washington.
3. Making plats for the local land offices of this State.
4. Copying correspondence of this office.
5. Making out contracts in triplicate.
6. Making sketches to accompany contracts of public surveys.
7. Keeping in order the records, plats, and field notes of public surveys.
8. Making out quarterly accounts and certificates of vouchers.
9. Posting books of accounts and records appertaining to the business of the office.
10. Examining proofs, surveys, and reports of mineral surveys.

There are a large number of valleys in different portions of the State that are very productive; they are generally located on the plains where the mountain streams come down into the valleys.

The hills and mountains are generally covered with a very nutritious bunch grass, and stock thrive remarkably well upon it until late in the fall. During the winter they go to the plains and live upon a weed called the sage. This weed grows upon dry, and otherwise barren land, and is admirably adapted for winter feed. When it ripens in the winter the top is filled with a small black seed. Stock are very fond of it, and come in in the spring in better condition than if fed upon the best of hay.

I consider this State one of the best stock countries in the Union: they require no feeding in the winter, and are fit for beef the year round.

As is usual in the early settlement of mining countries, agriculture has been much neglected, but I see no reason why the stock business should not become one of the leading branches of industry. I have confined the surveys the past year principally to establishing standard, meridian, and township lines in portions of the State most desirable for agriculture, and where the largest settlements have been made.

I have gained information by which I am enabled to ascertain the portions necessary to subdivide.

I believe it will be to the interest of the public service to expend most of the appropriation this year in running subdivision lines, and mostly along the line of the Pacific railroad. Upon the completion of this great national highway the wild savages will either be driven off or subdued, and large tracts of land adjacent thereto, now lying idle, will be opened to cultivation and settlement. In my last annual report I stated that the Central Pacific railroad was completed to the town of Cisco, 15 miles west from the summit of the Sierra Nevada mountains, and 216 miles east from the city of San Francisco. The past winter was of unusual severity, which somewhat retarded the work, but the road was kept in running order nearly every day as far as Cisco, which establishes the fact that the snows of the Sierra can be overcome, and communication kept open even during the severest winters.

The building of the road at and near the summit of the mountains was necessarily slow. A number of tunnels had to be cut through the solid rock, the longest being 1,658 feet. The company, to overcome this delay as far as possible, commenced grading on the eastern side of the mountains, and with teams drew iron and locomotives to prosecute the work. By the time the grading was completed at the summit, and the connection made between the two ends of the road in June, 1868, 78 miles of iron had been drawn over by teams and laid.

The cars are now running daily to Wadsworth, at the big bend of the

Truckee, a distance of 325 miles east from San Francisco. The track is being laid east from this point at the rate of at least two miles per day. There is no grading to impede the progress of the work until the mountains west of Salt lake are reached, and even they will probably be graded by the time the track is laid to them.

The experiment of successfully operating a railroad through perpetual snow over the Sierra Nevada mountains has become an accomplished fact, and the farseeing wisdom of a few great statesmen, who, 20 years ago, advocated its feasibility, against the judgment of the country, has been vindicated.

As the road advances settlements are being made and towns and villages are springing into existence as by magic.

Several new railroad lines have been projected. One leaves the Central Pacific railroad at or near Reno, on the Truckee river; running to Washoe City, Ophir, Carson City, Empire, Gold Hill, and terminating at Virginia City, has recently been surveyed, and it is expected that the grading will commence in a few days. The length of this road will be 39 miles.

A company has been formed for the purpose of building a road from the Central Pacific railroad, north of Austin, running south through the counties of Lander, Nye, and Lincoln, to the Colorado river. The country through which this road will pass is rich in gold, silver, copper, iron, and salt, with many fine valleys of good arable land.

Railroad facilities would do much toward developing the resources of the country, and would, doubtless, prove a profitable investment.

The mining interest of the State has in the main been prosperous.

The Comstock lode has yielded about as much silver as at any former period, and the mines of Lander, Humboldt, and Nye counties, have considerably increased, several new districts have been discovered, and bid fair to prove remarkably rich.

Among the most prominent of these districts are White Pine, in the eastern part of Lander county, and Pine Grove, in Esmeralda county.

Applications for a large number of patents have been made, and a general desire to obtain a government title is manifested. Proceedings to procure a patent in many cases have been stopped until the rights of property are determined in the courts. I consider the law an excellent one, and that it will prove of great advantage to the mining population by definitely settling disputes. Oftentimes a doubtful claim is held which will never be brought forward unless the mine proves of value, but in many instances after this fact has been established by honest toil, all has been lost by dishonesty and expensive litigation.

The plan of disposing of the mines, being a new one under our government, has necessarily led to some delay and inconvenience in establishing a system that will carefully guard the rights of all.

In protecting the rights of legitimate owners, and preventing frauds from being perpetrated, much depends upon the mineral deputies. They are, generally, familiar with each location. I have, in accordance with your instructions, required them to report all irregularities or attempts at fraud. I believe they have, in every instance, discharged their respective duties faithfully.

Respectfully, your obedient servant,

A. P. K. SAFFORD,
Surveyor General for Nevada.

Hon. JOS. S. WILSON,
Commissioner General Land Office, Washington, 'D. C.

A.—Statement of contracts entered into by the United States Surveyor General for Nevada, with the number of miles surveyed during the fiscal year 1867-'68.

Contract.		Name of deputy.	Work embraced in this contract and returned to this office.	Amount of contract.	Miles surveyed.			Amount returned.	Date of transmittal.	Remarks.
No.	Date.				Standard.	Township.	Section.			
1	1867. June 12	Wm. Epler.....	Humboldt river, Greenwich meridian, between ranges 35 and 36 east, from township 21 north to township 39 west.	\$2,430	108			\$1,620 00	1867. Aug. 16	Hostility of Indians prevented the completion of this contract in full. Embracing the Comstock lode.
2	June 25	R. R. W. Norris....	Townships 16, 17 and 18 north, range 21 east (sub-division.)	1,736		24.012	152.248	1,810 62	Sept. 2 & Dec. 23.	
3	July 2	C. C. Tracy.....	Reese river, Greenwich meridian, between ranges 42 and 43 east, from township 6 north to township 21 north.	3,996	90				Nov. 16	
			First standard parallel north, embracing ranges 41, 42, 43, 44, and 45 east.		30					
			Second standard parallel north, embracing ranges 41, 42, 43, 44, and 45 east.		30					
			Third standard parallel north, embracing ranges 41, 42, 43, 44, and 45 east.		30					
			Exteriors of townships 16, 17, 18, 19, and 20 north, ranges 42 and 43 east.			80.455				
			Subdivision section 36, township 19 north, range 43 east, secs. 35 and 36; township 17 north, range 47 east.				5	3,715 46		
4	July 20	Chase & Lash.....	First standard parallel north, embracing ranges 26, 27, 28, 29, 30, 31, 32, and 33 east.	2,016	43.820				Sept. 26	
			Second standard parallel north, embracing ranges 25, 26, 27, 28, and part of 29 east.		25					
			Third standard parallel north, embracing ranges 23, 24, 25, and 26 east.		24					
			Substitute guide meridian from township 6 north to township 10 north, between ranges 27 and 28 east.			30				
			Substitute guide meridian from township 6 north to State line, between ranges 28 and 29 east.			12.350		1,900 50		
5	July 20	Wm. Epler.....	Seventh standard parallel north, embracing ranges 35, 36, 37, 38, and 39 east.	4,698	30				Dec. 14	
			Eighth standard parallel north, embracing ranges 38, 39, and 40 east.		13					
			Exteriors of townships 33, 34, and 35 north, range 35 east; townships 33, 34, and 35 north, range 36 east; townships 33, 34, 35, and 36 north, range 37 east; townships 35, 36, 37, 38, 39, and 40 north, range 38 east; townships 35, 36, 37, 38, 39, 40, 41, 42, and 43 north, range 39 east, and townships 40, 41, and 42 north, range 40 east.			340.073		4,725 87		
6	July 30	A. J. Hatch.....	Carson river, Greenwich meridian, from township 21 north to township 23 north, inclusive, between ranges 20 and 21 east.	2,088	18				Oct. 8	

7	Sept. 28	A. J. Hatch.....	Exteriors townships 21, 22, 23, and 24 north, range 18 east; townships 21, 22, 23, and 24 north, range 19 east; townships 21, 22, and 23 north, range 20 east.	3,500	138.148	316.158	1,927 80	1868. Jan. 15	
8	Oct. 9	Chase & Lash	Subdivisions of townships 20, 21, 23, and 24 north, range 18 east; townships 18, 21 and 24 north, range 19 east; township 23 and 24 north, range 20 east.	4,536	356.698		4,280 37	June 27	
9	Nov. 2	C. C. Tracy.....	Exteriors of townships 9 and 10 north, range 23 east; townships 9, 10, 11, 12, 13, 14, 15 north, range 24 east; townships 9, 10, 11, 12, 13, 14, and 15 north, range 25 east; townships 9, 10, 11, 12, 13, 14, and 15 north, range 26 east; townships 5, 6, 7, 8, 9, and 10 north, range 27 east, and townships 4 and 5 north, range 28 east.	4,200	3			Feb. 24	
10	Nov. 23	E. B. Mcnroe	Exteriors of townships 16, 17, and 18 north, range 41 east, (fractional.)			348.472	-3,520 72		
11	Dec. 27	O. A. Palmer	Subdivisions of townships 16, 17, and 18 north, range 41 east; townships 16, 17, 18, and 19 north, range 42 east, townships 17, 18, 19, and 20 north, range 43 east.	5,832	265.331		3,183 97	April 6 and June 1	Field notes in full not yet returned.
12	Dec. 21	A. J. Hatch.....	Exteriors of townships 16 and 17 north, range 22 east; townships 16 and 17 north, range 23; townships 16, 17, 18, and 19 north, range 24 east; townships 16, 17, 18, 19, and 20 north, range 25 east; township 16, 17, 18, 19, and 20 north, range 26 east; townships 16, 17, 18, 19, and 20 north, range 27 east; township 17 north, range 28 east.	3,200		240.366	2,403 66	May 19	
13	March 27	Chas. C. Tracy.....	Subdivisions of townships 40, 41, 42, and 43 north, range 39 east, and townships 40, 41, 42, and 43 north, range 40 east.	6,026	30			April 17	Field notes in full not yet returned.
14	May 13	A. J. Hatch.....	Fifth standard parallel north, embracing ranges 31, 32, 33, 34, and 35 east.		46.894				
15	May 26	O. A. Palmer	Exteriors of townships 26 and 27 north, range 31 and 32 east.			94.886	1,961 59		
			Subdivisions of township 26 north, range 31 east; township 27 north, ranges 31 and 32 east.	7,200					Field notes not yet returned.
			Ruby valley, Greenwich meridian, from fourth standard parallel north to Idaho line.						
			Fourth standard parallel north from range 49 east to Utah line.						
			Fifth, sixth, seventh, eighth, and ninth standard parallels north, adjacent to Ruby valley, Greenwich meridian.						
			Subdivisions of townships 26 north, range 31 east; township 27 north, ranges 31 and 32 east.	4,000					Field notes not yet returned.
			Subdivisions of townships 35 and 36 north, ranges 37, 38, and 39 east; townships 37 and 38 north, ranges 38 and 39 east; township 39 north, range 39 east.	1,620					Field notes not yet returned.
			Humboldt river, Greenwich meridian, between ranges 35 and 36 east; from township 39 north to the Idaho line.						
			Eighth and ninth standard parallels north, adjacent to the Humboldt river, Greenwich meridian.						
			Total.....	471.82	1,296.961	1,157.13	34,212 14		

B.—List of mineral claims surveyed in the State of Nevada during the fiscal year 1867 and 1868.

No. of survey.	Name of company.	Location of claim.				Area, acres.	Date of approval.	Date of transmittal.	Character of lode.
		No. of min'l dist.	Mining district.	County.	Township.				
37	El Dorado South	3	Philadelphia	Nye	Unsurveyed	4.59	Mar. 30, 1868	Mar. 31, 1868	Gold and silver.
37	Twin River	3	Twin River	do	do	4.60	May 4, 1868	May 4, 1868	
37	West	3	Union	do	do	2.29	June 24, 1868	June 26, 1868	Do.
37	Northern Star	3	do	do	do	1.84	do	do	Do.
37	South American	4	Reese River	Lander	do	4.60	Dec. 26, 1867	Jan. 21, 1868	Do.
38	North Star	4	do	do	do	4.60	Jan. 14, 1868	do	Do.
39	Diana	4	do	do	do	11.16	Feb. 14, 1868	Feb. 29, 1868	Do.
40	Timoke	4	do	do	do	.46	Mar. 14, 1868	Mar. 14, 1868	Do.
41	Kentucky	4	do	do	do	7.35	Mar. 9, 1868	Mar. 9, 1868	Do.
42	Manhattan	4	do	do	do	3.07	Mar. 10, 1868	Mar. 10, 1868	Do.
43	Old Colony	4	do	do	do	3.67	Mar. 27, 1868	Mar. 31, 1868	Do.
44	Big Smoky	4	Smoky Valley	do	do	6.43	Apr. 13, 1868	Apr. 13, 1868	Do.
45	Mettacom	4	Amador	do	do	3.67	Apr. 20, 1868	Apr. 20, 1868	Do.
46	Silver Queen	4	Reese River	do	do	4.59	do	do	Do.
47	Manhattan	4	do	do	do	1.66	May 11, 1868	May 12, 1868	Do.
48	Confidence No. 2	4	do	do	do	13.77	June 1, 1868	June 1, 1868	Do.
37	Atlantic and Pacific	5	Humboldt	Humboldt	do	6.89	Mar. 13, 1868	Mar. 15, 1868	Do.
38	Montgomery	5	do	do	do	11.48	do	do	Do.
39	Atlantic and Pacific (Midas)	5	do	do	do	4.82	do	do	Do.
37	Dean	7	Silver Star	Storey	T. 16 N., R. 21 E	10.98	Dec. 26, 1867	Jan. 21, 1868	Do.
38	Golden Swan	7	Gold Hill	do	do	25.00	Feb. 15, 1868	Mar. 5, 1868	Do.
39	Knickerbocker	7	do	do	do	11.02	Mar. 5, 1868	Mar. 14, 1868	Do.
40	Cosmopolitan	7	Devil's Gate	do	do	13.77	Mar. 20, 1868	May 16, 1868	Do.
37	Utah	7	Virginia	do	T. 17 N., R. 21 E	27.27	Jan. 23, 1868	Jan. 28, 1868	Do.
38	Utah	7	Flowery	do	do	14.45	Feb. 22, 1868	Mar. 5, 1868	Do.
39	Brophey	7	do	do	do	3.44	do	do	Do.
40	Bailey	7	Silver Star	do	do	20.20	Mar. 18, 1868	Mar. 20, 1868	Do.
41	Lady Bryan	7	Flowery	do	do	45.29	Mar. 12, 1868	do	Do.
42	Hale & Norcross	7	Virginia	do	do	6.00	Mar. 30, 1868	Mar. 31, 1868	Do.
43	Homestead	7	Gold Hill	do	do	1.57	Apr. 20, 1868	Apr. 20, 1868	Do.
44	Succor	7	Flowery	do	do	4.59	June 30, 1868	Not forw'ded	Do.
45	Opal	7	do	do	do	7.57	June 29, 1868	June 30, 1868	Do.
46	Harrison	7	do	do	do	5.39	June 30, 1868	Not forw'ded	Do.
47	Rogers	7	do	do	do	69.78	do	do	Do.
37	Union	7	Palmyra	Lyon	Unsurveyed	4.98	May 11, 1868	May 16, 1868	Do.
38	Ohio	7	do	do	do	10.81	May 18, 1868	May 26, 1868	Do.
39	Buckeye	7	do	do	do	16.36	do	do	Do.
40	Rapidan	7	do	do	do	5.51	June 25, 1868	Not forw'ded	Do.
37	Radical	8	Emeralda	Emeralda	do	9.18	Aug. 1, 1867	Aug. 16, 1867	Do.
38	Spotted Tiger	8	do	do	do	2.42	do	do	Do.
39	Bald Eagle	8	do	do	do	4.59	do	do	Do.
Total						421.71			

C.—List of lands surveyed in the State of Nevada during the fiscal year 1867 and 1868.

Township.	Range.	Public land.	Unsurveyed.		Total.	Remarks.
			Barren.	Swamp.		
		<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	
20 north....	18 east....	23,636.66			23,636.66	} Embracing the Comstock and Washoe mines.
21 north....	18 east....	23,094.07			23,094.07	
23 north....	18 east....	9,269.98	13,760.00		23,029.98	
24 north....	18 east....	15,433.73	7,680.00		23,113.73	
18 north....	19 east....	23,030.47			23,030.47	
21 north....	19 east....	23,128.81			23,128.81	
24 north....	19 east....	13,650.54	9,440.00		23,090.54	
23 north....	20 east....	10,573.82	12,480.00		23,053.82	
24 north....	20 east....	6,715.26	16,320.00		23,035.26	
16 north....	21 east....	23,048.60			23,048.60	
17 north....	21 east....	23,061.29			23,061.29	
18 north....	21 east....	23,056.72			23,056.72	
26 north....	31 east....	14,238.53	2,400.00	6,398.80	23,037.33	
27 north....	31 east....	16,019.56	2,932.00	2,520.00	21,471.56	
27 north....	32 east....	1,781.00	19,952.00		21,733.00	
40 north....	39 east....	21,435.52		1,440.00	22,875.52	
41 north....	39 east....	15,827.06	7,159.03		22,986.09	
42 north....	39 east....	11,513.74	11,526.26		23,040.00	
43 north....	39 east....	2,080.00	20,960.00		23,040.00	
40 north....	40 east....	9,269.72	13,433.84	188.16	22,891.72	
41 north....	40 east....	13,516.16	8,878.60	640.00	23,034.76	
42 north....	40 east....	11,341.63	11,712.80		23,054.43	
43 north....	40 east....	1,615.94	21,424.06		23,040.00	
16 north....	41 east....	5,763.20	17,280.00		23,043.20	
17 north....	41 east....	3,841.60	19,200.00		23,041.60	
18 north....	41 east....	3,841.82	19,200.00		23,041.82	
16 north....	42 east....	15,250.80	7,668.80		22,919.60	
17 north....	42 east....	21,984.38	960.00		22,944.38	
18 north....	42 east....	23,074.18			23,074.18	
19 north....	42 east....	5,120.00	17,965.12		23,085.12	
17 north....	43 east....	2,892.80	20,160.00		23,052.80	
18 north....	43 east....	16,007.67	7,040.00		23,047.67	
19 north....	43 east....	10,249.70	12,808.56		23,058.26	
20 north....	43 east....	14,742.52	8,362.72		23,105.24	
Total		459,107.48	310,703.79	11,186.96	780,998.17	} Embracing Paradise valley.
						} Embracing the Reese River valley.

D.—Statement of plats made in the office of the United States surveyor general of Nevada, during the fiscal year 1867 and 1868.

	Original.	Department.	Registrar.	Sketches for deputies.	Total.
Plat of meridians.....	3	3			6
Plat of township.....	8	8			16
Plat of township subdivisions.....	34	34	26		94
Plat of township subdivisions made from tracings from the California office.....	11		10		21
Plat of mineral claims.....	41	41	41		123
Sketches for deputies.....				12	12
Total					272

E.—Estimate for the surveying service in the district of Nevada for the fiscal year ending June 30, 1870.

For surveying subdivision lines in the Humboldt River valley.....	\$18,000
For surveying subdivision lines in Ruby valley and vicinity.....	15,000
For surveying subdivision lines in the Carson River valley and vicinity.....	12,000
For surveying subdivision lines in the Walker River valley and vicinity.....	5,000

For surveying standard and exterior township lines in the valleys adjacent to the Humboldt river embraced in the Central Pacific railroad grant.....	\$9,300
Rent of office, stationery, and incidental expenses, including salary of messenger..	4,500
For compensation of surveyor general.....	3,000
For compensation of clerks.....	9,400
	<hr/>
	76,200
	<hr/> <hr/>

F.—*Statement of account of appropriation for compensation of the United States surveyor general and the employes in his office during the fiscal year 1867 and 1868.*

DR.

July 1, 1867. Amount paid quarter ending September 30, 1867.....	\$1,575 00
Amount paid quarter ending December 31, 1867.....	1,725 82
Amount paid quarter ending March 31, 1868.....	1,950 00
Amount paid quarter ending June 30, 1868.....	1,826 37
	<hr/>
	7,077 19

CR.

July 1, 1867. By balance.....	12,870 01
July 1, 1867. By balance.....	5,792 82
	<hr/> <hr/>

G.—*Statement of account of appropriation for survey of public lands in Nevada during the fiscal year 1867 and 1868.*

DR.

July 1, 1867. Amount paid quarter ending September 30, 1867.....	\$4,586 77
Amount paid quarter ending December 31, 1867.....	11,113 48
Amount paid quarter ending March 31, 1868.....	6,682 30
Amount paid quarter ending June 30, 1868.....	11,829 59
Amount paid for mineral surveys.....	2,578 00
	<hr/>
	36,790 14

CR.

July 1, 1867. By balance.....	\$57,051 55
By amount of special deposit with the United States assistant treasurer at San Francisco for mineral surveys.....	2,578 00
	<hr/>
	59,629 55
July 1, 1868. By balance.....	22,839 41
	<hr/> <hr/>

H.—*Statement of account of appropriation for rent of office, fuel, books, stationery and other incidental expenses, including pay of messenger, during the fiscal year 1867 and 1868.*

DR.

July 1, 1867. Amount paid quarter ending September 30, 1867.....	\$1,300 83
Amount paid quarter ending December 31, 1867.....	700 40
Amount paid quarter ending March 31, 1868.....	720 00
Amount paid quarter ending June 30, 1868.....	751 35
	<hr/>
	3,472 58

CR.

July 1, 1867. By balance.....	3,577 72
July 1, 1868. By balance.....	105 14
	<hr/> <hr/>

No. 17 H.

SURVEYOR GENERAL'S OFFICE,
Boise City, August 15, 1868.

SIR: In accordance with your instructions I have the honor to submit my annual report of this surveying district for the fiscal year ending June 30, 1868, together with tabular statement of office and field-work and expenditures for the same, and estimates for the year ending June 30, 1870.

A.—Statement showing the condition of surveying contracts not closed at the time of my last report.

B.—Statement showing the condition of such contracts entered into since the 30th of June, 1867.

C.—Statement of descriptive notes sent to the local land office.

D.—Statement of expenditures of appropriation for compensation of surveyor general and clerks in his office since my last report.

E.—Statement of the office expenditures for the last fiscal year.

F.—Statement of original maps and diagrams approved since the last report.

G.—Account of appropriations expended since the close of the fiscal year ending June 30, 1867.

H.—Estimate of expenses incidental to the survey of the public lands in Idaho for the fiscal year ending June 30, 1870.

I regret that the appropriations for surveys in this district have been so very small, less than one half the amount they should have been; and although we did not extend our standard lines as far as the best interest of the service required, we were left with a small sum for subdivisions, and settlers in all portions of the Territory are clamorous to have some of the more important valleys and thickly settled portions of the country surveyed, and if Oregon can have \$40,000 appropriated for surveys in order that a road company can select the best lands where there are no settlers, Idaho should have the full estimate made by this office, and it even will not meet the wants of the settlers who are making homes in good faith, and not to acquire lands for speculation which they are wisely prohibited by Congress from doing.

I think it essential to the public interest to have many of the standard lines run at an early day, not only to reach important valleys in order to make the subdivision surveys and to know more of the mineral localities and prepare the survey of the mineral lands under the late instructions from the Commissioner of the General Land Office, but to enable the department to judge somewhat of the future of this Territory, for information thus obtained is reliable; and if this course was pursued in these mountain territories, and the correct information in the hands of the Commissioner, he could bring before Congress some plan for a system of irrigation and reclamation that would make productive millions of acres now looked upon by the unthinking voyager as utterly worthless, and certainly few things should stand higher in a national aim or more worthy of congressional consideration than a well-devised plan to make available for farming, mining, and manufacturing all the territory possible, and the time is not far distant after the completion of the great railway when all the land that can be made available will be required to meet the wants of emigration.

There are large tracts of country in this Territory which can be irrigated by canals, ditches, and artesian wells, and it is a question whether Congress should attempt to reclaim these lands or so modify the land

law of the United States as to allow companies to purchase large tracts of land and allow them to locate as they may think best. I am inclined to take this view of matters, and think companies would be formed, particularly by our foreign immigrants, for this purpose.

A general system of irrigation is recommended to bring the large area of land susceptible of cultivation into settlement.

At present the settlers are located along the rivers and streams where irrigation is practicable.

The rivers of Idaho have an average fall of about ten feet to the mile, rising in the Rocky and Bitter Root mountains and flowing westward through the Territory and emptying into the Snake river.

The Snake river rises in the Rocky mountains in the southeast part of the Territory, and runs a west course through the southern part of the Territory, thence north to the Columbia river. Meandering a distance of about 1,200 miles, its numerous rapids and falls could be effectually turned for irrigation.

Should the Pacific railroad run north of Salt lake, at its nearest approach to this Territory there would be a depot for the passengers and freight, as most of the purchases for Idaho will be made in the eastern States, and transported direct by railroad, and the route through which freight and passengers will be conducted through the Territory would be thickly settled could the country be brought into cultivation.

The northern portion of Idaho Territory, from the north fork of the Clearwater river to the 49th parallel of latitude, consists principally of lakes and mountains. The climate is cold in winter and the country is thinly inhabited by whites.

Two hundred and fifty thousand acres of this part of the country has been reserved for the Cœur d'Alenes and other Indians. The Nez Percé reservation contains about 120,000 acres, and the boundaries should be surveyed at an early day, as it is impossible to close the survey of townships upon altogether imaginary lines, and the government is liable to have trouble with the Indians growing out of settlers trespassing upon lands claimed by the Indians as a part of their reservation and guaranteed to them by treaty stipulation; the same may be said of the Fort Hall or Shoshone reservation. Both these surveys should be made at once and under the direction of this office.

The country along the Clearwater and Salmon rivers and their branches is still extensively worked for its placer gold, which continues to pay the miner regular and profitable wages. Canals and water ditches have been opened throughout the country, and as the facilities of water have increased, the area of the placer mining is extended.

The central portion, from the Boise to the Clearwater rivers, consists of table-lands rich in grasses, heavily timbered mountains and fertile valleys. Big Camas prairie contains a large number of settlers who have resided here since the first discovery of gold in the Territory. The Payette and Weiser valleys contain about one hundred and fifty families. The Clearwater and Salmon River mountains are in this portion. The banks of the rivers and streams at the foot of these mountains have been rich in placer gold and the mines are still profitably worked over an extended area of country.

The southern portion, from the Boise river to the 42d parallel of latitude, being the boundary between Idaho and Utah and Nevada, consists of fertile valleys, sage-brush plains and table-lands, and is generally destitute of timber, except scattering cottonwood along the rivers, and pine, fir, and juniper on the mountains. Three fourths of this portion, which is equal in extent to one half the area of the whole Territory, is

now worthless, but can be brought into cultivation by a system of irrigation and is capable of producing abundant crops, such as can be raised on good second-rate soil.

The Silver Mountain district of Owyhee is in the southwest part of the Territory. On the branches of the Owyhee river are several fertile valleys containing a number of settlers, and an earnest appeal has been made to extend the third and fourth standard parallel south, preparatory to running the subdivision surveys of some of this valley.

The mining region of the South Boise and Yuba district, situated between the forks of the Middle and South Boise rivers, has a population of eight hundred persons, mostly engaged in mining. These mines are principally quartz ledges and show considerable richness; but owing to the difficulty and expense of transporting the requisite heavy machinery to this mountainous part of the country, but a small amount of work has been done on these ledges for the past year. Some of these mines are paying dividends and are exceedingly rich, and it will prove one of the richest mining districts in the Territory.

The mining region known as the Boise Basin, situated between the north fork of the Boise and the Payette rivers and embracing the towns of Idaho City, Placerville, Centerville, and Pioneer City, are being profitably worked and show increased richness as developed; some of the claims are paying regular dividends. Improved machinery has been put up on some of the ledges, and more has been ordered from the foundries.

This region was once rich in placer mines, but as these are being gradually worked out and quartz ledges of paying richness discovered, it has become the home of a permanent population.

The Lemhi district, at the head-waters of the Salmon river, has a population of one thousand persons, mostly engaged in placer mining. Some few settlers have located in the valleys. The mines have been profitably worked for the last eighteen months. A few ledges have been discovered.

The mines of the Owyhee district are more favorably situated for economical working than the other districts of this Territory. Much valuable machinery has been put up on these ledges. In consequence of strife, litigation, and want of capital, the development of the ledges has not progressed in proportion to their richness; but as these impediments are disappearing it is expected that bullion to the amount of five hundred thousand dollars per month will be taken from these mines the remaining months of this year. Over two millions was assayed in Silver City the past fiscal year. This district has a population of sixteen hundred people, and there is no doubt entertained but that when our Indian troubles are brought to a close, when prospecting can be made without danger, new and valuable discoveries will be made.

I would recommend the running of the boundary line between this Territory, Utah, and Nevada, at an early day. One million eight hundred thousand acres of the county of Oneida have been set apart as a reservation for the Indians.

In the southern part of this country, particularly along the Bear River valley, is an extent of fertile country, and it is estimated that over 3,000 persons are settled here who refuse to pay taxes to this Territory, but pay both taxes and tithes to Utah, although they are without a reasonable doubt in Idaho; yet until this boundary is defined the Territory cannot compel them to contribute their proportion for sustaining the expenses of the territorial government. The consequence is, this country is, to all intents and purposes, disorganized. No courts are held here, and the

amount collected for revenue will not pay the cost of collecting. The lines of the Fort Hall Indian reservation should be run and the entire country surveyed between the reservation and Utah, subdividing that part of the country already settled. It is expected the Pacific railroad will be located but a few miles south of this section, when an increased settlement will be made. It is already, perhaps, the most populous part of the Territory.

The Fort Hall reservation is located along the principal thoroughfare of the country. Its neighborhood to Salt lake, the railroad, and the road to Montana will bring the Indians in constant intercourse with the whites; hence another reason why the boundary should be surveyed and defined.

No available timber is found except on the mountains and high hills, and when the mines are generally worked by steam power some means must be resorted to to supply the country with fuel, although some indications of coal have been discovered in some parts of the Territory, yet nothing to warrant the supposition that a mine can be worked to afford an adequate supply. A railroad is necessary to bring forth the vast wealth of the mines.

No obstacle in altitude exists in building a railroad to open communication through Idaho with Oregon and Washington. The government aid to establish this road would be remunerated by a cheaper production of the precious metals, and an increased supply besides permanently populating the Territory.

The altitude of Idaho is from 1,000 to 6,000 feet above the sea level. The springs are early although late frosts occur. The mountains retain their snow till the beginning of summer, and the valleys being heated, the sweeping of the winds from the mountains to equalize the temperature retards early vegetation, but all cereals thrive well and more than supply the demand, and have encouraged the erection of distilleries to consume the surplus grain.

But little rain falls after the spring months, excepting occasional showers which generally follow the course of the rivers or the high land, so that the valleys are but little benefited.

The climate is generally healthy, the winters short, commencing in December and ending with February; and the falls are pleasant. A communication with the outside world is all that is desirable to render the people, who have heretofore been isolated, contented, and satisfied with the country where they have made their homes.

The water power of the country is unlimited, but, except for manufacturing, &c., cannot be made available after the supply of timber in the mountains is exhausted.

The mines that can be worked all winter cannot afford to lie idle during the cold weather, in consequence of the freezing of the streams suspending the crushing of ore, and prefer the more constant though expensive mode of steam power.

Employment for a large number of persons will be given by the mines when the expense of labor is less than at present.

It is probable that placer mining will be continued for years when the cost of living is reduced to compare with the price of labor elsewhere.

Farm labor is in demand. The population has gradually increased since my last report. It is probably about 25,000, who may be considered as permanent. There is no floating population now as at former times, when gold was first discovered.

The population of Idaho city is estimated at 3,000. Boise city 2,000. Silver city 1,600. In Boise city several expensive brick buildings have

been erected during the past year; also distilleries, breweries, and flouring mills, besides many finished private residences. It is to be regretted that the owners of valuable improvements cannot obtain a title to their land in consequence of the judicial system of the Territory not meeting the requirements of the general government. At the next meeting of the legislature no doubt county judges will be appointed for the purpose of entering town sites.

I wish to call your attention to the small appropriation for surveys and expenses of this office, and that of the local land office at this place, and would recommend that the business of the land office be transferred to the surveyor general's office, where it can be done with as much despatch and no cost except for the necessary stationery; this should be done, and if the Secretary of the Interior has not the power to make the transfer Congress should pass a resolution giving it to him.

Very respectfully, your obedient servant,

LAFAYETTE CARLIN.

Hon. JOS. S. WILSON,
Commissioner General Land Office.

A.—Statement showing the condition of surveying contracts not closed June 30, 1867.

Contracts.		Name of deputy.	Description of lines.	Estimated distance.	Amount surveyed.			Price per mile.			Remarks.
No.	Date.				Guide meridian, or standard parallels.	Exteriors.	Subdivisions.	Guide meridian, or standard parallels.	Exteriors.	Subdivisions.		Gross amount.
3	May 27, 1868	Allen M. Thompson.	Boise meridian north 180 miles, and 2 standard lines 140 miles.	Miles. 320	Miles. chs. lks. 220 74 40	Miles. chs. lks. -----	Miles. chs. lks. -----	\$15 00	-----	\$3,565 95	Contract closed; account transmitted and reported for payment. Contract closed; account transmitted and reported for payment.
4	June 26, 1868	Peter W. Bell.....	Exterior and subdivision lines of townships 1, 2, 3, 4, and 5, north of ranges 1, 2, 3, and 4, east of the Boise meridian.	-----	-----	203 63 10	225 06 11	-----	\$12 00	\$10 00		4,696 22

B—Statement showing the condition of surveying contracts entered into since the 30th June, 1867.

No. of contract.	Name of deputy.	Date of contract.	Character, amount, and locality of work.	Remarks.
5	Allen M. Thompson..	Aug. 9, 1867	Exterior and subdivision lines of townships 1, 2, 3, 4, and 5 north, ranges 1, 2, 3, and 4 west of the Boise meridian.	Surveys completed; notes returned and approved and plats and transcripts transmitted.
6	Peter W. Bell.....	Mar. 24, 1868	Exterior lines of township 1 north, range 5 east, and subdivision lines of township 1 north, range 5 east, township 3 north, range 3 east, township 5 north, range 1 and 2 east of the Boise meridian.	Surveys completed; notes returned and approved and plats and transcripts transmitted.
7	Allen M. Thompson..	Mar. 31, 1868	Exterior lines of townships 6, 7, 8, and 9 north, ranges 1, 2, 3, and 4 west, and of townships 6, 7, and 8 north, of range 5 west of the Boise meridian and the second standard parallel north and west.	Surveys completed; notes returned and approved and plats and transcripts transmitted.
8	Peter W. Bell.....	May 2, 1868	Subdivision lines of township 1 north, range 4 east of the Boise meridian.	Surveys completed; notes returned and approved and plats and transcripts transmitted.

C.—Statement of descriptive notes sent to the local land office.

Township.	Range.	Date when transmitted.	Township.	Range.	Date when transmitted.
3 north	2 east.....	May 2, 1868	4 north	3 west.....	May 2, 1868
4 north	1 east.....	May 2, 1868	4 north	4 west.....	May 2, 1868
4 north	2 east.....	May 2, 1868	5 north	1 west.....	May 2, 1868
4 north	1 west.....	May 2, 1868	5 north	5 west.....	May 2, 1868
4 north	2 west.....	May 2, 1868			

D.—Statement of expenditures of appropriation for compensation of surveyor general and clerks in his office for the fiscal year ending June 30, 1868.

DR.		CR.	
1867-'68.		1867.	
To amount paid surveyor general and clerks 3d quarter, 1867	\$1,375 25	July 1...	By balance.....
To amount paid surveyor general and clerks 4th quarter, 1867	1,575 00		By appropriation approved March 2, 1867, as advised by letter from the department of March 25, 1867
To amount paid surveyor general and clerks 1st quarter, 1868	1,575 00		
To amount paid surveyor general and clerks 2d quarter, 1868	1,575 00		
To balance.....	1,988 88		
	<u>8,089 13</u>		
			<u>\$3,089 13</u>
			<u>5,000 00</u>
			<u>8,089 13</u>
			<u>1,988 88</u>
			Balance

E.—Statement of appropriation for rent of office, stationery, and other incidental expenses, for the fiscal year ending June 30, 1868.

DR.		CR.	
1867.		1867.	
To amount stationery, &c., sent from General Land Office, 1866	\$209 43	July 1...	By balance.....
To amount expended 3d quarter, 1867	457 66		By amount appropriation approved March 2, 1868, as advised by letter from the department, March 25, 1868
To amount expended 4th quarter, 1867	282 99		
To amount expended 1st quarter, 1868	362 39		
To amount expended 2d quarter, 1868	345 41		
To balance.....	1 811 75		
	<u>3,469 63</u>		
			<u>\$1,469 63</u>
			<u>2,000 00</u>
			<u>3,469 63</u>
			<u>1,811 75</u>
			By balance

F.—Statement of original maps and copies transmitted to the General Land Office and to the district office since the date of my last annual report.

Descriptive plats.	Original.	General Land Office.	District office.	Total.	When transmitted to the General Land Office.	
					When transmitted to the General Land Office.	When transmitted to the district office.
Base line east and west, Boise meridian south, and first standard parallel south and west	1	1	.....	2	July 8, 1867	.....
Boise meridian north, sixth standard parallel north and east, and seventh standard parallel north and west.....	1	1	.....	2	Aug. 23, 1867	.....
Exterior lines of townships 1, 2, 3, 4, and 5 north, ranges 1 and 2 east; and of townships 1, 2, 3, and 4 north, ranges 3 and 4 east.....	1	1	.....	2	Dec. 7, 1867	.....
Exterior lines of townships 1, 2, 3, 4, and 5 north, ranges 1, 2, 3, and 4 west	1	1	.....	2	Dec. 23, 1867	.....
Exterior lines of township 1 north, range 5 east	1	1	.....	2	May 11, 1868	.....
Exterior lines of townships 6, 7, 8, and 9 north, ranges 1, 2, 3, and 4 west; and of townships 6, 7, and 8 north, range 5 west	1	1	.....	2	June 20, 1868	.....
Second standard parallel north and west	1	1	.....	2	.....	.....
Township 3 north, range 2 east	1	1	1	3	Jan. 30, 1868	Jan. 8, 1868
Township 4 north, range 1 west	1	1	1	3	.....	Jan. 17, 1868
Township 5 north, range 1 west	1	1	1	3	.....	Jan. 30, 1868
Township 4 north, range 1 east	1	1	1	3	Feb. 15, 1868	Feb. 15, 1868
Township 4 north, range 2 east	1	1	1	3	.....	Feb. 5, 1868
Township 4 north, range 2 west	1	1	1	3	Mar. 6, 1868	Mar. 5, 1868
Township 4 north, range 3 west	1	1	1	3	.....	.....
Township 4 north, range 4 west	1	1	1	3	.....	.....
Township 5 north, range 4 west	1	1	1	3	.....	.....
Township 5 north, range 1 east	1	1	1	3	May 11, 1868	April 18, 1868
Township 5 north, range 2 east	1	1	1	3	.....	.....
Township 3 north, range 3 east	1	1	1	3	.....	May 11, 1868
Township 1 north, range 5 east	1	1	1	3	.....	.....
Township 1 north, range 4 east	1	1	1	3	May 25, 1868	May 25, 1868

G.—Account of appropriation for extension of public surveys for the fiscal year ending June 30, 1868.

DR.

CR.

	1867.		
To amount reported for payment on contract No. 3, Allen M. Thompson	\$3,565 95	July 1...	By balance..... \$4,441 89
To amount reported for payment on contract No. 4, Peter W. Bell, (exterior lines)	2,445 46		By appropriation approved March 2, 1868, as advised by letter from the department, March 25, 1867
To amount reported for payment on contract No. 4, Peter W. Bell, (subdivision lines).....	2,250 76		15,000 00
To amount reported for payment on contract No. 5, Allen M. Thompson, (exterior lines) ...	2,588 95		
To amount reported for payment on contract No. 5, Allen M. Thompson, (subdivision lines).....	4,024 93		
To amount reported for payment on contract No. 6, Peter W. Bell	1,338 41		
To amount reported for payment on contract No. 7, Allen M. Thompson.....	2,568 54		
To amount reported for payment on contract No. 8, Peter W. Bell.....	600 97		
Balance	58 01		
	<u>19,441 98</u>		<u>19,441 98</u>
		By balance.....	58 01

H. — *Estimates for surveying and office expenses for the fiscal year ending June 30, 1870.*

OFFICE EXPENSES.

For compensation for surveyor general	\$3,000 00
For compensation for chief clerk	1,800 00
For compensation of draughtsman	1,500 00
For office rent, fuel, books, and stationery	3,000 00
	9,300 00

SURVEYING SERVICE.

For surveying standard lines, 500 miles, at \$15 per mile	\$7,500 00
For surveying exterior boundaries, of 60 townships, 720 miles, at \$12 per mile..	8,640 00
For surveying subdivisions, of 40 townships, 2,400 miles, at \$10 per mile.	24,000 00
	40,140 00

No. 17 I.

UNITED STATES SURVEYOR GENERAL'S OFFICE,
San Francisco, California, September 30, 1868.

SIR: In compliance with instructions from the department I herewith submit my annual report in duplicate in reference to the surveys executed in the State of California and Territory of Arizona, and other operations of this office during the year ending June 30, 1868.

I also forward statements of the business appertaining to this surveying district, to accompany the report, as follows, to wit:

A.—Statement of contracts during the year 1867-'68.

B.—Statement showing the number of miles surveyed in California and Arizona to June 30, 1868.

C.—Statement of account of appropriation for surveys of public lands to June 30, 1868.

D.—Statement of account of special deposits with the United States assistant treasurer, San Francisco, for the survey of public lands in California under the act of Congress of May 30, 1862, to June 30, 1868.

E.—Statement of account of appropriation for compensation of surveyor general and clerks, 1867-'68.

F.—Statement of account of appropriation for rent of office and other incidental expenses, 1867-'68.

G.—Statement of field notes of public surveys sent to Washington during the year ending June 30, 1868.

H.—Statement of descriptive notes, decrees of court, &c., relative to private land claims, to accompany plats for patent, compiled for transmission to the department at Washington, 1867-'68.

I.—Statement of plats made in office, 1867-'68.

K.—List of lands surveyed in California and Arizona, 1867-'68.

L.—Estimate for the surveying service in California and Arizona for the fiscal year ending June 30, 1870.

In addition to the office work as set forth in the foregoing statements, the employes have been engaged in the following duties, viz:

1.—Copying the correspondence of this office.

2.—Making out contracts in triplicate.

3. Making out instructions for surveys of private land claims, in duplicate.

4. Examination of field notes of public surveys returned by deputies.
5. Examination of field notes and tablings of surveys of private land claims returned by deputies.
6. Examination of location of surveys of private land claims.
7. Making sketches to accompany contracts of public surveys and private land claims.
8. Keeping in order the records of plats and field notes of public and private surveys.
9. Keeping in order the Spanish and Mexican archives and records of the late Board of Land Commissioners.
10. Making out quarterly accounts and certificates to vouchers.
11. Making out accounts for public surveys and posting the books of accounts and records appertaining to the business of the office.
12. Exhibiting the archives and land commission papers, records and plats to parties interested, and making the necessary explanations.
13. Making out in triplicate the annual report, with accompanying statements.

The public surveys executed during the past year have been principally north and east of the Mount Diablo meridian and base, and include townships bordering on adjudicated private land claims on the Sacramento and Feather rivers, and also those surrounding the mining towns of Nevada, Grass Valley, Rough and Ready, Park's Bar, Oroville, Cherokee Flat, and others of less note.

The townships northwest of Marysville, lying between the Sacramento and Feather rivers, have also been subdivided; also those surrounding Chico.

In the northeastern part of the State a large portion of the Pitt and Fall River valleys has been subdivided, (a valuable section of country,) through which winds the road to Yreka, by Lassen's Buttes.

These valleys are in the vicinity of the proposed California and Oregon railroad, and open a large field to the immigrant.

The estimate for public work in California is based upon the immediate wants of the Southern Pacific and other railroads; the first section of twenty-five miles of the southern road will be completed and the second commenced during the present year. But few townships are subdivided on these two sections. I suggest that \$100,000 could be very properly used for this class of surveys.

The 8th section of the act of July 23d, 1866, requires the surveyor general to segregate the public land from all Mexican claims, whenever the grantees of the latter shall have neglected for ten months after the final confirmation thereof to comply with the act of July 1, 1864, requiring the surveys to be made at their expense. There are many ranchos of this class in the southern part of California, the owners of which, under rulings of the State supreme court, hold possession of large tracts, whereas, if they were confined to their grants and decrees, the surplus land could be brought immediately into market.

I am unable, with but few exceptions, to execute the duty prescribed by this law. The surveys, or rather segregations, are to be based upon the final decrees of the United States courts; these decrees are principally in the Supreme Court at Washington, awaiting the payment of fees before the mandate can be filed in the United States district courts, fees paid therein, and certified copies handed to this office.

The grantee is the only person seemingly interested in making these payments, and it rests now, as before, with him as to when the claims shall be surveyed. A small appropriation for this purpose would remedy the evil.

The Southern Pacific railroad has as yet received no attention in the matter of surveys; it is essential that present assistance should be given to aid in building the first four sections and have them settled as the road progresses.

As soon as the Coast range of mountains is crossed the whole of the great Tulare valley will be opened to the immigrant and will become one teeming field of grain. A judicious appropriation, therefore, at the present time will be of more value to the agricultural immigrant than a larger sum at any other time.

The subdivision of this section of country closes up the gap between the great commercial centres and the immense valleys of southern California, heretofore deemed worthless, but which, with the transportation furnished by this road, will, at no distant day, surprise the civilized world by the variety and quantity of its productions.

The grain crops of our State have of late called the attention of the agricultural immigrant from all sections of the eastern States and Europe to California. Each steamer adds hundreds of this valuable class to our population.

The crops of the present year promise well. Our harvest year dates from July 1; the crops of this season are, however, from two to four weeks later than last.

The following is an approximate report for the first quarter of the harvest year, in round numbers, as compared with that of last year:

	Receipts 1868.	Receipts 1867.	Exports 1868.	Exports 867. 1
Flour, barrels.....	74,500	69,000	332,000	120,000
Wheat, 100-lb. sacks.....	2,379,000	2,672,000	2,569,000	1,500,000
Barley, 100-lb. sacks.....	242,000	263,000	37,000	2,300

The estimate for clerk-hire is based upon the constantly growing duties of the office. The records, books, &c., of the archives, public surveys and private land claims, each require a competent clerk to keep them in creditable order and up to the current work; one general clerk for miscellaneous duties, and four in the draughting department, are, in my opinion, absolutely necessary.

The public surveys have been commenced in Arizona, now a part of this district. This of course adds to the office work and should be provided for. The employes have done all in their power to keep the office work up to any appropriation allowed, and shall continue to do so; but I think you will agree with me in the proposition, that work cannot be performed with economy to the government unless sufficient force is allowed to do the same correctly, systematically, and expeditiously. According to present advices, the clerical force of the office must be discharged in December, thus virtually closing the office. I would earnestly recommend that a deficiency appropriation be asked for from Congress for the remainder of the year.

The prospects of the agricultural, mining, and manufacturing interests of California are very flattering. The addition to our population (being excess of arrivals over departures) for the past nine months has been estimated at not less than 30,000.

Since the 1st January, 1868, we have exported, in 135 vessels, some 178,000 tons of wheat and flour, valued at \$8,000,000. During the same period 9,500,000 pounds of wool, valued at \$1,724,000, has been shipped

to other ports. For the same period the export of treasure has been, in round numbers, \$29,000,000, and that of merchandise \$16,000,000. Of the latter, eighty per cent. was of California productions.

The semi-annual reports of the different savings banks of San Francisco show that at close thereof in July, 26,000 depositors held open accounts, averaging \$756. The total to the credit of depositors at that date was \$19,687,000, and the dividends paid for the first six months in 1868 were \$842,000.

The mercantile steam marine consists of some forty vessels, representing 60,000 tons of tonnage, affording direct communication with the eastern States, Europe, Australia, Central America, South America, China, Japan, Mexico, Sandwich Islands, Oregon, British Possessions, and Alaska.

With the completion of the Continental railroad, the Pacific States will receive a fresh impetus in their mining, agricultural, and manufacturing interests, and offer homes and employment to a population as vast as their eastern sisters.

Very respectfully, your obedient servant,

SHERMAN DAY,

United States Surveyor General.

Hon. JOS. S. WILSON,

Commissioner General Land Office, Washington, D. C.

A.—Statement of contracts entered into by the United States surveyor general for California and Arizona with deputy surveyors during the fiscal year 1867-'68.

Name of deputy.	Date of contract.	Location of work.	Amount of contract.	Remarks.
S. W. Foreman.....	June 14, 1867	Mount Diablo meridian, south and west.....	\$100 00	Closed.
G. H. Thompson.....	June 28, 1867	Mount Diablo meridian, north and west.....	55 80	Do.
S. W. Foreman.....	July 6, 1867	Mount Diablo meridian, south and west.....	425 00	Do.
H. C. Ward.....	July 1, 1867	Mount Diablo meridian, north and east.....	250 00	Do.
H. B. Martin.....	July 27, 1867	Mount Diablo meridian, second stand., north.....	650 00	Cancelled.
H. Hancock.....	Aug. 1, 1867	San Bernardino meridian, southeast and west.....	1,500 00	Closed.
S. W. Foreman.....	Oct. 1, 1867	Mount Diablo meridian, south and east.....	1,000 00	Do.
E. Dyer.....	Sept. 15, 1867	Mount Diablo meridian, north and east.....	4,000 00	Do.
W. F. Ingalls.....	Sept. 1, 1867	Mount Diablo meridian, north and east.....	7,500 00	Do.
G. P. Ingalls.....	Sept. 1, 1867	Mount Diablo meridian, north and east.....	7,500 00	Do.
E. H. Dyer.....	Sept. 5, 1867	Mount Diablo meridian, south and east.....	6,000 00	Do.
I. N. Chapman.....	Sept. 10, 1867	Mount Diablo meridian, north and west.....	2,000 00	Do.
H. Hancock.....	Jan. 14, 1868	San Bernardino meridian, south and west.....	300 00	Do.
J. M. Ingalls.....	Feb. 4, 1868	Mount Diablo meridian, north and west.....	6,000 00	
H. Hancock.....	May 17, 1868	} San Bernardino meridian, south and west.....	400 00	
	Sept. 9, 1867			
T. J. Delroody.....	July 13, 1867	Mount Diablo meridian, north and west.....	422 00	Special deposit.
J. Wallace.....	July 18, 1867	Mount Diablo meridian, north and east.....	235 00	Special deposit.
W. A. Pierce.....	July 24, 1867	Mount Diablo meridian, north and west.....	510 00	Special deposit, closed.
S. W. Foreman.....	July 29, 1867	Mount Diablo meridian, south and east.....	320 00	Special deposit, closed.
H. B. Martin.....	July 26, 1867	Mount Diablo meridian, north and west.....	160 00	Special deposit, closed.
J. S. Murray.....	Aug. 19, 1867	Humboldt meridian, north and west.....	292 00	Special deposit, closed.
J. B. Wood.....	Sept. 19, 1867	Mount Diablo meridian, north and west.....	200 00	Special deposit, closed.
C. Wohl.....	Oct. 2, 1867	Mount Diablo meridian, north and west.....	500 00	Special deposit.
S. W. Foreman.....	Nov. 1, 1867	Mount Diablo meridian, south and east.....	400 00	Special deposit, closed.
W. W. Dodd.....	Dec. 10, 1867	Mount Diablo meridian, north and west.....	350 00	Special deposit.
C. F. Hoffman.....	Dec. 26, 1867	San Bernardino meridian, north and west.....	650 00	Special deposit.
George Hausen.....	Feb. 7, 1868	San Bernardino meridian, south and west.....	775 00	Special deposit.
G. P. Ingalls.....	Jan. 17, 1868	Mount Diablo meridian, north and west.....	983 00	Special deposit, closed.
S. W. Foreman.....	Apr. 1, 1868	Mount Diablo meridian, south and west.....	580 00	Special deposit, closed.
I. N. Chapman.....	Apr. 1, 1868	Mount Diablo meridian, north and west.....	110 00	Special deposit.
N. W. Skinner.....	Apr. 16, 1868	Mount Diablo meridian, north and west.....	424 00	Special deposit.

A.—Statement of contracts, &c.—Continued.

Name of deputy.	Date of contract.	Location of work.	Amount of contract.	Remarks.
J. M. Ingalls	May 23, 1868	Mount Diablo meridian, south and west.....	\$660 00	Special deposit, closed.
Vitus Wackenreuder.....	June 2, 1868	Mount Diablo meridian, north and west	500 00	Special deposit
Max Strobel	June 22, 1868	San Bernardino meridian, south and west.....	200 00	Special deposit.
J. M. Ingalls.....	June 25, 1868	Mount Diablo meridian, north and west.....	432 00	Special deposit.
G. H. Perrin.....	Jan. 14, 1868	Humboldt meridian, north and east, and north and west	760 00	
W. F. Ingalls.....	Feb. 18, 1868	Gila and Salt River meridian, northeast and southeast ..	7,500 00	
G. P. Ingalls.....	Feb. 29, 1868	Gila and Salt River meridian, northeast and northwest...	7,500 00	
G. P. and W. F. Ingalls	July 10, 1868	Gila and Salt River meridian, south and east	7,500 00	

B.—Statement of number of miles surveyed in California and Arizona to June 30, 1868.

26 I

Name of surveyor.	Date of contract.	Base.	Meridian.	Standard.	Traverse.	Meander.	Township.		Section.	
		Miles. chs. lks. 330 60 57	Miles. chs. lks. 698 39 49	Miles. chs. lks. 4,263 79 01	Miles. chs. lks. 2,737 43 30	Miles. chs. lks. 398 49 90	Miles. chs. lks. 21,713 44 19	Miles. chs. lks. 81,275 51 88		
Miles surveyed to June 30, 1867, as per last report.....										
Henry Hancock	Jan. 30, 1867					12 32 70	14 78 69	34 19 86		
Henry Hancock	Dec. 10, 1866					15 62 44	19 00 26	37 33 75		
E. Dyer.....	July 7, 1866					15 53 00		11 15 01		
E. Dyer.....	Sept. 24, 1866					20 53 50		343 34 67		
S. W. Foreman.....	March 20, 1867					5 69 00	5 79 80	31 22 43		
William Magee.....	Oct. 27, 1866					1 13 56	5 31 75	11 68 50		
I. N. Chapman.....	Feb. 4, 1867					6 39 86		5 18 17		
Alexander McPherson.....	May 4, 1867						6 00 00	30 00 10		
E. Dyer.....	March 1, 1867			24 00 00		34 38 14	115 62 88	506 11 13		
G. H. Thompson.....	May 5, 1866							18 27 00		
J. Y. Pennington.....	June 1, 1864					5 73 16	2 13 44	7 25 05		
J. E. Freeman.....	March 25, 1867					5 72 00	12 16 81	35 74 12		
G. H. Thompson.....	March 13, 1867							8 45 77		
S. W. Foreman.....	Dec. 17, 1866					22 61 29	3 68 30	19 52 27		
G. P. Ingalls.....	Dec. 6, 1866			4 07 49		14 18 92	46 61 06	250 43 53		
E. H. Dyer.....	Dec. 6, 1866			10 41 75	10 43 06		94 10 03	413 04 67		
C. C. Tracy.....	Dec. 17, 1866					9 76 86	6 30 47	20 72 15		
C. C. Tracy.....	Nov. 24, 1866				7 52 98		8 45 11	14 10 64		
W. F. Ingalls.....	March 1, 1867			4 65 00			63 41 10	156 13 75		
H. Hancock.....	Jan. 14, 1868							28 65 35		
G. P. Ingalls.....	Sept. 1, 1867			8 46 22		19 43 30	129 34 61	494 71 47		
I. N. Chapman.....	April 10, 1867					16 69 47	34 76 11	77 42 78		
S. W. Foreman.....	Nov. 1, 1867					9 29 14	0 43 32	52 44 03		
W. F. Ingalls.....	Sept. 1, 1867			12 40 00			128 59 92	571 68 51		
S. W. Foreman.....	Oct. 1, 1867					13 60 02	1 76 00	68 52 98		
S. W. Foreman.....	July 6, 1867						10 11 30	30 26 48		
S. W. Foreman.....	Nov. 1, 1867						30 02 00	2 35 28		
G. P. Ingalls.....	Sept. 1, 1867					3 30 01	6 00 00	33 08 80		
G. P. Ingalls.....	Dec. 6, 1866			3 00 00		11 48 70	12 77 64	100 56 17		
E. H. Dyer.....	Sept. 5, 1867			3 00 00		13 07 24	37 07 72	197 19 64		
E. Dyer.....	Sept. 15, 1867					5 27 27	13 69 35	195 73 93		
S. W. Foreman.....	Dec. 17, 1866					17 23 13	3 31 26	30 32 34		
L. Ransom.....	March 15, 1867					4 28 04	14 62 00	19 30 00		
S. W. Foreman.....	July 29, 1867					16 17 00	69 50 00	8 57 56		
H. B. Martin.....	July 26, 1867							13 18 92		
G. H. Thorpston.....	March 8, 1865					1 07 69		41 23 00		
Total miles surveyed to June 30, 1868.....		330 60 57	698 39 49	4,334 39 47	2,755 59 34	701 65 34	22,611 65 12	85,198 11 69		

C.—Statement of account of appropriation for the survey of public lands in California and Arizona during the fiscal year 1867-'68.

Date.	On account of—	Amount.	Date of account.	In favor of—	Amount.
1867. July 1.	By balance	\$20,891 85	1867. Aug. 9	To amount paid E. Dyer, contract July 7, 1866.....	\$346 82
	By appropriation	30,000 00	9	To amount paid E. Dyer, contract September 24, 1866.....	3,744 36
			28	To amount paid S. W. Foreman, contract March 20, 1867..	472 70
			Sept. 9	To amount paid I. N. Chapman, contract February 4, 1867.	149 74
			26	To amount paid E. Dyer, contract March 1, 1867	7,310 01
			Oct. 29	To amount paid G. H. Thompson, contract December 1, 1866.	123 20
			Nov. 8	To amount paid S. W. Foreman, contract December 17, 1866.	557 93
			15	To amount paid G. P. Ingalls, contract December 6, 1866 ..	3,341 55
			Dec. 7	To amount paid E. H. Dyer, contract December 6, 1866....	5,575 98
			1868.		
			Jan. 9	To amount paid C. C. Tracy, contract December 17, 1866...	435 00
			9	To amount paid H. Hancock, contract August 1, 1867.....	1,980 46
			Feb. 8	To amount paid W. F. Ingalls, contract March 1, 1867.....	2,396 07
			March 17	To amount paid G. P. Ingalls, contract September 1, 1867..	6,923 89
			28	To amount paid W. F. Ingalls, contract September 1, 1867..	7,451 05
			May 13	To amount paid G. P. Ingalls, contract December 6, 1867..	1,404 02
			13	To amount paid G. P. Ingalls, contract September 1, 1867..	577 23
			21	To amount paid E. H. Dyer, contract September 5, 1867....	2,461 85
			21	To amount paid E. Dyer, contract September 15, 1867.....	2,205 75
			21	To amount paid S. W. Foreman, contract July 6, 1867.....	425 00
			June 26	To amount paid S. W. Foreman, contract October 1, 1867 ..	916 27
			27	To amount paid S. W. Foreman, contract December 17, 1866.	604 05
				To amount paid expenses of L. Upson to Washington.....	800 75
				To excess accounts over deposits 1864-'65.....	\$607 62
				To excess accounts over deposits 1865-'66.....	10 04
				To excess accounts over deposits 1866-'67.....	152 92
				To excess accounts over deposits 1867-'68.....	44
					771 02
				To amount paid W. H. Norway, contract August 17, 1866 ..	271 45

1868.
July 1

Balance..... 6,382 11
57,273 96

July 1

To amount paid J. T. Stratton, contract November 30, 1866.....	77 88
To amount paid S. W. Foreman, contract March 20, 1867....	600 33
To amount paid H. C. Ward, contract July 1, 1867.....	274 15
To amount paid E. H. Dyer, contract September 5, 1867....	1,139 57
To amount paid I. N. Chapman, contract September 10, 1867	2,313 99
To amount paid E. Dyer, contract September 15, 1867.....	1,621 89
	<u>57,273 96</u>
To balance.....	6,382 11

D.—Statement of special deposits for the survey of public lands in California and Arizona during the fiscal year 1867-'68.

Names of deputy.	Date of contract.	Names of depositors.	Amount of deposit.	Amount of account.	Remarks.
T. J. Dewoody	July 13, 1867	A. J. Easterly	\$422 00		Not returned.
J. Wallace	July 18, 1867	J. Wallace	235 00		Do.
W. A. Pierce	July 24, 1867	R. B. Woodward	510 00	\$523 91	
S. W. Foreman	July 29, 1867	J. McFadden	327 30	327 30	
H. B. Martin	July 26, 1867	W. S. Chapman	160 00	132 36	
J. S. Murray	Aug. 19, 1867	F. P. & J. A. Hooper	292 00	265 20	
J. B. Wood	Sept. 19, 1867	S. Wilfey	200 00	190 13	
C. Wahl	Oct. 2, 1867	C. Wahl	500 00		Do.
S. W. Foreman	Oct. 30, 1867	J. F. Stewart	400 00	79 50	
G. H. Perrin	Nov. 1, 1867	Preston & McKennon	400 00	400 00	
W. W. Dodd	Dec. 10, 1867	H. O. Donnell	350 00	10 00	
C. F. Hoffman	Dec. 26, 1867	T. W. Moore	650 00		Do.
G. Hanseñ	Feb. 7, 1868	W. S. Rosecrans	775 00		Do.
George H. Perrin	Dec. 28, 1867	G. Vance	160 00		Do.
Do.	Jan. 3, 1868	J. Rentfield	200 00		Do.
G. P. Ingalls	Jan. 17, 1868	S. H. Harmon	983 00	923 97	
S. W. Foreman	Apr. 1, 1868	L. Gr-nnam	580 00	470 46	
I. N. Chapman	Apr. 4, 1868	S. F. Butterworth and C. D. Cushman.	115 00		Do.
W. W. Skinner	Apr. 16, 1868	E. J. Whipple	424 00		Do.
J. M. Ingalls	May 23, 1868	R. O. Baldwin	660 00		Do.
I. Wackender	June 2, 1868	S. M. Duncan	500 00	331 85	
M. Strobel	June 22, 1868	John Forster	200 00		Do.
J. M. Ingalls	June 25, 1868	T. Pollard	432 00		Do.
Total			9, 475 30	3, 654 68	

E.—Statement of account of appropriation for compensation of the United States surveyor general for California and Arizona and the employes in his office during the fiscal year 1867-'68.

DR.

CR.

1867-'68.		1867-'68		
To amount paid surveyor general and clerks, first quarter.	\$4, 727 16	July 1.	By balance	\$2 98
To amount paid surveyor general and clerks, second quarter.	6, 201 61		By appropriation as advised by letter from the department, March 28, 1867.	14, 000 00
To amount paid surveyor general and clerks, third quarter.	7, 030 00		By deposits with United States assistant treasurer at San Francisco.	7, 802 00
To amount paid surveyor general and clerks, fourth quarter.	3, 986 24		By additional appropriation, (see letter, department, May 18, 1868.)	700 00
July 1, 1868.				
Balance	559 97			
Total	22, 504 98		Total	22, 504 98

F.—Statement of accounts of appropriation for rents of office, fuel, books, stationery, and other incidental expenses, including pay of messenger, for the fiscal year 1867-'68.

DR.		CR.	
1867-'68.		1867-'68.	
To amount paid in July, August, and September.	\$976 98	July 1.	By balance.....
To amount paid in October, November, and December.	1,201 45		By appropriation as per letter of department, March 28, 1867.
To amount paid in January, February, and March.	1,390 10		
To amount paid in April, May, and June.	1,170 21		
Balance	1,070 70		
Total.....	<u>5,809 44</u>		<u>\$809 44</u>
			<u>5,000 00</u>
			<u>5,809 44</u>

G.—Statement of transcripts of field-notes of public surveys sent to the department at Washington, from the United States surveyor general's office for California during the fiscal year 1867-68.

Name of deputy.	When sent.	Character of work.	Meridian.	Remarks.
Henry Hancock.....	July 11, 1867.....	Township 21 N., range 2 E.....	Mount Diablo.....	Township lines.
Do.....	July 11, 1867.....	Township 21 N., range 1 E.....	do.....	Do.
Do.....	July 11, 1867.....	Township 22 N., range 1 E.....	do.....	Section lines.
E. Dyer.....	Aug. 8, 1867.....	Township 13 N., range 18 E.....	do.....	Section and meander lines.
Do.....	Aug. 8, 1867.....	Township 40 N., range 17 E.....	do.....	Do.
Do.....	Aug. 8, 1867.....	Township 30 N., range 16 E., 31 N., range 14, 15, 16 E., 34 N., range 17 E., 44 N., range 15, 16, E., 45 N., range 16 E.	do.....	Do.
S. W. Foreman.....	Aug. 28, 1867.....	Township 10 S., range 1 W.....	do.....	Township and section lines.
William Magee.....	Aug. 28, 1867.....	Township 32 N., range 5 and 6 W.....	do.....	Do.
I. N. Chapman.....	Sept. 9, 1867.....	Township 14 N., range 17 W.....	do.....	Section and meander lines.
Alexander McPherson.....	Sept. 18, 1867.....	Township 9 S., range 1 W.....	do.....	Township and section lines.
E. Dyer.....	Sept. 26, 1867.....	Township 16 N., range 5, 6, 7, 8, E.....	do.....	Standard, township, and section lines.
Do.....	Sept. 26, 1867.....	Township 17 N., range 5, 6, 7, E.....	do.....	Do.
Do.....	Sept. 26, 1867.....	Township 18 N., range 4, 5, E.....	do.....	Do.
G. H. Thompson.....	Oct. 18, 1867.....	Township 1 N., range 1 W.....	do.....	Section lines.
Do.....	Oct. 18, 1867.....	Township 1 N., range 1 E.....	do.....	Do.
J. Y. Pennington.....	Oct. 29, 1867.....	Township 11 N., range 2 E.....	do.....	Township and section lines.
James E. Freeman.....	Oct. 29, 1867.....	Township 10 N., range 6, 7, E.....	do.....	Do.
G. H. Thompson.....	Oct. 18, 1867.....	Township 6 N., range 6 E.....	do.....	Section lines.
S. W. Foreman.....	Nov. 7, 1867.....	Township 12 S., range 2, 3, E., 13 S., range 2, 3, E.....	do.....	Township and section lines.
G. P. Ingalls.....	Nov. 15, 1867.....	Township 15 N., range 1, 2, 3, E., 16 N., range 1 E., 16 N., range 1 W., 17, 18, 19, N., range 2 W.	do.....	Do.
E. H. Dyer.....	Dec. 7, 1867.....	Township 18 N., range 6 E.....	do.....	Standard.
Do.....	Dec. 7, 1867.....	Townships 19 and 20 N., range 1 E.....	do.....	Township and section lines.
Do.....	Dec. 7, 1867.....	Township 20 N., range 2, 4, E.....	do.....	Do.
Do.....	Dec. 7, 1867.....	Township 19 N., range 4, 5, E.....	do.....	Do.
Do.....	Dec. 7, 1867.....	Township 21 N., range 3, 4, E.....	do.....	Do.
C. C. Tracy.....	Jan. 9, 1868.....	Township 12 N., range 16, 17, W.....	do.....	Do.
Do.....	Jan. 9, 1868.....	Township 13 N., range 17 W.....	do.....	Do.
W. F. Ingalls.....	Jan. 29, 1868.....	Township 22 N., range 3 E.....	do.....	Do.
Do.....	Jan. 29, 1868.....	Township 23 N., range 1, 2, 3, E.....	do.....	Do.
Do.....	Jan. 29, 1868.....	Townships 24 and 25 N., range 1 E.....	do.....	Do.
H. Hancock.....	Feb. 28, 1868.....	Township 2 S., range 11 W.....	San Bernardino.....	Do.
G. P. Ingalls.....	Mar. 17, 1868.....	Townships 33, 34, N., range 1 W.....	Mount Diablo.....	Standard, township, section, and meander lines.
Do.....	Mar. 17, 1868.....	Townships 34 N., range 1 E., 35, 36 N., range 4, 6, E., 36 N., range 4, 5, 6, E., 37 N., 4, 5, 6, 7, 8, E., 38 N., range 5, 7, E.	do.....	Do.
I. N. Chapman.....	Mar. 17, 1868.....	Townships 13, 14, N., range 9 W.....	do.....	Township and section lines.
Do.....	Mar. 17, 1868.....	Township 14 N., range 8 W.....	do.....	Do.
Do.....	Mar. 17, 1868.....	Township 14 N., range 10 W.....	do.....	Do.
S. W. Foreman.....	Mar. 28, 1868.....	Township 30 S., range 12, 13, E.....	do.....	Do.
Do.....	Mar. 28, 1868.....	Township 31 S., range 12 E.....	do.....	Do.
W. F. Ingalls.....	Mar. 26, 1868.....	Townships 37 N., range 6 E., 38 N., range 6, 8, 9, E., 39 N., range 6, 7, 8, 9, E., 40 N., range 5, 6, 7, 8, 9 E., 41, N., range 6, 7 E.	do.....	Do.

S. W. Foreman	May 8, 1868....	Township 27 S., range 8, 9, E., 28 S., range 9 E., 9 S., range 2 W., 31 S., range 13 E.	.....do.....	Do.
G. P. Ingalls	May 13, 1868....	Township 3 S., range 4 E., 11 S., range 4 E.	.....do.....	Do.
E. H. Dyer	May 20, 1868....	Townships 12 S., range 3 E., 4, 5, 6, N., range 2, 3, E., 7, 8, N., range 8 E., 13 N., range 5, 6, E., 14 N., range 5 E., 14, 15 N., range 7 E.	.....do.....	Do.
S. W. Foreman	June 26, 1868....	Townships 12, 13, S., range 4 E.	.....do.....	Do.
L. Ransom	June 26, 1868....	Township 1 N., range 4 and 5 W.	.....do.....	Do.
S. W. Foreman	June 23, 1868....	Township 14 S., range 2 E.	.....do.....	Do.
H. B. Martin	June 26, 1868....	Township 11 N., range 9, 10 W.	.....do.....	Do.
G. H. Thompson	June 26, 1868....	Township 4 N., range 25 W.	San Bernardino	Section lines.

K.—List of lands surveyed in California from June 30, 1867, up to June 30, 1868.

No. townships surveyed.	Description.	Public land.	A.	B.	C.	D.	E.	F.	G.	Remarks.	Total.
			Confirmed private land claims.	Military reservation.	Indian reservation.	Unsurveyed mountain land.	River, swamp, and overflowed land.	Unsurveyed public land.	Mineral land.		
<i>Mount Diablo meridian.</i>											
1	Township 3 N., range 5 E.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
2	Township 6 N., range 6 E.	3,335.99					19,922.77				23,258.06
3	Township 7 N., range 8 E.	4,457.05	A.				1,280.00			A + river	23,037.05
4	Township 8 N., range 7 E.	19,523.91				3,480.00					23,003.21
5	Township 8 N., range 8 E.	16,175.89	6,900.80								23,076.69
6	Township 11 N., range 4 E.	23,012.32									23,012.32
7	Township 12 N., range 3 E.	23,012.88									23,012.88
8	Township 13 N., range 5 E.	14,332.83	A.				5,579.16	F.		A + river + F	22,976.85
9	Township 13 N., range 6 E.	20,238.36	2,481.24								22,719.60
10	Township 13 N., range 18 E.	22,942.74									22,942.74
11	Township 14 N., range 5 E.	1,008.11					9,220.00				10,228.11
12	Township 14 N., range 6 E.	10,823.49	11,788.11								22,611.60
13	Township 14 N., range 7 E.	18,436.93	4,367.69								22,804.62
14	Township 15 N., range 1 E.	22,931.64									22,931.64
15	Township 15 N., range 2 E.	8,345.40	A.				14,316.37			A + river	23,041.77
16	Township 15 N., range 7 E.	20,209.78					3,124.12				23,333.90
17	Township 16 N., range 1 E.	24,494.14				7,960.00					24,494.14
18	Township 16 N., range 3 E.	13,775.72					1,829.29				23,565.01
19	Township 16 N., range 4 E.	6,715.42	A.				E.			A + E	22,862.42
20	Township 16 N., range 5 E.	8,103.46	A.				39.13	F.		A + F	22,867.14
21	Township 16 N., range 6 E.	21,284.51					1,774.89				23,059.40
22	Township 16 N., range 7 E.	22,630.50					497.61				23,128.11
23	Township 16 N., range 8 E.	22,765.08									22,765.08
24	Township 16 N., range 9 E.	23,081.34									23,081.34
25	Township 17 N., range 5 E.	23,069.58									23,069.58
26	Township 17 N., range 6 E.	22,380.68							640.00		23,020.68
27	Township 17 N., range 7 E.	23,055.88									23,055.88
28	Township 18 N., range 4 E.	11,282.15				11,760.00					23,042.15
29	Township 18 N., range 5 E.	22,878.29									22,878.29
30	Township 18 N., range 6 E.	23,069.59									23,069.59
31	Township 19 N., range 1 E.	23,079.86									23,079.86
32	Township 19 N., range 4 E.	17,556.72	5,756.92								23,313.64
		22,921.72									22,921.72

65	Township 40 N., range 8 E.	4,930.63			18,109.37				23,040.00
66	Township 40 N., range 9 E.	4,320.00			18,720.00				23,040.00
67	Township 40 N., range 17 E.	6,581.38			9,583.00				16,164.38
68	Township 41 N., range 6 E.	23,011.95							23,011.95
69	Township 41 N., range 7 E.	17,576.54			5,440.00				23,016.54
70	Township 1 N., range 5 W.	47.31				E.		A + E	22,992.69
71	Township 5 N., range 3 W.	21,452.82	1,520.00						22,972.82
72	Township 6 N., range 5 W.	14,568.82	A.		D.			A + D	8,860.00
73	Township 7 N., range 7 W.	6,176.40	A.		D.			A + D	16,959.60
74	Township 7 N., range 10 W.	17,389.37	5,590.00						22,979.37
75	Township 8 N., range 9 W.	10,588.59	A.			E.		A + E	12,432.75
76	Township 10 N., range 6 W.	11,292.58	A.		D.			A + D	13,450.00
77	Township 10 N., range 7 W.	12,315.77	A.		D.			A + D	12,560.00
78	Township 11 N., range 8 W.	4,752.46			18,218.42				24,875.77
79	Township 11 N., range 9 W.	1,760.00			21,280.00				22,970.88
80	Township 11 N., range 10 W.	800.00	A.		D.			A + D	23,040.00
81	Township 11 N., range 14 W.	2,125.81	113.49		20,800.00				23,039.30
82	Township 11 N., range 15 W.	7,251.39	2,119.27		8,180.00				17,550.66
83	Township 12 N., range 16 W.	3,780.38			17,280.00				21,060.38
84	Township 12 N., range 17 W.	3,026.17				120.00			3,146.17
85	Township 13 N., range 9 W.	22,926.70				19.55			22,946.25
86	Township 13 N., range 16 W.	6,676.86			16,929.00				23,005.86
87	Township 14 N., range 1 W.	6,941.24	A.			E.		A + E	15,589.00
88	Township 14 N., range 7 W.	9,673.24			12,640.92	626.45			22,521.24
89	Township 14 N., range 8 W.	16,574.68				6,218.90			22,910.61
90	Township 14 N., range 9 W.	3,986.54				18,968.98			22,793.58
91	Township 14 N., range 10 W.	10,662.12			12,179.24	142.86			22,955.52
92	Township 15 N., range 1 W.	6,294.87	A.			6,814.60		A + river	9,240.00
93	Township 15 N., range 9 W.	10,454.07			8,973.28	5,147.83			22,984.22
94	Township 15 N., range 10 W.	12,992.57			10,875.96	810.43			22,949.47
95	Township 16 N., range 1 W.	10,289.13	A.			7,037.00		A + river	5,706.00
96	Township 16 N., range 16 W.	21,416.40			1,610.00				24,575.18
97	Township 16 N., range 17 W.	9,977.85			7,520.00				24,678.96
98	Township 17 N., range 1 W.	9,089.48	A.						23,032.13
99	Township 17 N., range 2 W.	11,051.72	A.						23,026.40
100	Township 18 N., range 1 W.	10,209.81	A.			13,225.44		A + river	677.29
101	Township 18 N., range 2 W.	7,789.71	15,360.00			1,078.00		A + river	10,974.00
102	Township 18 N., range 16 W.	21,368.19			1,596.00	8,943.00		A + river	3,905.00
103	Township 19 N., range 2 W.	6,051.88	17,160.00						23,057.81
104	Township 4 S., range 1 E.	4,196.16	18,920.00						23,149.71
105	Township 4 S., range 2 E.	15,578.69	7,460.00						22,964.19
106	Township 4 S., range 3 E.	17,230.57							23,211.88
107	Township 5 S., range 2 E.	23,371.15			5,920.00				23,116.16
108	Township 5 S., range 3 E.	20,603.72							23,038.69
109	Township 6 S., range 2 E.	11,558.33	11,485.00		2,860.00				23,150.57
110	Township 6 S., range 3 E.	19,904.69	A.						23,371.15
111	Township 7 S., range 4 E.	6,401.24						A + D	3,210.00
112	Township 12 S., range 1 E.	236.90	A.		16,640.00				23,463.72
113	Township 12 S., range 2 E.	3,444.30	A.			E.		A + E	23,043.33
114	Township 12 S., range 3 E.	524.70	A.			E.		A + E	23,114.69
115	Township 12 S., range 5 E.	425.98	22,558.00				F.	A + F	5,890.00
116	Township 13 S., range 3 E.	1,934.08	21,110.00					A + F	19,580.00

K.—List of lands surveyed in California, &c.—Continued.

No. townships surveyed.	Description.	Public land.	A.	B.	C.	D.	E.	F.	G.	Remarks.	Total.
			Confirmed private land claims.	Military reservation.	Indian reservation.	Unsurveyed mountain land.	River, swamp, and overflowed land.	Unsurveyed public land.	Mineral land.		
<i>Mount Diablo meridian—Continued.</i>											
		<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>		<i>Acres.</i>
117	Township 14 S., range 2 E.	2,768.57	A.							A + E	22,836.57
118	Township 17 S., range 12 E.	2,424.00				20,603.04					23,027.04
119	Township 18 S., range 12 E.	13,811.49				8,960.00			303.00		23,074.49
120	Township 27 S., range 8 E.	6,211.44	9,094.56								15,306.00
121	Township 27 S., range 9 E.	13,139.71	A.			D.				A + D	22,989.36
122	Township 28 S., range 9 E.	6,266.00	11,100.00								17,366.00
123	Township 28 S., range 10 E.	14,200.42	A.			D.				A + D	24,350.42
124	Township 29 S., range 11 E.	11,295.31	A.			D.				A + D	23,040.00
125	Township 30 S., range 11 E.	1,181.45	A.							A + E	21,858.55
126	Township 30 S., range 12 E.	10,031.26	A.			D.	E.			A + D	23,009.52
127	Township 30 S., range 13 E.	5,173.94	A.			D.				A + D	17,910.00
128	Township 31 S., range 12 E.	4,795.17	A.			D.				A + D	22,985.17
129	Township 31 S., range 13 E.	1,405.03	A.			D.				A + D	23,095.03
130	Township 3 S., range 6 W.	2,934.14	4,360.00								7,294.14
131	Township 8 S., range 2 W.	22,338.95	960.00								23,298.95
132	Township 9 S., range 2 W.	23,446.94									23,446.94
133	Township 9 S., range 3 W.	18,913.47	4,243.39								23,156.86
134	Township 9 S., range 4 W.	13,078.12	5,680.00								18,758.12
135	Township 10 S., range 2 W.	10,370.32	A.						F.	A + F	23,049.36
136	Township 10 S., range 4 W.	40.00	A.						F.	A + F	2,420.00
<i>San Bernardino meridian.</i>											
137	Township 6 N., range 31 W.	3,484.40	19,250.00								22,734.40
138	Township 4 S., range 1 E.	560.00	320.00			22,167.00					23,040.00
139	Township 5 S., range 1 E.	5,873.28	952.88			16,174.00					23,000.16
140	Township 1 S., range 11 W.	3,899.40	19,189.60								23,089.00
141	Township 2 S., range 11 W.	7,933.70	15,200.00								23,133.70
142	Township 2 S., range 13 W.	10,412.45	12,647.79								23,060.24
143	Township 2 S., range 14 W.	9,932.80	13,072.64								23,005.44
144	Township 3 S., range 1 W.	7,285.02	1,207.80						14,390.00		22,882.82
145	Township 3 S., range 2 W.	3,840.00	7,600.00						11,300.00		22,740.00

146	Township 3 S., range 9 W.....	12,254.19	10,770.00							23,024.19	
147	Township 3 S., range 13 W.....	3,624.69	19,503.39							23,128.08	
148	Township 3 S., range 14 W.....	7,949.74	15,028.34							22,978.08	
149	Township 4 S., range 1 W.....	3,637.12	13,332.84			6,160.00				23,129.96	
150	Township 4 S., range 2 W.....	840.00	13,043.99			9,406.00				23,289.99	
151	Township 5 S., range 1 W.....	9,062.12	11,242.04			2,680.00				22,984.16	
152	Township 6 S., range 1 W.....	6,363.76	960.00			15,720.00				23,043.76	
<i>Humboldt meridian.</i>											
153	Township 4 N., range 2 E.....	15,005.04				8,005.30				23,010.34	
154	Township 8 N., range 1 W.....	5,392.24							L. H. res'n 42.79	5,435.03	
		1,913,925.58	399,005.93			479,699.27	128,100.18	25,690.00	943.00	466,808.64	3,414,172.60
<i>Mount Diablo meridian.</i>											
	Township 7 N., range 8 E.....	17,467.98	A.			3,480.00	E.		A + E	2,059.59	23,007.57
	Township 8 N., range 7 E.....	18,531.46	4,545.23								23,076.69
	Township 8 N., range 8 E.....	13,462.22	9,517.78								22,980.00
	Township 14 N., range 5 E.....	9,795.11	12,816.49								22,611.60
	Township 16 N., range 4 E.....	10,622.59	12,205.42				39.13				22,867.14
	Township 7 N., range 7 W.....	6,096.40	A.			D.			A + D	17,039.60	23,136.00
	Township 8 N., range 9 W.....	7,584.96	A.				E.	F.	A + E + F	15,432.00	23,016.96
	Township 14 N., range 7 W.....	638.67				D.	E.		D + E	22,312.05	22,950.72
	Township 16 N., range 17 W.....	3,609.40				11,520.00		2,400.00			17,529.40
	Township 3 S., range 6 W.....	1,537.93	A.				E.		A + E	21,502.07	23,040.00
	Township 9 S., range 3 W.....	6,123.53				16,927.67					23,051.20
	Township 9 S., range 4 W.....	12,678.98	A.			D.			A + D	6,081.52	18,760.50
<i>San Bernardino meridian.</i>											
	Township 3 S., range 1 W.....	6,881.12	A.					F.	A + F	15,936.00	22,817.12
<i>Humboldt meridian.</i>											
	Township 4 N., range 2 E.....	14,365.04				8,645.30					23,010.34
Returned in previous reports.....		129,395.39	39,084.92			40,572.97	39.13	2,400.00		100,362.83	311,855.24
		1,913,925.58	399,005.93			479,699.27	128,100.18	25,690.00	943.00	466,808.64	3,414,172.60
Returned in previous reports.....		129,395.39	39,084.92			40,572.97	39.13	2,400.00		100,362.83	311,855.24
Aggregate surveyed during the year.....		1,784,530.19	359,921.01			439,126.30	128,061.05	23,290.00	943.00	366,445.81	3,102,317.36

L.—*Estimate for the surveying service in the district of California and Arizona for the fiscal year ending June 30, 1870.*

For surveying extension parallels, township exteriors, and subdivision work in the State of California.....	\$150,000
For surveying extension parallels, township exteriors, and subdivision work in the State of Arizona.....	30,000
For rent of office, stationery, instruments, and other incidental expenses, including wages of messengers.....	6,000
For compensation of surveyor general.....	3,000
For compensation of clerks in the office of the surveyor general.....	17,400
Total.....	206,400

No. 18.—*Statement of confirmed Indian pueblo grants and private land claims in New Mexico*

PUEBLO GRANTS.

Designation.	Name.	Confirmer.	Under act of—	Area in acres.
A	Jemez.....	Indians of the pueblo.....	Dec. 22, 1858, Statutes, v. 11, p. 374.	17,510.45
B	Acoma.....	do.....	do.....	Not surveyed.
C	San Juan.....	do.....	do.....	17,544.77
D	Picuris.....	do.....	do.....	17,460.69
E	San Felipe.....	do.....	do.....	34,766.86
F	Pecos.....	do.....	do.....	18,763.33
G	Cochiti.....	do.....	do.....	24,256.50
H	Santo Domingo.....	do.....	do.....	74,743.11
I	Taos.....	do.....	do.....	17,360.55
K	Santa Clara.....	do.....	do.....	17,368.52
L	Tesuque.....	do.....	do.....	17,471.12
M	San Ildefonso.....	do.....	do.....	17,292.64
N	Pojoaque.....	do.....	do.....	13,520.38
O	Zia.....	do.....	do.....	17,514.63
P	Sandia.....	do.....	do.....	24,187.29
Q	Ialeta.....	do.....	do.....	110,080.31
R	Nambe.....	do.....	do.....	13,588.33
	Laguna*.....	do.....	June 21, 1860	Not surveyed.

* Confirmed by 3d section act of 21st June, 1860, Statutes, vol. 12, p. 71, in connection with private claim No. 30.

PRIVATE LAND CLAIMS.

Designation.	Name.	Confirmer.	Under act of—	Area in acres.
1	San Juan Bantista del Ojito del Rio de las Gallinas.	Preston Beck, Jr.....	June 21, 1860	318,699.73
2	Town of Tomé.....	Inhabitants of the town.....	Dec. 22, 1858	121,594.50
3	Tierra Amarilla.....	Francisco Martinez, et al.....	June 21, 1860	Not surveyed.
5	Town of Casa Colorado.....	Inhabitants of the town.....	Dec. 22, 1858	do.....
6	Brantio.....	Legal representatives of Juan Antonia Garcia.....	June 21, 1860	do.....
7	Town of Teolote.....	Inhabitants of the town.....	Dec. 22, 1858	21,636.83
8	Las Frigos.....	Legal representatives of Francisco Trajillo, Diego Padilla, and Bartolome Marquez.....	June 21, 1860	12,545.66
9	Junta de las Rios.....	John Seolly, Guillermo Duran, Santiago Trajillo, Augustin Duran, Santiago Giddings, and Francisco Romero.....	do.....	Not surveyed.
10	Nuestra Señora de la Luz.....	John Lamy, bishop of New Mexico.....	do.....	16,546.85
11	Town of Chilli.....	Inhabitants of the town.....	Dec. 22, 1858	38,435.14
12	Agua Negra.....	Antonio Sandoval.....	June 21, 1860	Not surveyed.
13	Town of Belen.....	Inhabitants of the town.....	Dec. 22, 1858	194,663.75
14	San Pedro.....	José Serafin Ramirez.....	June 21, 1860	35,911.60
15	.....	Charles Beanblen and Guadalupe Miranda.....	do.....	Not surveyed.
16†	.....	José Leandro Perea.....	do.....	do.....

* The claim of Casa Colorado is numbered 29 in the act of confirmation, but in the corrected list of private claims, (see letter of surveyor general of January 12, 1858,) is numbered as above.

† The claim of E. W. Favon is numbered 16 in the act of confirmation, but should have been numbered 13. It seems to have been accidentally omitted in the corrected list.

No. 18.—Statement of confirmed Indian pueblo grants, &c.—Continued.

Designation.	Name.	Confirmer.	Under act of—	Area in acres.
18	Cañon de Pecos.....	Legal representatives of Juan Estevan and legal representatives of Francisco Ortiz, jr., and Juan de Aguilar.	June 21, 1860	Not surveyed.
16	Rancho of the pueblo of San Cristoval.	E. W. Eaton, assignee and legal representative of Domingo Fernandez and others.	.....do.....	27, 854. 06
20	Town of Las Vegas.....	Inhabitants of the town.....	.....do.....	496, 446. 96
*	Location No. 1.....	Heirs of Luis Maria Cabeza de Baca, in lieu of "Las Vegas Grandes."	.....do.....	Not surveyed.
*	Location No. 2.....	.....do.....	.....do.....	99, 289. 39
21	Town of Tajiue.....	Inhabitants of the town.....	.....do.....	Not surveyed.
22	Town of Torreon.....	.....do.....	.....do.....	.....do.....
23	Town of Manzano.....	.....do.....	.....do.....	.....do.....
24	San Isidro.....	Legal representatives of Antonio Armenta and Salvador Sandoval.	.....do.....	.....do.....
25	Town of Cañon de San Diego.	Inhabitants of the town.....	.....do.....	.....do.....
27	Town of Las Trampas.....	.....do.....	.....do.....	.....do.....
28	.....	Legal representatives of Sebastian Martin.	.....do.....	.....do.....
29	Town of Anton Chico.	Inhabitants of the town.....	.....do.....	389, 662. 72
30	Rancho of Pagnate, rancho of El Rito, Gigante cañon, and rancho of San Juan and Santa Ana.	Indians of the pueblo of Laguna.....	.....do.....	Not surveyed.
31	.....	Legal representatives of Vicente Duran y Armijo	.....do.....	.....do.....
32	Town of Mora.....	Inhabitants of the town.....	.....do.....	.....do.....
33	Valverde and Fray Cristoval.	Heirs of Pedro Armendares.....	.....do.....	.....do.....
34	.....	.....do.....	.....do.....	.....do.....
35	Bosque del Apache....	Antonio Sandoval.....	.....do.....	.....do.....
36	Town of Chamito.....	Inhabitants of the town.....	.....do.....	.....do.....
37	Town of Tejon.....	.....do.....	.....do.....	.....do.....
38	.....	Legal representatives of Pedro Sanchez	.....do.....	.....do.....
43	Ortiz mine.....	Elisha Whittlesey, Abraham Rencher, Ferdinand W. Risque, Nathaniel M. Miller, Joseph F. Walker's representatives, Charles E. Sherman, and Andrew J. O'Bannon.	Mar. 1, 1861	69, 458. 3
70	Cañon del Agua.....	José Serafin Ramirez.....	June 12, 1866	3, 501. 21

*The heirs of Luis Maria Cabeza de Baca, by the act of June 21, 1860, were granted, in lieu of "Las Vegas Grandes," which they claimed, the same amount of land contained in the Las Vegas town grant, to be located by them in square bodies, not exceeding five in number. The heirs of Baca have located said grant in five square bodies, viz: Nos. 1 and 2 in New Mexico, Nos. 3 and 5 in Arizona, and No. 4 in Colorado.

No. 19.—Statement showing the area of the several States and Territories containing public and the quantity of land which remained unsold and unap

No. 1. States and Territories containing public land.	No. 2. Areas of States and Territories containing public lands.		No. 3. Quantity sold.	No. 4. Entered under the homestead law of May 20, 1862, and its supplements of 1864 and 1866.	No. 5. Granted for military services.
	Square miles.	Acres.	Acres.	Acres.	Acres.
Ohio	39,964.00	25,576,960.00	12,805,882.19	5,777.57	1,817,425.99
Indiana	33,809.00	21,637,760.00	16,122,244.78	-----	1,311,956.65
Illinois	55,410.00	35,462,400.00	19,879,408.27	272.03	9,533,453.00
Missouri	65,350.00	41,824,600.00	22,890,263.15	863,922.83	6,803,762.89
Alabama	50,722.00	32,462,080.00	17,788,665.12	*171,944.24	1,158,611.17
Mississippi	47,156.00	30,179,840.00	12,201,037.03	121,710.15	384,697.73
Louisiana	41,346.00	26,461,440.00	5,720,309.75	4,659.52	1,156,442.50
Michigan	56,451.00	36,128,640.00	12,265,866.12	1,171,732.11	3,554,606.78
Arkansas	52,198.00	33,406,720.00	8,235,659.03	236,446.20	2,258,146.92
Florida	59,268.00	37,931,520.00	1,832,431.49	228,128.67	464,782.04
Iowa	55,045.00	35,228,800.00	11,587,240.35	362,954.05	13,954,245.77
Wisconsin	53,924.00	34,511,360.00	9,819,225.39	779,372.10	6,141,012.82
California	188,981.00	120,947,840.00	1,198,874.41	368,321.76	470,452.00
Minnesota	83,531.00	53,459,840.00	2,127,314.18	2,439,759.64	5,788,839.00
Oregon	95,274.00	60,975,360.00	232,064.39	307,289.98	59,029.14
Kansas	81,318.00	52,043,520.00	244,976.32	788,452.87	4,070,365.95
Nevada	112,090.00	71,737,600.00	60,403.35	11,654.54	7,580.00
Nebraska	75,995.00	48,636,800.00	255,838.58	1,033,171.98	1,476,798.05
Washington Territory	69,994.00	44,796,160.00	178,295.92	246,553.39	41,653.63
New Mexico	121,201.00	77,568,640.00	-----	-----	-----
Utah	84,476.37	54,065,043.20	-----	-----	-----
Dakota	150,931.45	96,596,128.00	18,292.44	191,135.04	24,120.00
Colorado	104,500.00	66,880,000.00	69,191.65	125,758.49	155,160.00
Montana	143,776.00	92,016,640.00	35.93	-----	-----
Arizona	113,916.00	72,908,240.00	-----	-----	-----
Idaho	86,294.00	55,228,160.00	2,784.61	6,337.90	-----
Wyoming	97,882.92	62,645,068.80	-----	-----	-----
Indian	68,991.00	44,154,240.00	-----	-----	-----
Alaska	577,390.00	369,529,600.00	-----	-----	-----
Total	2,867,184.74	1,834,998,400.00	155,536,004.45	9,465,355.06	60,627,142.03

Column No. 5 shows the quantity of public land returned as actually located with military bounty land in Ohio, nor the outstanding warrants not returned as located up to June 30, 1868.

Column No. 6 shows the quantity selected within their own limits by States containing public lands, under act to non-public land-holding States which had been located by the State assignees up to June 30, 1868, and cable to all the States.

Column No. 7 shows the quantity actually certified under grants for railroads, and not the whole quantity to the railroad grants by acts of Congress, with the grants for wagon roads, will be equal to 185,890,794.67

Column No. 8 shows the quantity embraced in approved swamp selections, up to the 30th June, 1868, under (See swamp tables Nos. 5 and 6.)

Column No. 9 shows the quantity granted for internal improvements, under the act of September 4, 1841, grants to each State for internal improvements. In the case of Ohio and Indiana the prior grants covered the act of 1841. In the case of Illinois, Iowa, and Wisconsin, the quantities given in this column include the addi granted to Iowa for the improvement of the Des Moines river, under the acts of 1846 and 1862, and joint reso act of 1846, and therefore exceed the quantity of 500,000 acres.

Column No. 10 shows the quantity granted for university purposes, and the estimated quantity granted Indian territory nor Alaska being included.

No. 19.—Statement showing the area of the several States

States and Territories containing public land.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.
	Located with Indian scrip.	Located with float scrip, under act of March 17, 1862.	Estimated quantity granted for wagon roads.	Quantity granted for ship canal.	Salines.
	Acres.	Acres.	Acres.	Acres.	Acres.
Ohio					24, 216
Indiana					23, 040
Illinois					121, 629
Missouri		80. 00			46, 080
Alabama	7, 918. 83				23, 040
Mississippi	16, 402. 00				
Louisiana	78, 563. 24				
Michigan	400. 00	12, 896. 24	1, 718, 613	1, 250, 000	46, 080
Arkansas	275, 972. 64				46, 080
Florida					
Iowa	2, 200. 00	80. 00			46, 080
Wisconsin	22, 851. 21	1, 680. 00	250, 000	200, 000	
California	28, 949. 33	80. 00			
Minnesota	214, 350. 98	400. 00			46, 080
Oregon			1, 256, 800		46, 080
Kansas	640. 00				46, 080
Nevada	15, 156. 99				
Nebraska	1, 400. 00	80. 00			
Washington Territory					
New Mexico					
Utah					
Dakotah	9, 680. 00				
Colorado	80. 00				
Montana					
Arizona					
Idaho					
Wyoming					
Indian					
Alaska					
Total	674, 565. 22	15, 296. 24	3, 225, 413	1, 450, 000	514, 485

Column No. 12 shows the quantity located with scrip issued under the act of March 17, 1862, (Statutes, and La Nana grants, in Louisiana.

Column No. 15, showing the quantity granted for salines, does not include the selections by the State of Column No. 21 shows the quantity embraced in confirmed private claims, so far as returns of surveys have

DEPARTMENT OF THE INTERIOR, *General Land Office, November 5, 1868.*

* Donations to actual settlers under the act of September 27, 1850, and supplemental acts.

and Territories containing public lands, &c.—Continued.

No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Seats of government and public buildings.	Granted to individuals and companies.	Granted for deaf and dumb asylums.	Reserved for benefit of Indians.	Reserved for companies, individuals, and corporations.	Confirmed private land claims.	Remaining unsold and unappropriated June 30, 1868.
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
-----	32, 141. 24	-----	16, 330. 73	8, 805, 976. 00	26, 459. 80	500. 00
2, 560	843. 44	-----	126, 220. 71	149, 102. 00	329, 880. 53	1, 920. 00
2, 560	954. 64	-----	41, 754. 59	-----	233, 334. 00	424. 67
2, 560	-----	-----	22, 587. 61	-----	1, 477, 993. 77	1, 483, 715. 22
1, 620	1, 981. 53	21, 949. 46	2, 542, 378. 82	-----	213, 386. 65	6, 790, 996. 17
1, 280	15, 965. 31	-----	16, 561, 608. 82	-----	688, 083. 25	4, 828, 069. 11
-----	8, 412. 98	-----	-----	-----	2, 075, 426. 29	6, 582, 841. 54
13, 200	4, 080. 00	-----	109, 300. 83	-----	126, 711. 25	4, 614, 078. 26
10, 600	139, 366. 25	2, 097. 43	-----	-----	118, 451. 12	11, 574, 430. 18
6, 240	52, 114. 00	20, 924. 22	227. 49	305. 75	3, 739, 789. 00	17, 424, 438. 19
3, 840	-----	-----	119, 183. 34	-----	-----	2, 902, 528. 06
6, 400	5, 705. 82	-----	-----	-----	36, 880. 99	9, 258, 627. 33
6, 400	-----	-----	-----	-----	6, 030, 814. 86	104, 538, 420. 30
6, 400	-----	-----	-----	-----	-----	35, 534, 118. 75
6, 400	*1, 625, 376. 17	-----	1, 040, 640. 00	-----	-----	52, 518, 014. 32
6, 400	-----	-----	-----	-----	-----	42, 795, 589. 84
6, 400	-----	-----	-----	-----	-----	67, 085, 697. 12
25, 600	-----	-----	661, 427. 00	-----	1, 846, 247. 00	41, 624, 126. 40
44, 800	*228, 064. 53	-----	2, 039, 040. 00	-----	-----	41, 565, 717. 53
-----	-----	-----	-----	-----	-----	70, 705, 518. 00
-----	-----	-----	-----	-----	-----	48, 976, 310. 20
-----	-----	-----	-----	-----	-----	90, 966, 449. 52
-----	-----	-----	-----	-----	-----	62, 814, 254. 86
-----	-----	-----	-----	-----	-----	86, 904, 569. 07
-----	-----	-----	-----	-----	-----	68, 855, 890. 00
-----	-----	-----	-----	-----	-----	52, 150, 806. 49
-----	-----	-----	-----	-----	-----	59, 164, 787. 80
-----	-----	-----	-----	-----	-----	44, 154, 240. 00
-----	-----	-----	-----	-----	-----	369, 529, 600. 00
146, 860	2, 115, 205. 91	44, 971. 11	13, 280, 699. 94	8, 955, 383. 75	16, 943, 458. 51	1, 405, 366, 678. 93

volume 12, page 371,) in satisfaction of claims against the United States for lands sold within the Las Ormigas Nebraska, under the act of April 19, 1864, (Statutes, volume 13, page 49.)
 been received, not embracing claims confirmed and not yet reported as surveyed.

JOS. S. WILSON, *Commissioner.*

†Including Chickasaw cession.

No. 20.—Historical and statistical table of the United States of North America.

[NOTE.—The whole area of the United States, including water surface of lakes and rivers, is nearly equal to four million square miles, embracing the Russian purchase.]

The thirteen original States.	Area in square miles.	*Population—1860.
New Hampshire.....	9,280	326,073
Massachusetts.....	7,800	1,231,066
Rhode Island.....	1,306	174,620
Connecticut.....	4,750	460,147
New York.....	47,000	3,880,735
New Jersey.....	8,320	672,035
Pennsylvania.....	46,000	2,906,115
Delaware.....	2,120	112,216
Maryland.....	11,124	687,049
Virginia—East and West.....	61,352	1,596,318
North Carolina.....	50,704	992,622
South Carolina.....	34,000	703,708
Georgia.....	58,000	1,057,286

States admitted.	Act organizing Territory.	United States Statutes.		Act admitting State.	United States Statutes.		† Area in square miles.	* Population—1860.
		Vol.	Page.		Vol.	Page.		
Kentucky.....				Feb. 4, 1791	1	189	37,680	1,155,684
Vermont.....				Feb. 18, 1791	1	191	*10,212	315,098
Tennessee.....				June 1, 1796	1	491	45,600	1,109,801
Ohio.....	Ord'n'ce of 1787			Apr. 30, 1802	2	173	39,964	2,339,502
Louisiana.....	Mar. 3, 1805	2	331	Apr. 8, 1812	2	701	*41,346	708,022
Indiana.....	May 7, 1800	2	58	Dec. 11, 1816	3	399	33,809	1,350,428
Mississippi.....	Apr. 7, 1798	1	549	Dec. 10, 1817	3	472	47,156	791,305
Illinois.....	Feb. 3, 1809	2	514	Dec. 3, 1818	3	536	*55,410	1,711,951
Alabama.....	Mar. 3, 1817	3	371	Dec. 14, 1819	3	608	50,722	964,201
Maine.....				Mar. 3, 1820	3	544	*35,000	628,279
Missouri.....	June 4, 1812	2	743	Mar. 2, 1821	3	645	*65,350	1,182,012
Arkansas.....	Mar. 2, 1819	3	493	June 15, 1836	5	50	52,198	435,450
Michigan.....	Jan. 11, 1805	2	309	Jan. 26, 1837	5	144	*56,451	749,113
Florida.....	Mar. 30, 1822	3	654	Mar. 3, 1845	5	742	59,268	140,425
Iowa.....	June 12, 1838	5	235	Mar. 3, 1845	5	742	55,045	674,948
Texas.....				Dec. 29, 1845	9	108	*274,356	604,215
Wisconsin.....	Apr. 20, 1836	5	10	Mar. 3, 1847	9	178	53,924	775,881
California.....				Sept. 9, 1850	9	452	*188,981	305,439
Minnesota.....	Mar. 3, 1849	9	403	Feb. 26, 1857	11	166	83,531	173,855
Oregon.....	Aug. 14, 1848	9	323	Feb. 14, 1859	11	383	95,274	52,465
Kansas.....	May 30, 1854	10	277	Jan. 29, 1861	12	126	81,318	107,206
West Virginia.....				Dec. 31, 1862	12	623	23,000	.....
Nevada.....	Mar. 2, 1861	12	209	Mar. 21, 1864	13	30	†112,090	56,857
Colorado.....	Feb. 28, 1861	12	172		13	32	*104,500	†10,507
Nebraska.....	May 30, 1854	10	277	Mar. 1, 1867	13	47	75,995	‡34,277
								§2,261
								¶28,841

Territories.	Act organizing Territory.	United States Statutes.		Area in square miles.	*Population.		
		Vol.	Page.				
Wyoming.....	July 25, 1868			97,883	The estimated population of these Territories on January 1, 1865, as above indicated, was 360,000.		
New Mexico.....	Sept. 9, 1850	9	446	121,201			
Utah.....	Sept. 9, 1850	9	453	†84,476			
Washington.....	Mar. 2, 1853	10	172	69,994			
Dakota.....	Mar. 2, 1861	12	239	†150,932			
Arizona.....	Feb. 24, 1863	12	664	**113,916			
Idaho.....	Mar. 3, 1863	12	808	‡‡86,294			
Montana.....	May 26, 1864	13	85	143,776			
Indian.....				68,991			
District of Columbia.....	July 16, 1790	1	130	10 miles sq're.			
	Mar. 3, 1791	1	214				
*** Northwestern America purchased by treaty of May 28, 1867.						577,390	70,000

NOTES TO THE FOREGOING TABLE.

* The total population of the United States in 1860 was, in round numbers, 31,500,000. In 1865 it is estimated that the population was 35,500,000, including the inhabitants of the Territories, estimated at 360,000 persons on January 1, 1865. At the present time, November 1, 1868, according to the most satisfactory estimate, it is about 39,250,000. In 1870, according to existing ratios, the population of this country will be over 42,250,000. At the end of the present century, 107,000,000.

† The areas of those States marked with a star are derived from geographical authorities, the public surveys not having been completely extended over them.

‡ The present area of Nevada is 112,090 square miles, enlarged by adding one degree of longitude lying between the 37th and 42d degrees of north latitude, which was detached from the west part of Utah and also northwestern part of Arizona Territory, per act of Congress approved May 5, 1866, U. S. Laws 1865 and 1866, page 43, and as assented to by the legislature of the State of Nevada January 18, 1867.

§ White persons.

|| Indians.

¶ The present area of Utah is 84,476 square miles, reduced from the former area of 88,056 square miles by incorporating one degree of longitude on the east side, between the 41st and 42d degrees of north latitude, with the Territory of Wyoming, per act of Congress approved July 25, 1868.

** The present area of Arizona is 113,916 square miles, reduced from the former area of 126,141 square miles by an act of Congress approved May 5, 1866, detaching from the northwestern part of Arizona a tract of land equal to 12,225 square miles, and adding it to the State of Nevada. U. S. Laws 1865 and 1866, page 43.

NEVADA.—Enabling act approved March 24, 1864; Statutes, volume 13, page 30. Duly admitted into the Union. President's proclamation No. 22, dated October 31, 1864. Statutes, volume 13, page 749.

COLORADO.—Enabling act approved March 21, 1863; Statutes, volume 13, page 32. Not yet admitted.

NEBRASKA.—Enabling act approved April 19, 1864; Statutes, volume 13, page 47. Duly admitted into the Union. See President's proclamation No. 9, dated March 1, 1867. U. S. Laws 1866 and 1867, page 4.

That portion of the District of Columbia south of the Potomac river was retroceded to Virginia July 9, 1846. Statutes, volume 9, page 35.

*** BOUNDARIES.—Commencing at 54° 40' north latitude, ascending Portland channel to the mountains, following their summits to the 141° west longitude; thence north, on this line, to the Arctic ocean, forming the eastern boundary. Starting from the Arctic ocean west, the line descends Behring's strait, between the two islands of Krusenstern and Ratmanoff, to the parallel of 65° 30', and proceeds due north without limitation into the same Arctic ocean. Beginning again at the same initial point, on the parallel of 65° 30', thence in a course southwest through Behring's strait, between the island of St. Lawrence and Cape Choukotski, to the 172° west longitude; and thence southwesterly through Behring's sea, between the islands of Attou and Copper, to the meridian of 193° west longitude; leaving the prolonged group of the Aleutian islands in the possessions now transferred to the United States, and making the western boundary of our country the dividing line between Asia and America.

†† The present area of Dakota is 150,932 square miles, reduced from the former area of 240,597 square miles by incorporating seven degrees of longitude of the western part, between the 41st and 45th degrees of north latitude, with the Territory of Wyoming, per act of Congress approved July 25, 1868.

‡‡ The present area of Idaho is 86,294 square miles, reduced from the former area of 90,932 square miles by incorporating one degree of longitude on the east side, between the 42d and 44th degrees of north latitude, with the Territory of Wyoming, per act of Congress, approved July 25, 1868.

JOS. S. WILSON, *Commissioner*.

DEPARTMENT OF THE INTERIOR, *General Land Office, November 5, 1868.*