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CITY HALL, PHOENIX, ARIZONA. (USED AS CAPITOL BUILDING.)

REPORT

OF THE

GOVERNOR OF ARIZONA.

TERRITORY OF ARIZONA, EXECUTIVE OFFICE,
Phœnix, Ariz., October 17, 1896.

SIR: I have the honor to submit the following report on the Territory of Arizona for the fiscal year ended June 30, 1896.

I desire to call especial attention to the reports of the county commissioners of immigration, which are embodied therein. They are of a high order of excellence, setting forth with accuracy and conservatism the present condition and future prospects of their respective counties, and should be carefully perused by every homeseeker and investor.

I have the honor to be, sir, your obedient servant,

B. J. FRANKLIN,
Governor of Arizona.

Hon. DAVID R. FRANCIS,
Secretary of the Interior, Washington, D. C.

Arizona is one of the largest political subdivisions of the United States, lying between 31° 90′ and 37° north latitude, and 109° and 115° west longitude, and contains 113,020 square miles, or nearly 75,000,000 acres.

Its extreme breadth from east to west is 335 miles, and its extreme length from north to south is 390 miles. It is bounded on the north by Utah, east by New Mexico, south by Mexico, and west by California and Nevada. Its area is only exceeded by the States of California, Montana, Texas, and the Territories of New Mexico and Alaska. Its area is larger than that of Connecticut, Delaware, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont combined.

The surface consists of elevated table-lands, intersected by mountains and interspersed by valleys, many of which are of vast extent. Some of these valleys are more than 200 miles long and from 20 to 40 miles wide, and are more fertile than the far-famed plains of the valleys that are watered by the River Nile. With the completion of reservoirs now under way for the proper storage of the immense quantities of water from the melting snows which annually fall in the mountain region and now go to waste, no estimate can be formed of the productive capacity of our agricultural lands without a real test.

One who is not familiar with the character of this rich soil can have no conception of the future value of these immense valleys. In the very near future this great Territory will be one vast garden.

Arizona has been called the "Sun-Kissed Land," and the title is one well deserved. In no other country are there so many days of sunshine, and this, combined with an air pure, invigorating, and free from infection, not only sustains and prolongs life in the human family, but it creates a condition impossible to excel for the propagation and the sustenance of life in the animal and vegetable kingdoms. It is for this

reason Arizona produces the finest horses, cattle, sheep, and hogs to be found in the world. The earliest and finest flavored fruits (six weeks earlier than any other State or Territory in the Union), flowers of exquisite shape, tinged with the most attractive and pleasing dyes of nature, and cereals—wheat, barley, oats and rye—equaled nowhere else in the country.

The climate varies from the temperate in the northern portion of the Territory to a semitropical in the southern, thus affording a variety of climate seldom found in one political division of the country. The air is dry and pure, and Arizona already enjoys a reputation as the natural sanitarium of the world, many people spending a portion of each year here on account of the health-giving conditions of the climate.

Its resources are without limit, its mountains are the storehouse of precious metals and stones, its forests the greatest in the United States, its plains sustain vast herds of cattle and sheep, while the valleys produce grains and fruits that have no equal anywhere.

Arizona possesses one of the finest and most valuable forests in the world, known as the Mogollon forest, which covers an area of 10,000 square miles, or 6,400,000 acres, being, with possibly two exceptions, the most extensive body of timber in the known world.

Agriculture is rapidly becoming a great industry in this Territory, and yearly thousands of acres of land are being reclaimed by the development of water for irrigation purposes. Upon this land the husbandman reaps a splendid return for his intelligence and industry, the land producing almost every product known to the temperate and semitropical zones.

Stock raising is also being remarkably developed, and thousands of sheep, horses, and cattle are yearly fed upon its grazing land.

It is to-day one of the richest mineral sections in America, and the possibilities of this great wealth-producing agency are so great that they can not even be approximated. The mountains are nearly a solid wealth of mineral, everyone of which yet prospected contains rich bodies of the precious metals. Ore is found everywhere, gold, silver, and copper mining being most successfully pursued.

PRESENT CONDITION.

While Arizona has shared in the general depression which has prevailed throughout the country, it has nevertheless been favored with a marked degree of prosperity. Its advancement morally, socially, and materially has been most gratifying.

The product from the three most important industries—mining, stock raising, and agriculture—gives an aggregate return of $18,385,550.70, which of itself is a panegyric on the wealth of Arizona's resources.

The mineral output—gold, silver, copper, lead, and limestone—aggregated $13,978,263.20.

The stock industry gave a return of $2,757,287.50.

Although owing to the numerous ways by which products are transported, it is almost impossible to obtain statistics which would show an accurate estimate of the amount and value of farm produce exported, yet a very conservative estimate will show a total return from this source of not less than $1,650,000.

Our counties and cities are well governed. Our cities have a less number of policemen, and our court records show that fewer crimes are committed in this Territory than in any State of the Union.

In Phœnix and its suburbs there are 15,000 people and but three policemen are employed, and no more are required. The same may be said of Tucson, Prescott, and other towns of the Territory.

STREET SCENE, PHOENIX, ARIZONA.

Arizona has within its borders a population of over 100,000. The people are cultured, energetic, and enterprising; they have caused the desert to awaken with life; they have invaded the great forests and delved into the mountains that they might all pay tribute to the necessities of Arizona's modern civilization. The moral and social status is excellent. Our educational facilities meet every demand of a cultured and ambitious people. And every condition which we find in this splendid Territory shows every possible requirement for the making of a great and prosperous Commonwealth.

POPULATION.

The Eleventh United States Census report (1890) gives the population of Arizona at 59,620, exclusive of Indians. Since that time my predecessor in office gives its population as follows, to wit:

1893	65,000
1894	70,000
1895	77,000

From the reports of the commissioners of immigration for each county appended hereto, which reports have been very carefully and accurately compiled, the present population of Arizona is placed at 101,240, distributed as follows:

County.	Population.	County.	Population.
Apache	3,000	Pinal	5,000
Gila	3,500	Cochise	6,500
Graham	9,000	Pima	12,000
Yavapai	17,020	Mohave	2,200
Coconino	5,000	Yuma	3,020
Maricopa	31,000	Navajo	4,000

being an increase over the reported population of last year of 24,240. The immigration is of the very best class, and Arizona numbers among her population representatives from all portions of our Union, and the very highest types of citizenship of the communities whence they emigrate. They are progressive and enterprising, thoroughly American in character, loyal to their country, and justly proud of the home of their adoption.

TAXABLE PROPERTY.

The records of the Territorial board of equalization show that the value of taxable property for the year ending June 30, 1896, is more than $500,000 in excess of that for the preceding year ending June 30, 1895. The following statement is an abstract from the records of the board:

Counties.	Acres.	Valuation.	Value of improvements.
Apache	879,455	$247,827.68	$34,007.00
Cochise	38,921	58,867.00	85,080.00
Coconino	615,201	161,965.43	68,110.00
Gila	5,508	152,399.00	20,525.00
Graham	34,116	396,077.00	314,744.00
Maricopa	228,426	2,854,287.00	283,164.00
Navajo	1,036,630	256,498.66	27,844.50
Mohave	6,523	22,452.53	81,378.28
Pima	58,175	204,725.00	124,784.00
Pinal	48,652	423,604.00	208,074.00
Yavapai	385,031	509,846.00	106,380.00
Yuma	79,126	305,027.80	39,195.00
Total	3,415,764	5,593,577.10	1,393,285.78

Valuation of town and city lots, of improvements, and of horses, mules, etc., in the various counties.

County.	Town and city lots.	Improvements.	Horses.		Mules.		Asses.	
			Number.	Value.	Number.	Value.	Number.	Value.
Apache	$17,450.00	$44,408.05	2,523	$43,150.00	110	$1,266.00	96	$482.00
Cochise	49,905.00	367,979.00	3,225	48,308.70	117	2,824.00	134	735.00
Coconino	150,040.50	188,455.00	4,978	82,168.00	18	540.00	53	300.00
Gila	37,900.00	82,745.00	3,099	49,815.00	206	4,085.00	329	1,713.00
Graham	21,847.00	79,926.00	4,023	114,770.00	127	5,080.00	204	1,986.00
Maricopa	2,359,434.00	881,750.00	3,995	79,214.00	284	5,196.00	6	115.00
Mohave	9,802.00	66,950.00	1,894	52,593.00	68	2,730.00	94	430.00
Navajo	78,722.00	123,485.00	2,018	35,920.00	26	685.00	31	216.50
Pima	345,492.00	754,808.00	5,291	79,170.30	182	4,370.00	67	381.00
Pinal	51,107.00	64,005.00	1,967	29,163.00	96	1,750.00	10	77.00
Yavapai	321,556.00	570,804.00	6,566	135,080.00	57	1,650.00	220	2,670.00
Yuma	69,807.50	64,565.00	346	5,190.00	65	1,300.00	15	75.00
Total	3,513,063.00	2,289,880.05	39,925	754,542.00	1,356	31,476.00	1,259	9,180.50

Number and value of cattle, sheep, goats, and swine in the various counties.

County.	Cattle.		Sheep.		Goats.		Swine.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Apache	11,763	$104,254.00	110,140	$138,163.25	255	$255.00	151	$404.50
Cochise	51,686	404,841.00	6,675	9,079.00	737	745.00	187	557.00
Coconino	31,396	242,587.62	176,770	203,285.50	.....	.....	191	693.00
Gila	50,905	396,565.07	2,072	2,127.00	1,701	2,042.00	377	1,135.00
Graham	85,091	658,423.00	13,092	19,638.00	2,866	4,239.00	716	2,818.00
Maricopa	15,860	159,482.00	19,125	28,663.00	261	278.00	8,916	16,338.00
Mohave	25,155	197,370.37	.....	.....	.....	.....	88	268.50
Navajo	10,307	85,014.50	20,925	26,521.25	383	383.00	228	971.00
Pima	51,418	437,082.00	2,195	3,108.00	234	364.00	310	843.00
Pinal	24,164	189,718.36	3,800	3,800.00	.....	.....	505	1,408.00
Yavapai	66,767	523,453.28	21,077	27,400.00	4,303	4,303.00	800	2,450.00
Yuma	1,421	14,210.00	.....	.....	10	20.00	637	1,274.00
Total	425,933	3,413,001.20	375,871	461,785.00	10,750	12,629.00	13,106	29,160.00

Average valuation of different property.

County.	Land (average per acre).	Horses (per head).	Mules (per head).	Asses (per head).	Cattle (per head).	Sheep (per head).	Goats (per head).	Swine (per head).
Apache	$0.28	$17.06	$11.51	$5.33	$8.86	$1.27	$1.00	$2.61
Cochise	1.51	13.60	24.14	5.49	7.83	1.36	1.00	3.00
Coconino	.26	16.50	30.00	5.85	7.72	1.15	.....	3.63
Gila	27.63	12.82	20.00	5.21	7.79	1.01	1.20	3.00
Graham	11.60	28.52	40.00	9.73	7.85	1.49	1.48	3.83
Maricopa	12.49	19.57	18.19	19.16	10.06	1.50	1.07	1.83
Mohave	3.44	27.82	40.15	4.57	7.80	.....	.....	3.05
Navajo	.25	17.80	26.46	6.97	8.25	1.27	1.00	4.26
Pima	3.52	14.70	24.00	5.68	8.54	1.42	1.55	2.72
Pinal	8.74	14.82	18.23	7.70	7.85	1.00	.....	2.78
Yavapai	1.32	20.57	29.00	12.13	7.84	1.30	1.00	3.06
Yuma	2.75	17.00	20.00	5.00	10.00	.....	2.00	2.00
General average	6.18	18.49	25.14	7.74	8.38	1.28	1.26	2.98

SALT RIVER BY MOONLIGHT, NEAR PHOENIX, ARIZONA.

Land, town and city lots, 1896.

County.	Land.	Valuation.	Value of improvements.	Value, town and city lots.	Value of improvements.
	Acres.				
Apache	879,455	$247,827.68	$34,007.00	$17,450.00	$44,408.05
Cochise	38,921	58,867.00	85,080.00	49,905.00	367,979.00
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Gila	5,508	152,399.00	20,525.00	37,900.00	82,745.00
Graham	34,116	396,077.00	314,744.00	21,847.00	79,926.00
Maricopa	228,426	2,854,287.00	283,164.00	2,359,434.00	881,750.00
Mohave	6,523	22,452.53	81,378.28	9,802.00	66,950.00
Navajo	1,036,630	256,498.66	27,844.50	78,722.00	123,485.00
Pima	58,175	204,725.00	124,784.00	345,492.00	754,808.00
Pinal	48,652	423,604.00	208,074.00	51,107.00	64,005.00
Yavapai	385,031	509,846.00	106,380.00	321,556.00	570,804.00
Yuma	79,126	305,027.80	39,195.00	69,807.50	64,565.00
Total	3,415,764	5,593,577.10	1,393,285.78	3,513,063.00	3,289,880.05

Railroad and all other property.

County.	Railroad.		Value of all other property.	Total assessed valuation of each county.
	Miles.	Value.*		
Apache	54.482	$281,623.83	$88,191.35	$1,001,482.66
Cochise	177.370	1,012,701.00	376,772.00	2,418,393.70
Coconino	118.660	538,300.00	313,086.48	1,949,531.53
Gila			277,116.00	1,028,167.07
Graham	41	142,143.24	232,120.95	1,993,812.19
Maricopa	94.590	457,360.00	859,037.00	7,984,318.00
Mohave	108.076	540,380.00	91,773.00	1,066,127.68
Navajo	57.208	286,040.00	110,628.74	1,032,925.15
Pima	120.200	758,691.00	627,908.00	3,341,726.30
Pinal	79.790	495,484.78	95,441.00	1,563,632.14
Yavapai	60.552	302,760.00	1,011,549.00	3,519,901.28
Yuma	80	517,598.40	128,896.00	1,147,158.70
Total	991.928	5,333,082.25	4,212,514.52	28,047,176.40

*In returns made by some of the counties $56,160.18 of railroad valuation is embraced under head of "All other property."

The above total of $28,047,176.40 unquestionably does not represent more than one-third of the actual value of the property of the Territory. Property is not assessed at its real value, and in consequence the rate of taxation seems high; but if all property were assessed at its actual and real value the rate of taxation in this Territory would be very low in comparison with that of many of the States of the Union.

Instead of the above valuation, conservative men think that the actual value of the taxable property of this Territory is at least $90,000,000.

AGRICULTURAL RESOURCES.

The agricultural resources of Arizona can not as yet be computed with any great degree of accuracy, as their development is little more than begun.

Millions of acres within what is called this arid region will be reclaimed, and this Territory will in the future be a great agricultural State. The lands of our valleys, and they are extensive, are as rich as the land of any portion of the globe.

The Salt River Valley alone is as large as the entire State of Rhode Island, and when you consider the extent of all the valley lands of the Territory it will be found that we have an agricultural area that will compare favorably with many of the great States of the Union.

This is a great mineral region. Our mountains are full of the precious metals, yet we have an area of land that can be reclaimed sufficient to make a great agricultural State. The methods of farming here are different from the regions where the annual rainfall is depended upon for the production of crops.

A large portion of southern Arizona is semitropical. The orange, the lemon, the almond, and in fact all the semitropical fruits are produced with grand results. Is it not a grand agricultural-horticultural country where on the same section of land corn and alfalfa, wheat, barley, the orange, lemon, almond, grape, and pomegranate can be found growing side by side? Very few countries in the world produce such an exhibition. In all southern Arizona this can be observed. Five or six crops of alfalfa, one of the most nutritious of all grasses, are produced.

The winters are mild, there is no day in the year that the husbandman can not work in his shirt sleeves with comfort. We have almost perpetual sunshine. For only three months in the year is the heat oppressive, and, during that period, owing to the dryness of our atmosphere, there are no cases of sunstroke. What is called the hot season is the healthiest season of the year, and health statistics show that during the months of June, July, and August Arizona is one of the healthiest countries in the world.

Farm laborers work during the entire summer with impunity, although the thermometer indicates a much higher temperature than can be endured by laborers in other sections of the Union.

The agricultural and horticultural resources of Arizona are just beginning to be developed. Where there is a rich harvest the reaper will surely come, and capital will seek a region where remunerative profits are to be realized. Arizona has a total area of over 72,000,000 acres, and more than 10,000,000 may in time be reclaimed for agricultural and horticultural purposes. Of this vast area we have only 1,000,000 as yet reclaimed and under cultivation. All of our fertile valleys will some day bloom and blossom as a garden. They will be subdivided into small farms, and will be as productive as any lands of the Mediterranean. The grandest returns from agriculture and horticulture have resulted from irrigation farming. The countries that have yielded the greatest results per acre, and where the husbandman has been best rewarded for his labor, are those countries where irrigation and not the natural rainfall was depended upon. Not only the quantity but the quality of farm products is a matter worthy of note. An abundance of bright sunshine and pure, dry air are essential to the highest state of perfection of the products of the soil, not only of the cereals, but especially of the fruits. Not only are fruits grown in sunny lands more attractive in appearance by reason of their brighter and clearer coloring, but they possess greater sweetness and are of superior flavor to those from countries less favored in this respect.

Of all the political divisions of the Union, Arizona is par excellence the land of sunshine, as has been clearly demonstrated by the annual records of the Weather Bureau concerning the amount and brightness of the sunlight. No country in the world exceeds Arizona in the number of days of sunshine per annum. With these superior conditions of sun and air and soil and water intelligently applied, it will be but a short time before Arizona's agricultural and horticultural products, properly placed upon the market, will find first favor with discriminating consumers. With these existing conditions there can be but little question as to Arizona's agricultural future.

ALMOND ORCHARD, SALT RIVER VALLEY.

BALING ALFALFA HAY.

The northern portion of the Territory produces all the fruits known to the Temperate Zone, and its valleys yield bountiful harvests of wheat, barley, and oats. Not only has its great valleys produced bountiful harvests of grain, but it is one grand pasture field for immense herds of cattle.

Anyone in entering the Territory from the west and traveling on the Atlantic and Pacific Railway, will be impressed by the grandeur and beauty of the country. In many portions, for scores of miles it resembles a grand old English park, with not a particle of underbrush, and the grand pines standing as if they had been planted by the hand of man. With more than 10,000,000 acres of arable valley and mesa land ready for the plow as soon as sufficient water can be provided, as will be provided in the future, Arizona will be a great agricultural State.

In addition to this vast area of tillable land there are more than 40,000,000 acres of excellent grazing land, upon which great herds of cattle range, bringing from the markets of the East and the Pacific Coast great sums of money, as will be shown elsewhere in this report. The mountain ranges are the great feeding grounds, and the valleys will be utilized for fattening them for market at the butcher's block.

The following, concerning the agriculture and horticulture of the Territory, is from the pen of William Stowe Devol, professor of agriculture in the University of Arizona:

Alfalfa.—In the great Salt River Valley, and in other localities of the Territory, the mainstay has been, and still is, alfalfa. This wonderful pasture and hay plant reaches perfection under irrigation in this congenial climate. With due attention to the requirements of the plant, in order to secure its highest development, three, four, and even five crops may be harvested in a single year, yielding from 2 to 5 tons of cured hay per acre at each cutting. Forming one of the most nutritious of foods, it brings the capacity of an acre to support live stock to a very high standard. Upon this crop the range cattle are fattened for the block, and upon it stock hogs are grown, while upon large tracts the alfalfa is harvested, baled, and shipped out of the Territory.

Although large sums of money and years of time have been spent investigating and experimenting with others, nothing has been found to equal it as a pasture and hay crop.

Grain.—Grain is grown in nearly all sections of Arizona. Barley and wheat are chiefly grown, though rye, oats, and Indian corn are grown to some extent. Most of the wheat is converted into flour in the Territory, and barley forms the staple grain for live stock. Alfalfa-grown hogs are fattened almost exclusively upon wheat and barley grain for a few weeks before they reach the shambles.

Potatoes.—It was at one time thought that good potatoes could not be grown in Arizona. But the fallacy of this has been shown through the large quantities of excellent tubers grown in recent years in nearly every part of the Territory, especially in the northern and central parts. Even in the valleys of the extreme south good potatoes are produced, though these are usually lacking in keeping qualities. In the southern part of Arizona planting and harvesting are engaged in almost continuously throughout the year.

Sorghum.—The sorghums, both the sweet and the nonsaccharine kinds, are extensively grown for food for live stock. The leaves and stalks, especially of the sweet sorghums, are found excellent foods to supplement alfalfa in feeding horned cattle, both for fattening and for dairy purposes. Sorghum seed or grain is also grown for feeding purposes.

Other agricultural products.—Tobacco has been grown in a small way by Mexicans for many years. Recent trials by the experiment station show that many of the improved varieties thrive in the southern part, and this may be made an important farm crop.

Ramie grows luxuriantly and will become a staple fiber crop in this region as soon as a satisfactory decorticating machine is invented.

Australian salt bush has been grown experimentally and found to do well. There are several species, all known by the same common name, but one only (*Atriplex semibaccatum*) has thus far proved satisfactory. It will grow without irrigation, and in quite alkaline soil.

HORTICULTURE.

The conditions which serve to bring agriculture to so high a state of perfection, contribute in a more marked degree to the successful carrying on of horticultural pursuits. Horticulture has been defined as "refined agriculture," and again as "extensive agriculture." Under irrigation these terms are exemplified as under no other conditions.

Apricots.—Although other fruits may eventually outstrip it, up to the present time the apricot crop has led in acreage under cultivation and quantity of fruit produced. For several years apricots have been shipped from the Salt River Valley in car-load lots, both fresh fruit and dried being exported. The leading varieties grown commercially are Royal and Moorpark, but De Coulourge, Early Montgamet, and several other varieties do exceedingly well here and farther north.

Peaches.—The bright sun and congenial climate seem particularly fitted for the production of highly colored and luscious peaches. The Arizona peach, especially when water has been applied intelligently, is of superior size, quality, color, and flavor. Fruit has been shipped from the Territory for several years, but the lack of facilities for canning and drying has been a serious drawback to the development of peach growing. In protected valleys among the mountains are produced peaches which in beauty of coloring, and perhaps in flavor also, can not be surpassed by the product of any other part of the United States.

Grapes.—Grapes for the table, for raisins, and for the manufacture of wine are grown cheaply and in abundance, and of the very best quality; and shipments of raisins and fresh fruit are made in carload lots from the Salt River Valley. The principal varieties are Muscat, Thompson's Seedless, and Seedless Sultana, but a large number of varieties have been grown experimentally, and many found to do exceedingly well. Farther north, also, superior grapes are grown.

Apples.—It was stated a few years ago that apples could not be grown in Arizona, or if grown the fruit was insipid and worthless. While good fruit can not be produced in the lower valleys, and in some places the trees do not thrive, in the central and northern part of the Territory and at elevated localities in the south, even to the Mexican line, apples of splendid quality and of large size are produced, and the trees are very prolific.

Oranges.—The future of the orange in Arizona seems to be assured, although the area suited to its growth is limited. The mesas and about the foothills of the south central part and the region about Yuma have been found well adapted to its growth. The fruit ripens a month earlier than in California, and is beautifully colored. The Washington Navel, St. Michael, and Mediterranean Sweet are the varieties grown.

Lemons and grape fruits.—The Arizona lemons have a superior waxy appearance which causes them to be favorites in the markets. They are grown in Yuma and Maricopa counties. Grape fruits of fine quality are also successfully grown, but the trees have not been in bearing long enough to determine how large a yield may be expected.

Pears.—A few varieties of pears are grown successfully in the central part of the Territory, and a larger number farther north. Large areas are being set to pears, and this fruit is to be extensively grown. The Bartlett is the favorite variety.

Plums.—Some of the varieties of Japan and Oriental plums have been found to produce well, though most varieties do not prove prolific except in a few localities in the north central part of the Territory.

Figs.—The fig has not as yet proved a profitable fruit, chiefly because of a lack of knowledge as to culture and preparation of the fruit for market. When supplied with an abundance of water and properly treated it is very prolific, and fruit of excellent quality is produced.

Almonds.—The almond has been planted for commercial purposes but a few years, but large orchards are now in bearing, and the results give assurance of a great future for this nut in Arizona. The trees grow well, are prolific, come into bearing early here, and the fruit can be held to place upon the market when there is the most demand for it. Both the hard and soft shell strains are grown, and several varieties of each.

Dates.—Arizona is one of the few places upon the continent where dates may be successfully grown to maturity. That good dates could be produced in this Territory has not been long known, but several localities have been found where the fruit matures, and there is now quite a demand for date trees.

SMALL FRUITS.

Strawberries.—The strawberry has become a very important crop in the fruit-growing regions. It is very prolific under the warm sun, with plenty of water supplied by irrigation.

Blackberries.—Although the blackberry and dewberry are more plentiful north,

ARIZONA APRICOT ORCHARD.

excellent crops of fruit of these are obtained in most parts of Arizona. Raspberries and currants do not do so well. But few cherries are grown, and they do not thrive, except in the northern part of the Territory.

VEGETABLE GARDENING.

In many places in Arizona may be found a paradise for vegetable gardening. The climate is such as to permit of growing and harvesting many kinds of vegetables at all seasons of the year, and irrigation gives the gardener such perfect control of the water as to enable him to grow his crops to perfection.

Melons.—The most extensively grown of vegetable crops are melons, which are produced in large quantities along the line of the Southern Pacific Railroad, over which many carloads are shipped annually, and also in the Salt River Valley and along the Atlantic and Pacific Railroad for home consumption. Watermelons of enormous size and fine quality and muskmelons of excellent flavor and appearance are grown at a minimum expenditure of labor. It may almost be said that man plants the seed and the climate "does the rest."

Sweet potatoes.—Sweet potatoes and yams yield enormous crops, and the product is of the finest quality, especially in southern Arizona, where they are grown with the greatest ease.

Peanuts.—The peanut plant proves very prolific in the sandy soils of the valleys of the south. They have not been tried extensively, but the results obtained are very encouraging.

OTHER VEGETABLES.

Cabbages are grown successfully and easily in all parts of the Territory.

Beans constitute an important part of the vegetable gardener's product, and fresh string beans are in the market almost the entire year round.

Peas are also an important crop, being available (fresh) nearly all the year.

Lettuce is easily grown in the open ground, so as to offer fresh and crisp heads at all seasons.

Onions form a staple crop and fresh scullions may be had at almost any season.

Practically every vegetable grown commercially in temperate and subtropical regions are produced in Arizona, and in most instances to a high degree of perfection. Among those not given above may be mentioned turnips, beets, carrots, parsnips, vegetable oysters, radishes, peppers, celery, rhubarb, egg plant, tomatoes, spinach, etc.

CROP SEASON.

The following extracts, taken from the crop bulletin issued by the chief of the United States weather bureau at Phœnix, may prove of interest:

April 14, 1896.—The week was cold and windy, with considerable cloudiness, and with a light fall of rain and more of snow on the mountains. Grain is making slow growth; alfalfa doing well and some cutting done in Yuma, Pima, and Maricopa counties. Cattle are holding their own on the ranges, but the grass is short and making slow growth. Fruit trees are looking favorable for a good crop; nut trees look better; citrus trees looking well and the fruit well set. The water supply is holding its own, but rain is needed badly in all counties. Frosts injured barley in Pinal County, and did some damage to fruit trees in the northernmost counties.

April 20, 1896.—The week was exceptionally cold and windy, with general frosts on the 16th, 17th, and 18th, which did much damage to fruit and garden in the more northern counties. Late-sown wheat and barley growing well, but early-sown retarded by cold weather. Small fruits doing nicely; citrus fruits well set and doing nicely, not injured by frosts; alfalfa and grain hay being cut in the southern counties.

Strawberries are plentiful in the markets. Potatoes are two weeks late. Grass on the ranges is very short and dry, and rain is needed in all sections.

April 27, 1896.—Week was cold and windy, with some severe frosts in the northern counties. The ranges are short and dry, and stock is being moved to the higher ranges. The wool clip is being moved for shipment. Small and citrus fruits are well set in the northern counties. Alfalfa, wheat, and barley hay are being stacked; corn planting just begun in Graham County; market gardens have not been damaged by frosts, except in the most exposed localities; strawberries are plentiful and cheap; water is plentiful.

May 4, 1896.—Fore part of the week was cold and windy, but the latter part was warm and pleasant. A good rain the 27th did much good to all crops. The northern section was visited by frosts early in the week, which did some damage to fruits and garden truck, but grain and alfalfa made good growth during the latter half of week.

In the southern section wheat, corn, barley, alfalfa, and fruit made fine growth, and in Yuma County the second growth of alfalfa is being cut. All small fruits are doing well. Citrus and deciduous fruits, especially in the foothills, are doing well, but some damage was done fruits and garden truck in the more exposed localities. Apricots will be ready for shipment from Maricopa in the latter part of May. Grass on the ranges is dry and short, but stock is looking well, owing to extensive shipments. Lambs are in fine condition, and weather is favorable for lambing.

May 11, 1896.—The week was cold and windy, and all crops, except in the extreme southwest, made very slow growth. No rainfall, and this, together with high winds, necessitated frequent irrigation. Fruits made slow growth, but the prospects were not materially changed. In the southern section early apricots and garden truck of every description are in the market, and shipments of apricots will begin this week. Cattle have been shipped in great numbers to northern ranges, and the result has been to keep feed in sufficient quantity on the ranges. Water is growing generally scarcer, but there is no complaint as yet. Rain is needed very badly, and all crops on the dry ranges will soon suffer very severely. Citrus and deciduous fruits in Maricopa foothills are looking well and making slow growth.

May 18, 1896.—The temperature for the week was below the normal, but in general it was favorable to the growth of all irrigated crops. Water is growing scarcer, but there is no complaint yet of scarcity. Grain cutting has begun in the southern counties, and the second cutting of alfalfa has been cut in the southwestern counties. Small fruits are ripening slowly. All citrus and deciduous fruits in Maricopa County are progressing finely. The first carload shipments of apricots began this week in this county, and it was without doubt the first extensive shipment of such fruit in large lots in the United States. Cattle shipments still continue; an immense number will be shipped the coming week. It is estimated that 35,000 head will be shipped this season, leaving about 70,000 on the ranges. The ranges are dry and short, and a good rain would be of immense value to the Territory and to ranges in particular.

May 25, 1896.—The temperature rose above the normal the latter part of the week, and it was generally favorable for all irrigated crops and fruits. Haying continues in the warmer counties and the reports are favorable. Unirrigated crops and grass on the ranges have suffered, and the ranges are dryer than at any time this summer, and as a rule stock is suffering and shipments are necessary to relieve the ranges of surplus cattle.

Small fruits are making fair growth; deciduous and citrus fruits are very promising. Shipments of apricots of the early varieties have about ceased, but Royals will soon be shipped eastward. Water in the mountains is growing scarce; the larger rivers are making less flow, and unless rain comes soon serious results will follow.

June 1, 1896.—The week has been very hot, with considerable wind and some cloudiness. Traces of rain fell in almost every county, but it was not sufficient to be of any value. Irrigated crops have made good growth and deciduous fruits are maturing. Early peaches appeared in Phœnix as well as Royal apricots, figs, and plums. Wheat, rye, and barley have been cut with good yield and quality. Cattle shipments continue, and in some of the northern counties cattle are suffering and many dying. New grass does not sprout for lack of rain, and old grass is short, dry, and about the water holes and creeks the ground is bare for miles. Citrus fruits are making fine growth, and the prospect is excellent for a large yield of fine quality. The reservoirs are well filled, considering the drought, and there are few complaints of scarcity.

June 8, 1896.—Wheat and barley have been cut with good returns and grain hays baled. The second growth of alfalfa has been generally cut, and the quality is good. Fruits are maturing fast, and peaches, plums, apricots, together with melons, tomatoes, and early grapes, are to be seen in the southern tier of counties. Oranges in the foothills are in excellent condition, and are about the size of a hen's egg. Very few are dropping, and the yield, unless something extraordinary happens, should be very satisfactory, and will illustrate the fact that the culture of citrus fruit in the foothills is an established commercial venture.

The few reports as to the condition of corn are very encouraging, and a more extended report would be of interest. A good rain would be a boon indeed, and now grass would be in evidence in an incredibly short time.

June 15, 1896.—The condition of crops has not materially changed during the week, as all irrigated crops made fine growth and unirrigated ones made none at all. In the southern and central portion thrashing wheat and barley has occupied the ranchers, and the second crop of alfalfa has been stacked. The yield of grain is good and the quality excellent, but the acreage was not as great as last year, the tendency being to sowing of alfalfa as being a more remunerative crop all things considered. Corn is looking well, but the acreage is meager; deciduous fruits are maturing fast, and blackberries and peaches have appeared in quantity in this and more southern markets; citrus fruits are very encouraging and are growing nicely,

with droppings ceased; the second crop of figs will soon be ripe, and a few watermelons have appeared.

June 22, 1896.—In all irrigating localities crops have made good growth and are looking well. The third crop of alfalfa is being cut, and is found to be somewhat light because of lack of water. The honey yield that six weeks ago seemed to promise a failure has latterly given better indication. One hundred and twenty thousand pounds have already been shipped with five more carloads to be ready soon, so that a yield of the average amount, or more, may be reasonably expected. Grapes, melons, and vegetables are being shipped in quantity from the southwestern portions of the Territory.

June 29, 1896.—The ranges have been benefited by the rains of the last week, and the grass is beginning to sprout, and in a few days will afford feed for cattle. It has also filled the water holes. The first crop of alfalfa is being cut in the northern counties, but the crop will be light. The third crop is being cut in the southern counties and the yield is good and the quality excellent. Thompson's Seedless grape are about ready for shipment, and next week carload shipments will begin, being three weeks earlier than the California crops. Figs, grapes, water and musk melons, and peaches are plentiful in the market. There are no serious complaints of scarcity of water in the canals.

July 6, 1896.—The temperature has been above the normal, with light showers irregularly distributed throughout the Territory. In Graham County there were good showers for three successive days. A third crop of alfalfa has been stacked in the southern portion and the first crop stacked in the northern. Corn is ripe in the southern tier of counties. Melons and Sultana and Thompson's Seedless grapes are in the market in quantities. Almonds will be ready to pick this week. The crop of olives on the trees is looking well. Oranges are rather larger than hens' eggs, and are in prime condition. Lemons are about as large as apricots and never looked better. The second crop of figs is a bountiful one.

July 15, 1896.—Temperature was above the normal in the central and southwestern counties and below the normal in all other sections. Showers have been the rule during the week in every county in the Territory, and in the southern and central ones they were copious. The greatest amount reported was Pinal County, where 2 inches of rain fell. The rain has proven very beneficial to all crops, and especially so for irrigation and stock water. Cattle are looking well on all southern ranges, and even on the northern ones the grass is beginning to afford feed. The spring shipments of cattle have been enormous, being more than twice as great as during the whole of 1895, and the prices ranged higher on the whole. The season has been satisfactory to cattlemen, in spite of the long-continued drought. Alfalfa has all been stacked in the southern and central tiers of counties, and the second crop is ready to cut in the northern. Fruits are ripening fast, and the markets are well supplied with Sultana, Thompson's Seedless, Sweetwater, and Muscat grapes, while peaches in limited quantities and melons are as abundant as grapes. Oranges, lemons, and shaddocks are making fine progress and promise an abundant yield.

July 20, 1896.—Not in years has Arizona had a week that is indicative of such agricultural prosperity as the one just past. Bountiful rains have been the rule in every county, and the desert even will blossom as a rose. From Mohave to Cochise, and from Apache to Yuma, bountiful rains have cleared the atmosphere, liberated the latent heat, and made Arizona a ranchman's paradise.

The effect of the rainfall upon the range grass would be surprising to an Eastern man. Ten days ago the ranges were dusty and devoid of grass, but within that time grass has grown to a height of two or three inches, and now affords feed in abundance for all stock. Cattle are smart and strong. The rains insure feed for all stock until fall, when the shipments will again begin. Many have also been brought to the alfalfa fields of Salt River and southern valleys to be fattened for the fall trade. The rains will probably result in producing a fourth crop of alfalfa in the southern valleys, as the fields have been thoroughly soaked, and have received a supply of nitrogenous matter that will materially induce its growth. At any rate the reservoirs and canals are bank full, and there will be no scarcity of water during the hot season. Fruit and shade trees have been freshened up, dust and alkali removed from the leaves, and the general aspect has been materially improved. Oranges, lemons, and shaddocks have made fine growth, and unless something very extraordinary takes place a bountiful yield is assured. Grapes are looking remarkably well, and heavy shipments have been made to Northern and Eastern markets. Figs and melons are plentiful in the market, and the shipments of melons have been greater than during any previous season. Salt River Valley has been blessed with copious showers, and during the week an average of 2.17 inches of rain fell, and as each shower occurred during the night it was especially advantageous. The Salt, Verde, and Gila rivers, and all the creeks, are now well filled.

June 27, 1896.—The temperature for the week was below the normal in all sections, while the rainfall was considerably above the normal, as each county received another

generous supply of rain. In many counties the rainfall since July 7 was unprecedented in the last sixteen years, while the temperature was below the normal for the month. No damage to crop vegetation is reported except to newly mown alfalfa, which indeed was slight; but the loss in the vineyards was somewhat greater to the grapes, yet this trifling loss was offset by the great advance in the growth of the range grass and the present and subsequent outlook of stock. All sections are unanimous in the report upon the improved outlook for stock. Grass affords sufficient feed while the water holes, creeks, rivers, and basins are full to overflowing, and insures range feed for the entire year and alfalfa pasturage in the valleys. All canals are bank full, and the reservoirs contain enough water for irrigation until the winter rains set in. All fruits except grapes have been materially benefited, and citrus fruit growth has been unprecedented.

August 3, 1896.—The temperature of the Territory has been about the normal, while the rainfall has been generally above, especially so in the central and southeastern portions. There was no county that did not have some rainfall, all reports are very encouraging, and the summer and fall season bids fair to be one of the most profitable in many years to range men, miners, and stockmen. No complaints are heard from any section except that grapes have mildewed to some extent, and that mown alfalfa has been spoiled. The harvesting of barley in the northern sections is now in progress. Corn is harvested in the southern sections, and sorghum is about ready to cut. Citrus fruit made excellent growth during the week, and oranges, lemons, and grape fruit never gave promise of more excellent yields. Melons are plentiful, almonds are being picked, and as a rule in the eastern portion of Maricopa County the yield has been good, and the nuts large and full. The greatest progress has been made by stock, and cattle that three weeks ago were poor are now fattening. Range grass is very plentiful and sweet, and water is to be seen in every depression.

August 17, 1896.—The temperature for the half month has been below the normal as well as the rainfall, there being a greater deficiency of each during the first week than there was an excess during the second. On the whole, the weather has been all that could be expected, there being sufficient rain throughout the Territory to mature grasses and assist in the growth of crop vegetation, and not so warm during the day as to retard growth. The rainfall was rather evenly distributed throughout the several counties, not even excepting Yuma and Mohave counties, where the rainfall is usually the least. The crop season of the Territory is practically a thing of the past, and the lull is now on in farm work in all portions except the extreme north and northeast counties. In the southern tier all crops are harvested, and the only fruit on the trees are oranges, lemons, grape fruit, pears, apples, peaches, and pomegranates, and they will continue until December. Alfalfa is making a rapid growth, assisted by the late rainy period, and a fourth crop will undoubtedly be cut; and if not, the cattle will be turned in on it, and it will supply pasturage in unlimited quantities for "feeders" and will insure fat cattle for marketing. Sorghum is ready for feeding, that being the only use for which it is cultivated. Corn has been harvested, and the yield is satisfactory. Garden truck is always in the market the year round, and at present the fields are in excellent condition. Grapes are again looking well, and the vines are well filled. The curing of muscats and seedless grapes has begun in some vineyards, but it will be more general a few weeks later. Citrus fruits are a delight to look upon, the trees are bearing to their fullest capacity, the fruit is healthy, clean, and plump, and the growth is simply marvelous since the late rains. Unless something more than extraordinary occurs the season of 1896 will be one of most bountiful yield, and the quality will be perfect. It is no boast to assert that the Arizona orange, lemon, and grape fruit has not its equal in the whole West, besides having the additional advantage of ripening earlier than in any other State or Territory. It is a positive pleasure to see the Arizona ranges. On the desert, in the valleys, on the mesa, among the rocks upon the mountains, bunch and gramma grass are growing luxuriantly. Range cattle are glossy, mild-eyed, fat, and strong. There will be enough and more than enough feed until springtime. On the whole, the range has emerged from the time of doubt and dread to a time of peace and plenty, and the July average rainfall of more than 3 inches for all sections transformed it.

WHOLESALE PRICES OF PRODUCTS OF SALT RIVER VALLEY.

The following list of prices is furnished by E. F. Kellner's mercantile establishment, and is reliable:

Alfalfa hay	per ton	$5.00	to $5.50
Grain	do	7.00	to 8.00
Barley	per 100 pounds	.65	to .70
Wheat	do	1.00	to 1.25

Corn	per 100 pounds	$1.00 to $1.25
Flour	do	2.00 to 2.35
Corn meal	do	2.25
Sorghum sirup	per gallon	.50
Cane sirup, frequently sold as New Orleans molasses and of almost equal grade	per gallon	.50 to .60
Honey:		
Strained	per pound	.04 to .05
Comb	do	.08 to .10
Soap:		
Laundry	per 100 bars	3.75
Borax, good quality	do	4.50
Potatoes	per pound	.01½ to .01½
Onions	do	.01½ to .02
Cabbage	do	.02 to .02½
Alfalfa seed	do	.04½ to .05½
Wine vinegar, good grade	per gal	.20 to .25
Dried fruits:		
Apricots	per pound	.07 to .08
Seedless Sultana grapes	do	.04 to .05
Muscat grapes	per pound	.03 to .04
Peaches	do	.04 to .06
Beef, prime	do	.04½
Mutton	do	.05
Pork	do	.05
Sweet potatoes:		
Red		.01
Yellow		.01½

The following schedule shows the wholesale price of groceries:

Beans:		
Pink	per pound	$0.02 to $0.02¼
Navy	do	.02½ to .03
Coffee:		
Package (roasted)	do	.19 to .25
Mocha and Java	do	.36 to .45
Green Rio and Costa Rica	do	.20 to .23
Canned goods:		
Table fruit (assorted)	per case, 2½-pound cans	3.25
Tomatoes	do	2.00 to 2.10
Corn	per case, 2-pound cans	1.90 to 2.75
Beans	do	2.00 to 3.00
Peas	do	2.40 to 3.00
Canned goods, Eastern:		
Oysters—		
Blue Point, firsts	per case	5.50
Blue Point, seconds	do	5.25
Golden Star, firsts	do	5.50
Golden Star, seconds	do	5.25
Fruits, dried:		
Apples	per pound	.07 to .08½
Prunes	do	.08 to .10
Candles, 40-pound boxes, 16 ounces stearic acid	per box	5.00
Candles, 20-pound boxes, 16 ounces stearic acid	do	2.65
Crackers, soda	per pound	.07½
Milk, condensed:		
Eagle brand	per case	8.25
Monroe brand	do	5.50
Highland brand	do	7.00
Peninsular brand	do	6.50
Oil:		
Kerosene	per case of 10 gallons	3.25
Kerosene, bulk	per gallon	.27 to .30
Nails (wire)	per keg	4.75 to 5.00
Packing-house products:		
Breakfast bacon	per pound	.09 to .09¾
Sugar-cured hams	do	.12 to .13
Pure leaf lard	do	.07 to .08

Sugar.				
Granulated	per sack of 100 pounds			$6.25
Cube	do			6.50
Salmon:				
Alaska 1s	per case	$4.25	to	5.00
Columbia River 1s	do	5.50	to	6.50
Salt, table:				
50-pound sacks	per 100 pounds			1.75
In bales, 10s to 2s	per bale	2.45	to	2.60
Wire:				
Barbed fencing	per pound			.04½
Baling, No. 16	do			.04½
Starch:				
Laundry	per pound			.07½
Corn	do			.07½
Tobaccos:				
Star and Horseshoe	do	.36	to	.37
Climax	do	.37	to	.39
Battle Ax	do	.19	to	.21
Durham, 2 ounce	do			.54
Duke's Mixture	do			.30
Teas:				
No. 1 basket-fired Japan	do			.35
No. 1 pan-fired Japan	do			.35
Gunpowder, good grade	do			.45
Oolong, good grade	do			.45
English Breakfast Congo	do			.70
English Breakfast, good grade	do			.45

LIVE-STOCK INDUSTRY.

The live-stock industry of the Territory is in a very flourishing condition, and the outlook for this important business is most encouraging.

About one-half of Arizona's area can be used for grazing lands of superior quality. The copious rains which fell in all portions of the Territory during the early summer months thoroughly soaked the ground and made grass plentiful on desert, mesa, plain, and mountain, in consequence of which the cattle have an abundance of rich, nutritious food and are looking better than for many years. All the reports are most encouraging, and the fall season bids fair to be one of the most profitable in many years for the ranchman. The climate of Arizona is peculiarly favorable both to the healthful development and inexpensive care of animals, and they are here exempt to a large extent from the numerous diseases with which they become afflicted in most parts of the country.

Cattle, sheep, and horses are of the improved breeds, and progress has been continually made in this direction.

The development of the artesian water supply and the erection of surface wells and windmills, the conditions for which seem most favorable, will render the whole extent of her grazing lands available.

Alfalfa flourishes here as it does nowhere else, and the fattening of cattle and hogs on the valley farms has become a most profitable business. Yearly thousands of cattle are brought from the ranges and placed upon the alfalfa fields to prepare them for market.

There were shipped from the Territory during the past fiscal year, ending June 30, 1896, 220,583 head of cattle, which, at an average value of $12.50 per head, gave a return of $2,757,287.50.

AN ALFALFA FIELD, SALT RIVER VALLEY, ARIZONA.

CATTLE SHIPMENTS FROM ARIZONA.

The record of shipments of cattle from the Territory, which is authentic, from January 1, 1894, to June 30, 1896, is as follows:

	Head.
January 1, 1894, to June 30, 1894	157,783
July 1, 1894, to June 30, 1895	217,013
July 1, 1895, to June 30, 1896	220,583
Total	595,379

From July 1, 1895, to June 30, 1896, 23,697 head of cattle were slaughtered in the Territory by licensed butchers offering meat for sale at regularly established places of business. It is estimated that over 3,000 more were slaughtered by ranchmen and others for home use and for occasional sale. A system is now being adopted by the sanitary commission to procure record of every animal slaughtered in the Territory.

RANGE GRASSES.

There are eleven different plants indigenous to Arizona that, curing on the stalk, without cutting or labor of man, comprise the great bulk of the valuable fattening food for range stock.

Sporobulus wrightii (Sacaton grass).—This grass is found principally in the valleys, reaches the height of 8 or 9 feet, grows some all the year, but very rapidly after July rains, and blooms in September. It is very hardy, stands a great deal of pasturing, but is readily killed out by fire. It grows both from seed and the roots; is hard to mow on account of growing in tussocks; however, makes excellent hay when cut early.

Chloris alba.—An annual grass growing largely in swales where there is rich soil frequently overflowed. It has a large proportion of seed much sought after by stock and produces a large quantity of foliage, making excellent food. It is in some parts called Crowfoot grama.

Bouteloua oligostachya (blue grama, mesquite grass).—This grass is the main reliance of range stock in Arizona. It is eaten by them in preference to any other of the grasses. Cut for hay at the period of its growth when the seed has just passed the milk stage, it is very nutritious. Horses used every day, fed upon it, keep in good flesh. It cures better on the stalk, retaining more of its substance, and lasts longer into the following year than any other range grass. It is not readily tramped out, stands droughts well, and on ranges where it has apparently disappeared because of droughts and overstocking at once comes again when rains are plentiful, as they have been this season.

Aristida (white grama).—This grass the Mexicans call chino, or curly grama. It is to all appearances the same as the blue grama, and is about the same for food for stock on the range, but there is much less of it. It is distinguished from the blue by the flowering head, this being white, the other blue.

Bouteloua polystachya (low grama grass).—Grows rank on the edges of ponds and where the water stands for a month or more during and after the rainy season, also along slow-running streams. It is also found on many varieties of soil both on the mesas and on the prairie. It has the fattening properties of all the grama grasses.

Buchloe dactyloides (buffalo grass).—This grass furnishes a great amount of feed, makes more of a sod than any other range grass, is valuable next after the grama—would be its equal, perhaps, were it as

generally distributed in Arizona. It is evenly and closely eaten by stock; is well known all over the arid region; grows from the seed and from the offshoots, as does Bermuda grass.

Hilaria James II (Galletta or black bunch grass).—While not considered a first-class grass, is valued on account of being exceedingly hardy, withstanding great drought; does not tramp out; makes good hay when cut in season; certain soils seem to much improve its nutritive qualities.

Festuca (pine bunch grass).—Found throughout all the pine woods region of Arizona; is valued very highly as winter range feed and makes fair hay, but not as good as the grama grasses. Very little known in southern Arizona.

Atriplex (white sage).—Very valuable in northern Arizona, where the snow often falls to a depth to cover the most of the summer grasses; stock at such times live and thrive upon this plant, which grows on the order of a small bush or shrub.

Erodium (alfilaria).—This is a plant native of California, brought in the first instance in the wool of flocks of sheep to the Territory; found to do very well in the valleys of the San Pedro, Gila, and in the lower plains of southern Arizona; is very fattening and is highly valued as a spring food, it starting with very little rain and before any of the native Arizona grasses.

Medicago sativa (alfalfa).—This plant is called in different portions of the world French clover, Spanish trefoil, Brazilian clover, Chilean clover, medick, and lucerne. It is being cultivated in all parts of the United States, but in no part does it surpass the growth attained here on the irrigated lands. It furnishes food equally valuable for all kinds of stock, both green and dry, and as a forage plant is invaluable to the stockmen of the Territory. It is of very ancient origin, having been cultivated in Greece five hundred years before the Christian era.

REPORT OF COLIN CAMERON, ESQ.

The following valuable and exhaustive report on this subject has been prepared by Colin Cameron, esq., chairman of the Territorial live stock sanitary commission, and one of the most extensive stock raisers in the Territory. Mr. Cameron has an intimate acquaintance with the topic of stock raising in all its branches, and is an accepted authority thereon.

CATTLE.

The cattle industry of Arizona is of comparatively recent origin. In 1852, 1853, and 1854 emigrants going to California by the southern route report seeing on the line of their journey from the Rio Grande to the Pacific coast only old bulls, and but few of them, on the ranges. The wagon road then traveled left the Rio Grande at Las Cruces, N. Mex., striking water again on the Rio Mimbres, north of where Deming now stands, thence to the springs in the Animas Valley, in southwest New Mexico, and entered the country that is now Arizona through Guadaloupe Canyon, passing by the San Bernardino Springs, which were then, as they are to-day, the source of the river of the same name.

At San Bernardino the road dropped south into what is now the State of Sonora, Mexico, going by the waters of the La Morita, a point directly south of Bisbee, where now a customs entry port has been established by the Mexican Government. Continuing west, the road crossed the San Pedro River at a Mexican settlement of the same name, followed up the Terrenate River, going over the divide and down the Santa Cruz, entering the United States at the Rancho de Bueno Vista at the same point with the river as it flows on to Tucson. From Tucson the traveled road led on down the valley of the Santa Cruz until it reached, near old Maricopa, the Gila River, and thence down it, leaving Arizona by crossing the Colorado at Yuma.

From the Rio Grande this route of the emigrants to California followed the line of the most northern of Mexican settlements. It traversed the very heart of the

ALFALFA PASTURE.

FORT APACHE, NAVAJO COUNTY, ARIZONA.

best cattle ranges of to-day. The grass was unquestionably the best. For years it had been impossible to hold cattle on the ranges because of the depredations of the hostile Apaches.

At the military post of Santa Cruz there were a few cattle (20 or 30 head all told) that were watched all day by herders and at night driven within the adobe walls that surrounded the town. At Tucson there were no cattle.

The emigrants saw the ruins of extensive haciendas and signs of where there had been large corrals. They were told that in the years 1820 to 1830 the country had been stocked with many thousands of cattle and horses, but that in the year 1830 and up to 1843 the Apaches were so numerous and raided so frequently, driving away so many of their stock, killing and carrying into captivity so many of their people, that in the latter year all haciendas had to be abandoned, the people seeking refuge in the walled towns in order to save their lives. Stock raising was impossible under these conditions. Agriculture was only possible when two or three armed men kept the Apache away from the one at work in the field.

This condition of affairs continued to grow worse. The Apaches, having broken up all the haciendas in what is now Arizona and northern Sonora, having driven off and destroyed all the stock, every year raided farther, going into Sonora as far as Hermosillo, overrunning toward the west the whole of the Altar district, it being a matter of history as well as of tradition and in the recollection of old Mexican citizens now living that the settlements in the lower and upper San Simon Valley, respectively at San Bernardino and at Pueblo Viejo; in what is now the Sulphur Springs Valley, at Agua Prieta, in the south, and Sierra Bonita (Hookers Ranch), in the north, where was located the largest hacienda in the country; at Tres Alamos, at San Pedro, at the Babacomori, at San Rafael de la Zanja, at Sonoyta, and at Tubac, were all abandoned, and that Santa Cruz and Tucson were the only towns on the frontier that were not entirely destroyed and the people driven away by the Apaches. Tucson had no cattle left. Santa Cruz was reduced to 3 oxen and 1 cow.

The first cattle after this period within the limits of Arizona were about 40 head of cows kept in Tucson by William Oury, and the same number in Williamsons Valley, near Prescott, kept by a man named Stevens. They were bought from emigrants en route from Texas to California in the year 1864. They had to be guarded by armed men in the daytime and brought within strong inclosures at night, the inclosure being in part formed by the house for greater security.

In 1866 cattle were first brought into the Territory by General Banning, from California, to supply the military. In 1867 Hooker, Hooper & Hines got a portion of the contract and drove in cattle from Texas. In 1868, 1869, and 1870 the last-named firm, under the management of Hooker, supplied the entire military force of the Territory, as well as the Indians, with beef. Though many cattle were brought into the Territory from 1866 to 1872, they were solely for the purpose of feeding the military and the Indians; none were turned loose upon the range permanently previous to 1872 and 1873.

In 1869 Thomas Hughes started the Pennsylvania ranch near Fort Crittenden, cultivating land, raising grain and vegetables to supply the post. Later he attempted stock raising, but lost everything, being raided by the Apaches seventeen times in the years 1871 and 1872.

In 1868 Col. H. C. Hooker turned a herd on the range in Williamsons Valley, but, on account of the Indians, had to gather them in a short time and move them away. In 1869 he tried to hold 4,000 head on the head of the Babacomori, but failed, with 40 vaqueros in charge, and located in sight of Fort Crittenden, close herding them in the day, rounding them up and bedding them down at night. The Apachas gave him so much trouble that he was compelled to leave this section. His horses could only be kept from the Indians by bedding them down at night with the cattle. Knowing that in time he would lose all if he remained in that locality, he leased range from the Papago Indians, in the Babaquivera Valley, 100 miles southwest of Tucson, and during the winter of 1869 and 1870 held his cattle there. The Apaches did not follow him, because that country was then inhabited by the Papagoes, as it is to this day. Colonel Hooker lost (eaten by the Papagoes) that winter 400 out of 4,000 head, which was a less percentage than he would have sustained in any other part of Arizona at that time.

In 1872 the firm of Hooper & Hooker furnished 15,500 cattle to the Indians and military. These large drives from Texas (4,000 in a herd) by Colonel Hooker, were followed by herds brought in by Hardin & Martin, who drove to sell, and the Sanfords and Vails, who drove and located on ranches, which they have retained to date.

By this time (1873) the fame of the grazing lands of the Territory had extended far and wide, and cattle were brought from all directions. Several herds of improved Shorthorn cattle coming from Oregon in 1875, followed soon after by the Murphy thoroughbred Durhams from California, the blood of which herd, through bulls sold, has more or less improved every stock of cattle in southern Arizona.

The opening of two transcontinental railroads across the Territory in 1881 gave a

great impetus to the introduction of cattle on ranges. Men who had accumulated fortunes in the Territory, their friends in the States, adventurous spirits throughout the United States and in foreign countries—who are always ready to take great chances for promised large fortunes—came here, and in the years 1883 and 1884 every running stream and permanent spring were settled upon, ranch houses built, and adjacent ranges stocked with cattle brought in on foot and by rail from the States of Sonora, Durango, and Chihuahua in Mexico—from the Territories and States of the Union as far east as Maryland.

At that time Arizona was one great virgin pasture field; cattle remained fat throughout the year. The great mining camps of the Territory were in full blast. All through 1883 and 1884 beef cattle were in great demand for home consumption as well as for the California markets, three-year-old steers selling for 3¼ to 4 cents on foot, and weighing upwards of 1,000 pounds. This condition explains why the cattle of Arizona were so rapidly improved, surpassing in quality the Texas and New Mexico range animals. The prices received stimulated ranchmen to improve their herds. Many thousands of dollars were paid to the breeders of the States of the Mississippi Valley for bulls of high breeding that were then turned upon the ranges.

In 1885 the home market failed and the ranchmen were confronted with the necessity of finding one in the east. A shipment (the first made) of 500 head of three and four year old steers in November of 1885, from the best graded herd in southern Arizona, netted the owner $27.40 per head. This sale, being published largely in the Territorial papers, was commented upon to prove that even with no home demand Arizona could compete with countries nearer eastern markets because of the great productiveness of her herds, the rapid growth of her stock, and superior fattening qualities of her grass. The result was the retention by all ranchmen of their she stock and the determination to hold all steers until they were matured, fattened, and sell them as beef.

The result was inevitable, though long delayed. The last fat cattle in any number were sold from the open range in May and June, 1886. From that time until 1892 and 1893 all range-grown steers have been sold generally when three years old to ranchmen in the northern States and Territories, to farmers in the corn-feeding States of Nebraska, Kansas, Iowa, and Missouri, to owners of irrigated lands in California, or to farmers of such lands in our own Territory, all of whom matured these steers and sold them when fattened direct to slaughterers. No she stock was sold; ranchmen would not kill them to supply their own beef, though in 1888 a few were spayed, followed by larger numbers in 1889, and a very increased percentage in 1890 and 1891.

The practice of ranchmen keeping all the she cattle and holding all the steers until three years old was discontinued in 1892, because at this time many northern buyers refused to take the three's unless they could buy the two's. In order to make sale of the old steers, the Arizona ranchmen had to sell the younger. The northern buyer proved a better friend than he then got credit for being.

The ranges were now, in 1891, throughout the Territory, conceded to be stocked nearly to their full capacity. When the rainy season had passed and not one-half the usual amount of water had fallen; when it was seen that all the old grass was gone, that the new crop was a failure, and that an unprecedentedly large number of cattle in the calf crop (the calf crop of 1891 was the largest in the history of the Territory) had been thrown upon the range, it began to dawn upon the ranchmen that there was a limit to the number of cattle that the range would feed. The official assessment roll of cattle for 1891 shows 720,941 head, no doubt a fair assessment as compared with the listing of all other property in the Territory; nevertheless, men whose judgment is not at fault on these matters are positive that after the calf branding of 1891, and before the sales of steers made in the fall of that year, there were in round numbers 1,500,000 cattle in Arizona. At this time no apprehension of loss from starvation entered the mind of anyone.

Men with many thousands of dollars at stake, knowing that we have only 40,000,000 acres of grazing land (and that a very large portion of this, by reason of great distance from drinking water, was not available), that it requires from 15 to 25 acres of feed to one animal, made no effort to sell or remove even a part of their stock, but continued on in the even tenor of their way, expecting that the coming year would furnish grass to meet the necessities of the occasion.

In the year 1892 many cattle died in May and June, but not until July and August had passed without rain did cattle men realize how heavy the ranges were overstocked and had been since 1890, and that their cattle must be moved at once or their whole investment would be lost.

During September and October the bulk of the cattle of southern Arizona was moved to pastures in Texas, Indian Territory, Kansas, California, Nevada, and as far north as Oregon. The overstocking of the range was the same throughout Arizona, but on account of the greater severity of the drought in the southern portion of the Territory the loss was much greater. All ranchmen concede that it was no less than 50 per cent, and some insist that 75 per cent is not too great an estimate.

A part of this loss was sustained in the year 1892, a greater portion, however, occurred in May, June, and July, 1893.

The first rain of 1893 fell about the 15th of July. Had the rain been delayed sixty days longer all the cattle in southern Arizona would have perished. Immediately after the first fall of rain the cattle stopped dying; their recuperation, their recovery of strength, seemed like unto a miracle. So much was this true that by September and October, when the roundups were held, there was nothing in the appearance of any animal to indicate that in the first half of July (two months before) they were mere skeletons, so weak that they could not be turned around without falling down. The calf crop of this year was practically nothing. Sufficient rain fell and enough grass grew to insure the safety of what cattle remained alive upon the ranges, and the ripened seed falling out was of great advantage to the range just recovering from two years' severe drought. In 1894 and 1895 the rains were fairly good, and each year furnished enough grass for the cattle and considerable extra to reseed the range.

The drought left the range practically without bulls, and in consequence thereof the calf crop has each year since been short of expectations. The price of range cattle has until this year ruled so low that ranchmen have felt too poor to buy. The average price of cattle this year in the southern portion of Arizona has been $8.50 for yearlings, $11.50 for twos, and $14.50 for threes and older steers. These prices are an advance of $3.50 per head on each age over prices paid since 1892. In consequence of this advance in price, some few progressive ranchmen have supplied their ranges with the necessary bulls this year, and indications are that all will do so next.

The outlook at present for the range cattle man was never more flattering as far as feed is concerned. The rains came early. In some sections rain fell in May, and in the southern part of the Territory not later than June 25. All over the Territory rain fell in abundance in July by the 15th. The rainy season of this country is, generally speaking, July and August. The experience of old residents is that rains commence from June 23 to July 10 and continue on to September 5 to 20—that is to say, if rains commence later than July 10 and quit before September 5 the grass crop will be short.

Almost every year some rain falls in January and February. While rain at this season of the year makes no grass, it is much desired by ranchmen, because it puts water in the mountains, which enables the cattle to remain high in the hills, where they are protected while the weather is bad, and, in addition, they then get the grass that is far from the permanent water of the valleys.

The cattle business in Arizona was never done by the old rule of thumb method. The ranchman here never did notch his calf tally on a shingle, and, keeping only a check book, determine by his balance or overdraft at the bank whether his business had been profitable or otherwise. He always used system and economy in his business, and can only be criticised in that he did not look ahead—read the signs of the future and foresee the result of overstocking when combined with a severe drought.

That each section of range country must experience great loss before changing its method of doing business as conditions change, we have many examples. The drought in Texas and the blizzards in Wyoming and Montana caught the ranges in those States overstocked. The great losses sustained there, though well known to our ranchmen, contained no warning. Coming closer home, the loss sustained in southern Arizona in 1892 and 1893 did not cause a single ranchman in northern Arizona to ship out his cattle and thus try to avert the loss which they sustained in the early part of 1896 by reason of overstocked ranges caught in great drought.

In times past, when a 3-year-old steer brought $15 and a yearling $9, the ranchman would not sell. He would argue that he could not make money faster than by holding his $9 steer for two years and then get $15. This was all very well in theory, but in practice it did not result so well. There are many reasons: First, you can gather a greater percentage of yearlings than of any other age; next, the retention of the yearlings reduces the coming calf crop; again, if you keep steers until 3 years old you must keep less of a breeding herd. This is now so well understood that without exception all ranchmen in southern Arizona are selling the produce of their herd when 1 year old. The loss from straying, from theft, and from death is thus reduced to a minimum. This will be beyond doubt the course hereafter followed all over the Territory.

The great fall of rain this year has made a crop of grass that would perhaps last the cattle now on the ranges for two years, but the cattle men, having experienced a great loss for which they are in part responsible, will not only continue to sell their yearlings, but are selling all nonbreeders, barren cows, and bad colors to the extent of their heifer calf crop, being determined to keep their herds to a point that the range will carry through from year to year with only ordinary seasons of rain and grass growth, it being now well understood that the capacity of the range is the number of cattle that can be safely carried through the poorest season.

The percentage of increase from a breeding herd in the early days of cattle raising in Arizona, by actual count, ran from 90 to 95 per cent. Cows lived and continued producers to the age of 15 and 20 years. This is readily understood and believed when it is known that the country was a veritable stock-raising paradise. A day without sunshine was so much of an exception as to be noticeable. No storms of winter reduced the vitality of the cow; no heat of summer enervated her. So invigorating, healthy, and bracing was the air of the ranges as to make readily possible the increase here given when taken in connection with her early maturity, maternity, and great fecundity in this climate. When the ranges became overstocked the increase fell to 20 per cent. Not only was the percentage small, but the individual lacked size on account of want of nourishment from the mother. Happily this is now all changed; Arizona as a cattle country is to-day in about the same condition that it was in 1883. Grass has been in abundance and of such quality since 1894 that the yearlings from two herds in southern Arizona made growth sufficient to be good enough to bring $12.50 per head this year from Montana and Colorado buyers. The cattle men have passed through a trying ordeal, and will profit by it, and will conduct their business more with a view to medium immediate profits than to immense ones in the future.

BEEF CATTLE.

On all the irrigated lands in Arizona a forage plant called alfalfa grows with great luxuriance. It produces by irrigation three to six cuttings a year, and yields 2½ tons per acre per cutting. Its fattening properties are very great. Horses, cattle, sheep, hogs not only eat, live, and fatten to perfection upon it, but it is eaten with avidity by poultry, both green and when cured into hay.

The largest body of land in the Territory at present producing this food plant is located in the Salt River Valley, in Maricopa County, adjoining and surrounding the city of Phœnix, the capital. From a few hundred head of indifferent cattle fed in 1886 the industry has reached the proportion of 17,391 head of selected beef steers fed, fattened, and sold during the year ending June 30, 1896. These alfalfa-fattened steers are sold in every beef market in California from San Diego to San Francisco; in Denver, Colo.; in El Paso, Tex.; in Albuquerque, Las Vegas, Santa Fe, and other towns in New Mexico, in addition to furnishing the high-class beef found in every town and mining camp in Arizona. Several trains were sent east to Kansas City and Chicago, shrinking en route but little in excess of entire grain-fed cattle. A comparison of the number of cattle fattened in the Salt River Valley with the entire number shipped from the Territory indicates that all the cattle grown on the open ranges can be prepared for the butcher in the Territory as soon as water, now running to waste during the rainy season, is impounded in suitable reservoirs, which the people are anxiously hoping to see built by the Government or by private capital. The short statement that a $15 range steer can be fattened for from $12 to $15, and when ripe sell for $30 to $40, demonstrates why the business is desirable.

DAIRY INTERESTS.

A requirement to successful dairying in any section of the country is to have green food, or what most nearly approximates it, the year round. In the celebrated dairy districts of New York, Ohio, Illinois, and Iowa great attention is given to the planting of crops that will keep up the milk flow, first those rapid growers that come to maturity early in the season, followed by those of more slow growth, ripening later until frost finally destroys all, when resort must be had to the summer cut and cured hay, which must always be supplemented with grain feed and roots that have been summer raised, harvested, and stored with great labor and much expense.

In the dairy districts of Arizona—every portion of the Territory is a dairy district when lands can be irrigated—feed is green practically all the year. Alfalfa is, in the economy of the dairy, as for beef making, the principal food. Sorghum, fodder of sweet corn, wheat, rye, and the different millets are grown, and there is not a month in the year when they can not be produced at their best as green food. When fed along with alfalfa hay but little grain is ever required, the one trouble here being to keep the dairy cow from getting too fat. Beets, carrots, turnips, in fact, all root crops, grow to a perfection not attained in the colder climes.

Butter from the food named is of fine flavor and texture; the keeping quality is also excellent, and when rates of transportation on the railroad can be made more reasonable, to give an outside market for the surplus, much more butter will be produced than is consumed in the Territory. Butter making and cheese making is really in its infancy, the first carload of cheese having been shipped out of the Territory the last week of August, 1896.

Here in time will be bred and reared the dairy cow that will be so improved and developed as to surpass all her ancestors, whether it be the Jersey and Guernsey for butter, the Ayrshire for cheese, or the Holstein for milk.

THE BEST RANGE BREED.

In 1883, when the first carload of pedigreed Herefords was brought to Arizona, they were, along with the importer, subjected to all sorts of adverse criticism. It was November, they were 8 months old, winter was before them; it was confidently predicted that all would be dead by spring. The next May all of the 60 head were alive—had not only lived subsisting on range feed alone, but had grown as much and were in as good condition of flesh as yearlings native to the range. They did excellent range service in 1884; some few lived through the droughts of 1892 and 1893 and are yet alive, never having any food but that found on the range.

The Hereford to-day, by reason of his proven superiority, is respected and admired. They have gradually taken entire possession of the range; they are to-day without a rival. This has been in exact keeping with what was expected of them. For over three hundred years the history of the Hereford has been one of continuous practical development in useful lines. This improvement during all these years had been made on grass. Therefore it was reasoned that their developed fixed qualities would carry them to the front as range animals. It is not too much to say that they have surpassed the expectations and predictions of their most sanguine friends.

The Hereford breeds true to type. Their color and markings are both unvariedly and permanently established. Their thrift and rustling qualities will ever keep them the favorite of the practical range man. There is no sentiment in this. The range man demands a steer that in good years will get fully ripe on grass, and that in years of short grass will at an earlier age bring the most money from northern ranchmen or feeders in the corn States; this quality no other breed possesses.

Short on his legs, active and courageous, the Hereford was noticeably always in the best of condition on every range, where, during the great droughts of 1892 and 1893, cattle were actually rustling for an existence. It was then that the Hereford demonstrated forever and beyond controversy his matchless merits as the superior of all breeds for the range under the most adverse conditions.

HORSE GROWING.

Arizona is the natural home of the horse. Her rough, rocky mountains and stony and gravelly mesas, running into hard-ground plains, give just the condition of country best suited to develop in the highest degree those qualities of the horse most prized. The altitude and consequent atmospheric conditions develop unequaled lung power, the contour of the country over which he must travel for food and water develops muscles large and solid, and the texture of the soil makes the hoof to grow as hard and lasting as steel. Range-raised horses of Arizona are noted for their endurance and high courage; you can drive or ride them to death; the range produces no quitters. This was largely true of the wild horses found here and of the small ill-shaped horse of the native Mexicans. It is doubly true of the high-bred horses that are now grown here, the original stock of which came from the best studs of Pennsylvania, Indiana, Kentucky, and Tennessee.

The first horse brought to Arizona that left his mark on the stock of the country was of Morgan descent, of the Golddust strain, out of a thoroughbred dam. Though this was twenty years ago, the peculiar golden sheen of the rich sorrel color of the Golddust is seen in the coat of many horses in southern Arizona herds to-day, and the disposition of the mother that would brook no control is shown in the impatience of restraint in his descendants to this day.

In later years descendants of Hambletonian, Mambrino Chief, Morgan, Star, and Clay, in the choicest strains of their blood, as represented by sons of Electioneer, Sultan, Shamrock, Almont, Kentucky Prince, and Stamboul, have been brought to the Territory and bred with so much care that on one or two ranches every animal is standard bred according to the rules of the American Trotting Register Association. Perhaps the best horses grown in Arizona are those of saddle lineage, as represented in the blood of the true saddlers, Denmark and John Dillard, and the pacers of Tom Hal, Snow Heel, Blue Bull, and Pocahontas blood. They make fine drivers, are equally at home to the pole, in shafts, or under saddle. Their disposition is all that can be desired. Colts of this blood raised on the open range, running wild until 4 years old, readily submit to the process of gentling, exhibiting none of the vices always found in the ill-bred broncho. Horses of this blood and those out of these pacing and saddle-bred mares by thoroughbred stallions can not be surpassed for endurance. Instances of their having traveled without injury 100 miles in ten consecutive hours over this country, without roads, are established beyond doubt or question.

The running-bred horses of this Territory are chiefly of the blood of Lexington, through sons of his son Norfolk and through sons of his daughter Mamona, and of Bonnie Scotland, Leamington, and Longfellow blood, through colts of those strains brought from Kentucky to southern Arizona in 1885, which are doing good service

to this day, their blood being appreciated and used on the trotting, saddle, and pacing-bred mares with the result of producing for this country a saddle horse that equals the famous saddlers of Missouri, Kentucky, and Tennessee.

There are enough horses raised on the open ranges of Arizona to supply the United States army (cavalry) stationed in the Southwest country. They are inconceivably superior in every way to the horses used in the cavalry service at present; they are more tractable, have more courage, are greater weight carriers, and in the matter of endurance for rapid marches or to endure the fatigue of a protracted campaign, in this country or any other, they so far surpass the present army horse that there is no comparison. This has been demonstrated in my experience and observation in every Indian campaign in Arizona since 1882. Where they were used side by side, the ranch-raised horse, carrying a cowboy, his saddle, and complete outfit, double and ofttimes treble the weight of the soldier's outfit, has ridden not only at the head of the command and worn it out, but has ridden down two and three cavalry mounts.

The day when mounted soldiers were clad in heavy armor, and when weight in the horse was needed to give or withstand the shock of the onset of the charge, has long since passed, and to see the cavalry mounted as they are to-day for service in this country is almost as incongruous as would be the accouterments and mount of Ivanhoe for Apache warfare. The use of the range bred and raised horse for cavalry service would make a demand that would at once take our surplus, would stimulate improvement of herds, and would increase the usefulness of that branch of the Army threefold.

In the farming districts of the Territory are found horses of the Percheron, Clyde, and Suffolk Punch breeds. More than enough draft horses are bred and grown to supply the home demand for drays and heavy wagons in the towns, and for the draft teams used for freighting to and from the mines throughout the Territory. Several shipments of the medium draft horse have been made to Tennessee markets with profit, and within the last two months a large consignment was made direct to England. Cable advises are that the horses arrived in good shape and condition, and that they were quite as satisfactory as any Eastern-bred horses. In the districts of Arizona where alfalfa can be grown—and it is grown wherever water is put upon the land—two horses can be raised to maturity upon each acre; some farmers keep three to the acre. When they can be raised to stand a continuous shipment across the continent and over the ocean and yet compare favorably in England with horses grown upon the Atlantic shore, further comment upon Arizona as the unrivaled horse country is unnecessary, and a more extended knowledge of the class of horses we grow will be of great benefit to the individual farmer and to the Territory.

The business is more depressed than any other branch of the stock industry. They can not be sold for beef; there is no present adequate demand for them for any purpose. The country is becoming overstocked, and they are in some sections eating out and destroying the ranges for cattle. Ranchmen who have the largest herds are with scrupulous care keeping up the high quality of their stock by selecting choice stallions from their best mares and by importation of new blood, believing that in the near future there will be a demand, aside from cavalry use, at fair prices, for all stock carefully bred and raised. It is the belief, this hope for the future, that makes a ranchman breed for quality in his herd with the same care in the selection of sire or best nicking blood strains as is exercised on the best-appointed breeding farm in Kentucky.

SHEEP HUSBANDRY.

Sheep ranching on the whole up to the last three years has been more satisfactory than that of cattle, many owners in the northern counties of the Territory selling their cattle and reinvesting their money in sheep. In addition to its having been of itself more profitable, the nature of the business was felt to be more secure from the fact that the herder being always kept with the flock, counting them every morning as they go from the fold, there was practically no loss from straying and none from theft (the bane of cattle ranching), and on account of their always being in hand losses from drought and overstocking were avoided up to 1895 by driving to feed, which was an impossibility to the cattleman.

No portion of the United States surpasses the northern counties of Arizona as a sheep country. The conditions of climate and feed are exactly suited to their highest development both as mutton sheep and for woolgrowing. This, taken in connection with the alfalfa fields of our valleys, where they can be extra ripened for the shambles, places Arizona in the forefront as a sheep country.

Of late years the custom of driving to the vicinity of the alfalfa fields of the Salt River and other valleys to shear has enabled the sheep grower to have his lambs come much earlier than when they were held the year around on their northern ranges, in many instances enabling the ewe lambs to be bred a year sooner than before this custom was adopted.

We have all the conditions for the growing of superior mutton and wool; they could not be better.

PIG RAISING.

Breeders of hogs in Arizona, as elsewhere in the United States, have about discarded the use of the names "hogs" and "swine." He is a Berkshire, a Poland China, a Suffolk, a Chester, a Duroe Jersey, or an Essex, but never a hog. The business as carried on in Arizona is very remunerative. No expensive pens to protect from winter's cold are required; the pig is better outside; he lives the year around in the alfalfa field, asking only for a slight elevation where he may make his bed, rest, sleep, grow fat, and keep his young the first few days of their existence and be above the inundations of the semimonthly flooding for irrigation.

The more progressive pig farmers do build a roof of cottonwood boughs to protect them from the heat of the noonday sun and to shield them, should rain chance to fall, in the winter months.

There is no country where as large a percentage of increase can be raised, nor is there any other place where they can be so cheaply fattened. Alfalfa, green, dry on the stalk, or cured into hay, is alike eaten by pigs with relish, and the large numbers yearly shipped to outside markets for immediate slaughter is evidence of its great fattening properties. The pig farmers estimate that 1 cent per pound covers all expenses up to the time pigs are put aboard the cars for shipment to market. A large amount of capital is invested in this branch of the stock industry in farms especially equipped. That it is profitable is evident from the fact that present owners are extending holdings and new men are yearly being added to the list of pig raisers. The quality of the live pig is not surpassed in the best breeding centers of the corn-growing States, and the product dead is unexcelled.

MULES.

Mules have been bred in Arizona contemporaneous with horses, but up to Governor Safford's time they were by small Mexican jacks or burros. The mule by the burro is hardy, long lived, and good for light driving and saddle uses; in fact, they make freight teams not to be despised, as is yet daily demonstrated all over the Territory and in northern Sonora, where from 24 to 30 are hitched to one wagon and its trailers, moving an amount of freight that to name in tons would subject us to the charge of Munchausenism.

Governor Safford brought here one of the famous Kentucky jacks, 15½ hands high, of large bone and great substance, at the same time so closely built that he was a model. Mules by this jack from the ordinary mares ranging on the Santa Cruz south of Tucson grew to be 15, 15½, and 16 hands high, and were all good lookers and sold during the years 1879 to 1886 from $250 to $400 a span at 3 and 4 years old. The success of this jack induced others to pay from $800 to $1,500 to secure jacks of like breeding, size, and quality, which were brought to Arizona in the years 1884 to 1886 and put to immediate service. No better mules are grown in the United States for light driving than we are now producing on the open ranges of Arizona; for saddle purposes we certainly surpass any other country. The range-raised mule gentles very readily, is very docile, and for mountain travel is in fact the proverbial sure-footed animal that never stumbles under any conditions of declivity or roughness; in addition, quite a fair percentage grow to a size sufficient to warrant their being called medium draft mules.

Into the farming districts the last few years quite a number of high-bred large-size Kentucky and Missouri jacks have been brought. The mule outsells the horse at all times; that is, sells nearer to his actual worth. The depression in the horse market accounts for the attention that has been given of late to mules. As on the irrigated lands the draft horse grows to perfection, it is very safe to assume that we will produce there a mule not second to any grown elsewhere for draft.

LIVE-STOCK SANITARY COMMISSION.

In 1884, when ten herds of cattle (300), four of them consigned to importers in the Middle States, arrived in Canada from England, and one herd (28 head) at Portland, Me., suffering with foot-and-mouth disease, the cattlemen of Arizona were aroused to their danger, especially when taken in connection with the fact that pleuro-pneumonia was then prevalent in the Atlantic seaboard States and had spread in isolated instances as far west as Missouri. A meeting was called and a Territorial stock association was formed and executive committee named, who were clothed with authority to carry into effect any measure they deemed necessary to prevent the importation of diseased animals into Arizona.

The work of the committee was effective, because they were sustained by the executive of the Territory, and their action in every instance was approved and unanimously upheld not only by the cattlemen, but by all persons interested in the material prosperity of Arizona.

In order that the Territory might be able to act in concert with the United States authorities, if, unfortunately, pleuro-pneumonia should be brought into the Territory, and the more effectually to guard against its introduction, or of any contagious disease, the live-stock sanitary commission was created by legislative enactment in 1887, a board was appointed, clothed by law with the power to make and enforce rules and regulations for examining and quarantining, if necessary, animals coming to the Territory. To be on the safe side, this board refused entry to all cattle coming from States in which the disease existed up to one year after March 25, 1892, the date after which, by proclamation of the Secretary of Agriculture of the United States, no case of pleuro-pneumonia was discovered in the United States. While this course worked some hardship in a few individual instances, it counted as nothing compared with the fact that there never has been any disease of any nature among cattle on the open range of the Territory. So well is this fact recognized that every year our cattle go unquestioned as to disease to every State whose citizens are buyers of range cattle for maturing. Not only are they healthy, but they have an inherent vigor and robustness all their own that make them much sought after by the great range steer feeders of Colorado, Wyoming, Montana, and the Dakotas, as well as by the farmers of the corn-growing States of the Missouri River Valley.

There has been absolutely no disease among any stock on the open range of Arizona, and but very little in the irrigated districts, where the land is all inclosed and the stock held in fields by substantial barbed-wire fences. An outbreak of glanders a few years ago was so successfully handled by killing all affected animals that not a single case has since been found in that or adjoining herds.

Tuberculosis, found in a herd of Jersey cattle brought from Missouri, was entirely stamped out. A herd of Holsteins imported from California having the same disease has been held in close quarantine, and the disease was not communicated from either importation to a single native animal. To prevent the introduction of tuberculous herds in the future, all cattle coming from healthy districts of any State are required to be accompanied with a certificate of health issued by the State veterinarian; cattle coming from infected districts are held in quarantine until their condition is determined, and are only admitted when proven free from disease.

By far the greatest loss from disease has been caused from swine plague, thought by some to have been introduced by an importation of pigs from the Middle States; by others it is believed to have originated here on account of the conditions existing on a few ranches tending to reduce the vitality of the pig.

Medicine seems to be of little value in this disease. The Bureau of Animal Industry advise medicine only as a tonic, and from their published reports are evidently at a loss how to treat the disease. It has been entirely suppressed here by the killing of all young pigs and the complete isolation of every infected ranch.

Under enforcement of proper sanitary regulations nearly all old pigs recovered.

From February 15 to December 1 of each year cattle from a great part of the southern portion of the United States are prevented from going north by reason of being infested with a tick that communicates to northern cattle a fever from which death ensues. This tick is absolutely unknown in Arizona. Our cattle are as susceptible to the fever and die as surely from it as do the cattle of every northern latitude. Arizona quarantines against and prevents the introduction of the proscribed cattle for the same period named by the United States, and in all other ways adopts and enforces the rules and regulations governing the transportation of cattle promulgated by the Secretary of Agriculture of the United States, and as a consequence have added greatly to the value of the live stock of the Territory.

This sanitary board is also intrusted with the enforcement of the live-stock laws referring to theft and inspection. At every shipping and slaughtering point within the Territory they have inspectors and detectives selected because of their special aptitude for the work to be done. This branch of the service, which has only been properly organized and systematized during the past year, has given great satisfaction; some further legislation is necessary, after which the board will be exceedingly valuable as furnishing entirely reliable statistics concerning the stock industry.

THE FUTURE OF THE INDUSTRY.

In 1883 it was believed, and this belief continued for a number of years, until in the nineties, that the production of beef was below the actual demand for consumption—that is, that the percentage of population was increasing faster than the percentage of beef. Prices fell, however, in spite of theories, and continued to fall. Cattle men in every section of the country charged this condition of affairs to the large beef packers of Chicago. The Government was induced to look into it; Senate committees investigated exhaustively, and all interested watched closely. The result attained was that the packers only followed the rule of all commercial men—bought when they could get the cheapest and sold when their product commanded the best price. In fact, the charges against them were not proven. Arizona cattle

CATTLE ROUND-UP.

men suffered in common with all others from the depressed condition of affairs, but a much better feeling pervades the community since it is believed that overproduction caused the low prices. The cattle men have regulated their expense to meet their incomes. They now feel, because of substantial advance in prices received this year and the assurance of good range feed for some years to come, that their business is in a better condition than it has been for a long time past. With proper home legislation and governmental compliance with their just requests, there is every reason to hope that the dark days of depression are over. All our range men who can are increasing their holdings. Quite a number of northern cattle men have been buying stocked ranges in Arizona, seeing that a turn in the business for the better is near at hand.

The question is often asked, "How long will the range business last?" John J. Clay, jr., who concededly stands at the head for his intimate knowledge of range conditions in every part of America from the earliest days of ranching on the plains to the present time, and whose success is phenomenal as an all-around cattle man from the range to the great Chicago market, where he stands easily first, adding weight and value to what he says, answers this question in his Live Stock Report as follows:

"That is easily answered. It is here to stay, probably on different conditions, but it is a part and parcel of our American agriculture. It is a means to an end. That end is beef or mutton, and as long as the plains and mountains exist, with present climatic conditions, so will ranching. It will be our great reservoir from which we can draw an endless number of cattle and sheep, some of them fat, but most of them only feeders. Fences will increase, meadows watered by mountain streams will be more numerous, but there will still remain, whether surrounded by barbed wire or not, a vast pastoral region which can only be used as a grazing ground.

"Life in the West, whether it be by some quiet stream that meanders through the plains or under the shade of a snow-capped mountain, will always have an attractive side. The air is pure, the climate fine, and there is a freedom about it which compensates more or less for the sweets of civilization.

"Families grow up in Spartan simplicity, adapting themselves to the circumstances surrounding the frontier, but they are silently building up, with cattle and sheep, with spade and shovel, by school and teacher, a great empire which thrives on the arts of peace and the sinew of the worker.

"In the distance I see the wild and woolly cowboy gradually transformed into a quiet, unassuming citizen, with his homestead, meadow, and grazing lands, taking no chances except those which nature seems to provide in every clime and country.

"The work of revolution has begun, and the cattle on a thousand hills will have hundreds of owners, who will improve their quality as well as provide a greater quantity."

MINING.

From a date long preceding the organization of Arizona as a Territory it has been especially noted for its mineral wealth, and this fame of hidden treasure within its borders multiplied until on the consummation of the Gadsden purchase, in 1854, the mines first began to be opened, capitalists from the East became interested in the mining industry of the Territory, companies were organized, mills and furnaces were built and put in operation, and in the face of adverse conditions, notably the meager, expensive transportation facilities, mining operations were conducted with considerable success and the most flattering prospects.

This development continued until the outbreak of the civil war and the withdrawal of the United States troops in consequence thereof. Then the Apache Indians, the persistent enemies of the white man's encroachments, were once more masters of the Territory. This was in 1861.

The progress that had been made was completely demoralized, properties were plundered and destroyed, numerous murders of those engaged in mining pursuits took place, and the work was almost entirely suspended. This state of inactivity continued until the organization of the Territory in 1863, when new and rich discoveries were frequently made. But they were so close to the Apache strongholds

that prospecting was extremely perilous in most regions and the development work a most hazardous occupation for the miner.

This condition of things prevented the enlistment of Eastern capital, and many of the mines that were extremely rich could not be worked profitably by reason of the crude reduction works and processes of the pioneers. Some mines of extraordinary richness were, however, continually and profitably worked at this time. Some mines were remunerative at certain seasons, and quite a number of men derived large sums of money from working placers and small veins near by the more populous settlements.

The people were very impatient, knowing that they were in a country whose every mountain was a repository of rich bodies of the precious metal. They longed for the time when the bloodthirsty Apache would be conquered, peace once more restored, and the development of Arizona's rich mineral wealth begin in earnest.

The Apache war ended in 1874, and a remarkable revival of this industry took place, the aggregate product of her mines up to 1887 being estimated at $65,000,000, the production fluctuating considerably from year to year, chiefly attributable to Indian hostility, principally the bands of renegade Apaches, the implacable foe of the pioneer in these parts, which roamed around the Territory and caused the occupation of the miner to be, while a profitable one, yet a most hazardous undertaking. This condition has happily changed; the renegade Indian is no longer a menace to the people of this Territory, except in the remotest and most isolated parts. They have been subjugated and placed under control, and the people of Arizona owe a lasting debt of gratitude to President Cleveland for his prompt action in the removal from our midst of the Apache chieftain, Geronimo, the worst of his race, since which time Arizona has had but occasional and very little trouble with hostile Indian tribes.

Arizona is without question the most attractive mineral field in the United States. It has coal, lime, iron, lead, copper, gold, and silver in abundance. Several large deposits of fine marble—red, black, gray, and variegated—have been found, and building stone of the finest quality is produced in large quantities.

Rich deposits of onyx, or ribbon agate, have been found. Some of this onyx is of a fine alabaster white in color, with veins of red running longitudinally through it. These deposits are valuable, the stones being capable of the highest polish, and make a very beautiful ornamental finish. Limestone of excellent quality is also found, chiefly in Maricopa and Yavapai counties. Several valuable beds of rock salt are found on the Gila, Verde, and Salt rivers, one of which has been worked by the Indians for many years.

Owing chiefly to the lack of transportation facilities, and in several localities the scarcity of fuel and water, these rich minerals have been, to a very great extent, neglected by mining investors and operators, and the development of its many natural resources has been left to the prospector, unaided by outside capital. Gradually the prejudices existing against the Territory as a mineral field are being overcome, and within the last two years a very gratifying impetus has been given to mining enterprises in all parts of Arizona; but still it can be truthfully said that the country has never been prospected "below the grass roots," and yet awaits the exploitation of capital and labor to fully determine the extent and value of its ore deposits.

The brilliant success that attended the opening, and consequent development, of the copper deposits at Clifton, Bisbee, Globe, and

SCENE ON GRAND CANYON OF THE COLORADO.

Jerome, where the ore bodies increase in quantity as depth is attained, has solved the problem so far as this character of mining is concerned. The Copper Queen, Old Dominion, Longfellow, United Verde, and other companies, each capitalized well into the millions, notwithstanding the low price of copper and the remoteness from the market, have been successfully and profitably worked. The United Verde, owned by the Hon. W. A. Clarke, of Montana, is the greatest mine on the continent if not in the world. The reserve bodies of ore in this mine are sufficient to employ its present machinery for ten years, and the by-products of gold and silver pay all the expense of mining, reduction, and transportation, leaving the value of the copper as net profit to its fortunate owner. During the last year a mine has been opened in the Huachuca Mountains which bids fair to rival in value any of the older and well-established properties. The vein is large and the ore shipped carries gold, silver, and copper to the value of $100 per ton. In the counties of Mohave, Pinal, Pima, and Yavapai are valuable copper prospects that await further development, many of them carrying gold and silver.

In Pinal County are lead mines that in the near future, when railroads give cheap transportation, will prove valuable to the investor.

The coal fields of Apache, Graham, and Gila counties have been little worked and are now idle because of a lack of cheap transportation. A road, however, to penetrate this portion of the Territory is in contemplation, which if accomplished will impart a new life in this direction.

In all of the twelve counties of Arizona, the exceptions being Navajo, Apache, and Coconino, silver and gold leads are numerous. Silver mining, on account of the low price of silver bullion, has been neglected, operations in that direction being confined to chloriding and the shipping of rich ores where the land carriage is not too great. It is a fact, however, all statements to the contrary notwithstanding, that the mineral wealth of Arizona is greater in gold than in silver. The dry placers of the Territory have been a never-failing source of legitimate employment to the hardy miner for two generations past and will so continue for a long time. The annual return from this branch of mining, so far as can be determined, is about $600,000, and about 1,500 men are thus employed in different parts of the Territory at irregular periods.

The universal demand for gold has given an increased impetus to that class of mining. Valuable properties have been opened up, about fifteen new stamp mills were erected during the past year, and prospecting for new "finds" and development work on prospects is being pushed with an energy heretofore unknown. It is easy to secure good prospects on working bonds, which gives an inducement for those who command capital to do the work necessary to prove the property. There is no speculation fever attending mining enterprises. It is engaged in as a legitimate business. Large plants and investments necessary to reduce the ores are not made until the mine is fully prospected and its value fully established.

It is said that Arizona resembles a kind of laboratory where nature has tried experiments preliminary to a general distribution of minerals in the Pacific States. The experienced miner from abroad is puzzled by the many new combinations and strange geologic conditions with which he meets, though he generally finds sooner or later all that he has known in other States.

The natural conditions for mining, the supply of fuel and water, and a favorable climate for continuous working are here most excellent when compared with those of other States.

About 40,000,000 acres of her lands can be described as mineral bearing. Arizona is one vast storehouse of mineral wealth, and only awaits the introduction of sufficient capital to properly develop her properties; and they should receive the proper attention from capitalists, for her record has been, for those who have invested in her mining enterprises, one of dividend rather than assessment.

The mines of Arizona have produced for the past twenty years ending June 30, 1896, gold, silver, and copper amounting in the aggregate to the sum of $127,166,016.20. Her production of gold, silver, and copper for the year last past was $13,426,888.20.

From the most reliable sources obtainable the output of gold for the past fiscal year was $5,200,000, showing an increase over last year's production of $940,000, and this estimate does not include the large amount of gold found by prospectors and the men engaged in placer mining, from whom no statements can be obtained, but a conservative estimate of which will place it at $600,000.

The product of silver for the past fiscal year shows an output of 1,650,530 ounces, which, valued at 67 cents per ounce, gives a total of $1,105,855.10, showing a decrease of $31,644.90 from the reported product of last year.

Statements furnished by five of the largest copper-producing properties in the Territory show an output of that metal for the year to be 61,210,331 pounds. The above-mentioned statements, not including the output of about five properties, which will average a production of at least 2,000,000 pounds each, and from which no reports were obtained, added to the statements furnished, show the total product of copper for the year to be 71,210,331 pounds, being an increase over the reported production of last year of 21,549,042 pounds, which, valued at 10 cents per pound, gives a return of $7,121,033.10.

The estimated value of the lead output is $531,375, an increase over that of last year of $181,375.

In addition there was also produced in this Territory limestone of the value of $20,000, and onyx, marble, and building stone from which no returns could be obtained, but which would amount in value to many thousands of dollars. Adding the value of the lead and limestone product to that of gold, silver, and copper gives a sum total of $13,978,263.20 for the mining output of Arizona for the year last past.

I submit herewith a report on the subject of mines and mining from the pen of Prof. William P. Blake, a distinguished member of the faculty of the University of Arizona and director of the Arizona School of Mines. Professor Blake is a man of national reputation in his profession, and treats of this subject by sections. It is a most valuable and interesting contribution to the mining literature of the Territory.

Mines and Mining.

An attempt to show the geographical distribution of the mineral wealth of the Territory of Arizona results in the generalized statement that all of the mountain ranges are mineral bearing. Even the plateau region of the northeastern portion has its deposits of value of building stone and of coal, and probably of other mineral substances of commercial value. But the chief region of occurrence of the precious metals, of copper, of lead, and of other metals, lies southwestward from the Grand Canyon region and of the great lava districts around the extinct volcanoes of the San Francisco mountains.

The chief region of metalliferous minerals and mines thus commences on the northwest, in Mohave County, at the sharp bend of the Colorado River at Callville, and it extends northeastward diagonally across the Territory for nearly 500 miles in a broad belt of high and rugged mountains, including the Bradshaw Mountains, the Mazatzals, the White Mountains, the Apache and Pinal mountains, the Santa Catalina Mountains, the Santa Ritas, Huachuchas, and the Chiracahuas.

The chief towns, mining camps, and mining districts are found along or upon the margin of this broad central belt extending diagonally across Arizona from Nevada to Mexico. Commencing on the northwest end at the Colorado, we have in succession northeasterly Mineral Park, Hillside, Congress, Jerome, Prescott, Phœnix, Florence, Pinal, Globe, Mammoth, Tucson, Tombstone, Bisbee, Pearce, Arivaca, and Oro Blanco. The Longfellow copper mines and others of Clifton lie upon the northeastern border of the belt, while upon the northwestern border we find the celebrated districts of Harquahala, Weaver, Vulture, and many other districts. Passing farther westward, we come upon the lava or piedmont region of broad and extensive valleys and plains broken by numerous isolated ridges and ranges, all trending northwest and southeast parallel with each other and with the main central axis of mountains.

These mountain ranges and valleys fill out the area of the Territory to the Colorado on the west and Mexico on the south. They are all mineral-bearing.

The ancient district of Castle Dome, celebrated for its beautifully formed veins of argentiferous lead ores, lies about 20 miles north of Yuma in the extreme southwest corner of Arizona. Silver districts with very large veins carrying silver ore adjoins Castle Dome northerly, and there is a continuous series of mining camps and locations of gold, silver, and copper ores northward along the Colorado River to La Paz, Ehrenberg, Bill Williams Fork, Mohave, and beyond.

In the occurrence of rare and curious minerals, perhaps more interesting to science than commercially valuable, Arizona is much favored. The beauty of the crystalline minerals of the Copper Queen at Bisbee attracted great attention at the Columbian Exposition, Chicago. Such rare species as walfenite, vanadinite, and des cloizite are commonly associated with the lead ores of the Territory. Stromeyrite, olivenite, gerhardlite, and bournonite have also been found.

GOLD.

Of all the metals gold is perhaps the most widely and generally distributed. It occurs in nearly every mountain range from one side of Arizona to the other, and in its more local distribution follows the trend of the formations generally northwesterly and southeasterly.

From Yuma eastwardly to the Baboquirari Mountain Range a constant succession of mountain ridges, separated by broad valleys or plains, marks the prolongation northward of the gold region of Sonora, Mexico, a gold region of great extent and importance, characterized by a multitude of strongly defined quartz veins, following the trend of the mountains and fringed by placer deposits of great extent.

There are two especially well defined gold-bearing mountain ranges—those of the San Francisco, south of Sonoyta, on the boundary line, and west of El Plomo, Sonora, in which, along the contact between granite and porphyry on one side and a heavy quartzite formation on the other, a large quartz vein extends for miles, and deserves the title of the Mother Vein of Sonora. Two of the chief locations upon this vein are known as La Campana and the Alejandro. This same trend of gold-bearing formation extends northwest into Arizona. East of this line and north of the boundary we have the gold-mining districts of the Quijotoas and the Cababi ranges, all gold-bearing.

The gold-bearing ranges and hills of southwest Arizona have not been thoroughly prospected. The general absence of water is a great drawback, but notable success has attended many of the judiciously planned efforts to secure it. As examples of the importance of more thorough prospecting, two great properties have been added to the list of producing mines. These are the La Fortuna, near Yuma, and the Pearce mine in Sulphur Spring Valley.

GOLD PRODUCTION OF ARIZONA.

In regard to the annual production of gold in Arizona, statistics and estimates differ widely, and I prefer to abstain from estimating the amount of gold and silver produced until some more systematic and reliable method of collecting the statistics can be initiated. There can not be any doubt that a very considerable portion of the gold sent out from Arizona is from the adjoining State of Sonora, Mexico. Placer mining is carried on in a small way, but at numerous places along and near the international boundary line where the gold-bearing ranges cut across it.

The nearest settlements where supplies can be obtained are generally north of the line and the temptation to get the gold across the line and into the United States is too strong to be resisted by the average Mexican and Indian miner.

LA FORTUNA MINING COMPANY.[1]

The Fortuna mine, near Yuma, recently acquired by Mr. C. D. Lane, of California, and his associates, has largely added to the list of valuable gold properties in the Territory. It is also a prominent example of the fact that the gold-bearing regions of Arizona have been greatly neglected and not well prospected or developed.

The mines and mill of this company are situated about 30 miles southeast of Yuma City, in Yuma County. It is in a region without a natural supply of water, but capital and skill have remedied this defect by pumping water from the Gila River at a point 12 miles north of the mine. A large and powerful pump requiring 100-horse power is placed at the river and the water is forced through a 4-inch pipe to the mill at the mine, overcoming an elevation of 750 feet. The difficulty of working a mine and mill without water is thus overcome and the supply is unfailing.

The mine proper, or principal lode, consists of a glassy, rose-colored quartz, slightly copper stained in places, and partially covered also by iron rust or oxide, from the decomposition of pyrites. The gold is coarse and free. This main ledge is 20 feet wide, and dips to the eastward in the general plane or course of the surrounding formation—a hornblende schist. The dip is about 32°. A shaft has been sunk in this ledge or ore body to a depth of 220 feet, all of the way in ore, which carries the same value in gold from the top to the bottom of the shaft. There are three drifts extending at different levels from this shaft, with an aggregate length of 250 feet, and these are all in ore.

From these openings 6,300 tons of ore have been extracted in the last four months, producing gold to the value of $220,500.

The plant for hoisting and milling consists of a first-class double-reel hoist and a 20-stamp mill.

The average output of the mine since it started has been as follows:

Tons crushed per day	52½
Assay value of the ore per ton (gold)	$40
Amount saved in mill per ton (gold)	$35
Value of tailings per ton (gold)	$5
Total tons crushed in four months	6,300
Total amount saved in gold bullion	$220,500
Average production per month	$55,000

There are also upon this property, and within less than 2,000 feet of the Fortuna, four other distinct and well-defined ledges—one 10 inches wide, one 2 feet wide, one 4 feet wide, and one averaging 12 feet wide. The assay value of the ores from these ledges averages, respectively, $20, $25, $8, and $12 per ton. The several shafts or pits sunk on these ledges amount in all to about 375 feet and the drifting to 320 feet. All this sinking and drifting is on ore, and from the prospects it would appear that these ledges will develope into extensive and valuable mines comparable with the Fortuna. Work is progressing upon all.

Thus in a few short months this place (Fortuna) has developed from a desert and wilderness into a prosperous and growing camp, and intelligent, legitimate mining, with sufficient capital, is having its golden reward.

HAQUAHALA.

The 160-ton cyanide plant to treat the tailings of this mine is reported to be in constant and successful operation. Ten stamps of the company's mill are running upon ore of the Bonanza mine.

CONGRESS MINE.

I am indebted to Mr. William F. Staunton, superintendent of the Congress group of mines, for the following description of the property, prepared at my request for this report:

The Congress group of mines is located in Martinez mining district, Yavapai County, Ariz., near the line of the Santa Fe, Prescott and Phœnix Railway, about 70 miles north of Phœnix, and 66 miles north of Prescott. The mines are the property of the Congress Gold Company, a company incorporated under the laws of Arizona.

The town of Congress and the mines and reduction works are located at the mouth of a short canyon broad enough at the bottom to give ample room for the necessary buildings for town and works. The outcrops of the veins are on the mountain sides, giving abundant fall for waste dumps and the proper arrangements of mills.

[1] For the principal facts of this notice I am much indebted to Mr. R. M. Strauss, superintendent.

The water supply comes from Martinez Creek, 1 mile away. It is raised 500 feet by a steam pump to get over the ridge and runs into the camp by gravity.

Three hundred and fifty men are employed in the mines and surface works. The mills, mine, and all company buildings are lighted by electricity. The company owns and operates its own railroad from the junction to the camp. By a system of switch backs the cars are taken up the mountain side so as to deliver coal, timber, and other mine freight directly at the mines.

The company operates a general merchandise store and boarding house, and provides sleeping rooms lighted by electricity for its men. A hospital is also maintained, where the injured and sick are cared for.

The wires of the Postal Telegraph and Cable Company come into the camp, and the Congress company maintains a regular office.

Claims.—Twenty-two claims are owned or controlled by the company, but the greater part of the work has been done on only two—the Congress and the Why Not—although the others all carry promising veins and will be explored in the future.

Geology.—The country immediately around Congress is all granite. This rock is cut through by a series of approximately parallel dikes of greenstone trap, having a generally easterly and westerly strike and a dip of about 20° to the north. The Congress vein is in one of these dikes, or perhaps it may be said that the dike is the vein, for ore has been found in the dike in all possible positions from one granite wall to the other, but generally occupying a position near the foot wall and separated from it by a layer of vein selvage. The dike has a thickness of about 15 feet measured at right angles to the walls, but this is uncertain, as we rarely see the hanging wall in the mine, the drifts hugging the foot wall and their height not being sufficient to expose the hanging. These greenstone dikes are crossed by other more nearly vertical dikes, having a northeasterly and southwesterly trend. The cross dikes are apparently a kind of quartz porphyry. Very little is known of them, as they do not appear to be ore-bearing and have been but little exposed in the under-ground works. They do not seem to mark lines of faulting, as the greenstone dikes are not thrown at the intersection. They are apparently of more recent origin than the greenstone dike, as they seem to cut the latter and occupy the space of intersection.

The following analysis of a specimen of the greenstone was made at the Sheffield Scientific School, Yale University. No analysis of the quartz porphyry has yet been made.

	Per cent.		Per cent.
SiO_2	52.20	MnO	1.90
Al_2O_3	13.40	CaO	9.60
FeO	9.75	MgO	1.16

Besides the Congress vein, described above, and upon which nearly all the work has been done, there are several others of great promise on the surface and holding out well to the extent of the development work that has been done upon them. The principal of these is the Niagara vein, running nearly parallel with the Congress, but, unlike the latter, seeming to be entirely inclosed in the granite without the accompanying dike which is such a marked feature of the Congress vein. Preparations are now being made to thoroughly explore the Niagara vein with a view to largely increase the ore output. A cross cut is being run from the Congress workings on the 1,375-foot level to cut the Niagara vein, and a new shaft is being started (on the outcrop) which will be pushed down to a connection with this cross cut on the vein at the 1,375 level. There are already two shafts on the vein, one on the Remnant, 250 feet deep, and the other on the Why Not, 150 feet, both showing the vein strong and continuous to these depths and carrying ore which gave concentrates assaying 15 ounces gold and 55 ounces silver. The high silver is a peculiarity of the Niagara vein, distinguishing it from the Congress, the concentrates from which rarely carry over 3 ounces of silver per ton.

There are numerous smaller veins carrying good ore and running approximately parallel to the Congress and Niagara, but none of them have been explored to any extent.

Ore.—The Congress ore is white quartz, carrying very pure iron pyrite, generally disseminated through it in small particles, but at times in quite massive form. There is little if any gold in the quartz showing no pyrite, and hardly any free gold exists in the ore. The pyrite carries on an average about 8 ounces of gold per ton. Other sulphides so commonly accompanying iron pyrites are notably absent, a little galena of very rare occurrence being the only one identified, and chemical analysis of the concentrates from the ore showing hardly a trace of copper, arsenic, antimony, or indeed of anything but iron, sulphur, and silica.

The Niagara ore, on the other hand, shows considerable galena and some copper

minerals besides the iron pyrite. This difference seems to be rather characteristic of the ore of this neighborhood when the veins are entirely in the granite and distinguished from those which are accompanied by the greenstone dikes.

As stated above, the ore in the Congress vein is generally near the foot wall. Its position and appearance suggest that it occupies what has been the exceedingly flat lenticular cavities produced by a fracture of the dike along the plane of its dip, followed by sufficient movement along the line of fracture to leave such cavities by reason of the inequalities of fracture. There is no evidence of the replacement of the greenstone by quartz, the whole appearance being that of the filling of preexisting cavities by deposition from mineral waters. The valuable contents of the vein have been quite likely derived from the greenstone by segregation and infiltration. The above hypothesis regarding the origin of the vein is somewhat strengthened by the fact that no clearly defined ore shoots have yet been observed in the mine, the ore being in flat bodies with no more apparent relation to one another than would have been the case were the mode of formation as suggested. In one part of the mine the dike has been crowded into a wrinkle, such as would be caused by exerting a side pressure on the pages of a book, causing them to separate and leave more or less S-shaped cavities. In the case of the dike, this has been followed by the filling of these cavities by quartz and ore, making an unusual expansion in the size of the vein.

Underground works.—The accompanying maps show clearly the relative position of the different claims, as well as the underground workings. There are three principal shafts on the Congress, all sunk on the vein and conformably to its dip. The No. 2 shaft is at present the main working shaft, and has attained a depth on the vein of 1,740 feet. The 1,700-foot level is now being opened, and shows the dike and ore to be continuous and strong to that depth. The No. 1 shaft is also used for working purposes and will be carried down with the No. 2 and connected with it at intervals of about 300 feet for air and to block out the ground preparatory to stoping. The No. 3 shaft is at present merely an air connection, but a hoist has been ordered capable of sinking it 2,000 feet, and it will ultimately become of great importance in the operation of the mine.

The system of mining aimed at is to block out the ground by main levels, driven dead, approximately 300 feet apart. Stopes are then started at the shaft and rising above these levels. As the tops of the stopes are reached to the height decided upon as the proper distance for another level (generally 75 feet), the level is carried in, practically being already formed by the stope, with the exception of a little cutting of the roof to make room for the timbers. The ground stoped out is filled with waste as soon as possible, as the roof soon becomes heavy and the temporary supports put in during stoping would crush without the filling. By this method of stoping a large part of the waste broken is kept underground, serving the purpose of supporting the roof, saving hoisting, and causing the air to circulate upward along the working breast of the stopes.

Reduction works.—The present reduction works consist of a 40-stamp mill and a cyanide plant for treating the tailings. The milling process is as follows: The ore from the mine is dumped on grizzlys, the oversize passing through two 9 by 13 inch black crushers and thence with the fines to storage bins of about 100 tons capacity. Tullock feeders draw their supply from these bins for the 40 stamps. The stamps weigh 850 pounds each, and drop 6 inches 90 times per minute. Steel wire screens are used of 20 holes to the linear inch, No. 24 wire. The pulp is fed direct to 20 Frue vanners, equally divided between them. The resulting concentrates are dumped upon a sand filter to drain, and while still moist are loaded in bulk, without sacking, into cars for shipment to the smelter, at present the El Paso Smelting Works. The tailings pass to a Frenier & Le Blanc sand pump, which elevates them to settling tanks, where the surplus water is removed and pumped back to be used over again, while the tailings are run in cars to the dump.

Fine crushing and concentration at one operation on such material as the Congress ore is not a clean operation, but is probably the best process available, considering the very small supply of water. The concentrating percentage is in the neighborhood of 80 on $16 original ore, and the greater part of the loss is in the very fine slimes. It is quite probable that closer work could be done by hydraulic classifying previous to concentration, but the changes in the mill necessary to introduce this in a proper way would be quite extensive, as the necessary fall between the batteries and vanners is at present lacking. Furthermore, it is quite likely that the present reduction process may be entirely replaced by the cyanide treatment of the original ore, and until this question is finally decided it is not desirable to make any changes in the present arrangement of the mill.

Cyanide works.—In the spring of 1895 a cyanide plant was built to work the tailings. It consisted of three 26 feet diameter by 4½ feet deep leaching tanks made of Oregon pine, four 15 feet diameter by 10 feet deep solution tanks, together with the necessary pumps, piping, zinc boxes, car tracks, etc., the whole being inclosed in

ORE ROASTS.

substantial buildings. The process worked fairly well at first when the old oxidized and sandy tailings were used, but when it came to treating the more recently made tailings, which had not had time to oxidize and which were quite fine, filtration difficulties appeared which we were unable to overcome by raw treatment. A thorough trial of the agitation process, substantially as employed for slimes in South Africa, was made, but the process proved too wasteful of cyanide and water. As the result of careful experiments made on a working scale we are now building a Brown mechanical roaster of 100 tons per day capacity with the intention of roasting all the tailings previous to cyanide treatment. Only a very light roast is required to thoroughly oxidize the tailings and put them in such condition that the solution will readily percolate through them and give an excellent extraction. The process will be as follows: The tailings will be plowed to partially dry them. They will then be taken by wheel scrapers and dumped into a Stedman pulverizer, from which, by elevator, they will be discharged into a storage bin and thence to the self-feeder of the furnace. Emerging from the furnace after four hours' roasting, they will be automatically carried along on a cooling hearth and discharged into a storage bin, from which they will be elevated and spouted to the leaching tanks. This new tank will probably be in operation by December 1, 1896.

Production.—The present production of the company is at the rate of about 3,600 ounces of gold per month, all from the Congress vein. With the opening of the Niagara vein, and the largely increased milling plant now in contemplation, this rate of production will probably be doubled in the near future. Present indications point to the probable adoption of the direct cyanide treatment of all ore, preceded by roasting.

THE PEARCE MINE.

During the year 1896 this newly developed mine has become a large producer. It is another example of the great amount of mineral wealth lying dormant, awaiting the prospector and the aid of capital. The croppings have been known for years, but being in the low valley land and conveniently under foot and crossed by trails they were disregarded and neglected until assays revealed the importance of the ore.

The locality is in the Sulphur Spring Valley. It is about 17 miles east of South Cochise Station, on the Southern Pacific Railroad. It was bonded about a year ago and was worked until May, 1896, the ore taken out remaining on the dump. It was then purchased by the bondholders at about $275,000, according to report, and shipments of the ore began. The shaft is now about 250 feet deep and makes a most satisfactory showing of the vein to that depth. Drifts have been run each way from the shaft, and the ore is raised to the surface by horse whims, which are shortly to be replaced by a steam hoist.

The ore is shipped in bulk from Cochise Station to Pueblo at the rate of from 4 to 10 carloads per day. The freight rate to Pueblo is $11.75 per ton. It is stated that the ore so shipped carries from 1 to 2 ounces in gold and from 50 to 75 ounces in silver. According to the general report the veins average 16 feet in width and the croppings extend for over half a mile.

MAMMOTH MINE.

This property, which has been a large producer, has been idle most of the year owing, it is said, to a change of ownership. Considerable amounts of high-grade lead ore have been shipped from the mine. It is now reported that satisfactory results have been obtained in experiments with the cyanide process. This process will shortly be introduced there.

MOHAWK MINE.

This is the first southerly extension of the Mammoth in Pinal County, about 50 miles northerly from Tucson, and 3 miles easterly from the San Pedro River. The working shaft is 334 feet deep, and there are two other shafts about 100 feet deep each. The vein has been drifted upon for nearly 400 feet on the 100-foot level and about 250 feet on the 200-foot level. Veins average 12 feet in width. There is a 20-stamp mill and one Griffin mill with a power plant sufficient for a larger mill. The vein stone is quartz and the ore free milling.

BRADSHAW GOLD AND SILVER MINES.

Among the numerous claims and mines of the Bradshaw Mountains the Crowned King holds a prominent place. It is opened by tunnel and shaft. The ore is pyritic and is worked in a 10-stamp mill near by. As much as possible is collected on the plates and the concentrates collected by eight Frue vanners and are shipped to

smelting works. Wood and water are abundant. The Luke mine is about 2 miles south of the Crowned King mine. Seven men are employed, and it produces about a carload of ore a month. The last shipment carried about 600 ounces of silver to the ton of ore. The ore is packed to a wagon road upon burros and thence is hauled by wagons to the railroad at Phœnix. There are three veins—the Lorena, Congar, and Eclipse. The shaft on the Lorena is 300 feet deep with three levels.

The Rapid Transit mine is located less than a mile south of the Luke. It is opened by tunnels. The ores have been worked partly at the Oro Bella mill, and partly at the old Tiger mill. Several shipments of bullion have been reported. The last two bars were valued at $1,800.

The Oro Bella, Oro Bonito and Grey Eagle mines are upon well-formed gold-bearing quartz ledges and are equipped with a mill, but for some reason these properties have been allowed to lie unworked for years. All these veins produced rich gold ore at and near the surface. The oxidized ores were all rich in free gold, and the bright, clean sulphides which come in below give good results by assay. It would appear that these ores could be successfully concentrated, and that the concentrates could be successfully treated on the spot by chlorination, or by the cyanide process.

The New Jersey is reported among other promising veins. The Tiger mine, a large and rich lode of silver ore, celebrated in the earlier days of mining in the Territory, was worked to a depth of about 350 feet and has since stood idle. It was well equipped with powerful machinery and with a mill which still stands, but the village which formerly grew up about the mine and mill has fallen into ruins and has mostly disappeared.

The famous Peck mine is also in the Bradshaw district. It was a large producer of silver, and is credited with an amount equal to $1,000,000 in value when an ounce was worth $1. It is reported that this mine is to be reopened.

The Del Pasco is another property of historic record, upon which a tunnel is now being run to tap the veins at a greater depth.

VULTURE MINE.

This is one of the oldest gold mines worked in the Territory and has been comparatively idle for some years, but efforts are being made to work the large piles of tailings by the cyanide process.

The vein, though so large and promising, has not been worked to any great depth. A succession of faults, slips, or throws, but of small extent, has at different times given rise to reports that the mine had been worked out, and has tended to discourage deeper work. This should not be. The downward prolongation of the vein will probably be found some distance to the north of the present lower level, and upon discovery of its position it should be opened by a new shaft from the surface north of the old workings.

ORO BLANCO MINING DISTRICT.

This district receives its name from the fact that most of its placer gold is so largely alloyed with silver that the yellow color of the metal is lost and the gold is nearly white. A large part of the product is not over $\frac{400}{1000}$ fine.

The district is situated in the southwestern portion of Pima County, and is bounded southerly by the border line of Sonora, Mexico, into which state the gold-producing formations extend. It is more than 10 miles square, and consequently the district has an area of more than 100 square miles. All of this territory is gold bearing. It has long been known for its white gold placers and has been considerably prospected, but there has not been any serious or extensive development work. It is said that Mr. C. W. Kempton, mining engineer, who visited the district, remarked that, considering the extent and highly mineralized surface, it has been less developed by workings below the surface than any other mining section in the country. This district is accessible from Tucson by a triweekly stage. The roads are generally good. The rock formations are generally granite and porphyry with argillaceous slates. These formations seem to be everywhere gold bearing. In almost every ravine or gulch gold can be found by panning, and even on the hillsides and on the surface generally, especially where the soil is reddened by decomposed pyrite, gold can be obtained by dry washing. Most of the placer mining is carried on by Mexicans in a crude and desultory way, often with a small and wholly inadequate water supply, and in certain places by dry-washing machines worked by hand. The returns are small, but the miners manage to get their living, especially when they can get water.

Not only gold, but silver, lead, copper, and iron ores, are found in different portions. Gold is, however, the most generally diffused metal, but follows chiefly a broad belt or line through the district. The chief gold mines are found along this belt. These

ARIZONA SILVER NUGGET, 31 POUNDS, 900. FINE.

mines or claims are known as the Oro, Nil Desperandum, Sorrel Top, Tres Amigos, Holden, Gold Bug, McClenahan, Esperanza, Rob Roy, Golden Eagle, with many other locations and prospects, on several of which work is now being prosecuted.

Another part of the district seems to carry silver as the metal of dominating value, although more or less gold is associated with it. Owing to the depressed value of this once precious metal, less attention is now given to this silver-bearing portion of the district than formerly, and most of the claims are not worked.

Argentiferous lead ores are found also, but at present prices of lead and of silver the deposits are not explored. Copper ores are also found. A locality near the Jalisco range of mountains was worked for this metal with its associated gold and silver some years ago. Some lots of ore assaying as high as 37 per cent of copper and 18 ounces in silver have recently been taken out.

It is not possible to obtain definite and exact figures of the precious-metal product of this section, but the foregoing list of the principal mines and prospects is believed to include those from which bullion or concentrates in larger or smaller amounts have been shipped during the past year.

Several mills have been erected in this district, but there is not anywhere a shaft or mine 300 feet deep. The Montana is probably the mine upon which most work has been done since their location in depth and by drifts, cross cuts, and tunnels. The ore carries gold, zinc, and some copper. Since the death of its principal owner, Mr. Disston, of Philadelphia, the mine and mill have not been worked.

It is the opinion of Dr. A. H. Noon, one of the old residents of this district and to whom I am indebted for most of the foregoing information, that the Oro Blanco section constitutes a rich and inviting field, which is now receiving increased attention and which will eventually add largely to the mineral resources and productive wealth of the southern part of Arizona. As a cattle and stock raising region it is also highly favored. The shipment of cattle from there during the past year has been very large.

SILVER OF GLOBE DISTRICT.

The limestone which forms the hanging wall for the veins of copper is some 7,000 feet thick and is the foot wall of many of the old worked-out silver mines—such as the Alice, Miami, Centralia, Dime, and several others—all of which have produced from $30,000 to $200,000 in silver.

The silver country proper, however, is situated some 13 miles from the town of Globe. Here we find the old workings of the McMorris, Stonewall Jackson, Rescue, Old Mexican, etc., which in early days proved bonanzas to their owners.

The country is essentially a limestone country, the silver being found in pockets, usually small, but wonderfully rich. These pockets are mostly found under quartzite caps carrying red hematite.

The silver is found as chloride mixed with huge masses of native silver, and has AqPts-carbonates, some embolite, and vandinite mixed with it. The whole mass is usually associated with hematite, and is invariably free from gold.

The history of these mines shows that they contained from three to seven of these pockets. In one case only, that of the Old Mexican, one pocket was found; this, however, netted the owners $168,000.

SILVER KING.

There has been a revival of mining at the celebrated Silver King mine, in Pinal County, which for some years after the exhaustion of the great bonanza on the seventh level remained closed or idle. The mine has been reopened and a fresh supply of ore found east of and above the old open pit. Mr. Pheby, the present superintendent, writes that he is working to a depth of 230 feet on what appears to be a regular fissure vein. The new shaft is some 200 feet back of the old pit, or open cut, from which the earlier bonanzas were taken. The walls of this vein are hard, compact, highly basic feldspar porphyry. The vein cuts directly through this rock and is nearly vertical. There is a good gouge on one of the walls which is sometimes rich enough to mill. The new discovery carries the same kind of silver-bearing ore and minerals found in the western workings, and with quartz as the gange. Considerable ore has already been extracted from this new ground which gave concentrates carrying 800 to 900 ounces.

This mine is said to have paid over $2,000,000 in dividends. The great bonanza on the seventh level appears to have been cut off by sliding or faulting. Extended borings with the diamond drill under the floor of this level have not shown any continuation of the ore downward. It is probable that a proper critical study of the plane of slip would reveal the direction of the movement, and lead to a discovery of the great mass of ore.

The production of silver at the company's mill of ten stamps running five months on half time is valued at $25,000, the silver being reckoned at about 7 cents per ounce. This represents the output for the year.

GOLD CAMP OF GLOBE.

Within the past year a new gold country has been opened up about 6 miles from Globe, called Lost Gulch. Here, in the midst of granites, syenites, and porphyries, we find slates carrying very refractory looking pyrites, these slates being of a decomposed porphyritic nature. These veins being of a talcose nature near the walks, which are granite for foot and porphyry for hanging, and carry free gold—about $9 per ton—to a limited depth.

Lower down there are carbonates of lead yielding silver, and below that very base sulphides, iron, antimony, lime, copper, etc. Several claims have been taken up and are being developed.

COPPER.

The fame of Arizona as a copper producer is well sustained. The great camps of Bisbee, of Globe, Jerome (the United Verde mine), of the Clifton region have been producing actively for the past year. There has been an increased production near Tucson, and large amounts of ore have been sent to the local smelters at the railroad.

The mines at Rosemont in the Santa Ritas, some 25 miles southeast of Tucson, have changed ownership and preparations are being made to work them on a liberal scale.

COPPER SMELTER AT TUCSON.

The copper smelter at Tucson was started during the year and has been running most of the time upon ores of local production, chiefly from Hughes Camp, from Olive Camp, and the Sierritas. The copper ores received from July 1, 1895, to June 30, 1896, amounted to 2,200,000 pounds. The copper bullion shipped during the same period weighed 265,751 pounds, and the copper matte 228,548 pounds.

These works are under the management of Mr. Francis, and pay the highest market value for ores.

COPPER QUEEN.

The fame of the Copper Queen group of claims and mines at Bisbee extends far beyond the limits of Arizona. It is the chief producer of copper. By the courtesy of Ben Williams, superintendent, I am able to give the following statistics of the production and working.

The company is now running four blast furnaces and smelting about 400 tons per twenty-four hours. The product from these furnaces is all matte. This matte is bessemerized, or treated by the pneumatic method in two stands of trough converters of the Copper Queen or Williams type. These converters give a product assaying 99.3 per cent fine copper. This product is shipped as fast as made. The production for the fiscal year ending June 30, 1896, was $10{,}492\frac{510}{1000}$ tons, or 20,984,510 pounds of bessemer pig copper, averaging 99.2 per cent fine copper. The production for the year ending June 30, 1897, will be somewhat larger. About 800 men are employed in the mines and at the smelting works.

GLOBE MINING DISTRICT.

Globe district is situated on the northwestern slope of the Pinal Mountains, about 28 miles from the famous Silver King mine. In the period from about 1876 to 1883 this district attracted much attention by reason of many discoveries of rich silver veins. At present mining activity is confined chiefly to copper.

The first location on what is now considered the main copper-bearing belt was made in 1875 by the locators of the Silver King mine, and it was named "The Globe."

The location is now held and worked by the Old Dominion Copper Company, which also has two other locations on the same vein—the "Southwest Globe" and the "Globe Ledge."

The vein is described as following a contact, having for a foot wall diorite, and for the hanging wall limestone containing fossils of the Carboniferous period. On the west side of the outcrop there is a capping of a volcanic rock referred to trachyte, which conceals outcrops in that direction. That good ore occurs there was shown by Dr. Trippel, by a drift west from the money shaft, and openings were afterwards made through the bed of trachyte and have been extended downward on ore for over 300 feet. This deposit was regarded by Dr. Wendt as a fissure vein, and he notes that in approaching the ore body through the long adit tunnel, running lengthwise of the claims, the conditions are similar to those observed in the Longfellow mines at Clifton and the Queen and Prince mines at Bisbee, especially as regards the decomposition and kaolinization of the rock.

The ores are mostly oxidized, but large bodies of sulphides have been found on the second and third levels with oxidized ores below them. The ores carry a large amount of silica and frequently require heavy additions of lime and iron to the charges.

COPPER MINING SCENE, BISBEE, COCHISE COUNTY, ARIZONA.

OLD DOMINION COMPANY'S SMELTING WORKS, GLOBE, ARIZONA.

THE UNITED GLOBE MINES.

The mines have the "Hoosier Ground," consisting of some eighteen locations on the main lode, including the Hoosier, Centralia, Gladiator, Transit, and Nevada. The Buffalo group includes the Buffalo, Cleveland, and Mark Twain. In these mines we find practically the same conditions as in those of the Old Dominion claims. The vein, however, changes its trend somewhat, lessens in its angle of dip, and is not so wide. The limestone also becomes more magnesian. Sulphide ore in bodies have not yet been found and the ore is a little more siliceous than those described. Samples taken from the veins for a week gave the following for the average composition for the principal substances:

	Per cent.
Copper	14.6
Iron	19.3
Silica	29.4
Lime	13.1
Magnesia	4.2

The present output of the camp derived from two water jackets is on an average 3,000 pounds of black copper daily and of excellent quality, assaying usually as follows:

	Per cent.
Copper	97.60
Silver	0.52
Gold	Trace.
Iron	1.01
Sulphur	Trace.

The Old Dominion Company is now putting in two new 100-ton smelting furnaces.

The production of black copper from November 1, 1895, to August 1, 1896, is given as 6,940,000 pounds.

THE CLIFTON COPPER DISTRICT.

This district, the oldest of the great copper-producing camps of Arizona, was discovered about 1865 and has been worked almost continuously since. It is now connected by rail with the Southern Pacific Railway at Lordsburg. The prevailing rocks are granite, porphyry, and limestone, and the ore is found in large bodies, chiefly in the limestone; secondary deposits of cavernous shape and replacing the limestone. Rich bunches of carbonate red oxide and of native copper occur also in the midst of the abundant kaolin clay left by the alternation of the granite and porphyry by the passage of acid cupriferous solutions, derived no doubt, as at Copper Basin and at the other localities, by the oxidation in situ of bunches and lenticular masses of copper sulphide originally present as a constituent of the crystalline rocks, either in lenticular bunches of the seggregated type or diffused in the mass of the rock. This form of origin pointed out by me by my paper on the ores of Copper Basin (Transactions American Institute of Mining Engineers, February, 1889) appears to be general, though in some localities the parent source may be in a vein or veins accompanied by regular veinstones, and thus indicative of a source of the ore far removed from the adjoining rocks.

COPPER BASIN.

The copper deposit of Copper Basin, some 10 miles southwest of Prescott, Yavapai, County, are extensively interesting as showing the deposition of copper ore in progress. The geologic conditions are simple. The foundation rock is a coarse-grained granite and gneiss, in which soda feldspar predominates. There are also dikes of porphyritic rock and a large quartz vein containing pyrites.

Superimposed on this crystalline foundation we find heavy beds of mechanically formed rocks, conglomerates, breccias, and sandstones in horizontal layers cropping along the bed of a creek, and apparently the remnants of a much more extended formation now denuded and largely carried away by gradual atmospheric erosion.

The heavy beds of conglomerate are in many places much broken and tilted up, even standing on edge in large blocks, as if they had been lifted by some great convulsion; but the cause is much more simple, being merely the removal by gradual disentegration of the softened and decayed granite rock below.

The materials of these sedimentary beds are chiefly fragments of granite, gneiss, and plutonic rocks loosely mingled. They are the chief repositories of the copper ore, which forms the cementing substance. This copper ore is the blue and the green carbonate, azurite, and malachite, and the ore is generally so spread through the mass of the beds that the blue and the green croppings can be seen at a great distance, particularly after or during a shower of rain, when the colors are extremely bright and beautiful.

The copper carbonate is not only matrix and a cementing material for the fragments of rock, but it invests and covers these fragments so that only malachite and azurite are visible. The beds are from 3 to 10 feet or more in thickness, and, although seemingly solid carbonate of copper, are only masses of pebbles coated with the carbonate in thin crusts, forming incrustations rather than deposits of replacement as occurs when such solutions come into contact with easily soluble rocks like limestone and dolomites.

These deposits are suitable for a lixiviation process. They are not now worked. A full description may be found in the Transactions of the American Institute of Mining Engineers, February, 1889.

AJO COPPER MINES.

These mines, which once supplied large shipments by wagon train of native copper and red oxide, are not now in bonanza. A few miners and prospectors remain and are able to make an occasional shipment. The veins are not large but are numerous, and the ores are exceptionally pure and high grade. They are sent to Gila Bend Station on the railroad.

RAY COPPER MINES.

A group of copper-bearing claims, some 18 in number, with several mill sites, have been considerably prospected but are not now being worked. They are known as the Ray mines, and are on and around Ray Hill, 6 miles from Riverside, Pinal County. The ore is largely in masses and beds, in a decomposed felsitic rock, and is in an oxidized condition. The deepest opening does not exceed 100 feet, but there is an aggregate of 1,270 feet of levels and 560 feet of pits and winzes, mostly on ore.

HILLSIDE COPPER MINES.

An extensive area of outcrops of siliceous copper ores is found in the region south of Hillside mine. Chrysocalla and siliceous masses with black oxide abound, to the exclusion generally of the carbonated and oxidized ores. So far as known this copper district is not being developed.

COPPER ORES OF THE HUACHUCAS.

Important mines of a high grade of copper ore have been opened during the past year by Mr. Donnelly in the Huachucas Mountains, and considerable shipments have been made.

SANTA RITA COPPER ORES.

There are numerous claims in the district toward the north end of the Santa Rita Mountains, about 25 miles from Tucson. It is a region of limestone (carboniferous, probably) penetrated by dikes of porphyritic granite and other more basic porphyries. The deposits in limestone all show the phenomena of replacement. Large, thick crusts and pockets of green and blue carbonates are found in the limestone and generally near the contact with the crystalline rocks. Some bodies of yellow copper pyrite have been reached in sinking. Considerable ore has been shipped heretofore, and the district is well worthy of more attention than it has received.

COPPER ORES ALONG THE COLORADO.

The rich copper conglomerates of the vicinity of La Paz attracted great attention about the year 1865. Very rich masses of nearly pure vitreous copper were taken out, but the average does not appear to have been sufficiently high to justify working. Free gold visible to the eye was occasionally found in association with this ore.

In the vicinity of Castle Dome there are rich copper ores in small quantity which carry free gold. These appear to be more in the nature of veins than of deposits like those of La Paz and Planet.

Of the copper mines of the Harcuvar Mountains no information has been obtained.

COAL.

Investigations which I have made show that the rocks of the true carboniferous period have a wide extension and distribution over the Territory even as far west as Tucson. They are largely developed in the Chiricahua Mountains, and are there accompanied by Coal Measures with thick beds of black carbonaceous shale and impure graphitic coal, showing indisputably the former extension of the ancient carboniferous flora far westward of the limits usually assigned to it. Although efforts have been made to find in these carbonaceous graphitic beds some seams of workable

coal suitable for fuel, they have not been rewarded with success, and the question whether good coal can be had from these Coal Measures is still unanswered. There have been small quantities taken out as samples which burn very well and could be claimed as hard anthracite, but most of the coaly mass carries a large amount of ash and burns with difficulty, like the graphitic anthracite of Rhode Island, which it resembles. One bed of this material about 12 feet between the roof and floor is a brilliant-looking anthracitic mass of graphitic shale. It certainly marks the horizon of a basin of ancient carboniferous vegetation of large extent. Similar croppings are reported for miles north and south. The beds are not horizontal, but are strongly uplifted and plicated.

Local intrusions and disturbances may also account for the extreme degree of metamorphism and the conversion of the former coal shale into a graphite anthracite.

These carbonaceous beds are believed to be on the line of the southern extension of the San Carlos coal fields, so called. It is reported that southward, in Mexico, a fair coal is secured from the southern extension of the same mountain range, and that it is used by smiths. Notwithstanding the fact that the outcrops so far opened have not produced coal, I consider it highly probable that at some place upon this coal horizon a good seam or basin may be found. The discovery of good mineral coal is of such great importance to the people of the Territory that special explorations of the coal formations should be undertaken.

If reports are true, there are outcrops of good coal north of the Gila, upon the southern part of the San Carlos Indian Reservation.

The existence of true coal measures in the Chiricahuas prepares me to lend credence to these reports. I certainly advise an exploration of this region.

ARIZONA ONYX MARBLE.

The increasing production and exportation of the unequally beautiful onyx marble found upon Big Bug Creek, in Yavapai County, deserves special notice. The deposit covers some 200 acres and has become the property of the Arizona Onyx Company. It is about 26 miles from Prescott, in the vicinity of Mayers Station, on the stage road from Prescott to Phœnix.

Prof. George P. Merrill, of the United States National Museum, says of this stone that "it is traversed parallel with the planes of the deposition by wavy bands of color in all shades of amber, white, ocher yellow, deep ocherous red, and green of a most beautiful emerald shade." He likens this onyx to that of Mexico, which it resembles, but he considers the Arizona stone to be vastly superior to that now sent into our markets from the Mexican quarries.

SILICIFIED WOOD.

The finest and largest specimens of silicified wood in the known world are obtained at Chalcedony Park, near Holbrook, Apache County, Ariz. Whole trunks of trees and stumps with portions of the roots are found there converted into stone as dense and hard as the finest agate. Every cell and fiber of the former wood is preserved in stone. The specimens are often called "agatized wood" and also "petrified wood." A forest of trees appears to have been entombed in the rocks and to have been preserved by a slow process of replacement by silica from solutions permeating the beds. Subsequently the surrounding sediments have been washed away, while the enduring fossilized trees remained.

Tons upon tons of specimens have been taken away from the locality by collectors and dealers. A large quantity was shipped to Sioux Falls, S. Dak., to the large establishment founded there by the Drake Company, James H. Drake, president, for cutting and polishing the granites and porphyries of the Northwest for architectural decorative work. Sections of these trees 4 feet in diameter and large enough for tops of tables were cut and polished. Many specimens were shown at the New Orleans Exposition and at the Paris Exposition in 1889, where they were greatly admired for the perfect preservation of every detail of structure of the wood, for the very high polish, and for the exquisite interblending of colors in the mass due to the presence of various oxides in the original silicifying solutions.

The silicified woods of this locality in Arizona were first made known to the world through the collection of M. Jules Marcou, the geologist of the thirty-fifth parallel (Whipple's) survey, for a railroad route to the Pacific Ocean. Vide Volume III of the United States Pacific Railroad Surveys. The writer had the first specimen cut and polished from this collection in 1855. For a notice of the objects shown in Paris in 1889 reference may be made to the reports of the United States Commissioners (1889), Vol. I, p. 414.

For this exhibit of Arizona fossil wood, or "agatized wood," the exhibitor, the Drake Company, received a gold medal.

Arizona has thus contributed of its abundant wealth of beautiful material to the embellishment of palatial homes throughout the world. No other country, it is believed, can send to the lapidary such magnificent raw material of this nature as the petrified forests of Arizona afford. Not even the imperial works at Elcaterinbourg in Russia, with its wealth of Kalkansto jasper, its massive malachite, and other superb ornamental stones, can rival the beauty of the agatized wood of Arizona.

GYPSUM.

Large beds of gypsum occur in the Santa Rita Mountains about 25 miles from Tucson. They are in regular strata tilted up and are probably members of the Carboniferous series of rocks. The series appear to be some hundreds of feet in thickness, and is interesting not only from an industrial, commercial point of view, but to the science of geology.

There are deposits of this mineral in quantity in other parts of the Territory.

SULPHATE OF SODA.

Enormous deposits of sulphate of soda, containing also masses of pure salt, occur in the Verde Valley a few miles south of Campverde. These deposits are quarried extensively to obtain blocks of salt for cattle ranges. The time may come when this material will form the nucleus of extensive chemical manufactures in the Territory.

FINANCIAL.

The following statement from the Territorial treasurer will show that Arizona's financial condition compares favorably with any State or Territory in the Union:

Under an act of Congress approved June 25, 1890, and confirmed by the Territorial legislative assembly, session of 1891, the county and municipal debt of the Territory was funded by the Territory into fifty-year 5 per cent bonds, interest payable semi-annually in gold, amounting to $1,374,889.57. The counties and municipalities for whose benefit the bonds were issued are bound to the Territory for their payment, both principal and interest. The interest thereon has been promptly paid.

In addition to this, the Territory has issued bonds for $727,110.43, which constitutes its total net bonded indebtedness, a sum not large when the great resources of this young and growing community are considered, and makes a very small per capita indebtedness, according to population.

The following shows the condition of the Territorial treasury on June 30, 1896:

General fund	$74,640.30
Territorial insane asylum fund	4,027.87
Territorial university interest fund	5,596.19
Territorial normal school fund	3,833.34
Territorial school fund	2,093.95
Territorial interest (Rev. Stat., 2047)	3,656.32
Territorial interest funding fund	679.86
Territorial agricultural college fund	2,500.00
Territorial university fund	1,330.04
Territorial prison fund	6,135.21
Territorial insane asylum improvement fund	11,254.63
Territorial university dormitory fund	67.43
Total	115,815.14
Territorial floating indebtedness, total	242,144.68

THE BANKS OF THE TERRITORY.

The banks of the Territory are all in a safe and prosperous condition, and are ably and conservatively managed.

There are five national banks, with a paid-up capital of	$400,000.00
Surplus	84,182.06
With total resources of	1,470,260.53

There are seven banks organized under the incorporation laws of the Territory, and one private bank, making eight Territorial banks, with a cash capital of $237,640.06
Surplus 65,388.47

With total resources 1,114,799.10
Total capital and surplus 787,210.59
Total resources 2,585,059.63

As follows:

Discounts	1,461,828.96
Real estate	54,277.14
Furniture	23,858.27
Due from banks and reserve agents	411,260.78
Cash on hand	422,584.48
United States bonds	211,250.00
Total resources	2,585,059.63

Liabilities:

Capital stock paid up	637,640.06
Surplus and undivided profits	149,570.53
Deposits	1,695,950.10
Circulation	81,300.00
Due to banks	20,598.94
Total liabilities	2,585,059.63

Tabulated statement of the banks of the Territory.

	Capital.	Surplus.	Deposits.	Circulation.	Due to banks.
Phoenix National Bank	$100,000.00	$23,448.54	$207,648.33	$22,500.00	$9,430.34
National Bank of Arizona	100,000.00	21,321.17	117,964.47	22,500.00	748.66
Prescott National Bank	100,000.00	21,041.07	246,423.18	22,200.00	.....
Arizona National Bank, Tucson	50,000.00	9,886.61	163,415.76	2,850.00	.....
Consolidated National Bank, Tucson	50,000.00	8,484.67	153,686.41	11,250.00	5,461.32
Total	400,000.00	84,182.06	889,138.15	81,300.00	15,640.32

	Discounts.	United States bonds.	Real estate.	Furniture.	Due from banks.	Cash.
Phoenix National Bank	$216,126.07	$75,000.00	$4,614.85	$6,000.00	$7,219.57	$54,066.72
National Bank of Arizona	170,394.84	25,000.00	1,862.00	3,500.00	9,695.04	52,082.42
Prescott National Bank	224,517.55	25,000.00	.....	2,200.00	102,616.14	35,330.56
Arizona National Bank, Tucson	89,779.70	12,750.00	.....	640.00	71,794.91	51,187.76
Consolidated National Bank, Tucson	106,938.15	13,500.00	3,072.54	.....	70,228.59	35,143.12
Total	807,756.31	151,250.00	9,549.39	12,340.00	261,554.25	227,810.58

TERRITORIAL BANKS.

	Capital.	Surplus.	Deposits.	Circulation.	Due to banks.
Bank of Arizona, Prescott	$50,000.00	$15,548.80	$286,367.57	.....	$2,384.15
Western Investment Bank, Phoenix	15,200.00	2,284.46	33,451.53	.....	.....
Mesa City Bank, Mesa City	20,400.00	224.60	13,112.58	.....	70.07
Arizona Central Bank, Flagstaff	20,000.00	637.77	91,177.62	.....	.....
Farmers and Merchants' Bank, Tempe	25,000.00	6,492.32	42,939.46	.....	606.20
International, Nogales	5,000.00	.....	24,934.37	.....	1,898.20
Jas. Paschol & Co., Nogales	2,040.06	6,358.29	13,094.39	.....	.....
Valley Bank, Phoenix	100,000.00	33,842.23	301,724.43	.....	.....
Total	237,640.06	65,388.47	806,811.95	.....	4,958.62

Tabulated statement of the banks of the Territory—Continued.

TERRITORIAL BANKS—Continued.

	Discounts.	United States bonds.	Real estate.	Furniture.	Due from banks.	Cash.
Bank of Arizona, Prescott	$138,101.78	$60,000.00	$29,100.00	.....	$94,431.21	$32,667.53
Western Investment Bank, Phoenix	26,720.12	.....	.....	$2,182.85	4,280.71	17,762.31
Mesa City Bank, Mesa City	20,448.87	.....	9,547.75	.....	1,294.79	2,515.84
Arizona Central Bank, Flagstaff	82,344.30	.....	500.00	1,800.00	18,603.43	8,567.66
Farmers and Merchants' Bank, Tempe	58,670.78	.....	.....	1,197.50	6,365.34	8,804.36
International, Nogales	13,305.13	.....	.....	3,337.92	4,944.95	10,244.57
Jas. Paschol & Co., Nogales	13,908.97	.....	.....	.....	4,870.85	2,712.92
Valley Bank, Phoenix	300,572.70	.....	5,580.00	3,000.00	14,915.25	111,498.71
Total	654,072.65	60,000.00	44,727.75	11,518.27	149,706.53	194,773.90

COMMERCE AND THE PROGRESS OF RAILROAD ENTERPRISES.

Twelve railroads are being operated in the Territory, with a total mileage of 1,295.928, not including 9.250 miles of street railroad. The following table has been prepared by the secretary of the Territorial board of equalization:

Railroads.

Name.	Length.	Value per mile.	Total value.
Atlantic and Pacific	386.978	$5,000.00	$1,934,890.00
Southern Pacific	384.750	6,469.78	2,491,324.81
Arizona and New Mexico	41	3,466.00	142,143.24
Central Arizona	12	416.66	5,000.00
Arizona and Southeastern	37.900	5,300.00	200,870.00
Maricopa and Phœnix	34.380	4,358.02	149,829.50
New Mexico and Arizona	94.020	4,900.81	465,184.88
Total	991.928	.....	5,333,082.25

In addition to the foregoing, there are five railroads exempt from taxation by Territorial statute, as follows, to wit:

	Miles.
The Santa Fe, Prescott and Phœnix	197
The United Verde and Pacific	27
Globe, Gila Valley and Northern	68
Phœnix, Tempe and Mesa	9
The Congress Gold Mine Railroad	3

Nineteen and one half miles of railroad were constructed during the past year, of which 1½ miles consisted of street railroads.

The Southern Pacific passes through the southern portion of the Territory from Yuma, on the Colorado River, to the eastern boundary of Cochise County, traversing the counties of Yuma, Maricopa, Pinal, Pima, and Cochise.

The Atlantic and Pacific crosses the north of the center of the Territory, near the thirty-fifth parallel, and passes through the counties of Apache, Yavapai, Coconino, and Mohave.

The New Mexico and Arizona runs from Benson, on the Southern Pacific, in Cochise County, to Nogales, in the same county, on the Mexican line.

The Prescott and Arizona Central, which was formerly operated from Prescott Junction, on the Atlantic and Pacific, to Prescott, has been discontinued, having been absorbed and superseded by the Santa Fe, Prescott and Phœnix Railroad.

YUMA INDIAN AND SQUAW AGED, RESPECTIVELY 99 AND 102.

The Central Arizona runs from Flagstaff to Mogollon, in Coconino County, and is engaged chiefly in the lumber trade of that section.

The Arizona and Southeastern runs from Bisbee to Benson, where it connects with the Southern Pacific. This road is operated by the Copper Queen Company, its traffic being almost wholly composed of cattle and the product of the copper mines.

The Maricopa and Phœnix runs from Maricopa, Pinal County, on the Southern Pacific Railroad, to Phœnix, Maricopa County.

The Arizona and New Mexico runs from Clifton, Graham County, Ariz., to Lordsburg, N. Mex., and is engaged principally in carrying the mineral products of the section.

The Phœnix, Tempe and Mesa Railroad is a branch of the Maricopa and Phœnix, running from Tempe to Mesa City. This road is 9 miles in length and was constructed during the past year.

The Gila Valley, Globe and Northern is operated from Bowie Station, on the line of the Southern Pacific Railroad, to Geronimo, Graham County, 6 miles of which was constructed during the past year, from Fort Thomas to Geronimo. A further extension of this road is contemplated from Geronimo to Globe, the mining center of Gila County, the right of way for which has been secured through the San Carlos Indian Reservation.

The United Verde and Pacific runs from Jerome to Jerome Junction, and was built for the purpose of transporting the mineral product of the Jerome Mines.

The Santa Fe, Prescott and Phœnix Railroad is being operated from Ash Fork, on the line of the Atlantic and Pacific, via Prescott, in Yavapai County, to Phœnix, in Maricopa County.

The Congress Gold Mine Railroad is being operated by the Congress Gold Mining Company from Congress Junction, on the line of the Santa Fe, Prescott and Phœnix, to Congress, a distance of 3 miles, and was wholly constructed during the past year.

INDIANS.

There are on reservations within the borders of the Territory, as near as can be ascertained, about 38,000 Indians. They are located as follows:

Colorado River Agency:	
Mohaves at Mohave	677
Mohaves at Mohave Fort	700
Mohaves at Needles	667
Hualapais	700
Chimehuevis	141
Navajo Agency:	
Navajoes	20,500
Moquis (Pueblo)	2,029
Pima Agency:	
Pimas (Gila Reservation)	3,723
Maricopas (Gila Reservation)	203
Maricopas (Salt River Reservation)	93
Pimas (Salt River Reservation)	543
Papagoes (Gila Bend Reservation)	75
Papagoes (nomadic)	1,800
Papagoes (San Xavier)	517
Papagoes (Peerless Well)	246
San Carlos Agency:	
Coyotero Apache	612
San Carlos Apache	1,135
Tonto Apache	856

San Carlos Agency—Continued.	
White Mountain Apache	1,739
Mohave Apache	501
Yuma Apache	51
Suppai unattached in Navajo County	215
Total	37,723

Acreage in reservation.

Colorado River Agency	123,000
Pima Agency	357,120
Salt River Reservation	46,720
Gila Bend Reservation	22,391
San Xavier	69,166
Total	618,397

ACREAGE TOO LARGE FOR THE REQUIREMENTS OF THE INDIANS.

I think the above statement of the acreage of each reservation in the Territory and the number of Indians show that the reservations are entirely too large, and that action should be taken by Congress in the matter. There is no necessity for such large reservations, and the conditions and requirements now are far different from what they were many years ago. The Indians of Arizona are civilized—are what might be termed at least semicivilized. They do not follow the war path and the conditions that now exist are far different from those which existed when these large reservations were set apart for them.

These immense reservations were formerly given them for the purpose of affording vast hunting grounds and of allowing them to pursue their aboriginal habits. Conditions have entirely changed. I am of the opinion that the Indians on all the reservations in this Territory should be allotted their lands in severalty, and I recommend that an agent or commission from the Department of the Interior be sent to Arizona for the purpose of inquiring into the situation concerning the Indians of this Territory and to make such a report as the situation demands.

Separate property is the foundation of civilization and progress. No people can flourish where the title of land is held in common; and I am of opinion that the work of the Department in allotting the lands of the Gila Bend Reservation should be continued.

INDIANS SHOULD BE CONFINED TO THEIR RESERVATIONS.

The Indians of the different reservations should be, under reasonable and proper rules and regulations, kept upon them. Strict discipline should be observed in this respect. Great loss of property is suffered by the citizens of this Territory from the fact that they wander from their reservations and commit depredations upon the settlers.

For many years the great cattle industry has suffered great loss from the Indians. Many complaints have come to me since I have been the chief executive of this Territory concerning this matter, and conservative men, writing to me, whose statements are reliable, state that the actual loss sustained in the last five years by the cattlemen of one county alone (Pima County) by depredations of the nomadic Papagos amount to nearly $300,000. They roam at will many miles from their reservations, and seem to be under no restraint.

MEMORIALS OF THE EIGHTEENTH LEGISLATIVE ASSEMBLY OF THE TERRITORY OF ARIZONA.

These depredations have been so serious for many years that the eighteenth legislative assembly of the Territory of Arizona passed the following memorials in regard to them:

MEMORIAL CONCERNING THE DEPREDATIONS OF THE PAPAGOES.

To the Honorable Members of the Senate and House of Representatives of the United States in Congress assembled:

Your memorialists, the legislative assembly of the Territory of Arizona, respectfully represent that ranchmen in southwestern Arizona have, during the past three or four years, suffered heavily from the depredations of Indians of the Papago and kindred tribes.

That recently these Indians have become more aggressive, systematically killing and stealing the stock of cattle ranchers, threatening employees, and pursuing a general purpose of intimidation and theft, constantly becoming more aggressive, until the ranchmen are obliged to abandon their ranches, houses, and other improvements, consisting of wells from 700 to 800 feet deep, sunk at an expense of from $7,000 to $20,000 each, said improvements being made on land patented to the owners by the United States.

That these Indians do not respect the authority nor submit themselves to the control of the Indian agent of the Interior Department in whose care they nominally are; and that in like manner they set at defiance the powers of this Territory, so that when one ranch is abandoned others are exposed to these depredations, and unless succor is extended by the General Government in a short time that whole section of the Territory will have to be given over to these depredating Indians, at an enormous loss to our citizens and consequently to the Territory.

Your memorialists further represent that these Indians of the Papago and kindred tribes have at the present time, in the Territory of Arizona, for their sole and exclusive use, several large bodies of land, to wit:

	Acres.
Papago Indian Reservation, at San Xavier	69,029.49
Gila Bend Indian reservations	22,391.39
Pima and Maricopa Indian Reservation	350,000.00
Salt River Indian Reservation	47,500.00
Total	488,920.88

An area of land much in excess of their ability to use for any purpose whatever;

That a large portion of the above land is of the very best quality, suitable for cultivation by irrigation, and which, in the hands of white men, would be worth from $25 to $200 an acre;

Therefore, your memorialists earnestly request that immediate steps be taken to have these depredating Indians returned to their reservations and kept there by force of arms, if necessary; to the end that these outrages upon our citizens may be discontinued, the owners be able to return to their ranches, and the future loss of property prevented;

Resolved, That the Secretary of the Territory be, and is hereby, instructed to forward copies of this memorial, under the seal of the Territory, to the honorable President of the Senate, and the honorable Speaker of the House of Representatives of the United States, to be by them laid before their respective bodies; and be it further

Resolved, That the secretary of the Territory is hereby instructed to forward an engrossed copy of this memorial, duly attested under his hand and seal, to the Hon. M. A. Smith, Delegate to Congress for Arizona Territory.

J. H. CARPENTER,
Speaker of the House.

A. J. DORAN,
President of the Council.

DEPREDATIONS OF THE NAVAJOS.

To the Honorable the Secretary of the Interior, Washington, D. C.:

Your memorialists, the Eighteenth legislative assembly, respectfully represent:

That for the past four years the Navajo Indians, located on the Navajo Reservation in the northeastern portion of this Territory, have been the source of much

disturbance and trouble to the people living in that portion of the country. They are, as we believe and are informed, the most powerful and best equipped tribe of Indians in the West.

It is the custom with these Indians to leave their reservation with large herds of sheep and numbers of horses and pasture them in the counties of Apache and Coconino. Your memorialists represent that in and about Tuba City, in Coconino County, Ariz., many depredations are committed by this tribe upon the crops and live stock owned by the settlers; that crime is allowed to go unpunished, as the peace officers of the counties are unable to travel over the reservations to make arrests, and that processes of the courts are nullified and disregarded by this tribe. In this connection we beg leave to state that injunctions have issued to prevent these Indians from breaking down dams and reservoirs, built for the impounding and storage of water, to be used for irrigation, but that all orders and mandates of the court have been disobeyed to the great injury and loss of the settlers dependent upon said water for the raising of crops.

Your petitioners further represent that the boundaries of the said reservation are undefined, and that some of the Indians belonging to this tribe claim lands off their reservation.

In view of the facts aforesaid, and to avoid bloodshed and frequent quarreling, as well as in justice to the counties mentioned herein, your memorialists ask:

First. That the boundaries of the reservation be defined and distinctly marked, so that no dispute can arise as to the title to lands adjoining said reservation.

Second. That the Indians be kept on the reservation and be prohibited from pasturing their stock in and upon the lands necessary for the use of the people who pay the taxes and support the county government in the counties adjoining the said reservation.

Third. As this tribe is so large, powerful, and so well armed, we believe it for the best interests of the settlers and the Indians, that a company or companies of cavalry should be stationed somewhere along the western boundaries of the said reservation, to the end that peace and order be maintained, and your memorialists will ever pray.

J. H. CARPENTER,
Speaker of the House.

A. J. DORAN,
President of the Council.

DEPREDATIONS OF THE NOMADIC PAPAGOES.

The last legislative assembly of this Territory adjourned more than eighteen months ago when the depredations of these Indians were of such a serious character that the memorials heretofore mentioned were unanimously adopted. The cattle men of the Territory felt that they had for years been greatly aggrieved and oppressed, and their complaints were voiced by our legislature, but the situation is still unchanged. These nomadic Indians still roam throughout a great portion of Pima County, and slaughter cattle at will. Their depredations should not be allowed to continue.

The following letters addressed to me by Colin Cameron, esq., chairman of the live stock sanitary commission of this Territory, who is largely engaged in the cattle industry of the Southwest, and the letter of C. W. Wright, esq., a prominent lawyer of Tucson, fully describes the situation. Their statements can be fully relied upon.

RANCHO SAN RAFAEL DE LA ZANJA,
Pima County, Ariz., August 10, 1896.

DEAR SIR: I inclose you letter of date August 5, 1896, prepared and sent out by Judge C. W. Wright, of Tucson, in reference to the Papago situation in Pima County, and beg to be allowed to call your attention to a very serious condition of affairs existing here at the present time. Judge Wright's letter is not sensational; neither does he exaggerate in the least; it is a concise, dispassionate statement of the facts. The whole of the western portion of the county is overrun by the nomadic portion of the Papago, Pima, and Maricopa Indian tribes, all going under the generic name of Papagoes. They are generally classed as half civilized, self-supporting, and as being at peace with the whites.

Conservative men well acquainted with the facts estimate the actual loss sustained in the last five years by the cattlemen of Pima County alone from depredations by these Indians, in loss of stock, improvements on ranches abandoned, to be over $250,000. This allowing nothing for the increased valuation that always follows the settlement and development of a new country.

There are riding over this country from 800 to 1,000 buck Indians each carrying a riata on his saddle, and each man wears out on an average three riatas a year. It takes no mathematician to figure that from 2,400 to 3,000 cattle are consumed annually in this way, to say nothing of those killed whose hides are not so used. No business can stand such a drain on its lifeblood.

Repeated representations have been made to the Indian Bureau. The local Indian agency agent has been time and again informed. The legislative assembly has memorialized Congress (see copy attached), but all of no avail. The Indian still roams at large and the ranchman suffers. Knowing that the losses will increase year by year, having lost all hope of relief from the Indian authorities, an organization of cattlemen and other citizens directly interested has been formed to compel the Papago to stop his depredations. These Indians are well armed. The situation is indeed critical. The Indian Bureau should at once take measures to return and keep these Indians on their reservations. The portion of the country occupied by the roving Papago Indians comprises fully the western half of Pima County. Vast stretches of waterless plains, covered with a rank growth of exceedingly nutritious grasses in their virgin excellence, yield to-day not a dollar of revenue to the individual or the county because of the Indian. The cattlemen hesitate to commence war, in fact to commit any overt act, especially on a tribe that has always been counted peaceable; they will only do so when driven to the last extremity to save some small remnant of their herds.

The cattlemen of Arizona are an intelligent, active, energetic, and aggressive body of men; they were the vanguard of the settlement of the Territory; in fact they established their ranches even on the frontier, fought and drove back the Apaches, and made it possible for men engaged in other occupations to live here. They demand now to be protected, or to be given the privilege to protect themselves.

Some of your predecessors have reccommended an appropriation of money to develop artesian water in certain portions of the Territory. In other cases they have advocated the leasing of the public domain. No doubt both would be of benefit to the cattle interest. The cattlemen of Pima County have not waited for the Government to do either. He has sunk wells 600 to 1,000 feet in depth and is pumping the waters therefrom; he has built great reservoirs to impound the rain waters, and will work out his own prosperity and will develop the country if left alone. He would ask no protection from the Government if the Indians were not its wards. He fears not the Indian, but respects the strong arm of the law. He, however, believes that after his petitions and prayers have been neglected and refused that he should be held blameless for defending his property. The Papago Indians and kindred tribes should be removed to and kept confined on the reservations set apart for their use, and from which the white man is entirely excluded. They are more than amply large for their use, being as follows:

	Acres.
Papago Indian Reservation at San Xavier	69,029.49
Gila Bend Indian Reservation	22,391.39
Pima and Maricopa Indian Reservation	350,000
Salt River Indian Reservation	47,500

A total of 488,920.88 acres given wholly to the Indians, selected from the very heart of the best farming, grazing, and timber lands in the Territory, and yet the Indians are not compelled to occupy it. A land in its entirety coveted by the white man, but by law and by military force he is excluded from even entering to spy out its fertile acres of hidden mineral treasures. What justice is there in such treatment of our white citizens?

What is true in southern Arizona of the Papagoes is true to a greater or less extent in northern Arizona of the Navajo Indians. Both are retarding the settlement and development of the country, keeping away and driving out capital. This condition of affairs should no longer be allowed to continue. I voice the sentiment of every taxpaying citizen of Arizona when I say that the United States Government should compel all Arizona Indians to return to their reservations, and then keep them there.

Very respectfully,

COLIN CAMERON.

Hon. B. J. FRANKLIN,
Governor, Phœnix, Ariz.

TUCSON, ARIZ., *August 5, 1896.*

DEAR SIR: It is believed by those best informed on the subject that there is not a herd of cattle in Pima County that has not been in the past, and, unless protected, will not be in the future, preyed upon by the Papago Indians. It is known that the Quinlin was entirely destroyed by them, and that other herds have been materially decreased by them. For years this worthless mob have maintained themselves upon our herds, and, not being in any way interfered with, they have naturally educated themselves to believe that when they want meat, all that is necessary for them to do is to go out and kill it. At the beginning, only their bravest dared slaughter cattle, and then only when the cattle had strayed a long way from home; but now they come boldly in sight of the home ranch, select the best of the herd, shoot the animal down, and while some of them are butchering it, others sit by armed to guard them.

Owing to their numbers, the difficulty of identifying them, and the extreme hazard of arresting any of them, the law has proven itself impotent to afford any protection to this kind of property.

The gravity of this situation being understood, a considerable number of the cattlemen of the county met a few days ago for the purpose of discussing this situation and devising, if possible, some way of protecting their property from these lawless Indians. After a full interchange of views, it was finally decided that, as the one object and purpose of government was the protection of life and property, and that, as the cattle of the county paid a material portion of the taxes levied and collected by the county for its support, therefore, it was the plain duty of the officials of the county to do whatever was needful to be done to guard these cattle and to save them from these thieving Indians.

Accordingly a petition was prepared, addressed to the board of supervisors, setting forth the foregoing facts, the immediate need of protection, the conceded fact that the sheriff was powerless to aid us unless a sufficient force be supplied him for that purpose, and praying for the employment by the county of six men for the term of one month, to be armed, mounted, and fed by the cattlemen, their wages only to be paid by the county for one month; that these men should be sent into the country now occupied by the Papagoes to watch them, and, if possible, catch some of them in the act of slaughtering cattle, and then to arrest them and bring them in.

Messrs. Schumacher and Vail, of the board, and Lovell, district attorney, decided that the board had no authority to extend the protection prayed for, and therefore denied it.

The aid asked for being denied, necessarily we are thrown upon our own resources. Therefore the ones signing the petition met, organized, and decided to call a meeting of all the cattlemen of Pima County, the same to be held at the court-house at Tucson, on the 26th day of August, 1896, at 10 o'clock in the forenoon of said day, and for the purpose of considering and deciding whether our cattle shall be protected from these lawless Indians or abandoned to them; and if protected, devising ways and means for such protection.

At the meeting held the undersigned was instructed to put you in possession of the foregoing facts, and to strongly and persistently urge you to be present at the meeting to be held on the 26th instant.

C. W. WRIGHT.

The following report of a meeting held by the cattlemen of Pima County is from the Arizona Citizen, a paper published at Tucson:

THE CATTLEMEN—THEY PERMANENTLY ORGANIZE FOR PROTECTION AGAINST PAPAGOES.

About thirty Pima County cattlemen met yesterday in the district court room and perfected a permanent organization for protection against the Papagoes, whose inroads upon their herds, carried on for a long time, have at last passed the point of endurance.

The matter was very fully discussed by those present and the means to be adopted for future security were finally agreed upon. A system of patrol will be employed. Six men will be engaged by the cattlemen, and paid by contributions levied upon stock owners, each owner being assessed in proportion to the size of his herd. These patrols will be on the range constantly, and when they discover a cattle thief will bring him in and attempt to secure his punishment.

It is hoped that this method may prove successful in causing a cessation of these raids.

The organization is composed of the following officers: President, C. W. Wright; secretary, W. J. Ross; treasurer, George Pusch; executive committee, N. W. Bernard, James Finley, Sabino Otero, and ex-officio members, the president and secre-

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tary. An agreement as to the plan of the campaign against the Papagoes was drawn up and signed by all the cattlemen present, and will be offered for signature to all others interested in that Indian infested region.

The foregoing letters and memorials and the action of the meeting mentioned above of the cattlemen to devise means for the protection of their interests against the ravages of these thieving, wandering bands of Indians fully describe the situation, and I think that immediate action should be taken to suppress these depredations.

The cattle industry of this Territory is one of its grand interests. During the last year, as this report shows, cattle of the value of nearly $3,000,000 have been shipped from the pastures of Arizona. This industry is yearly increasing in value; the men engaged in it are among the most prominent and enterprising citizens of the Territory. They are law-abiding, and the picture they present of the condition of affairs is, in my opinion, a correct one. In many portions of the country there is a great deal of sentimentalism concerning the Indian question, that at least should not be further indulged in so far as this Territory is concerned. The gradual breaking up of tribal relations and the further allotment of lands should receive serious consideration.

INDIAN SCHOOLS.

The Indian school service established by the Government for Arizona has been productive of very gratifying results, and in view of the great number of Indian children in the Territory I earnestly recommend that it be enlarged.

The following report from Harwood Hall, esq., superintendent of the Indian school at Phœnix, is herewith submitted:

INDIAN SCHOOL SERVICE, OFFICE OF SUPERINTENDENT,
Phœnix, Ariz., September 15, 1896.

Sir: In compliance with request contained in your letter of the 29th ultimo, I have the honor to submit the information regarding this school as follows:

Enrollment:	
Boys	188
Girls	183
Total	371
Under 6 years of age (girls)	3
Between 6 and 18 years of age:	
Boys	171
Girls	176
Over 18 years of age:	
Boys	17
Girls	4
Average attendance during the year	315
Average of pupils	14
Teachers	5
Other school employees	41
Total (21 white, 25 Indians)	46

Total cost of maintaining school during year, $42,909.96, of which amount $16,857.42 was paid for salaries of teachers and employees and $26,052.54 expended for subsistence and support of pupils.

The course of schoolroom instruction is much the same as that employed in public schools, but the pupils attend school one-half day only, the other half being devoted to study of industries, such as carpentering, shoemaking, blacksmithing, harness making, farming, irrigation, housekeeping, baking, etc., the idea being to educate the Indian youth to be self-supporting.

The result of this training is shown by the number of Indian boys and girls work-

ing on farms and in families in this valley. Over 200 were employed in families and on farms during the past spring and summer, and the majority gave good satisfaction, as shown by the increased number of applications made for Indian help during the past month.

Very respectfully,

HARWOOD HALL,
Superintendent.

T. E. DALTON,
Superintendent of Public Instruction, Phœnix, Ariz.

FORESTRY AND THE PRODUCTION OF LUMBER.

Notwithstanding the general supposition that Arizona possesses very little forest area, it has within its borders some of the finest and most valuable forests in the world, its area in this respect being even larger than that of the State of Massachusetts.

It is estimated by competent judges that the quantity of lumber on the Colorado Plateau alone will amount to about 8,000,000,000 feet of excellent lumber. The ash, black walnut, and scrub oak are found in the valleys, besides which the pine growing to a height of 125 feet, with a diameter of from 6 to 8 feet, the cedar, wild cherry, maple, manzanita, alder, and cottonwood grow extensively. There are also two valuable trees, the mesquite and ironwood, which are peculiar to Arizona and Sonora.

The ironwood is very hard and brittle, and when dry is difficult to cut with an ax. Its texture and grain are beautiful, and take a splendid polish, resembling Spanish rosewood very closely, and is said to produce a veneering of excellent quality.

The centers of the lumber industry are Flagstaff, Williams, and Challender, on the line of the Atlantic and Pacific Railroad.

The production of lumber for the year has been slightly less than 35,000,000 feet, the exact statistics for which, however, I have been unable to obtain.

The following exhaustive article on the flora and forestry of Arizona is by Prof. J. W. Toumey, botanist and entomologist at the University of Arizona, and an acknowledged authority on the subject:

FORESTRY.

General observations on the flora of Arizona.—There are but few States in the Union that have a more varied flora than Arizona. The Sonorian character of much of the southern portion of the Territory, with a maximum amount of sunshine and a minimum rainfall, is productive of vegetation not found elsewhere in the United States. The high plateau of the north and the numerous mountain ranges which break the surface of our southern plains, ranging from a few hundred to 13,000 feet above the sea level, are productive of all degrees of climate, from the extreme heat of the lower valleys to that found at the summit of the San Francisco Mountains, where snow banks remain as late as August. Going hand in hand with this variation in climate is an equal variation in plant life.

The flora of the Colorado Plateau, and to considerable extent of the many mountain ranges south of this plateau, is strikingly similar to that of southern Colorado and Utah. Here among trees are found pines, junipers, oaks, firs, balsams, poplars, and a number of others of more restricted range. At the higher elevations the valleys are usually well covered with perennial grasses.

All of southern and central Arizona, with the exception of the higher mountains, has a flora entirely different. Succulent plants, including cacti, yuccas, and agaves, are here the most conspicuous forms of plant life. The plains are for the most part more or less thickly covered with a great variety of shrubs and bushes, in the protection of which many annuals and the weaker perennials find a home. Many of these shrubs enter largely into the forage of southern Arizona, and in seasons of extreme drought supplant to a great extent the grasses, other annuals, and small perennials, which under normal conditions constitute the greater portion of our forage. The greasewood, or creosote bush, grows in abundance on the driest of our plains, and is the most conspicuous and widespread shrub of the Territory. The water courses are lined with quite a variety of trees, the mesquite, cottonwood, willow,

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sycamore, and ash being the most abundant, and in the order named probably of greatest economic importance.

At first sight there is a wonderful sameness about the flora of the plains which has not escaped the notice of casual observers. The uniform sage-green character of the foliage with the great preponderance of red and yellow flowers argues to the unscientific mind but few species. This is a misconception, as the flora of the plains is an exceedingly varied one, the great number of species only resembling each other in color of foliage and in other superficial characters. The monotonous character of the flora disappears in a great measure when, on examination, these plants, so uniform in general appearance, are found to contain a large number of genera and species only differing from one another in the small variations compatible with their environment. These plants, as a rule, have diminutive or no leaves, hence the evaporating surface is brought down to the minimum. During the rainy season the tissues become gorged with water, which they retain with wonderful tenacity, enabling them to withstand many months of continuous drought.

The plants of the plains are usually covered with thorns and spines, or the surface of the leaves and younger stems are covered with resins or other protective agents. They have become toughened and hardened by generations of exposure to heat and drought, and are able to withstand the direst vicissitudes of their nativity.

The mountain flora shows a marked contrast when compared with the flora of the plains. The greater variations in the color of flowers and fruits, the deeper green of the foliage, and the larger leaves remind one of the flora of humid regions. This difference is due to the usual greater precipitation in mountainous regions and the higher elevation being productive of a slower evaporation.

The timber of the Territory practically belongs to the mountain flora. However, a large number of both deciduous and evergreen trees are scattered over the foothills and along the river courses of the southern plains.

A number of indigenous plants, a list much too long to enumerate here, have a local reputation for their medicinal qualities, many of them being kept for sale in our drug shops. It seems not at all improbable on investigation that some of them will be found to contain meritorious qualities which will give them a permanent place in our pharmacopœia.

The greater number of our weeds, and all of our more injurious ones, are introduced plants that do not properly belong to our flora.

The value of canaigre, a plant indigenous to southern Arizona, is already quite beyond the experimental stage, and bids fair to prove, in the near future, of considerable commercial importance as a source for tannic acid.

Native grasses of economic importance.—The soft and succulent grasses of the Eastern and Central States, in Arizona give place to a great variety of grasses with short, rigid leaves and hard stems or culms. These grasses are eagerly eaten by stock, and as a rule contain a much higher percentage of nutritive matter than the grasses of more humid regions. As yet but few of our indigenous grasses, which number nearly 250 species, have been thoroughly tested in cultivation. It is known, however, from their natural environment, that many of them will grow with a minimum amount of moisture. Our range grasses may be conveniently divided into two general classes:

(1) The large number of species growing along rivers and creeks, in the vicinity of springs and tanks and in other moist places. The most widely disseminated of these grasses is the common salt grass. This grass, although inferior to many others, is, on account of its abundance, the most important forage grass in many of the southern valleys. Two or three large species of the genus Sporobolus, known to cattlemen as sacaton grasses, are important valley grasses of southern Arizona.

(2) The grasses which grow on the mesas and mountains, covering large areas. These grasses are by far the more important, as they constitute the greater portion of the grass forage of the Territory and include those recognized by stockmen as mesquite grass, grama, needle grass, and gietta. The greater number are perennials, having hard, wirey leaves and stems, but very nutritious and usually well liked by all classes of stock. They grow rapidly after the summer rains, and provide fine forage for the fall and winter months.

Much of the fall forage consists of a variety of annual grasses known as six weeks' grass, from the fact that they spring into existence, grow, and mature in from four to six weeks. These grasses appear after the summer rains, and soon cover the plains with a more or less luxuriant growth of valuable forage. Drying on the ground and containing an abundance of seed, they retain a high percentage of their nutritive qualities for months after maturing and are a large part of the forage during the winter months.

The frequency of the summer rains during the past two years generally throughout the Territory and the greatly diminished number of cattle on the range have brought the natural pasturage into better condition than it has been for several years, so far as grass forage is concerned.

Overstocking has a tendency to kill out the better grasses, and when this is augmented by one or more dry seasons the range is several years in regaining its normal condition. Many of our grasses grow in isolated bunches or are scattered about here and there, only a few culms in a place. These are the grasses that suffer from close cropping, for when the top is continually eaten to the ground no seeds are matured and the roots gradually die or are trampled out by horses and cattle.

The abundant rains of the past July and August over most portions of the Territory have assured excellent forage for some months to come.

Forage plants other than grasses.—Probably in no other portion of the United States do we find so great a variety of plants, other than grasses, which may properly be termed forage plants. In many localities, during a portion of the year, grasses add but little to the forage. Cattle subsist largely upon the foliage of mesquite, buck brush, white sage, pig nut, saltbush, and other shrubs and hardy perennials, many of which provide excellent forage.

Several plants belonging to the genus Atriplex, closely related to the celebrated Australian saltbush, recently introduced into the arid regions of the Southwest for purposes of forage, are abundant throughout south and central Arizona.

The leaves and ripened pods of mesquite are valuable forage. The beans, according to the report of Dr. Lowe, contain about 30 per cent of grape sugar, are very fattening, and readily eaten by both horses and cattle.

We have another somewhat similar tree to the mesquite, known as the screw bean, but smaller and less abundant. In some localities it also provides excellent forage.

During late winter and early spring, or in periods of extreme drought, when grasses become scant, the value of this class of forage becomes apparent. It is a means of keeping stock alive and in growing condition, when without it they could not subsist. As the greater number of these plants are evergreen shrubs, they are fed upon to some extent during all periods of the year, though it is only in times of necessity that they become an important feature in range forage.

Forests of Arizona.—The forests of Arizona are Sonorian in character, and belong to the interior forest area which covers all that region embraced between the forests of the Pacific and the extreme western limit of the Atlantic region. The forests of much of this area, when compared with those of more humid regions, are more stunted in growth, fewer individuals to a given area, and with much less variation in their composition. However, the forests of the southern portion of this area, which includes Arizona, are heavy, dense, and valuable when compared with other portions of the interior region. In this Territory the valuable forests are confined to the higher portions of the Colorado Plateau and to the slopes and canyons of our numerous mountains. They attain their highest development in the high San Francisco Mountains and from here stretch away, with more or less extended interruptions, to and beyond the Grand Canyon of the Colorado to the north, to Bill Williams Mountain to the west, and southward to the great rim where the Colorado Plateau breaks down to the southern plains. To the southwest, with a number of interruptions, they become dense and heavy in the higher ranges of the White Mountains and from here extend into western New Mexico. Long arms of forest area also extend into all the mountains immediately south of the Colorado Plateau, which reach an elevation of more than 7,000 feet. The isolated ranges farther south are also timbered above 7,500 feet. The great forest area embraced in the Coconino and San Francisco region is considered by our greatest authority on American forests as one of the largest unbroken forests in the United States. It is almost entirely of yellow pine (*Pinus ponderosa*) and its varietal forms. This species of pine is the most widely disseminated and abundant tree of the interior forest area, and in Arizona, where it reaches its highest development, is practically the only tree of commercial importance in the manufacture of lumber.

On the higher mountains of northern Arizona, above the area of yellow pine, are a number of trees usually considered valuable for lumbering purposes, but their restricted area and inaccessibility render them as yet of little commercial value. Among these may be mentioned the Douglas fir (*Pseudotsuga Douglasii*), commonly known as Oregon pine, which reaches its southern extension on the high peaks of the Arizona mountains. Growing with the Douglas fir we find the Western spruce (*Picea Engelmanni*), the white pine (*Pinus flexilis macrocarpa*), and the close-grained foxtail pine (*Pinus aristata*). The latter species has very close-grained, compact wood and little resin. In mining operations it is valuable for timbering purposes, but in Arizona its inaccessibility has rendered it of little importance as yet.

Above 7,500 feet, where the forests have been cut away or swept by fires, the aspen (*Populus tremuloides*) comes in and reforests the denuded districts. Large tracts in the San Francisco Mountain region that in past years have been swept by fires are now thickly covered with a growth of aspen.

At the lower border of the zone of yellow pine, pin oak (*Quercus Gambellii*), cedar (*Juniperus occidentalis monosperma*), and juniper (*Juniperus pachyphlœa*) begin to appear, and as we pass below the belt of yellow pine its place is taken by a scattered growth of nut pine, represented in Arizona by three species (*Pinus edulis,*

Pinus monophylla, and *Pinus cembroides*), worthless for purposes of manufacture into lumber. These small pines are characteristic of the low mountains and foothills of Arizona and one or more species are found in nearly all the mountains of the Territory.

Large areas of the Colorado Plateau, below the pine zone, are covered with a scattered growth of juniper. Mingled with the pines and firs on some of the higher mountains are a number of deciduous trees, including a maple (*Acer grandidentatum*) and a locust (*Robinia New Mexicana*), while below the pines, at an elevation of from 6,000 feet to as many hundred, are more than forty deciduous and evergreen species which may be properly termed trees, but nowhere, with the exception of mesquite, growing in sufficient proximity to be termed forests. Nearly all, however, are valuable for fuel and other domestic purposes.

The forests of southern Arizona are confined to the high mountains and to the banks of the water courses, and disappear entirely from the valleys and low mountain ranges which constitute all of the southern portion of the Territory. The most important and widely distributed species, peculiar to the water courses of southern Arizona, is the mesquite (*Prosopis juliflora*). The foothills are covered with a scattered growth of palo verde (*Parkinsonia microphylla* and *Parkinsonia Torreyana*), mountain mahogany (*Cercocarpus parvifolius* and *Cercocarpus ledifolius*), giant cactus (*Cereus giganteus*), and a number of less conspicuous species. The canyons are lined with cottonwood (*Populus Fremontii*), alder (*Alnus oblongifolia*), ash (*Fraxinus velutina*), willow (*Salix nigra* and *Salix taxifolia*), walnut (*Juglans respestris*), and black oak (*Quercus Emoryi*).

A number of rare and local trees are found in portions of the Territory. The Arizona cypress (*Cupressus Arizonicus*) is a conspicuous tree in a number of the high mountain canyons of the south and central regions. An ironwood (*Ostrya Knowltonii*) is restricted to the Grand Canyon of the Colorado, while an oak (*Quercus Toumeyi*) is only found on the Mule Mountains.

Species of indigenous trees.—Arizona has about 75 species of indigenous trees, a number excelled but by few States in the Union. Of this number about half are evergreen, including a large number of species of pine and oak.

We have 9 species of oak, ranging in size from a mere shrub to the black oak, which sometimes reaches a diameter of more than 4 feet. On our mountains and high plateaus are found 11 pines, from our large yellow pine to the small nut pine of our southern mountains. Four willows grow along our water courses, and 2 cottonwoods and an aspen find a home at varying altitudes. Four junipers cover large areas between 4,000 and 6,000 feet, or occur as isolated specimens on the foothills and lower mountains. A spruce, 2 firs, a balsam, and a cypress mingle with the higher pines, and farther down are found 2 maples, 3 ashes, 3 species of mountain mahogany, 2 ironwoods, and 1 species each of madrona, juneberry, buckthorn, redbud, mulberry, cherry, walnut, sycamore, alder, locust, and hackberry.

The following are more southern species which extend along the water courses or are found on the foothills of southern Arizona, viz: Three palo verdes, 2 acacias, 3 arborescent cacti, and 1 species each of soapberry, screw bean, mesquite, and desert willow. One species of each of the following genera occasionally reach the size of trees in southern Arizona, viz: Vanquelima, Carrotia, Bermelia, Koeberlirria, and Cowarria.

Indigenous trees and shrubs for shade and ornamental purposes.—The people of Arizona do not properly appreciate the value of native trees and shrubs to plant about homes for ornamental and shade purposes. We can not expect to bring trees and shrubs from regions where they have been accustomed to a humid atmosphere and grow them with any degree of success in Arizona.

We are inclined to look to foreign countries and other States for our ornamental trees and shrubs, when with a little care in selection we can find in our own flora a variety of such plants that will grow with a minimum amount of care and in a few years surpass in appearance anything which we may bring in from outside. Generations of exposure to the conditions of an arid region enable them to survive and even flourish where plants unaccustomed to such an environment perish.

The ash is one of our most valuable trees for street planting. Its growth is rapid and it is but little affected by insects. The cottonwood, although not so desirable as the ash, gives dense shade during the summer, grows with great rapidity, and requires little care. If in planting care is exercised to plant only staminate trees, no cotton will be produced, and the chief objection to them removed. The desert willow, a beautiful tree with catalpa-like flowers, one of the most graceful trees in America, grows along the water courses of southern Arizona and should take the place of many trees which we now get from outside.

It is hoped that the people of Arizona will give more attention to our native trees and shrubs, as they are more in harmony with our surroundings and better adapted to the purposes of landscape gardening. Many of our shrubs are evergreen, while others have attractive flowers or fruits. By proper care in selection they are in the end much more satisfactory and less liable to die than imported plants.

METEOROLOGY AND CLIMATOLOGY.

The climate of Arizona makes the Territory one vast health resort. Within her boundaries can be found all the varieties of altitude and climatic conditions, from 6,886 feet elevation, at Flagstaff, situated on the Atlantic and Pacific Railroad, at the foot of the San Francisco Mountains, whose peaks are covered with perpetual snow, to the valleys around Yuma, which is situated at the crossing of the Colorado River by the Southern Pacific Railroad and is but 141 feet above sea level, surrounded by green fields, and bearing orchards of olives, oranges, lemons, and other semitropical fruits, so that invalids can find that altitude or climatic condition best suited to their individual cases.

Heretofore the wealthier health seekers have passed by Arizona. Though recognizing the advantages of our climate, they were unable to secure the best accommodations. But within the last few years men of means have seen the demand for good accommodation, and to-day private sanitariums and elegant hotels afford all in this line that the most exacting could desire. Many invalids who can not live in the cold, damp climates of the Northern and Eastern States come here and find relief from their ailments, and many who come here suffering from pulmonary troubles are entirely cured.

RAINFALL AND TEMPERATURE.

The following concerning the temperature and precipitation of all stations in the Territory for the fiscal year ending June 30, 1896, is reported by the director of the United States Weather Bureau at Phœnix:

July, 1895.—Temperature: Average of all stations, 82°; the highest monthly mean is shown at Camp Wells, being 96.7°; the lowest monthly mean was at Flagstaff, 65.6°. Precipitation: Average of all stations, 1.20 inches.

August, 1895.—Temperature: Average of all stations, 81.4°; the highest monthly mean shown for the month was 97° at Texas Hill; the lowest was 66.6° at Flagstaff. Precipitation: Average of all stations for the month, 2.84 inches.

September, 1895.—Temperature: Average of all stations, 77.1°; the highest local monthly mean was 87.6° at Gilabend; the lowest 59° at Flagstaff. Precipitation: Average for all stations was 1.22 inches.

October, 1895.—Temperature: Average of all stations, 66.6°; the highest local monthly mean was 78.5°, at Gilabend; the lowest 48.2°, at Flagstaff. Precipitation: The average of all stations for this month was 1.104 inches.

November, 1895.—Temperature: Average of all stations, 51.8°; the highest monthly mean shown was 64.5°, at Reymert; the lowest was 33°, at Flagstaff. Precipitation: Average of all stations for the month, 2.70 inches.

December, 1895.—Temperature: Average of all stations, 44°; the highest monthly mean shown was 54.4°, at Casagrande; the lowest was 27°, at Flagstaff. Precipitation: Average of all stations for the month, 0.38 inch.

January, 1896.—Temperature: Average for the Territory, as deduced from the records of 36 stations, was 47.7°; the highest monthly mean was 58.8°, at Gilabend; the lowest was 31.1°, at Flagstaff. Precipitation: The average of 44 stations was 0.55 inch.

February, 1896.—Temperature: The monthly mean temperature was 50.01°; the highest monthly mean was 62.6°, at Texas Hill; the lowest 32.3°, at Flagstaff. Precipitation: The average precipitation was 0.28 inch.

March, 1896.—Temperature: The monthly mean temperature was 57.06°; the highest monthly mean was 70.08°, at Parker; the lowest was 32.02°, at Navajo Springs. Precipitation: The average precipitation was 0.44 inch, which is 0.65 inch less than the normal amount.

April, 1896.—Temperature: The monthly mean temperature was 60.03°; the highest monthly mean was 68.08°, at Maricopa, and the lowest 41.9°, at Flagstaff. Precipitation: The average precipitation was 0.21 inch, which is 0.37 inch less than the normal amount.

May, 1896.—Temperature: The monthly mean temperature was 72.4°; the highest monthly mean was 84.6°, at Parker, and the lowest 52.8°, at Flagstaff. Precipitation: The average precipitation for May, 1896, trace inch, which is 0.32 inch less than the normal amount.

June, 1896.—Temperature: The monthly mean temperature was 83.6°; the highest monthly mean was 99.5°, at Texas Hill, and the lowest 63.2°, at Flagstaff. Precipitation: The average precipitation was 0.02 inch, which is 0.34 inch less than the normal amount.

REPORT OF SURGEON-GENERAL OF ARIZONA.

I submit herewith the following interesting article, which has been prepared by Harrison E. Stroud, M. D., surgeon-general of Arizona, on the climate of the Territory:

In attempting a description of the climate of so large a Territory as Arizona, within whose borders every altitude exists, from but 12 feet above sea level to regions of eternal snow, it will be necessary to divide into sections, the chief cities being represented. There are, however, certain peculiarities that apply to the Territory at large regardless of altitude, and these are the extreme dryness and clearness of the atmosphere and an entire absence of malaria. In no part of America is the per cent of humidity so low as in Arizona, and in considering the question of heat and cold this is a vital point. It is customary to divide the year into seasons, but I believe it will be more useful to describe each month. This description applies to the great Salt River Valley and its cities, Phœnix, Tempe, and Mesa.

Phœnix, the capital of the Territory, is a city of 12,000, is built at an altitude of 1,086 feet above sea level, surrounded by a chain of mountains on every side, the land forming a gentle slope to the south. The average depth of soil is 16 feet, and is, when irrigated, exceedingly fertile.

REPORT OF YEAR, BY MONTHS, FROM AUGUST, 1895, TO AUGUST, 1896.

January.—Days bright, clear, and warm; the nights cool and exhilarating; there were four light frosts and thin ice on the lower levels, but none along the foothills sufficient to injure oranges that ripened during December and January. Percentage of sunshine, 77; rainfall, 0.46.

February.—Days clear, bright, and warm; nights cool; seven light frosts, and thin ice on lower levels; none along foothills. Percentage of sunshine, 87; rainfall, 0.05.

March.—Days clear, bright, and warm; nights cool; two light frosts, and thin ice on lower levels; none on higher levels. Percentage of sunshine, 75; rainfall, 0.89.

April.—Days clear, bright, and warm; nights cool; no frost. Percentage of sunshine, 91; rainfall, 0.05.

May.—Days clear, bright, and warm; nights usually cool. Percentage of sunshine, 89; rainfall, none.

June.—Days clear, warm, occasionally hot; nights warm. Percentage of sunshine, 99; rainfall, 1 inch.

July.—The days bright, clear, and usually hot; nights usually hot. Percentage of sunshine, 73; rainfall, 4.25.

August.—Days bright, clear, and hot. Percentage of sunshine, 85; rainfall, 0.27.

September.—Days bright and clear, cooler than in preceding months; nights warm, gradually cooling. Percentage of sunshine, 89; rainfall, 0.10.

October.—Days bright, clear, and warm; nights cool. Percentage of sunshine, 88; rainfall, 0.80. No frost.

November.—Days bright, clear, and warm; nights cool. Percentage of sunshine, 81; rainfall, 0.89. No frost.

December.—Days bright, clear, and warm; nights cool; eleven light frosts, and thin ice on lower levels, but none along foothills. Percentage of sunshine, 88; rainfall, 0.09.

For the year ending August, 1896, the average sunshine has been 85 per cent. Total rainfall, 7.35 inches. There has been during the year thirty-nine days which were seven-tenths cloudy; of these but two days in the year in which the sun did not shine.

The summers are hot. There are some warm days in May, gradually increasing into June; and from then on until the end of August the thermometer ranges high, but with September comes cooler days and nights.

This heat is peculiar; it is never close and oppressive; there is never a sense of suffocation. The summers are the most healthful period of the year. The dry heat oxidizes and desiccates refuse matter and prevents fermentation that is the great cause of disease, especially among children, in most countries during the summer. To my knowledge there has never been a case of cholera infantum in the Territory, nor has there been a case of sunstroke, except in drunkards inebriated at the time. During our hottest days man and beast work right along without a fear of injury. During the summer months there is no dewfall at night—absolutely none. It is the common custom to sleep out of doors from the middle of May until September, and many (as the writer) sleep out during the whole year. There are not five days in the whole year but that the most delicate invalid can spend part of the day, at least, out of doors. In this climate injuries and wounds heal very readily; contagious diseases are usually very mild. There has been no epidemic, except in whooping cough, for years.

The winter months, from the middle of September to the first of May, are in this locality the finest in the world. One bright sunshiny day succeeds another; the nights are cool and exhilarating; the whole country green with the richest verdure and the brightest flowers. Truly, it is a joy to live.

The fact that there is not a lightning rod on any building in Phœnix is stronger evidence than words that lightning is not feared here; and the fragile wickiups (brush houses) of the Indians are monuments to the fact that high or destructive winds do not occur in this valley.

It is unfortunate that so large a per cent of the citizens of the country are compelled to seek a climate where they may enjoy a degree of health, or even live at all; and to none does this apply as to the large army of consumptives. The fact that we have a Mecca within our own beloved country should be known to every physician in the United States; but that the effect of climate and altitude is not properly understood is shown by the frequent injudicious advice to patients.

This fact, based upon many years of observation in this and other mountain regions, may be of service to prospective health seekers. There is but little difference in the atmospheric pressure between sea level and an altitude of 1,000 feet, but after passing this the effect begins to be perceptible. The higher one assends the lighter and rarer becomes the air, and in order to obtain sufficient oxygen to supply the system it is necessary to breathe faster. The action of the heart is accelerated, so also the nerve phenomena. As a rule, it may be said if the pulse is 70 at sea level it will be 80 to 100 at an elevation of 5,000 feet; if respiration is 18 at sea level, it will be 22 to 30 at 5,000 feet. Every form of nervousness, excepting that caused directly by dyspepsia, and every form of heart disease is aggravated by a high altitude. The higher the altitude the lower the atmospheric pressure and the greater the tendency to pulmonary and other hemorrhages. On the other hand, most cases of dyspepsia and asthma are benefited by a high altitude. From this it will be seen that each case is a law unto itself—that what would be beneficial to one might be fatal to another. Again, a section that might be suitable at one time of the year would not be at another period. The same intelligence that guides the administration of other theraputic measures must be exercised in prescribing climatic conditions.

The altitude of the Salt River Valley and its cities, Phœnix, Tempe, and Mesa, is a little less than 1,100 feet above the sea level. While no section enjoys the monopoly of all that is good, experience proves that about this altitude will agree with a larger per cent than either a higher or lower. The dry air of this section is found to be especially beneficial in chronic rheumatism, asthma, malarial poisoning, and chronic bronchitis, and those who suffer from the cold; but it is especially instrumental in effecting cures in the early stages of phthisis. At present I have never known a person coming to this Territory in the early stages of pulmonary disease and locating in the altitude suited to their particular case that did not get well; nor have I known of one in the second stage that did not improve. But I can not refrain from raising my voice against the outrage of sending advanced cases to this or other sections to die among strangers.

The following table is kindly supplied by Arthur L. White, of the United States Weather Bureau, at Phœnix:

Comparative data at Phœnix, Ariz., August, 1895, to August, 1896.

Data.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	July.	Average for the year.
Mean actual temperature	89	82	72	57	49	54	56	62	64	74	88	89	70°.
Mean sensible temperature.	70	64	59	49	41	44	44	48	48	54	62	70	54°.
Lowest temperature	65	47	48	34	23	30	28	34	38	45	61	69	Lowest temperature 23°, December 30, 1895.
Highest temperature	110	107	93	83	78	79	82	92	89	110	115	109	Highest temperature 115°, June 15, 1896.
Mean relative humidity, 5 a. m.	61	54	67	81	76	69	65	56	50	41	40	68	61 per cent. } Average, 45 per cent.
Mean relative humidity, 5 p. m.	27	29	39	54	40	40	25	21	15	14	13	30	29 per cent. }
Percentage of sunshine	85	89	88	81	88	77	87	75	91	89	99	73	85 per cent.
Monthly rainfall, inches	0.27	0.10	0.80	0.89	0.09	0.46	0.05	0.39	0.05	Tr.	Tr.	4.25	7.35 inches; average for month, 0.61.
Average hourly wind velocity.	43	41	43	46	40	43	48	51	60	57	51	48	48 miles per hour.

Trace rainfall too small to measure.
One hundred days continuous sunshine.
Station established August, 1895.

ARTHUR L. WHITE, *Observer in Charge.*

Tucson is a city of 9,000 inhabitants, on the main line of the Southern Pacific Railway; altitude, 2,400 feet above sea level. Tucson is one of the oldest settlements made by the Spanish conquerors. It is now the commercial and railroad center of southern Arizona. The climate is exceedingly dry and bracing, the humidity being exceeding low; the yearly minimum and maximum being 26° and 56°, respectively. The rainfall is small and but little irrigation is carried on. The water supply is excellent. The summers are long, the thermometer ranges high, but the low degree of humidity makes the clear warmth tolerable, and the most healthful part of the year. Sunstrokes and heat prostrations are unknown. The climate of Tucson has been found by experience to be particularly beneficial to most cases of pulmonary phthisis, especially those in the earlier or pre-tubercular periods. Disease of the stomach and kidneys, and especially asthma, when not depending upon heart disease, are especially benefited by this climate. Disease of the heart and blood vessels are not favorable affected by this climate.

The following climatic table was taken at the University of Arizona:

Month.	Rainfall.	Average temperature.	
		Maximum.	Minimum.
1895.	*Inches.*	°	°
January	0.56	65	39
February	Trace.	75	37
March	None.	77	41
April	Trace.	85	46
May	0.09	92	58
June	.03	98	63
July	.11	100	72
August	4.48	96	69
September	.75	96	65
October	.68	85	52
November	4.30	70	37
December	.08	63	30

Total rainfall for the year, 11.08 inches.

H. W. FENNER, M. D.

TUCSON, *August 25, 1896.*

Yuma is located on the main line of the Southern Pacific Railway. The town is built at an altitude of 140 feet above sea level. In spite of the lowness of the altitude the same conditions of extreme dryness of the atmosphere and entire absence of malaria that characterize Arizona exist.

I consider the climate of Yuma one of the best for incipient or advanced consumption, especially when combined with heart lesions; also asthma, bronchitis, and nervous prostration.

The following table is taken from the United States Weather Bureau:

Year.	Temperature.								
	Mean.				Highest.	Lowest.	Daily range.	Daily change.	Number of days minimum below 32°.
	Mean actual barometer.	Monthly.	Maximum.	Minimum.					
	°	°	°	°	°	°	°	°	
1893	29.75	72	87	57	111	32	30	3	0
1894	29.77	71	86	57	113	28	29	2	8
1895	29.75	72	87	58	114	30	29	2	4
Mean	29.76	73	86	58	.....	.....	28	2	.....

Year.	Relative humidity.	Rainfall.	Number of days.				Wind.	
			Rainy.	Clear.	Partly clear.	Cloudy.	Average hourly.	Maximum hourly.
	°	*Inches.*						
1893	42	3	18	270	74	21	7	44
1894	44	2.95	13	260	85	20	7	54
1895	41	1.33	8	298	57	10	7	46
Mean	44	3.05	14	278	70	17	6	.....

T. H. SABIN, M. D.

YUMA, *September 1, 1896.*

Prescott, a city of 3,000 inhabitants, on the Santa Fe, Prescott and Phœnix Railway, lies nestled in a bowl, as it were, of pine-clad mountains. The altitude is 5,756 feet above sea level; the average rainfall is from 14 to 16 inches; the mean temperature for the summer, 63, and for winter, 42.

Prescott claims especial advantages as a sanitarium for the early stages of consumption; as a summer climate it is beyond comparison. The days are bright, clear, and warm, but the nights are always cool. Injuries and wounds heal very rapidly in our pure, dry air. Eruptive fevers in children are exceedingly mild. Epidemics are unknown. There are no diseases peculiar to this section.

The following table is taken from Fort Whipple:

Month.	1894–95.		1895–96.	
	Rainfall.	Mean temperature.	Rainfall.	Mean temperature.
	Inches.	°	*Inches.*	°
June	Trace.	61	None.	65
July	1.13	74	0.88	71
August	3.85	71	3.53	73
September	.45	62	.90	66
October	1.37	55	.24	55
November	None.	49	3.57	40
December	3.43	39	.50	34
January	4.37	35	.55	40
February	.55	38	.20	39
March	None.	44	.81	42
April	.22	52	.35	47
May	.50	59	None.	60

CHAS. T. ABBOTT, M. D.

PRESCOTT, *September 1, 1896.*

Flagstaff, a city of 1,200 people, is located on the main line of the Atlantic and Pacific Railway. The altitude is 6,886 feet above sea level.

Flagstaff is built in the center of the great northern pine forest of northern Arizona and is essentially a milling town.

The following table is taken from the United States Weather Bureau for the year 1895:

Month.	Mean temperature.	Rainfall.	Month.	Mean temperature.	Rainfall.
	°	*Inches.*		°	*Inches.*
January	26	12.60	July	65	None.
February	28	2.40	August	67	None.
March	38	1.70	September	59	None.
April	49	None.	October	48	1
May	55	.40	November	33	1.20
June	63	None.	December	27	1.20

The forests about Flagstaff abound with game of all kinds, and the streams with fish. The winters in these altitudes are cold and a good deal of snow usually falls; the summer months are delightful. The air is pure, rare, and free from dust. The days are bright and warm, but the nights are always cool. The pure mountain streams afford the most excellent drinking water.

To those who require an altitude such as this the summers at Flagstaff are most desirable. The pure water and ozonized air are unexcelled in any region.

HARRISON E. STROUD, M. D.,
Surgeon-General of Arizona.

PHŒNIX, ARIZ., *September 1, 1896.*

HEALTH.

The following table, prepared by Dr. Lawrence Woodruff, of this city, will show that Arizona compares favorably with any country in the world as a health resort. What he says in regard to the Salt River Valley is equally true of all the southern half of Arizona, and the northern portion is equally healthy.

DEATH RATE OF THE SALT RIVER VALLEY.

Vital statistics of the Salt River Valley, of that part north of the Salt River, west of the Verde, and east of the Agua Fria, covering a territory of 250 square miles.

	1892.	1893.	1894.	1895.	Total.
Total number of deaths	133	185	168	141	627
Transients	29	38	41	47	155
Accidental deaths	10	15	7	13	45
Among residents	94	132	120	81	427
Percentages (fractions of 1 per cent)	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{9}{7}$	$\frac{3}{5}$	$\frac{3}{4}$
CLASSIFIED BY AGES.					
Deaths under 5 years of age	28	59	33	29	149
Deaths over 70 years of age	12	8	13	7	40
Deaths over 50 years of age	31	32	36	19	118
DURING THE SUMMER MONTHS OF MAY, JUNE, JULY, AUGUST, AND SEPTEMBER.					
Total	41	75	54	58	228
Transients and accidental	8	21	13	23	65
Residents, from natural causes	33	54	41	35	163
Percentages (fractions of 1 per cent)	$\frac{1}{4}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{4}$
Under 5 years of age	6	28	13	14	61
Under 5 years of age, of bowel trouble	6	11	9	5	31
CAUSES OF DEATH.					
Stomach and bowel diseases	10	30	21	14	75
Nervous and brain diseases	17	8	4	8	37
Typhoid fever	2	4	4	2	12
Scarlet fever	1	3	0	0	4
Measles	0	4	0	0	4
Diphtheria	0	5	2	0	7
Heart disease	8	1	7	3	19
Diseases of respiratory organs	50	73	61	56	240
Old age	4	4	6	4	18
All other causes	40	56	58	54	208

NOTE.—Deaths designated as transients are only those of persons who have been here but a brief period prior to their decease, who came here as a dernier resort in the advanced stages of diseases of the respiratory organs. This accounts for the large number of deaths under that head.

A large proportion of those claimed as residents ought to have been included in the transient class.

Now a word as to the summers in this valley. Accurate data I can not give you as to temperature, humidity, etc. The Weather Bureau station was only established at Phœnix last fall. This I can say from personal observation extending over four summers, and as corroborated by the above table of vital statistics, that there is not a more healthy place on earth than this same Salt River Valley in the summer time. While about one-third of all the deaths in the United States during the summer months are from bowel troubles among infants, here such deaths average less than two each month in a population of 15,000. Our death rate last summer for the whole five hot months was but one-fourth of 1 per cent, while the average for whole country was about 2.2 per cent. Is there any other place that can make such a showing?

PUBLIC LANDS, ETC.

The Territory comprises two land districts. The Gila or Tucson land district comprises and includes all that portion of Arizona lying south of the first standard north. The following counties lie wholly within said district: Cochise, Graham, Pima, and Pinal. The following are partially in this district and partially in the Prescott district, viz, Apache, Gila, Maricopa, Navajo, and Yuma. The balance of the Territory is in the Prescott land district.

The following statement is officially reported by the registers of the land offices at Tucson and Prescott:

Statement of lands entered at United States land office, Tucson, Ariz., for year ending June 30, 1896.

Class of entries.	Entries.	Acres.
Original entries:		
Homestead	180	23,815.03
Preemption	1	40
Excess payments on homestead and other entries and locations	8	10.70
Desert land	219	56,035.88
Mining applications	10	502.80
Total	418	80,404.41
Final entries:		
Homesteads	57	7,260.56
Timber culture	5	552.72
Desert land	14	2,475.88
Cash	15	1,834.94
Mineral	7	372.67
Total	98	12,496.77
Aggregate	516	92,901.18

Tucson land district.

County.	Area unappropriated and unsurveyed.			Area reserved.	Area disposed of.	Total area of land surface of the county in land district.	Remarks.
	Surveyed.	Unsurveyed.	Total.				
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	
Apache	22,792	19,668	41,860	204,980	160	247,000	Mountainous.
Cochise	1,394,700	2,412,123	3,806,823	135,077	40,100	3,982,000	Mountainous and grazing.
Gila	45,216	414,985	460,201	745,807	5,492	1,211,500	Do.
Graham	795,706	2,175,140	2,970,846	1,090,000	77,154	4,138,000	Arid and grazing.
Maricopa	1,066,192	2,928,309	3,994,501	193,000	491,499	4,679,000	Do.
Navajo				70,000		70,000	Mountainous.
Pima	1,049,160	5,370,826	6,419,986	208,053	85,961	6,714,000	Arid and grazing and mountainous.
Pinal	861,341	2,166,686	3,028,027	375,970	70,503	3,474,500	Do.
Yuma	640,800	4,097,002	4,737,802	110,000	84,198	4,932,000	Do.
Total	5,875,907	19,584,139	25,460,046	3,132,887	855,067	29,448,000	

Statement of lands entered at the Prescott land office for fiscal year ending June 30, 1896.

	Number.	Acres.
Original entries:		
Homestead entries	116	15,731.29
Desert-land entries	11	1,115.42
Mineral applications	26	1,765.541
Preemption declaratory statements	1	160
Total	154	18,772.251
Final entries:		
Homestead entries	38	5,660.92
Preemption cash entries	2	320
Commuted cash entries (including excesses)	19	2,704.30
Desert-land entries	3	360
Timber-culture entries	3	240
Valentine scrip locations	2	80
Mineral entries	22	406.362
Railroad selections	670	107,154.28
Total	759	116,926.362
Aggregate	913	135,698.613

Prescott land-office district.

County.	Area unappropriated and unreserved.			Area reserved.	Area disposed of.	Total area of land surface of county in land district.
	Surveyed.	Unsurveyed.	Total.			
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Apache	1,427,799	788,877	2,216,676	3,487,080	1,219,244	6,923,000
Coconino	1,343,202	9,280,220	10,623,422	2,023,748	582,830	13,230,000
Gila	43,320	1,295,600	1,338,920	376,320	2,760	1,718,000
Maricopa	135,800	1,237,040	1,372,840	.....	2,160	1,375,000
Mohave	961,387	5,748,112	6,709,499	383,990	42,511	7,136,000
Navajo	1,415,305	788,000	2,203,305	3,100,000	1,006,695	6,310,000
Yavapai	823,467	3,926,066	4,749,533	25,750	481,717	5,257,000
Yuma	.....	1,193,900	1,193,900	201,600	.....	1,395,500
Total	6,150,280	24,257,815	30,408,095	9,598,488	3,337,917	43,344,500

THE WHITE MOUNTAIN INDIAN RESERVATION.

For the purpose of restoring the San Carlos or White Mountain Indian Reservation to the public domain its southern boundary has been ordered to be amended to run as follows:

Commencing at a point on the present eastern boundary of the said reservation, 1 mile south of Goodwin Spring, thence in a general direction west to the highest point on Mount Turnbull, thence in a westerly direction to a point on a line between the agency building proper and Stanley or Saddle Butte, 7 miles from said building, in a southerly direction, thence in a westerly direction at longest possible tangents to the mouth of Hawk Canyon, not crossing said canyon, thence down the Gila River, following the south bank to a point where said Gila River crosses the present western boundary of the reservation. Thus restoring to the public domain a very valuable property, rich in a fine quality of coal, the developement of which will be of much benefit to the Territory.

PERALTA-REAVIS LAND GRANT.

What is known as the Peralta-Reavis land grant embraces large tracts of land in the counties of Maricopa, Pinal, Graham, and Gila. The people of this Territory have never individually seriously considered the pretensions of the claimant to this land, but have looked upon it as a mere farce and fraud, and the Court of Private Land Claims has recently decided it to be fraudulent and void, and made the titles to the lands embraced within this so-called claim perfect and free from any cloud occasioned thereby.

It is impossible to estimate the value of the lands covered by this claim, but the amount in the aggregate is many millions of dollars.

The great copper mines of Globe, Clifton, and Morenci, and the many valuable gold and silver properties that will some day pay tribute to this Territory, are embraced therein.

In the Clifton mines alone the superintendent states that $3,500,000 have already been invested, and very nearly as much at Morenci.

The San Carlos coal fields, now being segregated from the White Mountain Indian Reservation, and embraced in this so-called land grant, are also of great value.

This Peralta-Reavis land grant is looked upon as one of the most gigantic and ingenious frauds ever attempted, and the people of Arizona are to be congratulated on the fact that it has been determined by the courts and the fraud so thoroughly exposed.

And while no one in this Territory believed for a moment that this claim had any merit whatever and was other than the fraud it has been proven to be, yet until the courts so thoroughly exposed the scheme it had some influence in preventing capital from being invested in the Territory.

RECLAMATION OF ARID LANDS.

The reclamation of its arid lands is a supreme question with the people of this Territory. All the arid region of the West is evincing a great interest in the question of irrigation.

The Fifth Annual Irrigation Congress will be held in Phœnix on the 15th, 16th, and 17th of December, and it bids fair to be composed of many of the brightest minds and ablest men in the West.

Great questions touching the vital interests of the entire region will be discussed, and the Congress of the United States will be aided in this great work by its deliberations.

Why should Government aid not be liberally extended for the reclamation of the arid regions? Congress bestows millions of dollars for the improvement of rivers and harbors for the benefit of insignificant streams, and why should it not be given to the boundless arid plains of the West, that will become fertile fields and add to the wealth and greatness of the country when properly irrigated?

Millions of money for the improvement of rivers might as well be thrown away; it is uselessly expended, no good is effected, commerce is not aided, navigation is not improved—the most of it is spent for the protection of cities and towns on the banks of rivers because they have the influence to obtain the aid.

This question of irrigation is an important one to all countries west of the Rocky Mountains. Just think of the millions of acres that now form the desert of our country that by judicious application of water can be made a garden.

It is a historical fact that can not be disputed that the regions of the world that have been cultivated by irrigation have been the most productive.

Where a proper system of irrigation exists there can be no failure of crops; but in the most productive regions, where the rainfall is annually sufficient to preclude and render unnecessary irrigation works, the drought often comes, and a consequent failure of crops.

WATER SUPPLY.

The water supply in the Territory if properly utilized and developed is amply sufficient to irrigate all the agricultural lands within its borders. On the western boundary of the Territory flows the great Colorado River. This river can never be wholly used by the States north of this Territory for irrigation purposes from the fact that it and most of its tributaries flow in deep canyons, so it will always be true that this great river will be delivered from the Grand Canyon and can be carried upon millions of acres of valley and mesa land in the counties of Mohave and Yuma and across the border line into old Mexico. This will require capital; but the capital will come in the future, for its investment will be rewarded by great dividends.

MOUNTAIN SUPPLY.

The mountains of Arizona receive great quantities of rainfall during certain seasons of the year. This rainfall forms what we might call

SCENE ON GRAND CANYON OF THE COLORADO.

"weather streams," whose beds are dry the greater part of the year. These "storm waters" can be economically stored for use by the construction of reservoirs.

ARTESIAN WELLS.

The geological structure of some parts of the Territory is such that wells may be used for irrigation, and many tracts for orchards and vineyards may be made highly profitable. This to some extent has been accomplished in some parts of the Territory with good results, the wells flowing as true artesian fountains.

RESERVOIR SITES.

There are many splendid reservoir sites throughout the Territory, and they should be secured to the people by proper legislation, and not allowed to be seized upon for private speculative purposes. One of these sites, at the Box Canyon, on Salt River, would, if properly developed by capital, be of sufficient capacity to reclaim every acre of irrigable land of the public domain in the valley, amounting to millions of acres. On the Gila River, 12 miles above Florence, at what is known as the Buttes, is situated one of the finest natural reservoir sites to be found anywhere in the arid regions of the West. This site has been thoroughly surveyed and reported upon by Lieutenant Glassford, topographical engineer, United States Army, to the Senate Committee on Arid Lands. Five hundred thousand acres of the finest land in the world could be reclaimed by the erection of a dam at this point.

Lieutenant Glassford says as follows:

The canals taken from the Gila in the vicinity of Florence cover about 300,000 acres of land, including 50,000 acres on the Pima Indian Reservation. These canals nearly exhaust the water at ordinary stage, although they furnish a superabundance of water in the spring of the year in crop season, and also when the summer rains come early on the upper Gila, to make a second crop; but there occur usually two short periods in each year when there is a scarcity of water in all the lower valley—say from three to six weeks in June and July, and again about the same length of time in November and December. Especially during the latter period is the amount needed usually limited.

When the water in the upper Gila gets low, immediately after it passes through the gorge at the Buttes, where the bed rock comes to the surface, it largely disappears in the gravel bed that underlies the plains in the lower valley. Canals that are taken out immediately below the Buttes have a steady and constant supply of water, while those lower down get none in low water, except at a few places where the bed rock comes to the surface. Notwithstanding this, the entire volume of the river might be turned down to the lower sections if it were possible to raise the level of the water sufficiently through the agency of a reservoir. The many thousands of acres of the most valuable land in these lower plains, before noted, can be successfully brought under cultivation at a comparatively small cost to each acre by constructing a dam on the Gila River at the place above mentioned at the Buttes, some 10 miles above Florence.

A dam constructed there would store a sufficient quantity of water when the river is flush in the two rainy seasons to insure a steady flow of water in all the canals now in use in this valley, and allow a sufficient surplus of water to guarantee the construction of another canal to be taken out of the river at the Buttes on the south side of the river. The capacity of this canal can be as great as all other canals, and would water some of the finest land ever looked upon. This statement may seem an extravagant one, but upon examination of the accompanying map (see the commissioner's report of Pinal County), showing the topography of the country above Florence, at and above the Buttes, it is readily seen that an enormous basin of water can be formed by constructing a dam at that place. It appears that a dam 150 feet high will back the water about 20 miles, giving probably an average depth of some 75 feet for the entire distance. The canyon of the river immediately above the Buttes widens out, and at a distance of one-fourth of a mile it is as much as one-half mile wide on the bottom, and much of the entire distance it is a mile or more wide. The sides of the mountain surrounding this basin are broken by side or lateral canyons that add greatly to the capacity of the basin. The conception of the capacity of such a reservoir can only be appreciated by the engineer and by a study

of such spaces. No cross sections of this basin have ever been made, so far as known, to calculate the vast volume of the basin, but the above statement it is believed is not overdrawn, and that an accurate survey will increase this estimate. There can be no doubt of the water supply being sufficient to fill this vast reservoir when a dam is once constructed, as a glance at the rainfall data in the watershed covering southwestern Arizona and a large part of western New Mexico and Sonora will prove. It is believed this watershed will not only furnish water for this ideal reservoir, but will also supply many other reservoirs, smaller in capacity, that can be constructed at different places in the lower Gila River Valley, and from which many thousands of acres of valuable land can be reclaimed.

The above facts seem to me so patent that it is respectfully urged that this place be investigated for early experiment and surveys in Arizona, under the Government, as there are few spots in the United States, and certainly few in Arizona, where so much can be accomplished with so small an expenditure of means. Indeed, to the person who has looked at the place with the object in view, it appears as if nature has largely made this extraordinary place for the purpose.

A dam about 200 feet wide at the bottom and 100 feet high, though the height might be doubled, will, it is believed, accomplish the result heretofore outlined. At this place the best rock, almost in place, can be quarried for constructing the dam, and in the immediate vicinity good hydraulic lime can be burned, as is now done by the Mexicans for use by the cattlemen for the purpose of constructing water tanks. With all these advantages, and many others not enumerated, that will be found to exist when properly examined, the Government can not too early turn its attention to this extraordinary place, that it may be utilized while it is yet unencumbered by settlers or other claims, so that this, if the first experiment in the storage of water from large streams, may be a success beyond a question.

Some action in this direction by the Government is essential, as the work is of such magnitude that it deters private capital from undertaking it, until prominent engineers have pronounced the proposition feasible beyond a doubt.

The following extracts from the county immigration commissioners' reports will show what has been done in constructing canals, building reservoirs, etc:

CANALS AND RESERVOIRS.

Maricopa County.—Main canals, 219 miles; laterals, 794 miles. Cost about $1,500,000. Land reclaimed, 275,000 acres. Land in process of reclamation about 300,000 acres. Two large reservoirs in course of construction, estimated cost about $1,200,000. One artesian well, small flow.

Mohave County.—Main canals, 10 miles; laterals, 25. Many reservoir sites, and on Colorado River a large canal has been commenced (3,000 yards constructed), and stopped for want of capital.

Gila County.—Many small ditches. Some of the finest reservoir sites in the Territory—notably the Tonto basin, surveyed and located by the Hudson Reservoir Company, not yet under construction; $2,000,000 is the estimated cost.

Graham County.—One hundred and eight miles of canals, irrigating 37,680 acres; many reservoir sites undeveloped.

Navajo County.—Eighteen canals, small; 45 miles laterals; cost not given.

Pinal County.—Seventy-five miles main canals, 75 miles of laterals; 1 reservoir, cost $150,000. Butte reservoir site is in this county (see report of Lieutenant Glassford); its cost is estimated when built at $2,000,000.

Pima County.—One hundred and thirty miles main canal, cost $150,000; reservoir sites abundant.

Apache County.—Reservoirs, 6; irrigation canals, 6; length of canals and cost of reservoirs not given.

Coconino County.—Many reservoir sites; none constructed and only a few small canals; length and cost not given.

Cochise County.—Eleven artesian wells, flowing large quantities of water and irrigating a large area of land; amount not given; many reservoir sites undeveloped.

Yavapai County.—Many small ditches and great number of reservoir sites of great capacity, sufficient to reclaim 2,000,000 acres; no estimate.

Yuma County.—One hundred and twenty and one-half miles main canal; miner's inches, 77,100; cost, $337,000. Several large canals contemplated and some preliminary work done.

IRRIGATION.

On the subject of irrigation Prof. Edward M. Boggs, of the University of Arizona, and irrigation engineer, writes the following:

The past year has been rather a quiet one in irrigation affairs. Perhaps from the irrigator's standpoint it may be said to have been a prosperous year. The plentiful

supply of water in the streams throughout the greater part of the year has exceeded the demand, and thereby prevented much of the distress which is sometimes occasioned by the scarcity of water. Advancement is slowly being made in the direction of economy in the distribution and application of water, but it must be admitted that room for improvement still remains.

But little new construction has been undertaken. Work has generally been limited to the cleaning and repair of existing canals and laterals, with occasionally some enlargements or other improvement.

Of the several large storage enterprises which have been projected during the past few years, not many have yet advanced far in the work of construction; none have reached completion. The financial stringency which has been felt throughout the whole country has borne with especial severity upon the promoters of new enterprises where the investment must be heavy; and the returns, although promising to be ample and sure, are not to be expected for some years in the future. The difficulty of obtaining money for the completion of the costly works which have been undertaken has prevented any very notable advance during the past year.

In several instances where work upon a large scale was intended, it has resulted that little if any more work has been done than that which was necessary to prevent lapsing of acquired rights.

The factors entering into the problem of water supply are so numerous and so far-reaching that private capital is inadequate to properly study them. Data relating to the flow of our streams, during long periods of time, are of vital importance to this Territory, and it is hoped that the work of stream gauging will be recommenced and continued by the General Government.

The development of underground waters by any of the several possible plans is of importance to the Territory. Explorations of this nature are too extensive for private means to accomplish much, and reliance must be placed upon aid from the Government if we are to progress far along these lines.

The provisions of the Carey law, whereby a million acres of land is granted to Arizona for irrigation purposes, do not become effective until the Territory becomes a State, and in justice to the people of Arizona this law should be made immediately operative.

The invention of an engine which shall be actuated by solar heat would be an inestimable boon to Arizona. Although there is no portion of the earth where a commercially practicable solar engine would be as valuable as in this Territory, its advantageous use would not be restricted to this locality. The idea is by no means a visionary one. Several inventors have constructed models which have been so far successful as to give promise of ultimate complete success. It would seem good policy for our Government to stimulate the exertion of inventors by offering a large sum of money as a prize to the person who should first perfect a practical engine of this class.

CUSTOMS.

Statement of the business transacted at the port of Nogales for the fiscal year ended June 30, 1896.

[Under tariff act of August 28, 1894.]

When imported.	Commodities free of duty.	Dutiable commodities.	Duties collected.
1895.			
July	$165,776.00	$3,385.00	$920.59
August	132.915.00	2,811.00	1,080.48
September	135,717.00	1,555.00	401.72
October	153,467.00	19,520.00	4,087.50
November	166,447.00	118,033.00	24,057.80
December	184,193.00	85,662,00	16,191.26
1896.			
January	178,114.00	42,999.00	8,265.15
February	192,731.00	46,526.00	9,448.56
March	190,845.00	7,748.00	2,036.64
April	222,540.00	7,643.00	2,321.50
May	262,840.00	39,302.00	12,798.28
June	227,928.00	14,805.00	3,762.78
Total	2,213,513.00	389,989.00	85,372.26
Additional duties collected later pertaining to above months			893.90
Aggregate	$2,603,502.00		86,266.16

Statement of business transacted at the port of Nogales for the fiscal year ended June 30, 1896—Continued.

Cattle imported paying duty	head	48,205
Cattle imported free of duty	do	4,467
Total		52,672
Value of domestic and foreign exports during fiscal year		$941,779.00
For the year ended June 30, 1895, importations were—		
Commodities free of duty		1,887,640.63
Dutiable commodities		211,579,05
Aggregate importations		2,099,219.68
Duties collected		48,728.90
Exports		805,970.00
Increase of exports over 1895		504,282.32
Increase of duties collected over 1895		37,537.26

Statement of value of and estimated duty on merchandise entered at the port of Nogales and destined to interior ports in the United States and to foreign countries under warehouse and immediate transportation bond.

Date.	Value.	Duty.
From July 1, 1895, to June 30, 1896:		
To interior ports in the United States	$894,628.00	$84,087.57
To foreign countries	3,453.00	1,434.00

The total amount of duties estimated on merchandise entered and destined to interior ports in the United States under warehouse and immediate transportation bond, together with the total duties collected in 1896, should be credited to this port.

A United States live-stock agent is stationed permanently at Nogales to inspect cattle when presented for entry. Present quarantine regulations permit importation of cattle and other ruminants only through the port of Nogales and subport of Bisbee after special inspection by the live-stock agent and issuance by him of a special permit thereof, but cattle are allowed to cross the line at any point convenient for inspection and satisfactory to the collector of the port and the live-stock inspector. It was found necessary to limit the number of ports at which cattle may be allowed to cross the frontier, in order that there may be a proper inspection and supervision of their movements, and under no circumstances will the importation of cattle from Mexico be allowed at any other points in Arizona.

INTERNAL REVENUE.

Collection of internal revenue for the fiscal year ending June 30, 1896.

Playing-card stamps	$25.08
Special-tax stamps	15,097.76
Tobacco stamps	243.00
Cigar stamps	336.90
Cigarette stamps	159.00
Spirit stamps	584.87
Beer stamps	132.97
Fines, penalties, etc. (list)	468.27
Total	17,047.85

UNIVERSITY OF ARIZONA, TUCSON.

SPECIAL TAXPAYERS.

Special taxpayers in Arizona are classified as follows:

Rectifiers less than 500 barrels	1
Retail liquor dealers	620
Wholesale liquor dealers	15
Brewers, less than 500	2
Brewers, more than 500	
Wholesale dealers in malt liquors	17
Retail dealers in malt liquors	9
Wholesale dealers in oleomargarine	1
Retail dealers in oleomargaine	3
Total	668

EDUCATION.

The educational institutions of Arizona are in a flourishing condition, and the Territory expends for educational purposes as large an amount per capita as most of the States of the Union.

Arizona is proud of its university; although young in years it is fast taking a high rank among the universities of the southwest.

We are proud of our normal school, and of our public schools, which are a credit to any country.

The university.—The University of Arizona was established by an act of legislature in the spring of 1885. It was located at Tucson, and an appropriation of $25,000 was made to begin the work. The location is an excellent one, for Tucson for nine months in the year has one of the finest climates in the world. It is within easy reach of the mineral regions of the southwest, and has many advantages as a location for a great university.

The university was not completed and open to students until October 1, 1891, the first session closing June 1, 1892. The institution is now well equipped in the schools of agriculture and mines, and for instruction in all the departments afforded by the best colleges of the country. There is no necessity for any of the youth of Arizona going elsewhere for an education, but there are many reasons why the University of Arizona should be crowded with students from all parts of the country. The climate of Tucson can not be excelled by any portion of the country during the entire months the university is open for educational purposes. The mines are within easy reach, and in many branches taught the location itself offers superior advantages.

Expenses for tuition, etc.—The University of Arizona affords advantages for a first-class education at a very moderate cost. Students are required to pay once only (upon entrance) a matriculation fee of $5. Charges are made for materials actually consumed by students in the laboratories.

The expense for board and room rent will amount to about $15 per month. Students will be provided with simple furniture, including single bedstead. They will supply their own mattress, pillow, bed clothing, towels, etc., also mirror, washbowl, pitcher, and slop jar.

Text-books required may vary in cost between $5 and $10 in different years of the course.

Economical students should readily go through the year with $150 to $160, excluding clothing.

Members of the battalion will be required to provide themselves with the prescribed uniform. The cost can not be stated at this time, but assurances are given that it will be moderate. Moreover, the uniform is far more serviceable than a civilian suit of equal cost. Parents are

urged to consider the matter of uniform when supplying their sons with clothing for the approaching school year.

Provision has been made for the self-support of students to a limited extent.

The above items of the cost of maintaining students at the university have been furnished by the president.

Hundreds of persons come to Arizona to spend the fall, winter, and spring months on account of its health-inspiring climate. Why should they not send their sons and daughters to our university during the same period, when the same educational advantages can be enjoyed as in older States and when they will be under the influence of our health-giving climate?

I earnestly recommend that Congress make an increased appropriation for its maintenance and support. I have full faith in the patriotism and intelligence of Arizona and the loyalty of her people to the cause of education, and believe that our university, our normal school, and our public schools will receive the great consideration they deserve.

In recognition of the magnitude of the mining interests of this Territory and the great wealth produced by mining and the development of our mining resources, I urgently recommend that H. R. 5380 [Report No. 226], reported February 3, 1896, to the first session of the Fifty-fourth Congress by Mr. Mondell, from the Committee on Mines and Mining, be passed by the coming session of Congress, and that Arizona be included in the report accompanying the bill and secured in the great benefits to be derived by its passage.

The object of this bill is to apply a portion of the proceeds of the public lands to the endowment and support of mining schools in the several States and Territories, for the purpose of extending similar aid in the development of the mining industries of the nation, as already provided for the agricultural and mechanical arts.

The grandeur of any country is founded upon the intelligence of its people and the money expended for this purpose is always wisely expended, and Congress should not hesitate to make a liberal appropriation for our university.

The university building is a large and creditable one for so young a university, and it is situated upon a large and beautiful tract of land just outside of the limits of the city of Tucson, which was donated as the university grounds.

The number of students attending the university has increased every year, and a larger number have matriculated this year, by a large per cent, than any year previous.

As the chief executive of this Territory I am glad to note the prosperous condition of this institution.

Herewith I submit the report of the Rev. Howard Billman, the president of the university:

UNIVERSITY OF ARIZONA.

[Special report by President Howard Billman.]

The total number of professors, assistant professors, and instructors in the university during the year was fourteen, and the wisdom of the board of regents in making two additional appointments over the previous year may be called in question; but if due consideration is had for the organization and the aims of the institution it will not be.

The range of instruction contemplated in the establishment of the colleges of agricultural and mechanic arts in the several States and Territories is a very wide one. This will be more appreciated after looking into the annual registers of these institutions. Provision has been made in the University of Arizona for five regular

courses, viz, general, agriculture, civil engineering, mechanical and electrical engineering, and mining engineering. In addition to the foregoing regular courses of study students will be received for special courses, without regard to a degree, in the following subjects: Agriculture and horticulture, biology (botany and zoology), chemistry, civil and hydraulic engineering, drawing (free-hand and mechanical), elocution and physical culture, English language and literature, geology and mineralogy, history and civics, mathematics, mechanical engineering, mining and metallurgy (mill work, etc.), assaying, modern languages, physics.

A glance at the last annual register will show that quite one-half of the advanced pupils were doing special work, or were entered in the engineering courses. A large proportion of the remaining half will be later on.

The school of mines department, it is felt, should do a work on behalf of the mining interests of the Territory similar to that which is proposed by the agricultural experiment station on behalf of the agricultural interests. It will be occupied very largely in a work of investigation. A paragraph in the announcement of the school of mines says:

"In order to promote the knowledge of the mineral wealth of Arizona and to disseminate accurate information regarding the mineral and rock formations and their distribution, qualitative tests, or determination of the natural mineral substances are made gradually upon samples sent by mail or delivered to the institution without charge."

There is already a large and constantly growing demand made upon the assay department for commercial work, and the advantage of having within easy reach of miners an office whose determinations in accuracy are inferior to those of no assayer in the country can not be overestimated.

A special feature of the university is the agricultural experiment station. An act of Congress approved March 2, 1887, says:

"There shall be established, under direction of the college or colleges or agricultural departments of colleges in each State or Territory established, or which may be established hereafter, in accordance with the provisions of an act approved July 2, 1862, entitled 'An act donating public lands to the several States and Territories which may provide colleges for the benefit of agricultural and mechanic arts,' or any of the supplements to said act, a department to be known and designated as an 'agricultural experiment station.'"

Section 2 of this act reads as follows:

"It shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and values of grasses and forage plants; the composition and digestibility of different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese, and such other researches and experiments bearing directly on agricultural industry of the United States as may in each case be deemed desirable, having due regard to the varying conditions and needs of the respective States or Territories."

For the work of these agricultural experiment stations the General Government provides annually the sum of $15,000 to each station. Four members of the university staff receive their compensation in the main from this experiment-station fund and devote a large portion of their time to the station work.

The situation is such in the Territory of Arizona, from an educational point of view, that the university must necessarily give much attention to the work of preparatory training. To a considerable extent the number of students from time to time doing university work will depend upon the number gathered into the preparatory department and successfully trained there. At the present time more than one-half of the attendance is in this department. There are many obvious disadvantages and much loss in requiring specialists of superior ability to devote any part of their time to this preparatory work.

In view of our environment and the organization and aims of the university, successful operation depends upon a large teaching force. We can now say to prospective students: "You can fully depend upon our doing successfully the work laid out in our annual register, and need not fear that your interests will be neglected in any of the departments in which the institution has promised to do work."

In the past year there has been marked increase in the attendance of pupils and marked improvement in the adjustment of the equipment of the university to the

needs of enlarged attendance. The following statement shows the enrollment of pupils each year from the beginning:

Year.	Total enrollment.	From Tucson.	Other places in Arizona.	Outside Territory.	Special students.
1892–93	38	33	2	3	3
1893–94	57	50	3	4	3
1894–95	47	38	5	4	2
1895–96	100	55	39	6	19

It is worthy of note not only that the attendance has doubled in the past year, but that a much larger proportion of pupils has been drawn from other points in the Territory.

STUDENT BODY.

The attendance by counties was as follows: Pima, 60 (from other places than Tucson, 5); Cochise, 15; Maricopa, 6; Pinal, 6; Graham, 3; Yuma, 2; Apache, 1; Navajo, 1.

It is worthy of note also that this is the first time in the history of the university when there have been many special students. Under the head of special students for the present we have included not only those doing special work, but also those enrolled in any one of the special engineering courses.

Special students were divided as follows: Mining engineering, 5; electrical engineering, 2; civil engineering, 1; assaying, 4; English, 3; botany, 1; bookkeeping and stenography, 3. There was a class of about 15 in bookkeeping and stenography, but only 3 made these a specialty; the others took them in connection with full work in the university.

As bearing upon this point I quote from a report submitted to me January 1, 1896, by Prof. Robert H. Forbes, of the department of chemistry:

"The class work for the last half of the preceding school year was very light, but since the beginning of the present school year there has been an encouraging increase in the number of students doing chemical work. Of these students, 13 in number, 1 is pursuing a technical chemical course, 6 are taking special work in connection with mining and engineering courses, while 6 others have followed the study for sake of general scientific training. The advantages enjoyed by these students are excellent. The equipment—including room, apparatus, and chemicals—is well adapted to the teaching of chemistry. The lecture room, containing desks and hoods for the accommodation of 12 students, is well lighted and ventilated, and, when necessary, can be fitted up for the use of a much larger number. The supply of apparatus and chemicals on hand is abundant and of good quality. The collection of charts, organic and inorganic compounds, and special lecture apparatus for illustrating the principles and applications of the science, though as yet small, are carefully selected and serve their purpose well."

Also from a report by Prof. Meade Goodloe, in the department of mineralogy and assaying, I quote as follows:

"The department of mineralogy and assaying has had a greatly increased demand for instruction during the past term. Previous to this no full course in assaying or mineralogy had been in one operation or even definitely specified in detail, since no regular students in courses of study requiring extended work in these subjects had reached that point at which such instruction was to be given.

"Since the establishment of the university special students in assaying had been given work suited to their needs, and a short course in mineralogy had been given to a class of general science students.

"At the opening of the present school year, however, a class of three regular students sufficiently advanced to undertake the work of a complete course in mineralogy applied for such instruction and have been successfully pursuing the work of a course as complete as could be covered in the time indicated in our current catalogue. This class increased by one or more regular advanced students will, as now arranged, complete their work in mineralogy at the close of the spring term and at once enter upon a course of assaying. Two special students devoting all their time to assaying and mineralogy have been given instructions during the past term."

We have been surprised to find how large a number of students have gone beyond the bounds of the Territory for school privileges; nor has it been for advanced work, but to considerable extent for preparatory work. Upon investigation it is found that this is due to the fact that the strength of the university faculty and the equipment of the institution have not been sufficiently known. This exodus abroad was checked to a considerable extent in the past year, and will be much more in the year to follow. The pupils will be just as well taught here and at greatly reduced expense to parents.

ARIZONA NORMAL SCHOOL, TEMPE, ARIZONA.

APPARATUS.

In addition to the teaching force, which is very strong for so new an institution, the work of training is facilitated by an exceedingly well chosen collection of apparatus in the several departments. This is represented as follows:

Mining engineering department	$20,000.00
Physics and mechanics	5,960.00
Chemistry	4,000.00
Civil and hydraulic engineering	3,337.46
Botany	2,976.39
A specially well-selected library	3,533.46

The total cost has been nearly $40,000, and the apparatus has been selected with great care.

ACCOMMODATIONS FOR STUDENTS.

Marked accommodations and improvements have also been made for the care of the students. Two buildings, erected at a cost of $12,729.85, and formerly occupied by members of the faculty, will in the near future be used exclusively as dormitories for young lady students. Here they will be under the constant watch of careful and competent matrons and female teachers. A dormitory for young men is just now receiving the finishing touches. It will cost approximately $14,000, and will accommodate from 35 to 40 students. The university has thus provided, at a cost of about $30,000, very superior dormitory and boarding accommodations for about 75 students.

AGRICULTURAL EXPERIMENT STATION.

The slight increase in the university teaching force has enabled the members of the experimental station staff to give much more attention to the work of origina investigation. There has been much attention bestowed along the following lines:

Agricultural.—The growing of forage plants, canaigre, tobaccos, and fiber plants, and the feeding of dairy cows.

Horticulture.—The growing of large numbers and varieties of fruits and of decorative trees and plants, the fertilization of fruit orchards, and the testing of garden vegetables.

Irrigation engineering.—The examinations of sites for storage reservoirs and the measurement of the flow of water in streams.

Meteorological.—The keeping of records of meteorological conditions and the compilation of tables making comparison with observations made elsewhere.

Botanical.—The conducting of field experiments for the eradication of fungous diseases of fruits and examination of plants and collecting an herbarium.

Entomological.—The study of insects, making a collection, and experiments in methods of destroying injurious insects.

Chemical.—The study of the chemical life history of canaigre, and the examinations of soils and waters.

The following bulletins have been prepared and distributed during the year:

By Wm. Stowe Devol, director, agriculturist, and horticulturist:

No. 15.—List of varieties of fruits growing upon the grounds of the Tucson station.

No. 16.—Notes on apricots, at Phœnix station.

Nos. 17 and 18.—Agricultural convention, containing a full report of the proceedings of a meeting of farmers, fruit growers, and stockmen, held in Phœnix, October, 1895.

No. 19.—Sixth annual report.

By Edward M. Boggs, irrigation engineer and meteorologist:

No. 20.—Arizona weather, containing a full report of the meteorological conditions prevailing at the university for the first four years, with briefer reports from other sections and a comparison of these conditions with other parts of the world.

By Robert H. Forbes, chemist:

No. 21.—Canaigre, containing a complete report of the chemical examination of canaigre, with brief observations respecting other points in canaigre and its culture.

NORMAL SCHOOL.

The law creating the Territorial normal school was enacted March 10, 1887. It was located at Tempe, in Maricopa County, 7 miles from the capital. The law creating it says, inter alia, "the purpose of this school shall be the instruction of persons, both male and female, in the art of teaching and in all the various branches that pertain to a good

school education." Also to give instruction in the mechanical arts and in husbandry.

There has been a marked improvement in this institution from the day of its foundation to the present time.

The president of the normal school, Professor McNaughton, is an able instructor of long experience, and is giving great satisfaction to the people of the Territory.

This school will soon take rank with any of the normal schools of the Southwest.

The school is situated in the midst of an intelligent and moral community, and the climate of Tempe can not be excelled.

BUILDINGS AND GROUNDS.

The campus includes 20 acres, which was donated to the school by the enterprising citizens of Tempe, and a great portion of it is highly ornamented with trees and shrubs.

The building, erected in 1887, is not now sufficient to accomodate all the students who desire to enter, and a new building is in process of construction, and will be completed within six months, at a cost of $60,000, that will acommodate 500 pupils.

This edifice will be beautiful in architectural design, convenient in arrangement, and substantial in construction.

LIBRARY.

There is connected with this school a library of more than 700 volumes, covering the fields of history, science, education, and general literature.

Contributions will be continually made to this library, and it is to be hoped that an appropriation will be made by the next legislature for its benefit.

There are two literary societies connected with this normal school.

This school will soon take rank equally with any of the normal schools of the country. It has an able president and faculty.

The following report is submitted by President McNaughton:

ARIZONA TERRITORIAL NORMAL SCHOOL.

The Arizona Territorial Normal School was established at Tempe by an act of the thirteenth legislative assembly, amended and reenacted March 10, 1887.

The control of this institution is by law vested in a board of education, consisting of five members—the superintendent of public instruction and the Territorial treasurer, members exofficio, and three members appointed by the governor of the Territory.

OBJECTS OF THE SCHOOL.

The objects of the school were declared by said act to be the instruction of persons, both male and female, in the art of teaching and in all the various branches that pertain to a good common-school education; also to give instruction in husbandry and agricultural chemistry, in the fundamental laws of the United States, and in what regards the rights and duties of citizenship.

LOCATION.

The location of this school at Tempe, in the Salt River Valley, is especially fortunate; for the climate during the school year is delightful, and the expenses of living are less than in any other portion of the Territory, and in the vicinity of the school compares favorably with any other in the Territory.

APPROPRIATIONS.

The amount appropriated by the legislature for the erection of the building now occupied by the school was $6,500; and by the act of March 10, 1887, a tax levy of


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2½ cents on every $100 of assessed valuation, to be levied annually until the Territory becomes a State, was made for the maintenance of the school.

By the seventeenth legislative assembly an appropriation of two-fifths of a mill on the dollar of the entire assessed valuation of the Territory, to be levied two years, was made for the erection of buildings for the accomodation of the school. The eighteenth legislative assembly authorized the same levy for two years more.

These levies yielded enough money to enable the board of education to inclose the new building. About $26,000 has been expended upon it. There is only enough money appropriated and still unexpended to finish enough of the new building to accommodate the school but partially at the present time.

CAMPUS.

The campus contains 20 acres, and was a donation from the citizens of Tempe, made in compliance with the legislative enactment establishing the school. It is inclosed, and the north half is in a high state of cultivation, being thickly set with shade and ornamental trees and beautified with shrubs. Although there are about twenty different kinds of shade trees now growing on the campus, the white ash is found in far the greater number.

SCHOOL BUILDINGS.

The building now occupied by the school was erected in 1886; it is a one-story brick structure 70 feet long and 60 feet wide, surrounded by a high roof and having a veranda 12 feet wide entirely surrounding it.

The new building stands about 60 feet north of it, and is 136 feet long, 75 feet wide, and three stories high; the lower story is of brown stone, the other two of pressed brick and brown-stone trimmings.

This edifice is beautiful in architectural design, convenient in arrangement, and substantial in construction. When completed the ground floor will be used for chemical and physical laboratories and manual training shops; the middle story for study and recitation rooms and principal's office; the third story for assembly hall, society halls, and reading room, musuem, and library. It is believed this building will accommodate the school for several years to come.

LIBRARY.

The library now contains more than 700 volumes, covering the fields of history, science, education, and literature. Many of the valuable publications of the Smithsonian Institution, as well as the reports of the Commissioner of Education, and statistical reports of the Interior Department are found on its shelves. It is supplied with reference books sufficient for the present needs of the school. Many of the principal educational publications are received regularly and kept on file for use of students.

MUSEUM.

The museum already contains many valuable pieces of archæologic relics, and a large number of interesting specimens of animals, plants, and minerals, characteristic of Arizona, such as copper, silver, gold, and lead ores, native insects, birds, small animals, and plants; in fact, a valuable nucleus of a museum of such a wide range of interesting specimens as Arizona alone can produce.

CONTRIBUTIONS.

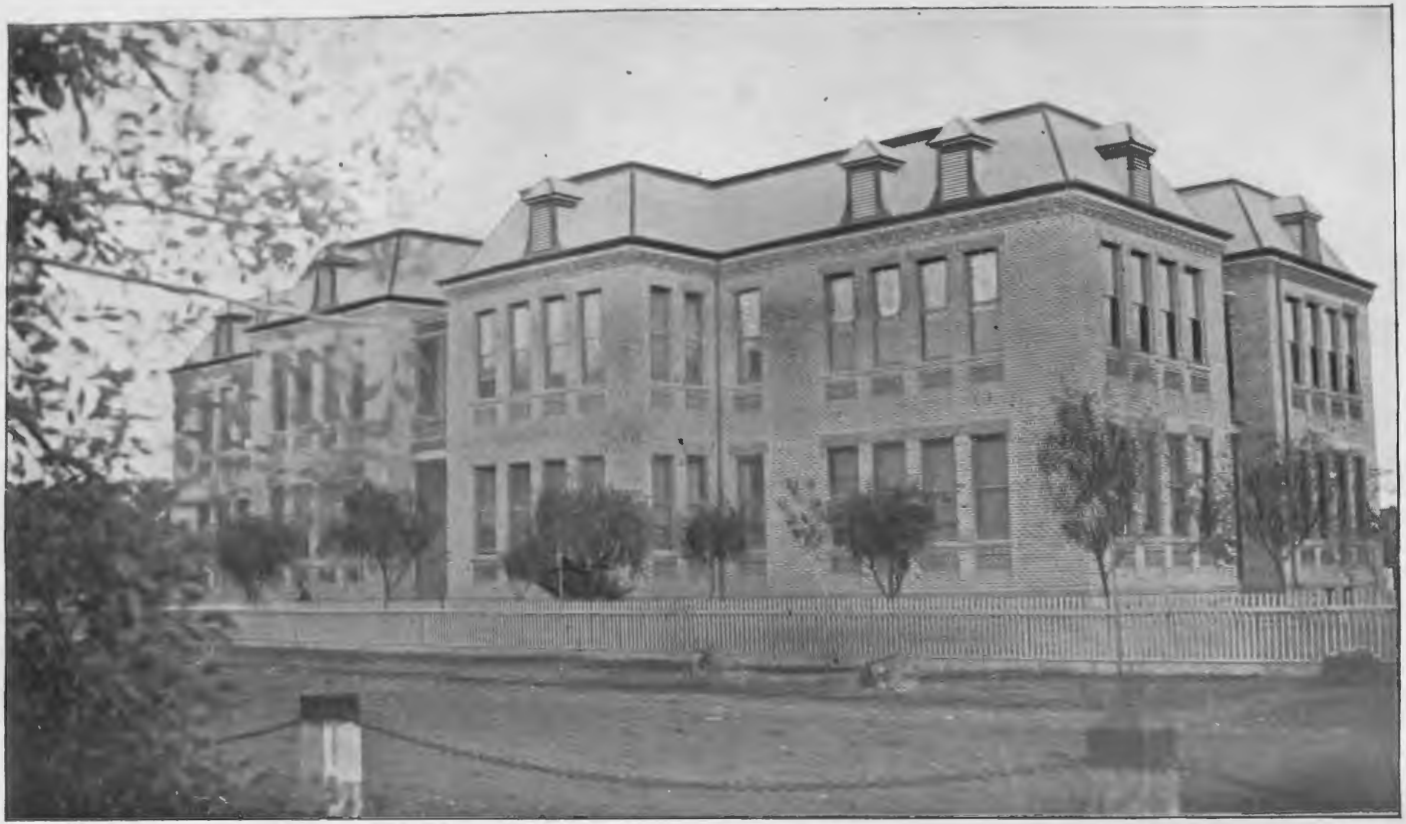
During the past few years, many friends of the institution have contributed valuable articles. Their generosity and interest in the museum is appreciated and hereby acknowledged. The students have taken great interest in the museum and have contributed much to its success.

ATTENDANCE.

Owing to some accident to the records, it is not possible to state the attendance at the school for the first five years of its existence, but the first year's attendance was not far from 20. The attendance increased steadily but slowly until in the fifth year it numbered 55.

Attendance in—

1890–91	54
1891–92	76
1892–93	87
1893–94	91
1894–95	94
1895–96	138



PUBLIC SCHOOL BUILDING, PHOENIX, ARIZONA.

Statistics of public schools—Continued.

County.	Average salary paid to teachers.		Total amount paid in salaries.		Teachers examined.		Receiving certificates.		Teachers who are graduates of a normal school.	
	1895.	1896.	1895.	1896.	1895.	1896.	1895.	1896.	1895.	1896.
Apache	$66.79	$62.11	$6,040.00	$5,883.61	2	7	2	4	4	3
Cochise	76.42	76.37	13,832.89	14,210.93	14	8	14	6	3	2
Coconino	85.50	84.14	6,785.00	7,780.00	5	5	4	1	1	4
Gila	69.66	67.50	5,446.97	5,695.24	7	12	5	6	2	4
Graham	56.60	56.50	8,782.98	9,671.80	12	17	12	11	3	3
Maricopa	70.00	69.50	32,799.50	40,317.99	56	44	34	23	20	25
Mohave	72.67	71.00	6,065.83	6,194.25	2	2	2	1	2	6
Navajo	57.60	62.50	6,120.00	6,997.25	3	21	1	8	3	7
Pima	69.39	67.00	18,263.40	18,080.58	14	12	10	5	4	5
Pinal	80.00	73.03	6,078.75	7,097.15	3	9	3	9	8	6
Yavapai	73.03	74.50	22,031.05	22,717.24	13	17	12	14	17	9
Yuma	82.50	70.00	5,045.00	5,159.00	2	1	1	1	4	1
Total	71.68	69.55	137,291.37	149,805.04	133	155	100	89	71	75

County.	Cash paid for sites, buildings, and school furniture.		Total amount expended, all sources.		Total valuation of school property.	
	1895.	1896.	1895.	1896.	1895.	1896.
Apache	$197.41	$487.06	$7,476.02	$7,663.73	$9,945.00	$10,350.00
Cochise	343.91	219.75	18,032.60	17,581.52	20,299.00	20,205.00
Coconino	13,800.00	1,853.97	23,586.37	12,153.73	30,165.00	29,350.00
Gila			6,101.32	7,388.49	4,245.00	3,630.35
Graham	341.70	2,805.68	11,183.63	14,680.99	13,600.93	15,210.00
Maricopa	5,098.34	4,997.88	47,371.96	56,070.90	173,400.00	182,481.30
Mohave	680.59	6,127.06	8,063.25	13,968.85	4,817.00	11,083.00
Navajo	125.00	96.83	11,887.94	8,298.02	2,211.30	3,189.00
Pima	50.00	526.00	23,944.54	25,517.82	75,848.82	77,263.84
Pinal	692.95	1,410.75	9,326.90	12,076.89	20,290.50	22,281.00
Yavapai	988.54	174.50	26,045.48	27,975.72	48,655.00	46,458.00
Yuma	217.42	1,084.49	8,337.88	7,177.98	11,000.00	7,424.00
Total	22,535.86	19,783.97	201,357.89	210,554.64	414,477.52	428,935.49

From the above tables it will be seen that there were 324 teachers during the past year as against 314 the previous year, thus showing an increase of 10. There were 16,828 census children in the Territory as against 15,909 in previous year, thus showing an increase of 919 children between the ages of 6 and 18 years. Of this number there were 1,433 more enrolled in the public schools than in the previous year, and the average daily attendance increased 627. The average salary has been gradually decreasing for a great many years and during the past year the decrease was $2.13 per month, while the whole amount paid for salaries has increased $12,613.67.

The whole amount expended for school purposes during the past year was nearly $250,000, and the valuation of school property in the Territory has reached nearly $500,000.

The percentage of the whole number of children of school age who were enrolled in the public schools between July 1, 1895, and June 30, 1896, was 76, and during the preceding year, viz, from July 1, 1894, to June 30, 1895, it was 72 per cent, thus showing an increase of 4 per cent of the children of school age attending the public schools.

The annual cost per capita, based on the whole number enrolled from July 1, 1894, to June 30, 1895, was $17.58. From July 1, 1895, to June 30, 1896, it was $16.34.

In Iowa, for year ending June 30, 1895, the cost on the same basis was $15.58, while in New York State for the same year it was $18.97.

The annual cost per capita, based on the average daily attendance from July 1, 1894, to June 30, 1895, was $29.94, and from July 1, 1895, to June 30, 1896, it was $28.98. In Iowa, for the year ending June 30, 1895, it was $24.50, thus showing that we spent $5.40 more for each child in actual attendance at school than did the State of Iowa.

Besides the number of children reported above as attending public schools, there were during the year ending June 30, 1896, 972 who attended private and denominational schools. Adding this to the whole number attending the public schools and we find that there are but 17 per cent of the children of the Territory between the ages of 6 and 18 years who do not attend school for a part of the year at least.

This showing is especially gratifying when we consider that in the great Empire State the percentage of children of school age not attending any school was a little over 31 per cent. In the State of Maine it was 34 per cent, and in Iowa 20 per cent.

The percentage of children enrolled in the public schools for the year ending June 30, 1896, was 76 per cent, while in New York State for the year 1895 it was only 59 per cent, and in Iowa it was exactly the same as our own, 76 per cent.

The average salary paid to teachers in this Territory for the year ending June 30, 1896, was $69.55, while in Iowa for the preceding year the average salary was only $34.65. In fact, our salaries are so much higher than in other States that our superintendents are daily in receipt of many inquiries from well-qualified and experienced teachers who desire positions in our schools. This fact alone has had a beneficial effect, for it enables the school officers to select the best, and it has encouraged the officers whose duty it is to issue certificates to raise the standard.

That this has been done will be noted from the table. In the past year there were 155 applicants examined, and out of this number only 89 received certificates, while in the previous year there were 133 applicants, 100 of whom were granted certificates.

Total bonded indebtedness of the school districts of the Territory June 30, 1896, was $142,200, bearing 6 and 7 per cent interest, and distributed among the counties as follows:

Coconino	$22,000
Maricopa	84,200
Mohave	6,000
Navajo	7,500
Yavapai	17,000
Yuma	5,500
Total	142,200

CAPITOL GROUNDS.

The fifteenth legislative assembly of the Territory of Arizona, at its session begun on the 28th day of January, 1889, enacted as follows:

TO OBTAIN A CAPITOL SITE AND TO PROVIDE FOR ITS IMPROVEMENT.

Be it enacted by the Legislative Assembly of the Territory of Arizona:

SECTION 1. There shall be established a commission of three persons, residents of the Territory of Arizona, to view, select, and obtain a site for a capitol building for the Territory of Arizona, and when the same shall have been viewed and selected by such commission they are hereby empowered to obtain the same for capitol grounds and to locate the capitol building thereon: *Provided*, That such commission shall not accept any grounds unless the same shall be donated, together with a clear title thereto, by the owners thereof, to the Territory of Arizona, in a quantity not less than ten acres of land in compact form, within the limits of the city of Phœnix, or a distance therefrom not greater than one-half mile.

SEC. 2. When any such grounds shall be selected by said commission it shall be their duty to have a deed of conveyance made, executed, and delivered to the Territory of Arizona: *Provided*, The title thereto shall be good and that the same be donated to the Territory of Arizona for capitol purposes, free of expense to the Territory. After such grounds shall have been so acquired the said commission shall have the charge, care, and custody of the same.

In pursuance of said act the citizens of Phœnix donated 10 acres of ground to the Territory for the purpose of such capitol site, free of expense to the Territory. There is now a commission in charge of the grounds and the Territory has expended nearly $20,000 upon their improvement.

They are a marvel of beauty and I do not believe that any State in the Union has capitol grounds that excel them. Nearly all the trees and shrubs known to the semitropical region are found upon them. They are a perfect picture of beauty, of which not only the people of Phœnix but of the whole Territory are proud.

I recommend that at least $25,000 be appropriated by Congress for their further improvement. Expenditures of like character have been made for other Territories. Why should not Arizona receive such an appropriation?

COURT-HOUSE AND PLAZA, PHOENIX, ARIZONA.

PUBLIC BUILDINGS.

There are five public buildings in the Territory, being the university, at Tucson; the normal school, at Tempe (for description of which see "Education"); the insane asylum, at Phœnix; the reform school, at Flagstaff, and the penitentiary, at Yuma.

With the exception of the reform school these buildings are completed and being used for the purposes for which they were erected. They are well finished, suitably furnished, and afford ample accommodations for the present necessities of the Territory.

The legislature at each session makes an appropriation for the repair and maintenance of the public buildings, and the money thus appropriated is expended in such manner that the buildings are kept in good condition, and their capacity increased in proportion to the demand caused by the increasing population of the Territory.

PENAL, CHARITABLE, AND REFORMATORY INSTITUTIONS.

The penal, charitable, and reformatory institutions of the Territory are three in number—the insane asylum, the Territorial prison, and the reform school.

They are under the control of a board consisting of three members created by an act of the eighteenth legislature, and designated the board of control. It consists of the governor, the auditor, and a citizen member appointed by the governor. The affairs of these institutions are governed by this board, and all appropriations for their support and for the erection of new buildings for a similar purpose are expended by the board of control.

TERRITORIAL PRISON.

The Territorial prison is located at Yuma, on the Colorado River. Its superintendent is the Hon. M. J. Nugent, who has occupied many positions of honor and trust in this Territory, and his management of the prison is highly satisfactory. For many years the cost of maintaining the prison has been a considerable burden to the taxpayers, but the cost has been gradually reduced, being now less than half the cost in 1894 and a great decrease over 1895. The average cost per capita per day for maintaining the prison was:

For the year ending June 30—	Cents.
1892	96.5
1893	93.95
1894	88
1895	72.7
1896	60.5

Since June 30 of the present year the cost has been still further reduced, the report of the superintendent of the prison for the quarter ending September 30 showing the per capita cost per day for the quarter to be 40.1 cents, which is less than the cost of maintaining larger and older institutions of the same kind in many of the States.

The buildings are in a thorough state of repair and sanitary condition and the health of the inmates good.

In the matter of discipline the prison of Arizona is unique. No unusual or cruel punishments are inflicted and there is no occasion for such punishment. The inmates are well behaved, are anxious to observe the rules governing the institution, and take a personal interest in maintaining proper order and decorum. In this respect there is no similar institution in the United States. Its character is that of a

reformatory, and that it is practical has been fully demonstrated. The inmates are, in effect, graded, and as they pass through the various stages they become better men, so that when they are discharged there is none of the evil, debasing, and brutalizing influence so prevalent in the penitentiaries of the country. There are groups of prisoners working outside of the prison walls without guards and who do not return to the prison for days at a time. There are other prisoners employed without restraint both inside and outside of the prison, and none of these attempt to escape.

The prison decipline is not severe, and its humane character has much to do with the reformation of the prisoners. None of the strict discipline in vogue in other prisons is used here. The lock step, the whipping post, and other brutal forms of discipline and punishment are unknown. The labor performed by the prisoners is not hard and none work for more than half a day at a time. They are allowed to converse with each other, and there is a reading room and library where many of them spend several hours daily.

In the pulpit and the press many theorists have discussed the question of the reformation of unfortunate outcasts of society, but it has remained for the Territory of Arizona to practically demonstrate that a prison conducted on humane principles and with elevating influences may restore to usefulness and save from a career of crime many an unfortunate who has been consigned to its walls.

The people of Arizona are proud of the beneficial work which this prison is accomplishing; and while it is not self-sustaining, yet it is conducted in a business-like and economical manner, so that, considering its use to society, the present cost of the prison is one that should be considered least burdensome by the people of the Territory.

INSANE ASYLUM.

The insane asylum of Arizona is under the charge of Dr. H. A. Hughes, who is its superintendent and resident physician.

It is situated 3 miles east of the city of Phœnix and contains 160 acres, which are under a high state of cultivation, the ground immediately surrounding the building being set out in ornamental shrubbery.

It was established in 1886 at an original cost of $100,000, and has a capacity for accommodating 200 patients. There are at present 130 patients in the institution, and as there is no asylum in the Territory for the care of epileptics or feeble minded, all such patients are cared for in this institution and are included in the number given above. The death rate is very low and the ratio of recovery is far better than the average for an insane asylum.

The annual expense of maintaining the institution, including the incidental improvements, is $27,000, the cost per capita being lower than that of many older institutions in other States. The last legislature appropriated the sum of $28,000 for improvements on the institution, which was principally used in putting in a sewerage system, electric-light and water plants, porches, and steam-heating apparatus.

Dr. Hughes, the superintendent, is a physician of high repute in this Territory, and the patients receive the best and most humane treatment and medical supervision. This institution is a credit to Arizona.

REFORM SCHOOL.

An act of the legislature of the Territory, approved April 13, 1893, provided for a reform school for juvenile offenders, to be located in the

INSANE ASYLUM, PHOENIX, ARIZONA.

TERRITORIAL REFORM SCHOOL, FLAGSTAFF, ARIZONA.

county of Coconino, for the confinement, discipline, education, employment, and reformation of juvenile offenders in the Territory of Arizona. Under this act the board of trustees, consisting of three citizens of the Territory, was empowered to select a suitable location in the county of Coconino containing not less than 40 and not more than 160 acres, and full control of the institution was vested in the board. The site selected was at the city of Flagstaff, on the line of the Atlantic and Pacific Railroad.

The said board of trustees, organized by the last-mentioned act, was superseded by the Territorial board of control, organized under an act of the eighteenth legislature, vesting in said board of control full charge of all charitable, penal, and reformatory institutions that now exist in the Territory or that may hereafter be created.

By further provision of law the said board was authorized to expend so much money of the reform-school fund as may be necessary for the erection, completion, and maintenance of said reform school.

During the term of my predecessor in office the erection of this institution was begun and the fund applicable therefor exhausted, with the exception of a few dollars. The building has only been partially completed, and in its present condition is of no service whatever to the Territory. It is likely, however, that the legislature which convenes in January will make some provision for this institution, although the Territorial prison as now conducted serves every requirement of a reformatory institution, there being too few juvenile offenders to make a separate building necessary.

SOCIAL CONDITIONS.

The material prosperity of the Territory is not more marked than is its social and moral advancement. The various fraternal societies are well represented, and there are a number of trade and labor unions.

The various church organizations are in charge of refined and cultured men, and are well represented.

The following church statistics are submitted:

CHURCHES.

Methodist Episcopal.

Organized Methodist Episcopal churches in Arizona	20
Church members	750
Sunday schools	26
Scholars	1,500
Value of church property	$164,000

Episcopal.

Membership	260
Church buildings	6
Ministers	6
Sunday-school scholars	170
Total value of church property	$29,000

Methodist Episcopal South.

Membership	550
Ministers	7
Churches	6
Sunday-school scholars	575
Value of church property	$22,500
Five parsonages, value	$8,000
Two Mexican missions	120
Value of property	$3,200

Presbyterian.

Churches	12
New churches organized	2
Ministers	11
Communicant members	597
Membership increase during year	117
Sunday-school membership	850
Increase of Sunday-school membership	125

Congregational.

Communicants	250
Ministers	4
Value of church property	$17,000
Sunday-school scholars	330

Free Methodist.

Membership	50
Sunday-school scholars	50
Number of ministers	2
Value of church property	$25,000

Christian.

Total communicants	200
Church buildings	1
Church organizations	3
Sunday-school scholars	100
Value of church property	$2,500

Baptist.

Membership	347
Churches	9
Ministers	7
Sunday-school scholars	207
Value of property	$15,600

Mormon.

Churches	37
Membership	8,000
Ministers	52
Sunday-school scholars	2,050
Value of church property	$40,000

Catholic.

Parishes with resident priests	9
Missions	16
Parochial schools	3
Academies	3
Pupils	420
Indian school	1
Pupils	70
Orphan asylum	1
Inmates	40
Hospitals	3
Catholic population	15,000

THE PRESS.

The newspaper field in Arizona is well occupied, there being a newspaper published in every county, and there is scarcely a town of 300 inhabitants in which there is not a weekly newspaper. In all the larger towns daily newspapers are published.

The total number of papers in the Territory is 35, of which 8 are daily, 26 weekly, and 1 monthly. Of the weeklies three are printed in the Spanish language.

Politically the papers are divided as follows: Democratic, 15; Republican, 8; Populist, 3; Independent, 9. The newspapers are well edited and are influential in their respective communities.

Much of the development of the Territory is due to the energy and enterprise of the newspaper men, which has largely been a labor of love, for in Arizona, like in many other new States and Territories, the newspaper business is not, from a purely financial standpoint, a lucrative one.

THE MEDICAL PROFESSION.

There are 115 physicians in the Territory engaged in general practice; 100 allopaths, 10 homeopaths, and 5 eclectics. Those engaged in general practice have several county medical societies and a Territorial association which holds regular annual sessions. The homeopaths have a Territorial association which meets annually. The standard of the profession is high, and graduates from the best medical colleges in the world are to be found among them. The medical profession of the Territory keeps abreast of the times in general practice and in the practice of the most important specialties.

DENTISTS.

There are 44 registered dentists in the Territory who stand high in the practice of dentistry, it being unlawful for anyone to practice who has not received a license from the Territorial board of registration in dentistry.

THE LEGAL PROFESSION.

The bar of Arizona will compare most favorably with that of other States and Territories. One hundred and forty-eight attorneys are actively engaged in the practice of their profession, the four judicial districts of the Territory being ably represented.

NATIONAL GUARD OF ARIZONA.

The National Guard of Arizona was created by act No. 74 of the Sixteenth legislative assembly of Arizona, passed and approved March 19, 1891. It consists of ten companies of infantry, comprising the First Regiment of infantry, and regimental band.

The general condition of the Guard is very good; considering that very little encouragement has been extended it in the past and the difficulties it has been forced to contend with, it is excellent. The discipline, as evinced by prompt obedience to orders, is excellent. As a rule, officers and men take great interest in their duties, and could be depended upon should any emergency arise calling them into active service.

STAFF OF THE GOVERNOR AND COMMANDER-IN-CHIEF.

Brig. Gen. Ed. Schwartz, adjutant-general, ex-officio quartermaster and commissary-general and chief of ordnance (reappointed), Phœnix.

Col. H. E. Stroud, surgeon-general, Phœnix.

Col. Frank Cox, judge-advocate-general, Phœnix.

Col. Barron M. Jacobs, paymaster-general, Tucson.

Lieut. Col. E. J. Babbitt, aide-de-camp, Flagstaff.

Lieut. Col. P. P. Parker, aide-de-camp, Phœnix.

Maj. H. F. Robinson, inspector small arms practice (reappointed), Phœnix.

Capt. W. E. Vaughan, chaplain, Phœnix.

First Regiment, headquarters Tucson.—Col. John H. Martin, Tucson; Lieut. Col. A. J. Doran, Florence; commanding Second Battalion, Maj. R. Allyn Lewis, Phœnix; commanding Third Battalion, Maj. John A. Black, Tucson; adjutant, First Lieut. B. W. Tichenor, Tucson; quartermaster, First Lieut. George W. Cheyney, Tombstone; commissary, First Lieut. J. H. Carpenter, Yuma; surgeon, Maj. George E. Goodfellow, Tucson; assistant surgeons, Capt. D. J. Branen, Flagstaff, and First Lieut. Charles H. Jones, Tempe.

Company A, Globe: Captain, James Wiler; first lieutenant, H. H. McNelly; second lieutenant, C. T. Martin. Aggregate strength of company, 38.

Company B, Phœnix: Captain, L. W. Coggins; first lieutenant, J. N. Ziegenfuss; second lieutenant, G. W. Russell. Aggregate strength of company, 38.

Company C, Tempe: Captain, W. E. Mullen; first lieutenant, Curt W. Miller; second lieutenant, F. M. Schureman. Aggregate strength, 26.

Company D, Tucson: Captain, Philip Contzen; first lieutenant, D. L. Hughes; second lieutenant, Emanual Drachman. Aggregate strength, 33.

Company E, Mesa: Captain, George McDonald; first lieutenant, William M. Newell; second lieutenant, Talma E. Pomeroy. Aggregate strength of company, 40.

Company F, Tucson: Captain, J. M. Trayer; first lieutenant, R. M. Hulton; second lieutenant, Ignacio Riesgo. Aggregate strength of company, 50.

Company G, Nogales: Captain, Allen T. Bird; first lieutenant, Silas D. Piper; second lieutenant, James D. Fisher. Aggregate strength of company, 45.

Company H, Yuma: Captain, F. C. Ingalls; first lieutenant, P. C. Aune; second lieutenant, Mel. Greenleaf. Aggregate strength of company, 59.

Company I, Flagstaff: Captain, F. C. Hochderffer; first lieutenant, W. E. Hochderffer; second lieutenant, William Gibson. Aggregate strength of company, 40.

Company K, St. Johns: Captain, Walter Scott; first lieutenant, Thomas Peterson; second lieutenant, Sidney M. Craig. Aggregate strength of company, 41.

Band, Tucson: Aggregate strength of company, 26.

The total strength of the National Guard, officers and enlisted men, is 460. An effort will be made at the Territorial legislative assembly of 1897 to increase the present infantry regiment to twelve companies, and to add one company of cavalry and a light battery of artillery to the present strength of the National Guard. This would make the possible strength of the guard 1,400.

RECOMMENDATIONS.

In view of the above facts I would strongly urge that the apportionment of the appropriation made by the National Government for States and Territories for the purpose of providing arms and clothing for the guard be increased, so far as Arizona Territory is concerned, from $2,000 to $4,000 annually. At $4,000 a year it will take several years to equip the guard properly for field service.

The importance of thoroughly equipping the National Guard of Arizona may be appreciated when it is known that the southern border of the Territory rests on a foreign country, and there are a number of semi-

civilized tribes of Indians quartered on reservations within our borders, and the fact that the National Government is gradually withdrawing its regular forces from the Territory.

For this and kindred reasons I recommend an increased appropriation on behalf of the military department of the Territory.

UNDEVELOPED RESOURCES.

Arizona is a most inviting field for capital and skilled labor. Her undeveloped resources are varied and almost without limit. Millions of acres of agricultural land are yet to be reclaimed by the development and proper storage of water. Communication by enlarged and cheaper railroad facilities is urgently demanded between the various points of the Territory that an interchange of home products between the mining and agricultural sections may be made.

The full extent of her rich mineral lands remains yet to be explored and developed. Her grazing lands have not been fully utilized by reason of the failure to develop artesian water and erect surface windmills, the conditions for which are excellent.

Many avenues of industrial life offer varied and profitable inducement for the engagement of capital and labor, and her agricultural, mineral, and grazing wealth should receive in the near future that attention from outside investors which they deserve.

Factories might also be profitably started. There are many fibrous grasses and plants of indigenous growth that could be used in the manufacture of paper, bagging, rope, etc. In the valley of the Colorado River wild hemp suitable for this purpose is found in almost unlimited quantities.

Ironwood, which grows all along the base of our mountains, is very hard when dry, and when polished is of a beautiful appearance. This wood produces a veneering of good quality, which could be made to supply Eastern manufacturers, who now obtain their product from other countries.

CANAIGRE.

Canaigre is the American corruption of the Spanish "cana agria" (sour cane), by which the plant is chiefly known.

Canaigre is chiefly remarkable for its tuberous roots, and grows in a wild state in all of the river valleys of Arizona, and, owing to its valuable properties as a tanning material, it is at present receiving much attention by agriculturists. For some time there has been a demand in the commercial world for a good, cheap tanning material as a substitute for the more expensive matter extracted from the oak and hemlock bark, and it is thought that canaigre will fill every requirement. Although the agriculture of this plant is yet in its experimental stage, its utility as a tanning material has been demonstrated, and it is possible that it may yet prove of further value as a food, fuel, and fertilizer.

The conditions favorable to its cultivation are nowhere more perfect than in Arizona. At present a farm of 1,500 acres, 9 miles southwest of Phœnix, is devoted exclusively to the cultivation of this plant, and the erection in the near future of a factory for the manufacture of canaigre extract is contemplated.

The cultivation of canaigre is destined to be an important industry of this Territory, and the manufacture of its extract a useful and profitable business.

The following extracts are taken from Bulletin No. 21, issued by Professor Forbes, of the University of Arizona, and chemist of the Agricultural Experiment Station:

The best conditions for the growth of canaigre are a cool, but not freezing climate, a moderate amount of moisture, sandy, fertile soil, and probably, also, a sunny and arid atmosphere.

These conditions are nowhere combined more perfectly or for a longer period of the year than during the six or seven cooler months in the dry, sunny, winter climate of Arizona.

As to locality, canaigre is found most commonly in sandy washes where water is more abundant. With irrigation it will make a good growth in any fertile, tillable ground, but the influence of soil conditions on actual production has been little studied.

It seems to stand considerable alkali, and is even reported in the salt-grass meadows of Tia Juana Valley, near San Diego, Cal.

As a fuel canaigre bagasse apparently has considerable value. The heating and evaporating power of three samples has been compared with that of an average soft coal and with mesquite wood, which is a leading fuel in the arid Southwest, the comparison of fuel values being made from the evaporating powers in each case, which means the number of pounds of boiling water which can be evaporated theoretically by 1 pound of dry fuel. Compared with soft coal canaigre bagasse appears to be as 8.87 to 13 in evaporating power, or about two-thirds, while it is even better than in mesquite wood.

Probably an excellent use for canaigre waste is as a fertilizer. When the wet bagasse is piled it ferments vigorously owing to its starchy nature, and shortly rots down to a black mold, rich in organic matter and containing part of the nitrogenous and mineral constituents which the crop removes from the soil.

The canaigre industry is properly concerned with three facts: (1) The demand for canaigre tanning materials; (2) the preparation of extract; (3) the culture of the plant.

The utility of canaigre in tanning.—As regards the value of canaigre tanning materials the writer has been at some pains to obtain the verdict of practicing tanners, and finds that the earlier favorable opinions of tanning chemists have been excellently supported by the experience of the trade. From various sources it is learned that canaigre chips and extracts have been successfully employed, either alone or in connection with other tanning materials, for the production of a remarkable variety of leathers, including both heavier and lighter grades.

According to the statements of different tanners it is employed in the production of—

(1) Patent and enameled leathers for the carriage, saddlery, and upholstery trades.

(2) Patent and enameled leather for fine shoes.

(3) Carriage covers and dashboard leather.

(4) A high grade of carriage and furniture leather and a fair grade of patent shoe tipping.

(5) Upper, grain, or similar light leather.

(6) East India kips finished as waxed leather.

(7) Yellow leather for mittens, horse hides, butts, kangaroo, glazed kid, and other fine shoe leathers.

(8) The heaviest sole and harness leather and for the lightest calf and sheep, with best results for all kinds.

The application of canaigre to such a variety of results is due to various causes, such as the peculiar nature of the union between the hide and the tannins, the effect of color, and that of sugar. With proper management these factors may be so controlled as to produce one or another result. Some special qualities in leather which may be secured by its use appear from the following extracts:

(1) For light leathers it gives excellent wearing or strain-resisting qualities.

(2) It gives split leather far greater strength than either gambier or hemlock liquors.

(3) New canaigre liquor will give a fair color and produce a very fair leather in cool weather.

(4) The stock plumps very much and fills well after changing into other tanning liquors, and again, canaigre plumps the grain.

(5) The permanence and speed of canaigre tannage is also noticed by other correspondents.

Certain peculiarities of canaigre seem favorable to its agricultural future:

(1) It grows in winter, when water is more abundant throughout the arid region. This fact may render possible the reclamation of large tracts of land for which there is not sufficient irrigation in summer.

(2) The climate is mild at this season of the year, and labor is therefore more comfortable and effective.

(3) In case of extreme drought the crop is not lost, but the plant simply stops growth and waits for better conditions.

(4) Harvesting may occur at any time, the mature crop remaining in the ground indefinitely without injury, and even with a certain amount of improvement.

STATEHOOD FOR ARIZONA.

The question of statehood for Arizona is a paramount one with the people of this Territory. It is the supreme question with all the people in every section, in every township, in every county, in every mining camp.

For thirty-three years we have been under Territorial government, a condition not contemplated by the Constitution. We have the wealth, the population, and the intelligence which should be required of a people who wish to govern themselves. We have all the requirements for a State, we have sufficient population, we have a great agricultural country, great mining regions, and vast grazing lands.

Our aggregate returns from mining, stock raising, and agriculture, the three great industries which, from the very dawn of civilization, have contributed more than any other agencies to the wealth of mankind, show nearly $19,000,000.

We desire home rule; we desire the privilege of electing our own officers and managing our own affairs as we consider best, and it seems strange, after the admission of Territories within the past five years, that we are denied statehood. We are able to take care of ourselves; we have all the elements of a great and a prosperous Commonwealth; we have young cities within our borders that will compare in culture, in refinement, in all that goes to make good citizenship, with any State in the Union.

The agricultural lands in our valleys are greater in the number of acres than many of the wealthy States. Our mines, although yet undeveloped, yield rich returns, and promise to be as rich as any in the world.

Our copper product reported alone amounted to more than $7,000,000 during the past fiscal year, but the actual output is much in excess of this; and this Territory will be one of the great copper-producing countries of the world.

Our gold product for the year amounts to nearly $6,000,000 and our silver product to nearly $1,500,000.

The cattle industry of the Territory is a great wealth-producing agency. During the past year we have shipped 220,500 head of cattle, amounting in value to nearly $3,000,000. Our stock ranges are unexcelled.

The people of this Territory believe that they should be allowed to take care of themselves, to be given State sovereignty. They have braved for more than thirty years the perils of frontier life, have erected beautiful homes, have created a great agricultural region, have established rich mining camps, and erected what promises to be a great Commonwealth.

What reason can be urged why Arizona should not be admitted as a State after the admission of North Dakota, South Dakota, Idaho, and Wyoming?

We have a greater population, we have greater wealth, we promise more for the future than many of the States that have been heretofore admitted. This question of admission to statehood should not be made a question of politics; it is a question of right and justice.

I recommend that upon the admission of Arizona as a State the following grants of public lands be made for the following purposes:

	Acres.
For the establishment and maintenance of a miners' hospital for disabled and infirm miners	100,000
For the Insane Asylum	100,000
For a deaf, dumb, and blind asylum	50,000
For normal schools	100,000
For State charitable, penal, and reformatory institutions	300,000
For the Territorial prison	100,000
For the county hospitals	100,000

And that 150,000 acres be donated for the benefit of the agricultural college, which has heretofore been established as a department of the university.

That 150,000 acres be donated for the maintenance of the school of mines, which is now an established department of the University of Arizona.

I hope that the above recommendations for the benefit of the educational institutions of the Territory, and for the establishment of a hospital for disabled and infirm miners may receive especial attention.

Our public schools are of a high order and our university will one day be one of the great educational institutions of the country.

The disabled and infirm miners should be especially provided for. They paved the way for civilization; they endured all the privations and toils and dangers of a frontier life, and did more to bring Arizona into prominence than any other class of men. They were the pioneers, and I hope when Arizona is admitted as a State that a liberal appropriation of public lands will be made for the establishment of a hospital for the benefit of those of them who are incapacitated from earning a livelihood.

The following table shows the date of admission of each State, the population by the census next preceding the admission, and the population by the census next following the admission:

State.	Date of admission.	Population by census next previous to admission.	Population by following census.
Vermont	Mar. 4, 1791	85,425	154,465
Kentucky	June 1, 1792	73,667	220,955
Tennessee	June 1, 1796	35,691	105,602
Ohio	Nov. 29, 1802	45,365	230,760
Louisiana	Apr. 30, 1812	76,556	152,923
Indiana	Dec. 11, 1816	24,520	147,178
Mississippi	Dec. 10, 1817	31,306	75,448
Alabama	Dec. 14, 1819	9,046	127,901
Illinois	Dec. 3, 1818	12,292	55,162
Maine	Mar. 15, 1820	228,705	298,532
Missouri	Aug. 10, 1821	66,557	140,455
Arkansas	June 15, 1836	30,388	97,574
Michigan	Jan. 26, 1837	31,679	212,267
Florida	Mar. 3, 1845	54,477	87,445
Texas	Dec. 29, 1845	.....	212,592
Iowa	Dec. 28, 1846	43,112	192,214
Wisconsin	May 29, 1848	30,945	305,391
California	Sept. 9, 1850	101,597	327,263
Minnesota	May 11, 1858	6,077	169,654
Oregon	Feb. 14, 1859	13,294	52,288
Kansas	Jan. 29, 1861	107,017	363,485
West Virginia	June 19, 1863	.....	442,013
Nevada	Oct. 31, 1864	6,857	39,316
Nebraska	Mar. 1, 1867	28,778	122,906
Colorado	Aug. 1, 1876	39,677	193,561
North Dakota	Nov. 2, 1889	36,909	182,496
South Dakota	.....do	98,268	328,808
Washington	Nov. 11, 1889	75,116	349,390
Idaho	July 3, 1890	32,610	84,219
Wyoming	July 11, 1890	20,789	60,700

From the report of the county commissioners of the different counties of this Territory it will be seen that Arizona has a population of 101,240.

The above table shows that none of the States admitted had a population by census next preceding admission greater than the population of Arizona, except the States of Maine, California, and Kansas. Alabama when admitted had a population next preceding admission of only 9,046; Wisconsin had only 30,945; Illinois only 12,292; Ohio only 45,365.

Mr. Wheeler, the honorable chairman of the Committee on the Territories of the Fifty-third Congress, in his speech advocating the admission of this Territory, said that "the population of Arizona is some sixteen times larger than the population of Minnesota by the census next preceding its date of admission, and that it is fifteen times larger than the population of Nevada by the census next preceding the date of admission."

We are Arizonans. But, irrespective of Territorial boundary lines, Americans—one people, having mutual interests, reciprocal duties, and a common destiny.

If granted this boon, Arizona will take high rank among the great sisterhood of States. It will be a grand event for our people when her star is placed in the constellation of the Union.

She has vast commercial prospects, untold treasures, and a population intelligent, enterprising, and rapidly increasing. Capital will then seek our borders and our industries receive due recognition. The political parties have declared in favor of her admission, we trust not to—

> Keep the word of promise to our ear
> And break it to our hope.

Respectfully submitted.

BENJAMIN J. FRANKLIN,
Governor of Arizona.

Hon. DAVID R. FRANCIS,
Secretary of the Interior, Washington, D. C.

APPENDIX.

OFFICIAL ROSTER.

EXECUTIVE DEPARTMENT.

Governor, Benjamin J. Franklin, Phœnix; private secretary, Alfred Franklin, Phœnix; secretary of the Territory of Arizona, Charles M. Bruce, Phœnix; assistant secretary, F. B. Devereux, Phœnix; treasurer of Arizona, Thomas E. Farish, Phœnix; auditor of Arizona, C. P. Leitch, Phœnix; attorney-general, J. F. Wilson, Prescott; superintendent of public instruction, Thomas E. Dalton, Phœnix; adjutant-general, Edward Schwartz, Phœnix.

BOARD OF CONTROL.

Governor Benjamin J. Franklin, chairman; C. P. Leitch, auditor (ex officio member); T. J. Wolfley, citizen member.

JUDICIAL DEPARTMENT.

Supreme court.—Chief justice, A. C. Baker, Phœnix; associate justices, J. D. Bethune, Tucson; Owen T. Rouse, Solomonville; John J. Hawkins, Prescott; clerk, J. L. B. Alexander, Phœnix.

District court, first judicial district (comprising the counties of Pima and Cochise).—Judge, J. D. Bethune, Tucson. Clerks, A. J. Halbert, Tucson; Scott White, Tombstone. Commissioners, D. G. Chalmers, Tucson; J. S. Taylor, Nogales; E. A. Nichols, Willcox; James F. Duncan, Tombstone; J. W. Wright, Bisbee.

District court, second judicial district (comprising the counties of Pinal, Gila, and Graham).—Judge, Owen T. Rouse, Solomonville. Clerks, Thomas F. Weedin, Florence; Alonzo Bailey, Globe; B. B. Adams, Solomonville. Commissioners, O. N. Creswell, Globe; Thomas F. Weedin, Florence; George H. Hyatt, Solomonville.

District court, third judicial district (comprising the counties of Maricopa and Yuma).—Judge, A. C. Baker, Phœnix. Clerks, J. E. Walker, Phœnix; Charles Brinley, Yuma. Commissioners, J. W. Crenshaw, Phœnix; Murat Masterson, Yuma.

District court, fourth judicial district (comprising the counties of Yavapai, Mohave, Coconino, Apache, and Navajo).—Judge, John J. Hawkins, Prescott. Clerks, Andrew J. Herndon, Prescott; L. O. Cowan, Kingman; Charles Keller, Flagstaff; Alfred Ruiz, St. Johns. Commissioners, H. T. Andrews, Prescott; William G. Blakely, Kingman; F. J. Wattron, Holbrook.

United States attorney, E. E. Ellinwood, Phœnix; assistant United States attorney, Marcus A. Smith, Phœnix; clerk, Frank M. King, Phœnix.

United States marshal's office, district of Arizona.—Marshal, W. K. Meade, Tucson. Deputy marshals, Sidney A. Bartelson, Florence; W. R. Campbell, Winslow; Alexander Ezekiels, Tucson; George Ruffner, Prescott; Frank Morrell, Williams; George A. Olney, Solomonville; John W. Slankard, Phœnix; Joseph Pratt, Phœnix; R. M. Templeton, Yuma; J. H. Thompson, Globe; Scott White, Tombstone; Mel Greenleaf, Yuma.

UNITED STATES INTERNAL-REVENUE DISTRICT OF NEW MEXICO AND ARIZONA.

Collector, Charles M. Shannon, Santa Fe; chief deputy, Andrew J. Loomis; deputy, first division, Moses P. Moore; deputy, second division, William Burns; deputy, third division, Neri F. Osborn; storekeeper and gauger, Henry M. Jeter; gaugers, John A. Jacoby, Robert Harvey.

UNITED STATES CUSTOMS SERVICE, DISTRICT OF ARIZONA.

Collector of customs, Sam F. Webb, Nogales; deputy collector, S. M. Aguirre, Nogales; J. H. Politzer, statistical clerk, Nogales; Eugene K. Sykes, entry clerk,

Nogales; Dan McCunningham, United States live stock inspector, Nogales; Fred W. Heyne, jr., United States Government assayer, Nogales; Mrs. Robert Hannah, inspectress, Nogales; George W. Webb, mounted inspector, Nogales; J. M. Miller, mounted inspector, Nogales; Robert M. Catlett, foot inspector, Nogales; Robert Hannah, foot inspector, Nogales; William J. Osborn, foot inspector, Nogales; Frank Hare, deputy collector, Bisbee; Samuel King, mounted inspector, Bisbee; A. P. Behan, deputy collector and mounted inspector, Lochiel; H. W. Brady, mounted inspector, Lochiel; James P. Welsh, deputy collector, Buenos Ayres; William Dunbar, mounted inspector, Buenos Ayres; John F. Kellner, mounted inspector, Buenos Ayres; James L. Powell, deputy collector and mounted inspector, Yuma.

UNITED STATES SURVEYOR-GENERAL'S OFFICE.

Surveyor-general, George J. Roskruge, Tucson; chief clerk, Walter E. Murphy, Tucson; clerks, Raymond H. Satterwhite, Tucson; Charles von Erxleben, Tucson; draftsman, August A. Lysight, Tucson; mineral clerk, Alexander F. Krohn, Tucson.

UNITED STATES LAND OFFICE, PRESCOTT.

Register, H. D. Ross; receiver, Jake Marks; chief clerk, P. W. O'Sullivan; clerk, W. S. Marks.

UNITED STATES LAND OFFICE, TUCSON.

Register, Eugene J. Trippel, Tucson; receiver, Edward R. Monk, Tucson.

UNITED STATES INDIAN AGENCIES.

Pima Agency, J. Roe Young, agent, Sacaton; Colorado River Agency, Charles E. Davis, Parker; Navajo Agency, Capt. Constant Williams, acting agent, Fort Defiance; San Carlos, Capt. Albert Myer, San Carlos, acting agent.

BOARD OF LOAN COMMISSIONERS.

Governor Benjamin J. Franklin, chairman, Phœnix; Territorial Secretary Charles M. Bruce, Phœnix; Territorial Auditor C. P. Leitch, Phœnix; Alfred Franklin, secretary of board, Phœnix.

BOARD OF EQUALIZATION.

Mose Drachman, first judicial district; George H. Skinner, second judicial district; C. P. Leitch, third judicial district; Morris Goldwater, fourth judicial district.

TERRITORIAL BOARD OF IMMIGRATION COMMISSIONERS.

Governor B. J. Franklin, chairman; Apache County, H. J. Platt, St. Johns; Cochise County, William H. Hattich, Tombstone; Pima County, Herbert Brown, Tucson; Graham County, George H. Kelly, Solomonville; Gila County, George W. P. Hunt, Globe; Yuma County, John W. Dorrington, Yuma; Mohave County, Anson H. Smith, Kingman; Yavapai County, E. A. Rogers, Prescott; Navajo County, J. W. Wallace, Winslow; Coconino County, C. M. Funston, Flagstaff; Maricopa County, T. C. Jordan, commissioner and secretary of the Territorial board, Phœnix.

OFFICERS OF THE TERRITORIAL PRISON.

M. J. Nugent, superintendent, Yuma; James Coyle, assistant superintendent, Yuma; Harry McKean, secretary, Yuma; Thomas H. Sabin, prison physician, Yuma.

OFFICERS OF THE TERRITORIAL INSANE ASYLUM.

Resident physician and superintendent, Dr. H. A. Hughes, Phœnix; matron, Miss B. Echols, Phœnix; steward, J. A. Vinson, Phœnix; assistant steward, Charles Robinson, Phœnix.

LIVE STOCK SANITARY COMMISSION.

Colin Cameron, chairman of the board, Lochiel, Pima County; E. A. Tovrea, commissioner, Phœnix, Maricopa County; Hugo Richards, commissioner, Prescott, Yavapai County; William Stowe Devol, acting veterinary surgeon, Tucson, Pima County.

REGENTS OF THE UNIVERSITY.

Rev. Howard Billman, chancellor and president; Governor Benjamin J. Franklin, ex officio member; superintendent of public instruction, Prof. Thomas E. Dalton, ex officio member; E. R. Monk, member; S. M. Franklin, treasurer; M. G. Samaniego, member.

BOARD OF EDUCATION FOR THE NORMAL SCHOO

Dr. James McNaughton, president, Tempe; T. E. Farish, Territorial treasurer and ex officio member; Prof. T. E. Dalton, Territorial superintendent of public instruction and ex officio member and secretary, Phœnix; Mrs. Clara A. Evans, member, Phœnix; J. F. Wilson, member, Prescott.

FISH AND GAME COMMISSIONER.

Edward Schwartz, Phœnix.

DELEGATE TO CONGRESS.

Nathan O. Murphy, Phœnix.

COMMISSIONED OFFICERS OF THE NATIONAL GUARD OF ARIZONA.

Brig. Gen. Ed. Schwartz, adjutant-general, ex officio quartermaster and commissary-general, and chief of ordnance (reappointed), Phœnix; Col. H. E. Stroud, surgeon-general, Phœnix; Col. Frank Cox, judge-advocate-general, Phœnix; Col. Barron M. Jacobs, paymaster-general, Tucson; Lieut. Col. H. D. Ross, aid-de-camp, Prescott; Lieut. Col. P. P. Parker, aid-de-camp, Phœnix; Lieut. Col. W. A. Farish, aid-de-camp, Phœnix; Maj. H. F. Robinson, inspector small-arms practice (reappointed), Phœnix; Capt. W. E. Vaughan, chaplain, Phœnix.

Colonel.—John H. Martin, Tucson.

Lieutenant-colonel.—Andrew J. Doran, Phœnix.

Majors' regimental staff.—George E. Goodfellow, surgeon, Tucson.

Majors.—John A. Black, Tucson; R. Allyn Lewis, Phœnix; George Hochderffer, Flagstaff.

Captains' staff.—D. J. Branen, assistant surgeon, Flagstaff.

Captains.—F. S. Ingalls, Yuma; J. M. Thayer, Tucson; W. E. Mullen, Tempe; Philip Contzen, Tucson; F. C. Hochderffer, Flagstaff; Walter Scott, St. Johns; James Wiley, Globe; Allen T. Bird, Nogales; George MacDonald, Mesa; Lewis W. Coggins, Phœnix.

First lieutenants' staff.—G. W. Cheney, regimental quartermaster, Tombstone; J. Harry Carpenter, regimental commissary, Yuma; Bryan W. Tichenor, regimental adjutant, Tucson; Charles H. Jones, assistant surgeon, Tempe; Frank T. Alkire, battalion adjutant, Phœnix.

First lieutenants.—W. C. Hochderffer, Flagstaff; H. H. McNelly, Globe; Curt W. Miller, Tempe; D. L. Hughes, Tucson; P. C. Aune, Yuma; E. M. Hutton, Tucson; Silas D. Piper, Nogales; Thomas Peterson, St. Johns; William M. Newell, Mesa; J. N. Ziegenfuss, Phœnix.

Second lieutenants.—William Gibson, Flagstaff; T. C. Martin, Globe; Fletcher M. Shureman, Tempe; Emanuel Drachman, Tucson; Mel. Greenleaf, Yuma; Ignacio Riesgo, Tucson; James D. Fisher, Nogales; Talma E. Pomeroy, Mesa; Sidney M. Craig, St. Johns; Frank G. Russell, Phœnix.

COUNTY OFFICERS.

Apache County.—L. J. Brown, chairman board of supervisors, Nutrioso; W. H. Gibbons, member board of supervisors, St. Johns; Gustave Becker, member; N. Gonzales, clerk board of supervisors, St. Johns; Willard Farr, probate judge and ex officio school superintendent, St. Johns; W. H. Burbage, district attorney, St. Johns; N. Gonzales, county recorder, St. Johns; James Scott, sheriff and ex officio assessor, St. Johns; Albert F. Potter, treasurer and ex officio tax collector, St. Johns.

Coconino County.—A. A. Dutton, chairman board of supervisors, Flagstaff; C. H. Schulz, supervisor, Flagstaff; F. R. Nellis, supervisor, Williams; C. A. Bush, clerk of board of supervisors, Flagstaff; R. H. Cameron, sheriff, Flagstaff; A. T. Cornish, treasurer and tax collector, Flagstaff; C. A. Bush, recorder, Flagstaff; N. G. Layton, probate judge and superintendent of schools, Flagstaff; J. E. Jones, district attorney, Flagstaff; C. A. Keller, clerk of district court, Flagstaff.

Cochise County.—J. D. Bethune, judge of district court; Scott White, clerk of district court; United States court commissioner, James F. Duncan; C. S. Fly, sheriff; J. V. Vickers, treasurer; J. A. Bright, assessor; A. Wentworth, recorder; W. F. Bradley, probate judge; G. W. Swain, district attorney; John S. Williams, chairman of board of supervisors; N. A. Gilman, member; John Montgomery, member; W. A. Harwood, clerk; C. L. Beckwith, surveyor.

Gila County.—W. W. Brookner, chairman board of supervisors; David Devore, member; B. F. Stewart, member; Mills Van Wagenen, probate judge and ex officio county superintendent of public schools; P. M. Thurmond, district attorney; J. H.

Thompson, sheriff and assessor; H. C. Hitchcock, treasurer and tax collector; G. M. Allison, recorder and clerk, board of supervisors; O. N. Creswell, clerk of district court; Alex. G. Pendleton, surveyor.

Graham County.—Arthur A. Wright, sheriff; M. M. Rice, undersheriff; Francis J. Dysart, treasurer; Wiley E. Jones, district attorney; George Cluff, probate judge; Manuel Leon, county recorder and ex officio clerk board of supervisors; P. Michelena, deputy recorder; Burwell B. Adams, clerk district court and deputy clerk United States district court.

Maricopa County.—Lindley H. Orme, sheriff; Jerry Millay, district attorney; C. W. Crouse, probate judge; J. W. Kincaid, county recorder; D. L. Murray, county treasurer; J. T. Priest, member board of supervisors; W. L. George, member; W. A. Kimball, member; H. A. St. Claire, county assessor; F. P. Trott, county surveyor; J. E. Walker, clerk district court.

Mohave County.—William Grant, chairman board of supervisors, Hackberry; William E. Frost, member, Kingman; J. H. Johnson, member, Kingman; L. O. Cowan, clerk, Kingman; John M. Murphy, district attorney, Kingman; Harvey Hubbs, treasurer, Kingman; J. E. Perry, probate judge, Kingman; L. O. Cowan, county recorder, Kingman; James Rosborough, sheriff, Kingman; L. O. Cowan, clerk district court, Kingman.

Pinal County.—Charles F. Bennett, chairman board of supervisors; William H. Lonurgan, member; John Miller, member; Jose M. Ochoa, clerk; D. C. Stevens, probate judge; F. M. Doan, district attorney; Jose M. Ochoa, recorder; W. C. Truman, sheriff; Thomas F. Weedin, clerk district court; E. O. Stratton, treasurer; W. H. Merritt, county surveyor.

Pima County.—James Finley, chairman board of supervisors; C. F. Schumacher, member; Zack. T. Vail, member; Fred. G. Hughes, clerk; John S. Wood, probate judge; William M. Lovell, district attorney; Robert N. Leatherwood, sheriff; Royal A. Johnson, treasurer; Charles A. Shibell, recorder; Henry Levin, assessor; Philipp Contzen, county surveyor.

Yuma County.—B. A. Harazthy, chairman board of supervisors; G. Gondolfo, supervisor; A. Modesti, supervisor; Mel. Greenleaf, sheriff; William B. Hodges, deputy sheriff; C. H. Brinley, clerk district court; A. Frank, probate judge and ex officio county superintendent of schools; M. L. Pool, recorder and clerk of board of supervisors; Sam Purdy, district attorney; O. F. Townsend, surveyor; P. G. Cotter, county physician.

Yavapai County.—J. W. Smith, chairman board of supervisors; John Wood, member; Thomas Roach, member; C. H. Akers, clerk; F. A. Tritle, recorder; F. A. Tritle, jr., deputy recorder; C. P. Hicks, probate judge; G. C. Ruffner, sheriff; J. P. Dillon, deputy sheriff; John Hartin, treasurer; Robert E. Morrison, district attorney; H. H. Carter, assessor.

Navajo County.—J. H. Bowman, chairman board of supervisors; J. H. Breed, member; J. H. Willis, member; F. W. Nelson, clerk of board; C. P. Owens, sheriff; Robert Hufford, undersheriff; F. M. Zuck, probate judge; W. M. Perrill, district attorney; F. W. Nelson, recorder; E. A. Sawyer, treasurer and ex officio tax collector.

NEWSPAPERS.

The following is a list of the newspapers published in Arizona:

Apache County.—The St. Johns Herald, weekly, St. Johns.

Coconino County.—The Coconino Sun, weekly, Flagstaff; The Flagstaff Democrat, weekly, Flagstaff; The Williams News, weekly, Williams.

Cochise County.—The Tombstone Prospector, daily and weekly, Tombstone; The Sulphur Valley News, weekly, Willcox; The Bisbee Orb, weekly, Bisbee; The Bisbee Democrat, daily, Bisbee.

Gila County.—The Arizona Silver Belt, weekly, Globe.

Graham County.—Graham County Bulletin, weekly, Solomonville; Graham Guardian, weekly, Safford.

Maricopa County.—The Arizona Gazette, daily and weekly, Phœnix; The Phœnix Herald, daily and weekly, Phœnix; The Arizona Republican, daily and weekly, Phœnix; The Arizona Populist, weekly, Phœnix; Southwestern Stockman, weekly, Phœnix; The Riata, weekly, Phœnix; La Opinion Publica, weekly, Phœnix; El Observador, weekly, Phœnix; The Tempe News, daily and weekly, Tempe; The Mesa Free Press, weekly, Mesa.

Mohave County.—Mohave County Miner, weekly, Kingman; Our Mineral Wealth, weekly, Kingman.

Navajo County.—The Winslow Mail, weekly, Winslow; The Argus, weekly, Holbrook.

Pima County.—The Tucson Citizen, daily and weekly, Tucson; The Arizona Star, daily and weekly, Tucson; El Fronterizo, weekly, Tucson; The Oasis, weekly, Nogales; The Border Vidette, weekly, Nogales.

Pinal County.—The Florence Tribune, weekly, Florence.

Yavapai County.—The Arizona Journal Miner, daily and weekly, Prescott; The Prescott Courier, daily and weekly, Prescott; The Arizona Mining News, weekly, Jerome; The Arizona Educator, monthly, Jerome.

Yuma County.—The Yuma Sun, weekly, Yuma; The Arizona Sentinel, weekly, Yuma.

BOARD OF IMMIGRATION COMMISSIONERS.

The eighteenth Territorial legislature created a board of immigration commissioners, one for each county, to reside at the county seats of the counties of the Territory. The duties of this commission are to annually make reports to the governor, and from time to time issue circulars and pamphlets, and write letters setting forth the advantages of their respective counties to prospective immigrants and all persons making inquiries concerning the Territory.

The annual reports of these commissioners are published in, and form a part of, the governor's annual report to the Secretary of the Interior.

I think the law creating this commission a good one, and if the commissioners faithfully perform their duties their services will be of great value to the Territory. Their reports, if properly made, will be a history of each county, will aid immigration, and cause thousand of acres of our public lands to be reclaimed.

The work of this commission has been of inestimable value, as is abundantly proven in the rapid increase in population and taxable values within the last two years. It is an inexpensive system in making known the undeveloped resources of the Territory, its matchless climate, its fertile soil, and many advantages to the homeseeker on the public domain of the West.

The following letter from the Hon. T. C. Jordan, secretary of the commission, transmitting the reports of the counties is self-explanatory. These reports show a very satisfactory result and give high evidence that every section of Arizona is progressing.

We do not deny that Arizona has felt the general financial depression that has existed for some time throughout the whole country, but we do claim that its general condition is better than most sections of the Union.

PHŒNIX, ARIZ., *October 12, 1896.*

SIR: I herewith submit, prepared for publication in accordance with section 6, act 70, of the Eighteenth legislative assembly, the reports of the several Territorial commissioners of immigration. These reports show an increase of population, taxable wealth, and the progress of the several counties of the Territory for the fiscal year ending June 30, 1896. They also show the rate of assessed valuation on property of all kinds to be remarkably low, not more than one-third of what it should be. In round numbers, $46,000,000 would more correctly represent the valuation of the assessable property of the Territory, and this amount would probably represent less than one-third of its actual value.

Two of the counties, Navajo and Coconino, show a slight decrease in revenues, attributable to droughts that prevailed during the year 1893–94, making it necessary to transfer temporarily many large herds of cattle and sheep to other locations.

With these exceptions all of the counties of the Territory are making rapid progress.

I have the honor to be, respectfully, yours,

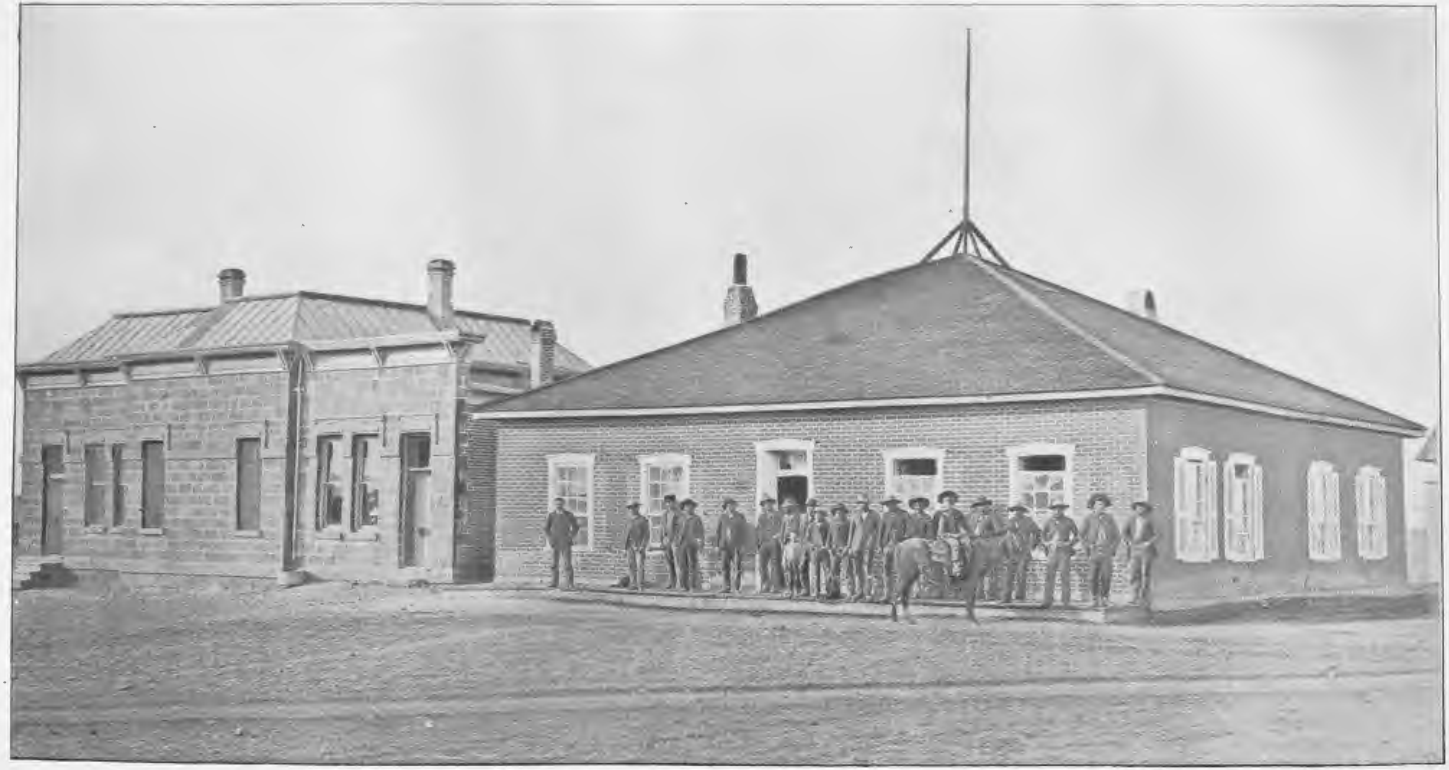
T. C. JORDAN,
Secretary Board Immigration Commission.

Governor B. J. FRANKLIN,
Phœnix, Ariz.

APACHE COUNTY.

By Commissioner W. H. Burbage, St. Johns.

Since issuing and forwarding my last fiscal report this office has been the recipient of many communications from possible home seekers and others. Said communications have the postmark of various and distant localities within the United States. Information was requested touching the resources of the county and Territory, agricultural, mineral, and forest, also climatic properties and conditions, evincing a decided interest on the part of the seekers in our Territory. In every instance I have endeavored to impart every information at my command, and I have not hesitated to enter into details in the discharge of the functions of the office.



Jail. Court-house.

POPULATION.

I would approximate the population at about the same number as my last report, 3,000. Many have departed the county, but in every instance men who were engaged solely in the stock-raising industry. This I account for on the ground of the continued droughts, which have so reduced the range as to make stock raising almost impracticable, while, on the other hand, numbers of new residents have entered the county, farmers strictly, who have taken the place of the departed stockmen, thus keeping the general population at a balance.

TAXABLE PROPERTY.

In this important feature a very gratifying increase in valuation appears. This I glean from the assessors' report just turned in, and about complete. This report shows a total increase in gross valuation of property in the county, both real and personal, of $100,000. This increase, it is hoped, will have the effect of reducing taxation very perceptibly the present year.

CATTLE.

Heretofore during years past the principal industry in the county was stock raising, but owing to the large profits to be gained the business was overdone and the range was overcrowded. The continued drought augmented the depression until owners were simply compelled to sell and relieve the range. The result has been that many thousand cattle have been shipped out of the county during the year, and many of the owners are going out of the business.

SHEEP.

This important industry, like cattle, has suffered fearfully, but not from the same cause. The range is sufficient, and the climate and surroundings in every way favorable. The terrible depression in wool values has been the sole factor of distress; it has been, and is at the present writing, quite impossible for sheep raisers to make any profit out of the business, even out of their two annual products, wool and mutton. In fact, only by practicing the strictest economy can they sustain themselves in the business and keep their flocks from being swallowed up in general expenses.

LAND RECLAIMED AND AGRICULTURAL DEVELOPMENT.

I copy herein an article published in the St. Johns Herald, the official organ of Apache County, under date of May 30, 1896:

"A most wonderful improvement in the above important science has been taking place in this county during the past twelve months. Our readers can hardly fail to notice it. Rarely an issue of the Herald but contains one or more notices of final proof. These, we should remember, means more valuation to the taxable property of the commonwealth, and a new home blocked and carved out of the waste land of the United States Government transferred to the county. From an accurate and reliable source we learn that 32,000 acres of land have been reclaimed during the period mentioned. Of course all these acres are not under cultivation, but they are every one of them susceptible of cultivation, as the estimate is based on reservoir capacity, and the reservoirs are either already completed and full of water, or they are far advanced in construction and will be complete within the time for sowing the next crop. This is encouraging. Apache county should well feel proud of the progression thus exhibited by her citizens. With the exception of Maricopa, and possibly Gila, no other county in the Territory can make the showing in this line that Apache has.

"The St. Johns Irrigation Company, one of the largest in the county, is contemplating the construction of a ditch from their big reservoir 3½ miles south of St. Johns, the ditch to run along the upper edge of the great mesa southwest of the town. This construction will cost the company the sum of $5,000, and will, when completed, add to the cultivated land of the county 5,000 acres of the very finest agricultural land in the county, or, for that matter, in the Territory.

"All in all, this county is rapidly forging ahead. Our people are not asleep. They realize the value of the natural resources so abundantly spread around them, and are utilizing them. Keep at it. Ere many years the land will be as scarce in Arizona as it is in Kansas. The old cry of 'No water' has now been exploded. Water is in abundance. Confine it; here lies the whole secret."

WATER STORAGE.

Six new irrigation reservoirs have been surveyed and partially constructed in the county since my last report. They will be completed and ready for the early spring planting. From the water capacity of these reservoirs 32,000 acres of land can be reclaimed and watered. All of these improvements are the result of home labor and capital.

ORCHARDS.

The orchard acreage has been largely added to this past spring. The leading fruits of this line that are grown successfully here are apples and peaches.

GRAIN.

The soil is peculiarly adapted to the raising of small grain, such as wheat, oats, and barley. An almost fabulous yield is produced annually. An immense acreage is devoted to these products throughout the county.

VITAL STATISTICS.

For the past twelve months the climate of this section of the Territory has been even more than usually balmy.

The early spring we must except, during which time there were wind storms more or less severe, but which at their height were very faint reflections of the violent storms, cyclones, and tornadoes of almost all parts of the United States.

During the stormy season an epidemic of la grippe (the first of its kind here) prevailed in the county. The cases were quite severe, but there were no deaths except among weakly infants, elderly persons, or those previously suffering from heart disease.

There has not been a case of smallpox, malaria, diphtheria, or scarlet fever in the county. The county records show there has not been a death from any lung trouble (excepting la grippe) reported.

SCHOOLS.

Under the broad system of education adopted and fostered by the laws of Arizona, the public schools of Apache County have flourished, and nearly every settlement, no matter how isolated, boasts its public school. The school at St. Johns possesses a library, not alone for the use of the school, but the entire precinct. Much care has been devoted to the selection of books, and the library now contains several hundred works of the very highest standard, both classic and modern.

PROFESSIONS.

In the county there are three physicians and surgeons, graduates of State and foreign universities of medicine; the same number of lawyers, one civil engineer, and one land surveyor. One paper is published in the county. The weekly St. Johns Herald, in politics Democratic, established in 1887, and well patronized throughout the county.

TOWNS AND VILLAGES, THEIR COMMERCE AND MANUFACTURING.

The principal towns in the county are St. Johns, the county seat, population about 1,500; Springerville, population about 600; and Concho, population about 400. In each of the above towns several large mercantile houses are established, and merchandise is sold at reasonable prices.

St. Johns and Springerville have each a flouring mill, built on modern plans and with modern appliances.

Concho has a wool-scouring plant, recently erected and prospering.

PRINCIPAL INDUSTRIES.

The principal industries are agriculture, grazing, sheep and wool raising, and cattle. Vast quantities of Government land suitable for farming lie open for settlement as irrigation develops, and all that is needed to develop these immense resources is capital. Water for domestic and irrigating purposes is abundant, but money is required to make it available.

TOPOGRAPHICAL.

The county is a series of hills, and broad, beautiful, and fertile valleys, with perfect drainage. Locations for natural water storage reservoirs are plentiful, and but little capital is required to make these valleys blossom and yield bountiful harvests.

BRIDAL VEIL (GRAND CANYON).

FORESTS.

The mountains are covered with a heavy growth of tall, stately pines, and varying in diameter from saplings to 4 feet. Very little timber has been cut from these forests, and that only in a primitive way and only for near-by use. In timber alone this county is worth many millions of dollars, all idle, awaiting the advent of capital.

PROFITABLE ENTERPRISES.

Among enterprises that could be engaged in and made profitable, I would mention cheese and butter; woolen mills; tanneries; lime and cement. The county has every facility for carrying on the above, and insure the investment in either a practicable and lucrative one.

COCONINO COUNTY.

By Commissioner C. M. Funston, Flagstaff.

Coconino County is in the pine-timber belt of Arizona and has a population of about 5,000. There has been no decided increase of the population during the past year.

The taxable property for the year 1896, as taken from the tax roll of the county, is as per the following table, and shows a slight decrease as compared with the year 1895:

Property.	Number.	Value.	Value of improvements.	Total value.
Acres of land	615,201.93	$161,965.43	$68,110.00	$23,975.43
Town lots	3,540	150,640.50	188,155.00	338,495.50
Horses	4,978	82,168.00	.....	82,168.00
Mules	18	540.00	.....	540.00
Asses	53	300.00	.....	300.00
Cattle	31,396	238,041.00	.....	238,041.50
Sheep	176,770	203,285.50	.....	203,285.50
Swine	191	693.00	.....	693.00
All other property	.....	.....	.....	31,086.48
Miles of railroad	116.66	.....	.....	538,300.00
Total value of property	.....	.....	.....	1,944,895.41

The public lands within the county are being slowly taken up. The timber lands near the railroads are the most valuable, and these are being settled upon.

AGRICULTURE.

Agriculture is not at present one of the leading industries of this county, there being probably but 5,000 acres of land under cultivation.

Wheat, oats, rye, and potatoes of excellent quality, also turnips, beets, and hardy vegetables yield enormously, and that, too, without irrigation. The market is a ready one, with good prices, and the farmer can make a good profit on what he raises.

STOCK INDUSTRY.

The live-stock industry is the leading one. Sheep and cattle raising are as to their value about equal.

LUMBERING.

With 2,000,000 acres of pine forest within her borders, Coconino County has the supplying of lumber for the entire Territory; and the lumber industry is an important one, and gives employment to hundreds of men.

The principal sawmills are located at Flagstaff, Challender, and Williams. At present the output of these mills can only find a market within the Territory of Arizona.

RED SANDSTONE.

Flagstaff red sandstone, of which there is an inexhaustible supply, is greatly in demand from all over the West, where it is used in constructing many of the finest buildings in its leading cities.

MINERAL RESOURCES.

The mineral resources are numerous. There are immense deposits of coal, black onyx, and red sandstone. The Grand Canyon of the Colorado River is rich in gold, silver, and copper. One copper mine in that locality is working and making shipments of rich copper ore.

CLIMATE AND NATURAL OBJECTS OF INTEREST.

The climate in summer is a most delightful one, and the many natural attractions within the county attract hundreds of visitors during each year. The Grand Canyon of the Colorado River; the ancient ruins of cliff and cave dwellers; Canyon Diablo and Oak Creek Canyon; Montezuma Wells and Castle; the Natural Bridge; numerous extinct craters and beds of lava, and a hundred minor points of interest are here to attract the visitor.

CHURCHES.

The following denominations have churches in this county: Methodist, 2; Catholic, 2; Episcopal, 1; Presbyterian, 1; Mormon, 1; all of which have church edifices.

SCHOOLS.

The census report of 1896 shows 583 children of school age, an increase over last year of 35. There are six schools which require twelve teachers. The school districts of Flagstaff and Williams have fine school buildings.

IRRIGATION.

Irrigation is not much practiced in Coconino County. At Tuba City, 110 miles northeast of Flagstaff, the Indians and Mormons have a few acres under irrigation. There is, however, along the Little Colorado River, in the eastern part of the county, thousands of acres of fine land that would be highly productive with irrigation. There are within this section many natural reservoir locations that could be developed with but little capital.

NEWSPAPERS.

Three newspapers represent the thought and wishes of the people, namely: The Coconino Sun (Republican) and Democrat of Flagstaff, and the Williams News (Republican) at Williams.

They are all weekly papers, the Sun being issued on Thursday, the Democrat Monday, and the News Saturday.

ENTERPRISES THAT WOULD PAY.

Many things are yet needed to further develop the resources of this county. Principal among them are the railroad to the Grand Canyon, a smelter, wool-scouring mill, flour mill; furniture factory, and in view of the increased supply of water which Flagstaff intends getting from the San Francisco Mountains these enterprises might be established here with profit. Moreover, the building of a sanitarium here would alone be a source of profit to its projectors, and would be of incalculable benefit to the thousands who come here for the purpose of seeking God's greatest gift to man—health.

In conclusion, I would say that the people here, irrespective of politics or creed, are unanimous for the admission of this Territory to the sisterhood of States.

COCHISE COUNTY.

By Commissioner William Hattich, Tombstone.

Cochise County is located in the southeastern part of Arizona. Within its boundaries are mineral deposits unequaled in extent and value by that of any other portion of the Territory. It has stood preeminently among the mining counties of the Territory as possessing the largest dividend-paying mines, and well has she earned the proud distinction.

In the pursuit of her foremost industry many mines of value have been discovered by the dauntless prospector; and many yet remain hidden in her rock-ribbed hills and mountains seamed with precious metals.

MONTEZUMA'S WELL.

TOMBSTONE, ARIZONA.

In the Tombstone district, which has borne an enviable record as a silver producer, evidence of systematic operations on a small scale are to be seen, in the face of all obstacles and barriers. Many of the mines are being worked by the chloriders, who work the properties on a royalty of the ore extracted, and net fair returns. The Tombstone Mill and Mining Company, one of the oldest worked mines in the district, continue work on their mines with satisfactory results.

The cyanide system of reducing low-grade ores is a recent introduction in this district, and its success has led to the operation of several plants. The Tombstone Mill and Mining Company, with a capacity of 90 tons daily, operates successfully, and the enlargement of its capacity is among the possibilities. The Grand Central dumps are likewise yielding good revenue to a local company working the same, while the Contention dumps are also being converted into bullion through this method. Several plants are in contemplation of erection by the owners of mines, as the cyanide process of working ores has thus far proven profitable as well as successful.

With the decline of silver many of the great silver producers have lain dormant, awaiting the restoration of the white metal to its rightful place, when again the revival and activity in silver mining would receive an impetus never before known, and a long and prosperous career assured.

The Commonwealth mines, located at Pearce, about 20 miles distant from Tombstone, have recently been purchased by a strong company of the same name for $275,000, and are erecting the necessary machinery for a thorough working of their mines, and have incorporated for the amount of $2,000,000. The mine has, indeed, proven a wonder. Its richness and mammoth ore bodies thus far developed give promise of yielding immense wealth. The country surrounding this bonanza is being thoroughly prospected, and many promising developments are being made.

Dos Cabezas district presents an inviting field for the capitalist. The belt of mineral extends over a large section of country and the amount of low-grade gold ore at present developed can not be equaled in any section of the Territory.

Many of the mines at present being worked are yielding handsome profits. The Tevis, Turquois, Russelville, Winchester, Chiruchua, Swissholm, and Cochise districts all abound in precious metal; and, with capital, could be made to yield profitably. The Huachuca range is commanding attention also, through the richness of its copper and silver ores. The most prominent of the mines now being worked in this range are the Copper Glance mines, which are improving steadily as work progresses.

The great copper-producing plant at Bisbee is being enlarged. The sulphur dust and noxious gases are raised above the mountain tops by immense stacks, making the town more healthful, besides recovering the waste or oxidized copper that would otherwise return to the earth and be lost to man.

When one contemplates the magnitude of the Copper Queen Consolidated Mining Company's great smelters, reducing and refining works, and the busy hands of 1,000 men employed to the best possible advantage, all under control of one mind, each at his allotted task, from the superintendent to tool boy, moving along daily without friction or contention, we are lost in contemplation of the great possibilities of concentrated work.

CATTLE INDUSTRY.

While Cochise County ranks as a first-class mineral-producing county of the Territory, yet the stock interests are engaging the attention of a large number of our citizens. The years 1893 and 1894 were a severe test of the courage and faith of the stock raiser. The drought and the low price of beef in those years caused a cloud to hover over one of the most healthful and lucrative industries of Cochise County; but in the year 1895 better times for the stockmen seemed in the very air, and with renewed energy our people grappled the situation, and the result manifests an increase of cattle on our ranges netting a fair profit, and well-founded hope for the future.

ARTESIAN WATER AND RESERVOIRS.

At St. David, a thriving agricultural settlement, eleven artesian wells are steadily flowing, irrigating an extensive acreage. The deepest well is 275 feet and the flow has not diminished since water was first encountered. The loss from evaporation is very slight.

Cochise County has the honor of having the only developed artesian wells in the Territory.

There are several points in the county where storage reservoir sites could be built to advantage and with a comparatively small outlay.

CLIMATE.

The climate of Cochise County is unsurpassed, which makes it a favorable resort for invalids who find in the equable atmosphere rest and recuperation. Its health-giving qualities few can equal.

SCENERY.

The scenery in the different mountain ranges affords a novel attraction for the tourist. Prehistoric relics are found in different parts of the county. Cochise's stronghold, the rendezvous of the famous Apache chief of that name, and after whom the county was named, is to be found in the Dragoon Mountains.

MISCELLANEOUS.

There are 18 schools and 26 teachers within the county, with a school census of 1,211 children of school age.

Eleven towns are enumerated within the boundaries. At Tombstone, the county seat, is published the Daily Prospector and Tombstone-Epitaph, and at Willcox, the Valley News is issued weekly. At Bisbee is published the Bisbee Orb, a weekly.

Hooker's Hot Springs are easily reached from Willcox. Its waters possess medicinal qualities fully equal to those of the famed resorts, and this fact when it becomes known more fully will give them a reputation as a health resort equal to the Hot Springs of Arkansas.

Among the industries, besides those above outlined, which could be established with profit are the cultivation of canaigre, a factory to extract the tannic acid, a tannery, and a well-equipped sanitarium.

GRAHAM COUNTY.

By Commissioner George H. Kelly, Solomonville.

Graham County for the years 1895 and 1896 has been unusually prosperous, and substantial improvement may be reported in every industry, the principal ones being agriculture, cattle raising, and mining. There has been no rush of immigration; still, a number of good citizens have been added to our population during the year.

CATTLE.

The assessment roll for this year shows 85,000 head of cattle now on the ranges of Graham County. This is an increase of over 17,000 head, notwithstanding the fact that the shipments last fall and this spring were unusually large, prices being good and urgent demand for all grades, including yearlings and stock cattle. Taking the assessment as a basis of estimate, the number of cattle on the ranges in this county may be put down safely at more than 100,000 head. The range during the past year was fairly good and much better than for five years, but the outlook for next year promises more grass and a general improvement. Cattle support themselves, and with an average season they make the finest of beef. Where living water can not be had, it is furnished from wells, windmills supplying ample power for pumping at a moderate rate. Cattle require but little attention on the range. Beef cattle are marketed in California, and those not suitable for beef are shipped to Kansas, Wyoming, and Montana, where they are pastured and fed.

During the past year several, for the first time, engaged in fattening cattle on alfalfa in the Gila Valley, and the success of this enterprise has proven quite satisfactory, and this industry will no doubt become an important one here in the future. There is always a market for good beef at the large mining camps of Clifton, Carlisle, Morenci, and several carloads of beef were shipped from here during this summer to Silver City, N. Mex. Fattening cattle, it is believed, offers the best cash market for hay, of which there are great quantities produced here. In the early history of this valley hay was marketed at the surrounding military posts, and the prices obtained were about what could be realized by fattening cattle, but the abandonment of these military posts and the steady increase in the production of hay has turned attention to feeding, which will no doubt be a source of good profit to our farmers in the future.

AGRICULTURE.

The assessment roll for this county for the year 1896 shows that there are 34,116 acres of patented land, valued at $396,077, and the improvements on the same are valued at $314,744. This shows an increase of about 4,000 acres over last year and the increase in valuation $60,000. The crops are all produced by means of irrigation, by water taken from the Gila River, and they vary little from year to year.

In 1873 the first canals were dug and land cleared for farming in Gila Valley. This valley is the second largest in Arizona, which has an ample supply of running

CATTLE RANCH, GRAHAM COUNTY, ARIZONA.

water for irrigation, extending from a point 9 miles above Solomonville to San Carlos, a distance of some 70 miles. That part above San Carlos, a distance of 30 miles, is on the Indian reservation and is only cultivated in a crude way by the Indians. Above Solomonville the population is mostly Mexicans, who took out the first ditches. Here the land is very fertile, and the crops of barley, corn and wheat, chili, beans, alfalfa, etc., are large.

There is yet but a very limited amount of Government land that can easily be brought under cultivation by irrigation. To clear, fence, and secure a water supply for land, has cost from $10 to $40 per acre. It will produce annually from 20 to 50 bushels of wheat, corn, or barley, or from 7 to 10 tons of alfalfa hay. A crop of barley and a crop of corn may be raised on the same land in one year with the usual summer rains. Corn is not cultivated; the only labor being the planting, irrigating, and gathering. If it was cultivated as in the Mississippi bottom, the yield would be much greater.

Good land in cultivation and with water right can be purchased here at from $25 to $50 per acre. Hogs do well on alfalfa pasture, and persons who have engaged in this industry have found it profitable.

The lands along the streams and alluvial bottoms are very rich. The mesas or table-lands are good soil, but the running streams for irrigating them are lacking. The Gila Valley contains the largest body of land that can be irrigated from a running stream. It will average 2 miles in width in bottom land. The slightly elevated table-lands extend from the bottoms from 2 to 6 miles to the high mountains. In time, much of these table-lands will be reached by an irrigating system, and they will prove equally productive with the bottoms. Especially are they desirable for fruit culture, being in the thermal belt and less subject to the late frosts. All the crops adapted to the temperate zone are grown here to perfection.

A new canal has been begun in the valley during the past year, which promises to increase the cultivated area several thousand acres, but agricultural industry is very near its limit without water storage, the opportunities for which are very favorable in several localities. This system for furnishing water for irrigating purposes will be adopted only when capital can be attracted to a fair promise of remuneration. With water storage, from 75,000 to 100,000 acres of land could be reclaimed in this county, which cannot be excelled for production anywhere in the world. The amount of water which passes down the Gila River to the Pacific for eight or nine months in the year, measured, would be sufficient for every need, if husbanded for use during the time when water runs low in the river.

The principal canals in Gila Valley, in Graham County, are the San Jose, Montezuma, Union, Central, and Oregon, though there are a great many smaller ones, under all of which agriculture is making good progress, and the farmers gradually making good and prosperous homes.

The following is a list of canals and ditches, their length, and the number of acres of land lying under them:

Canals and ditches.	Length.	Land supplied.	Canals and ditches.	Length.	Land supplied.
	Miles.	*Acres.*		*Miles.*	*Acres.*
Brown ditch	1½	500	Oregon Canal	7	2,500
Sanchez ditch	4	500	Mathews Canal	5	2,000
Fourness ditch	2	480	Curtis Canal	6	2,000
Mojia ditch	4½	600	Kempton Canal	4	600
San Jose Canal	7	3,000	Maxey Canal	11	5,000
Michelena ditch	4	600	Fort Thomas Canal	2½	1,500
Montezuma Canal	9½	4,000	Thompson ditch	3	800
Union Canal	11	4,500	Duncan Canals	7	2,500
Sunflower Canal	3	600			
Graham Canal	5	2,000	Total	108	37,680
Central Canal	9	4,000			

The Montezuma and Union canals are the largest, and are about 12 feet wide on the bottom. These canals are all owned by farmers, who own the lands under them. The owners usually incorporate themselves in stock companies, as they find it much easier to manage their affairs that way.

The cost of maintaining the canals varies according to the amount of flood waters coming down from the mountains, but the cost of water to those owning rights in the canals will not exceed 75 cents per acre in any year, and the average is less than 40 cents per acre.

Under the system of irrigation operated by the farmers of Graham County they are required to pay very little cash for their water supply, as about three-fourths of the charges for maintaining the canals is paid in labor. After a recent visit to our

valley by Governor Franklin this year, he declared that here was the most successful and economical system of irrigation he had ever investigated.

Alfalfa is about the only hay crop raised. It is very profitable, and is cut five and six times a year, and yields about 1½ tons to the acre at each cutting. The price ranges from $5 to $10 per ton.

Much wild hay is also cut on the ranges during rainy seasons. This wild hay is first class and is received at the Government military posts.

No effort has ever been made in this county to secure artesian water. The products here, in addition to alfalfa hay, are corn, wheat, barley, oats, beans, chili, fruits, and berries, except the tropical. It is too cold here for oranges, lemons, or even figs.

The hardiest fruits, apples, pears, plums, etc., are found to be the most profitable and certain. Apricots and early peaches are not a certain crop, owing to the late frosts in the spring. Canaigre grows wild, some of the tubers being as large as a good-sized potato. Test shows the canaigre root, which flourishes near Thomas, in the lower portion of the valley, contains a larger per cent of tannic acid than any ever sent to the extract works from either Arizona or New Mexico.

There is no means of making a correct estimate of the number of acres of land planted in fruit, but a conservative guess would place it at 1,000 acres.

POPULATION.

The population of Graham County has increased but little more than the normal during the past year, and would now probably reach 9,000, based on careful estimates from the great register and school census reports.

TAXABLE PROPERTY.

The total amount of all property as returned for assessment this year is $1,993,812.19, an increase over 1895 of $160,000. But one other county in the Territory exhibits such a gratifying condition. Last year our county increased in taxable property $275,000, thus showing an increase of nearly a half million for 1895 and 1896.

The prosperity of Graham County is no surprise to anyone acquainted with its resources. Here we have the three great industries of Arizona, all in a flourishing condition, mining, stock raising, and farming.

With this steady increase of taxable property which will go on for years, it will not be long until our taxes will begin to grow materially less, and our debts will begin to disappear.

The following is an abstract from the assessment roll, for 1896, of Graham County:

Value of—	
34,116 acres of land	$396,077.00
Improvements on these lands	314,744.00
Town lots	21,847.00
Improvements on town lots	79,926.00
41 miles of railroad	129,750.00
4,023 horses	114,770.00
127 mules	5,080.00
204 asses	1,986.00
85,091 cattle	658,423.00
13,092 sheep	19,638.00
717 hogs	2,818.00
2,866 goats	4,239.00
Other property	244,514.19
Total value of property	1,993,812.19

STOCK INDUSTRY.

The stock of this county is of good quality and the real value of all except cattle would be one-third more than the assessed value. Cattle on the range are assessed at about their actual value per head, but there are probably 30 per cent more cattle in the county than appears on the assessment roll.

MINING.

Located in the principal mining districts of this county are Clifton and Morenci, though there are districts in the county where rich mineral has been discovered, and with development will no doubt prove rich and in paying quantities, notably the Lone Star, Clark, and Aravaipa districts.

The works of the Arizona Copper Company operate at Clifton on the San Francisco River, where is located its metallurgical plant, the mines being located from 4 to 9

CLIFF DWELLING.

miles distant in the high hills or mountains which break down to the river. The mines are reached by a "baby gauge" railroad (15-inch gauge) and a system of gravity incline roads, the most successful ever devised. The output of this company has been materially increased during the past year by an addition of a new concentrator and other new and improved machinery. This plant also includes a plant for the treatment of its low-grade ores, a sulphuric-acid works with a capacity of 10 tons of strongest sulphuric acid per day, this being the first of its kind in the country; also a leaching plant equipped with lead-lined pipes and tanks and the latest improvements, with a capacity of 100 tons low-grade ore per day. This is successfully operated and yielding 120 tons of copper per month.

The Arizona Copper Company produced and shipped during the six months ending June 30, 1896, 3,887,019 pounds of copper and 4,032,831 pounds of copper matte, an average of 659 tons of copper and matte per month. This company employs about 750 men, at wages ranging from $1.70 to $3.50 per day.

The Arizona and New Mexico Railroad belongs to the same company and runs from Clifton to Lordsburg on the Southern Pacific Railroad, a distance of 71 miles, 41 miles being in Graham County. It is a narrow gauge and is used exclusively in the work of the copper camp. It gives employment to 70 men. Without this road it would be impossible for the copper mines to continue operations.

The Detroit Copper Company has an extensive plant at Morenci, 7 miles from Clifton, and is connected by the "baby gauge" railroad and inclines. The plant has been greatly increased during the past year, and for the first six months of this year it shipped 2,265,000 pounds of copper. Its plant consists of four huge blast furnaces and concentrator.

CLIMATE.

The elevation of Gila Valley, in Graham County, being 3,000 feet, the climate is not so warm as in the other large valleys in Arizona, which are much lower. In hottest summer the mercury rarely reaches 100°, and 105° is about the extreme limit. In winter snow is not infrequent, covering the ground, though it quickly disappears. The nights in summer are always cool. Within 18 miles, which can be reached by wagons from the valley in six hours, are some cool and most charming summer resorts to be found in the southwest. Beautiful locations are nestled in the rugged sides of Mount Graham, where the whole country is covered with a luxurious growth of fern, grass, pine, oak, juniper, and fir timber, with cold spring water. Several primitive summer resorts have been established in the mountains, the principal one being Camp Arcadia, 16 miles south of Solomonville, reached by a good wagon road.

ANCIENT RUINS.

On the mesas and in the valleys are found the remains and implements of prehistoric man, and old cities of large size can be traced by foundation stones in many localities. On Bonita Creek and in the Arivaipa Canyon can also be seen the remains of the homes of the cliff dwellers.

PUBLIC SCHOOLS.

There are 25 schools in Graham County, every settlement being supplied. Twenty-seven teachers were employed during the last year. The average attendance was 844, with a total enrollment of 1,471. The census report shows that there are 2,281 children within the school age in the county. The average term taught last year was six and a half months. The teachers are about equally divided between male and female. The average salary paid to female teachers was $57, and the average paid to male teachers was $56.

THE PRESS.

The press is represented by the Graham County Bulletin, published in Solomonville, and the Graham Guardian, published at Safford.

CHURCHES.

There are 5 churches in the county—3 Catholic and 2 Methodist.

LABOR.

Labor commands good wages here in the mines and on the cattle ranges, but efficiency has much to do with the price received. Farm labor is about $20 per month and board; day labor, $1.25; carpenters receive all the way from $2.50 to $4.50 per day. An industrious man with good habits is rarely found out of employment. The

towns in the county are Solomonville, Safford, Thatcher, Central, Pima, and Fort Thomas, in the main part of the Gila Valley. Clifton and Morenci are mining towns, and Duncan is situated on the Gila River, above Solomonville some 50 miles. Solomonville and Safford are the largest towns in the valley, and both are growing.

UNDEVELOPED RESOURCES.

The undeveloped resources are to be found in the mineral, agricultural, and timber industries. Immense forests of pine timber are to be found in Graham County mountains.

INVESTMENTS THAT WOULD PAY.

A bank, it is believed, would pay well at Solomonville, the county seat.

A fruit and canning establishment is badly needed in the valley.

There are three first-class roller mills in the valley—two located at Safford and one at Pima. These mills are well supplied with wheat by our farmers, and their products are disposed of here and at the adjacent mining camps.

RAILROADS.

Two years ago the Gila Valley, Globe and Northern Railroad was built from Bowie Station, on the Southern Pacific Railroad, through the main part of the Gila Valley to Geronimo, on the line of the San Carlos Indian Reservation, where it was stopped because of difficulty in securing right of way from Apache Indians. This road enters the Gila Valley at Solomonville, the county seat, and follows the valley to Thomas, a distance of 28 miles. It is understood that work will be resumed soon, and the road constructed to Globe, a thriving mining camp, 70 miles beyond Thomas.

The Southern Pacific Company have a corps of experts at work with a diamond drill prospecting for coal, near Solomonville, and it is confidently expected that they will find a good body of this fuel.

GILA COUNTY.

By Commissioner G. W. P. Hunt, Globe.

Gila County lies in east central Arizona, and is the most inaccessible portion of the Territory. It was formed from portions of Maricopa and Pinal counties in 1881. Since then a small strip has been added from Yavapai County on the north. It is surrounded on all sides by rugged and stately mountains, whose lofty peaks are covered with snow through many months of the year.

On the south the Pinal Mountains, whose summits are covered with a fine forest of pine, while on the west the Superstitious, Four Peaks, and Matazals ranges are the natural boundaries.

The dark rim of the Mogollons is the dividing line of the north, while on the east are the snowy White Mountains and Black ranges. Situated within these formidable barriers is an empire of itself, whose wonderful riches will yet make Arizona famous.

CLIMATE AND NATURAL OBJECTS OF INTEREST.

Arizona abounds in natural sights and curiosities of great interest, few of which are yet much known or appreciated, owing to their remoteness from railroads and frequented highways.

Gila County is rich in these wonders of nature, the most noted of which is the Natural Bridge on Pine Creek, in the northern portion of the county, and which rivals the Natural Bridge of Virginia. It spans Pine Creek at a height of 200 feet, and the walls of the canyon rise above it on either side 700 feet. The bridge is of lime formation, and the inside of the great arch, which is 250 feet across, is worn by the water as smooth as though chiseled by the trained hand of a stone mason. The arch on top is nearly 400 feet in width and 1,000 feet in length across the canyon, and at the thinnest part only 6 feet through. Near the center of the arch is a hole large enough to admit the body of a man, and through which one can look down into the crystal pool of water 200 feet below.

SCENE ON GRAND CANYON OF THE COLORADO.

The dike which forms the bridge extends in a sweeping curve up the right side of the stream and, together with the bridge proper, affords a surface area of about 150 acres of fertile land, which has been converted into a fine farm, irrigated from a splendid spring that issues from the right side of the mountain.

The climate is exceedingly mild, and to this fact is ascribed the wonderful variety of vegetable growth, numbering some 250 trees, shrubs, vines, and plants, some of which are quite rare. The vicinity abounds in numerous fossils and shells, and wherever moisture percolates through the calculous rocks beautiful stalactites are formed. Underneath the bridge are numerous caves, which are lined with these pending cones resembling huge icicles.

On the ranch known as the old John Gray place, between Payson and the rim of the Mogollon Mountains, is one of the finest springs in all probability in Arizona. It gushes forth from a perpendicular face of rock, a veritable river of clear, cold water, and which, although possessing the inherent power to turn the wheels of industry, flows on unhindered, and few residents of Gila County ever saw or are even aware of the fact that 45 miles northeast of Globe, at the Shurley ranch, is a waterfall of surpassing beauty, and which in the height of fall rivals some of the noted curiosities of the world. The stream shoots over the brow of the butte and falls sheer 200 feet onto a bench, and before its tranquillity is regained it is again precipitated 200 feet, throwing off spray which is diffused by the wind and sparkles and glitters in the sunlight. True, it has not the mighty volume of Niagara, but surpasses it in the height of the fall. In grace and charm it rivals Minnehaha, which Longfellow's inspiration made famous.

Gila County also boasts of two hot springs, one of which is 30 miles north of San Carlos and the other on the Gila River, both of which are highly prized by the Apaches for their restorative properties. Both these springs are within the boundaries of the reservation and are not available to white men.

FRATERNAL SOCIETIES.

Two lodges of I. O. O. F., one of A. O. U. W., one Knights of Pythias, and one Masonic, all of which are flourishing.

TAXABLE WEALTH.

The taxable wealth of this county from all sources for the year ending June 30, 1896, amounts to $1,155,800, an increase over last year of $337,370. This of itself shows that Gila County is experiencing a wonderful growth, and I do not think any other county in the Territory can show such vast gains.

AGRICULTURE AND HORTICULTURE.

Wheat, barley, corn, and alfalfa are some of the leading agricultural products of the county, while in fruit growing and gardening we are able to show as fine products as are to be found in this or any other country. All of these products find a ready market in the home towns and mining camps. These industries are in their infancy, but in the near future are destined to become of vast importance.

CATTLE INDUSTRY.

The cattle industry is one of the greatest sources of profit, and probably no portion of Arizona is better adapted to cattle raising than Gila County. There were sold off the ranges this year nearly 15,000 head of cattle, bringing in a revenue of nearly $200,000.

RAILROADS.

Gila County is the only portion of the Territory which has no railways crossing its boundaries, and its progress has been further retarded by the White Mountain Indian Reservation.

The Globe, Gila Valley and Northern Railroad is now running from Bowie on the Southern Pacific to Geronimo, 70 miles distant, and the completion of the road to Globe is assured at an early day, and then with an outlet to the markets of the world, and with our wonderful resources, Gila County will take rank as one of the richest counties of our fair Territory.

MINING.

The principal and most important industry of Gila County is mining, and from the south end of the county to its northern boundaries mineral abounds. From the first discovery and opening of the mines they have been noted for their richness and variety.

The pride of the county is the Globe mining district. Here are vast copper mines which have been worked for years. The best producer has been the Globe mine, which has produced 70,000,000 pounds of ingot copper direct at the furnace 98.5 fine, valued at over $7,000,000.

During the past year this property has changed hands and under the new management the output of bullion would not be given. Under able management, however, there is no doubt this mine will continue to produce a vast amount of copper.

The United Globe mines, under the able management of Capt. E. H. Cook, have in the past year been worked strictly and to great advantage and this coming year will be one of the great producers of copper in Arizona. The company has just completed a new tramway over a half mile in length and a new 150-ton water-jacket furnace will soon be in operation. This company is noted for its liberal and progressive management, and as they own a vast amount of mineral property in this district their output of bullion is likely to increase, and there is every assurance that this county will soon lead in the production of bullion in Arizona.

Silver mining.—In early days Globe was noted for its rich deposits of silver, and the rich finds of native silver has made it celebrated, but owing to the steady decline in the production of silver the output in this county for the fiscal year amounts to but $3,000.

Gold mining.—The past year has been remarkable in the production of this metal, and from all sources the output for the past year has been:

Craig mill	$1,000
Coleman mill	15,000
Kasser mill	48,000
Total	64,000

The northern portion of the county, near Payson, is rich in gold. Three small stamp mills are worked part of the time, and the only thing that retards that section is its isolation. The most noted producer of gold in this county is the Kasser Gold Mining Company, situated at Lost Gulch, 8 miles from Globe. This company began operation last fall, and under the management of Col. A. C. Crane has produced a great deal of bullion and has brought Globe forward as a gold-mining center. They have had a 10-stamp mill in operation for the past ten months. The ore is free milling, and concentrated ore averages $16 per ton, producing $6,000 per month; 12½ per cent of this is concentrates, assaying 45 per cent lead, 6 ounces of silver, and 3½ ounces of gold. This company has done a great deal of development work in the past year and have opened up a great deal of ore.

The vicinity of Lost Gulch is rich in gold property. New companies are buying up property, and before long this section will produce a great deal of gold.

NEWSPAPERS.

Gila County has but one newspaper, the Arizona Silver Belt, which has always advocated the interests of the county.

This portion of our Territory has a glowing and bright future, and in common with the rest of Arizona is progressing upward. The industry and hospitality of its citizens are noted, and the stranger traveling within her borders is struck with their kindness and hospitality.

MARICOPA COUNTY,

By Commissioner T. C. Jordan, Phœnix.

Maricopa County was organized in 1871 and named in honor of a friendly tribe of Indians located on a reservation within its borders. It is situated, geographically, nearly in the center of the Territory.

The county is about 144 miles in length from east to west and about 91 miles in width from north to south, and contains about 7,300 square miles, or 4,679,000 acres.

The land surface of the county capable of reclamation by irrigation is not less than 1,500,000 acres. It consists principally of an alluvial plain, rising by easy gradients from its many drainage streams to distant foothills or base of strangely formed mountain peaks, which serve to diversify and beautify one of the most lovely valleys on the American Continent.

SOILS.

The soil of the high or mesa portion of the valley is a gray sandy loam, while that near the river and creeks is of a dark sandy formation, exceedingly rich, and admirably adapted to the growth of vegetables, melons of all kinds, sugar cane, and to many of the semitropical fruits.

CLIMATE.

The climate of the Salt River Valley is delightful almost the entire year. It is but seldom the thermometer registers below freezing point in winter, while the heat of summer is tempered by constantly alternating breezes from the Pacific Ocean, Gulf of California, and the snow-clad peaks of the Rocky Mountains. Tornadoes, cyclones, and blizzards are here unknown.

The elevation of the valley (above sea level) at Phœnix is 1,100 feet.

RIVERS AND CREEKS.

The county is well supplied with rivers and creeks. The principal streams are the Gila, Salt, Verde, Agua Fria, and Hassayampa. The first three enter the county from the mountain regions of the Territory—east, northeast, and north. The Verde connects with the Salt about 20 miles northeast of Phœnix, which (passing) enters the Gila about 20 miles below, first receiving the waters of the Agua Fria flowing from the north; farther west the Gila receives the waters of the Hassayampa, also flowing from the north; thence flowing in a southwesterly direction crosses the Yuma County line and enters the Colorado River at the town of Yuma.

POPULATION.

In my last annual report the population was given for the county at 30,000. At that time many well-informed people thought the estimate too high. Since then I have given to the subject much closer investigation, and am satisfied now that the estimate was very nearly correct. During the year an increase of fully 10 per cent has been added. I give the population of the county at this time as 33,000. Of this increase fully 2,000 have settled in Phœnix.

These people have come from all parts of the Southern, Middle, New England, and older Western States, and from northern, middle, and southern Europe. They are cosmopolitan in make-up, and represent a high average of the best thought, impulse, experience, enterprise, and skill of the civilized world. They entertain a higher measure of hospitality—genuine social and business hospitality—than is to be found in many older communities. With such a people the work of ages in older lands is compassed here in a decade. Seeking wider fields, they have met here in this beautiful valley, brave, confident, self-reliant, self-helpful, ready, quick, and practical; with them there is no doubting, no halting, and no waiting. The result is seen on every hand in the enterprise, liberal intelligence, liberal views, and progressive ways of the community.

AGRICULTURE.

Farming on an extensive scale, small farming, horticulture, market gardening, stock raising, and the grazing and fattening of stock from the mountain pastures and ranges are the pleasant and profitable pursuits of a large percentage of the rural population of the county. Practically the crop seasons extend through the entire year.

HEALTH.

With the absence of extremes of heat and cold, of malarial-breeding swamps and humidity of atmosphere, with long terms of bright sunshiny weather, and constantly alternating sea and mountain breezes, the health of this valley could not be other than it is—very nearly perfect.

Under such conditions the average duration of human life must be greater than in any other locality in this country. This is abundantly proven by numerous examples of extreme old age among the aboriginal and Mexican population.

MINERAL SPRINGS.

In the mountain regions of the county have been found many mineral springs of great medicinal value. At present most of them are inaccessible for the want of good roads.

At Agua Caliente, in the southwestern part of the county, are some valuable hot springs which have long been resorted to for their health-giving properties.

FIELD CROPS.

Wheat, barley, corn, alfalfa, sugar cane, sorghum, ramie, sugar beets, etc., are the staple field crops of the county. Wheat and barley can be sown at any time between the months of October and March, and yield about 1,500 pounds per acre. Corn does best planted in July. Alfalfa, or French lucern, is a perennial field grass of remarkable fattening properties. Under irrigation it can be cut from four to six times each year, and yields from 2 to 4 tons of hay per acre at each cutting. Both cattle and hogs fatten rapidly upon it. Cut for hay or rented to the range cattleman the annual return per acre will average not less than $40. Sugar cane and sorghum are grown only for home consumption. The ramie and sugar beet are both new agricultural industries in this county. They have been thoroughly tested. Two thousand five hundred acres, near Phœnix, are now being prepared for the cultivation of ramie, a fibrous plant of great commercial value. Sweet potatoes, pumpkins of all varieties, ground pease, or "gubers," pease, and beans are also grown as field crops and exported in large quantities beyond the county.

Experiments in cotton planting have been made, the result proving beyond a doubt that the soil and climate of the valley is well adapted to the production of this great commercial staple. Fully 2,000 pounds per acre was the result of these experiments. The long haul to market and high freight rates will, however, for many years deter our people from engaging in cotton planting to any extent.

Experiments with the tobacco plant have also been made at the United States Government experimental station near Phœnix. Eleven varieties were tested last year and all made good showing, the Spanish, Brazilian, and White Burley being specially noted for "fine growth and texture."

CANAIGRE.

The eighteenth legislature passed an act "to promote the raising of canaigre and the manufacturing of tanning extract therefrom." Under the provisions of this act a plant was established at Phœnix and Tempe. Success immediately followed and now this new agricultural industry promises to be of great importance to the county, and in fact to all southern Arizona.

The tuber is indigenous to this region and has long been used by the aboriginal and Mexican population in the production of leather. It contains a large per cent of tannin and recent experiments prove that it is of superior value in the production of high grades of patent leather, in the manufacturing of which large amounts are paid out each year by the Government on imports of gambier and other tannin extracts.

The cultivation of this tuber is beginning to be extensively engaged in in this county.

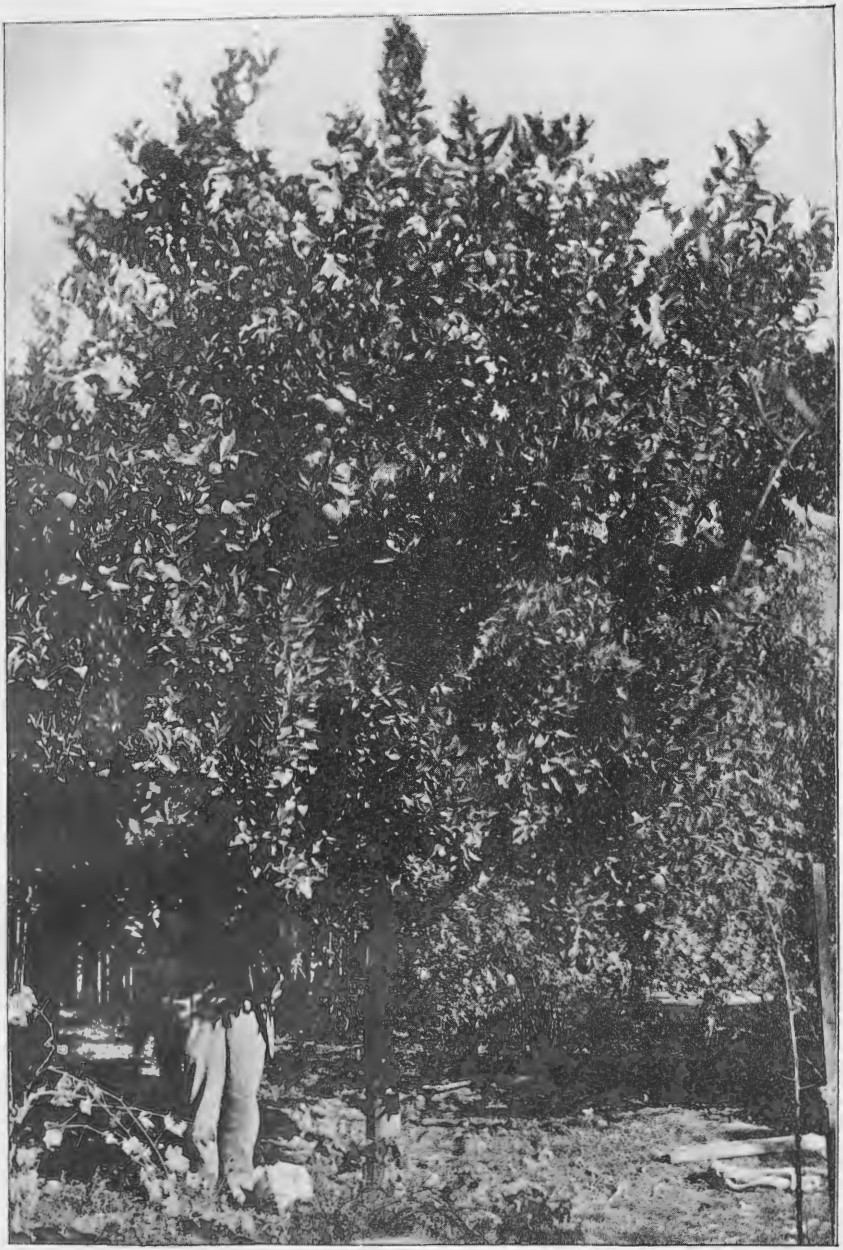
HORTICULTURE.

Year after year hundreds of acres are being added to this industry in Maricopa County. Experiments in this line are no longer necessary, as it has been fully demonstrated that here are found the soils, elevation, equable temperature, climatic softness, and other requisites for the perfection of all, or nearly all, of the fruits of the middle and semitropical latitudes. Her people no longer marvel at the wonderful transformation which is going on, though the Northern and Eastern visitor will continue to express genuine surprise when they first look upon the vast orchards, vineyards, and gardens of this valley. In my opinion this industry is destined to become the greatest source of wealth of her people. Trees and vines mature earlier, yield more generous fruitage, have fewer enemies, have longer seasons for growth and perfection of fruit than elsewhere in this country, even California, over which favored section this valley has the additional advantage of being several hours nearer the great markets of the East.

In the foothills, valleys, and slopes the orange and lemon and other semitropical fruits do best, while anywhere in the valley the peach, pear, apricot, cherry, nectarene, almond, English walnut, olive, plum, pomegranate, fig, etc., and all the small fruits do well. Especially noteworthy among garden fruits is the strawberry, which yields bountifully and is of rare size and flavor. It is now a staple crop and the acreage under cultivation is being rapidly increased.

GRAPE CULTURE.

Fully 4,500 acres are devoted to this industry in Maricopa County. More than one-half of the vines are of the raisin variety, the Malaga, Muscat, and Sultana leading, while table varieties comprise the Black Hamburg, Lady Downing, Tokay, Rose of Peru, Mission, and many others. The Zinfandel is a fine wine grape, and from it



ORANGE TREES NEAR PHOENIX, ARIZONA.

ORCHARD SCENE NEAR PHOENIX, ARIZONA.

a splendid claret is being manufactured at Mesa City, where at this time a great deal of attention is being paid to this and the production of finer and lighter grades and brands from other varieties of wine grapes.

MARKET GARDENING.

Near the cities and towns and along the railroads this industry is making rapid strides. No more pleasant or profitable occupation along agricultural lines exists. Markets for products are practically illimitable, as the growth of cities and towns and facilities for reaching the mining camps keep constantly in advance of the production. To the homeseeker, people of energy, and small means this industry offers many advantages. Under our system of irrigation the years record no failures. The Scriptural injunction, "Plant and ye shall reap," is here fully verified. A "season" is always at hand. It is but the work of a few moments to raise the "head gate" and a "season is on." Shut it down and it is "off." Under such conditions perpetual verdure and perpetual growth is assured; "ideal" farming is practicable. Every month in the year vegetables can be grown and marketed.

SMALL FRUIT FARMING.

This delightful and profitable industry has as yet attracted the attention of but few "specialists" in this county, yet no calling is surer of large returns on the investment of the needed capital, labor, and experience.

Blackberries, raspberries, gooseberries, special lines of table grapes, strawberries, and many other small fruits grow here in perfection. A home market exists for all these products, which is never adequately supplied, though the profits from them can not be less than from $300 to $500 per acre yearly.

POULTRY.

Many "colossal fortunes" have been built up from less promising occupations than are offered by this line of industry in Maricopa County. Domestic fowls all do well here, are subject to few diseases, and are remarkably prolific. One lady engaged in "chicken ranching" informed the writer hereof that last year and for many years past she had realized a net profit on turkeys alone of over $500. Few occupations in the valley offer greater inducements or give better returns on the required capital. Plant an alfalfa "patch," purchase a few tons of waste from thrashers, erect a few sheds, and secure the necessary "stock," and the "rancher" is ready for business with the certainty of a cash market right at the ranch door. The "egg and chicken peddlers" are many and are always abroad in the land.

TAXABLE WEALTH.

The assessment rolls of the county for the year ending June 30, 1896, were as follows:

Lands (including $283,164 in improvements)	$3,137,451
Town and city lots (including improvements)	3,241,184
Horses	79,214
Mules and asses	5,311
Cattle	159,482
Sheep and goats	28,941
Swine	16,338
Other property	851,544
Railroads	457,360
Total value	7,976,825
Assessment for 1895	7,444,409
Increase	532,416

Real value of all the property in the county is not less than $20,000,000.

ACREAGE IN CULTIVATION.

At this time there are about 270,000 acres in cultivation in the county, of which about 10,600 are devoted to horticulture.

The following table will show, approximately, the number of acres devoted to the products named:

	Acres.		Acres.
Wheat	100,000	Figs	300
Alfalfa	105,000	Oranges	2,500
Miscellaneous crops	12,000	Lemons	100
Vines (raisin and other grapes)	4,500	Pomegranates	50
Apricots	1,500	Blackberries	10
Peaches	1,500	Quinces	25
Pears	1,000	Grain hay	20,000
Almonds	500	Sugar cane and sorghum	5,000
Strawberries	300	Timber culture, about	11,000
Plums	300	Ramie	2,500
Apples	100	Canaigre	1,000

BEE CULTURE.

Bee culture is a most pleasant and profitable occupation in this valley. Pasturage is unlimited. There are now in the county about 6,000 stands of bees and the average product is about 100 pounds per stand. It is of the finest quality and flavor, and finds a ready market in Eastern cities.

CHURCHES.

The following denominations have active organizations in this county, and some of them have church edifices that would attract attention and favorable comment in much older communities:

Methodist Episcopal South	8	Congregational	1
Methodist Episcopal	6	Dunkard	1
Baptist	4	Catholic	2
Episcopal	2	Mormon	2
Presbyterian	2	Salvation Army	1
Free Methodist	2		

FRATERNAL SOCIETIES.

There are in the county:

Masonic lodges	3	Woodmen of the World	1
Odd Fellows	3	Grand Army of the Republic	1
Foresters	1	Confederate Veterans	1
Knights of Pythias	1	Benevolent and Protective Order of Elks	1
Ancient Order of United Workmen	1		

PUBLIC SCHOOLS.

The public schools of Maricopa County, organized under our Territorial system of public school laws, which for liberality and sound democratic principles is second to none in any State or Territory in the Union, are the pride and boast of her people. Nearly every district in the county has its commodious, well-appointed school building.

The following table will show the conditions of the schools of the county during the past year:

Teachers employed	90
Number of private schools	6
Number of public schools	90
Pupils enrolled	3,779
Average salary paid	$69.50
Average school year ..... months	6.1

Add to the number of children enrolled (for isolated camps, absent, and overlooked by census marshal) at least 75, which will place the enrollment about what it should be.

INDIAN SCHOOLS AND RESERVATIONS.

There are three Indian reservations in the county—the Papago, at Gila Bend; the Pima, in the southeastern part of the county, and the Maricopa, near Phœnix. Local schools are maintained at all these reservations. At Phœnix the Government has erected large and commodious school buildings for the exclusive use of these Indians. The interest manifested in them by the Government and all religious denominations, and the eagerness shown by them in adopting civilized habits and methods, are most gratifying. These Indians have ever been friendly to the whites, and there are many traditions extant of timely aid and assistance extended by them in the early days of immigration to the Pacific Coast.

The allotment of lands in severalty to these Indians by the Government and ample facilities for irrigating them are most earnestly recommended.

MINING AND PROSPECTING.

The mountain regions of Maricopa County are rich in gold, silver, and copper. They have been run over many times, but until recently nothing like scientific prospecting has been resorted to. In the Superstition Mountains new discoveries continue to be made, where (at Camp Goldfield) several mills are being operated on gold properties. At Cave Creek, Castle Creek, Wickenburg, and in the Haqua Hala Mountains great activity in prospecting and development work continues. Many "placer" discoveries have been made in the foothill valleys, and as water for working them is developed the output will be very considerably increased.

From all sources I estimate the output in the county during the past year at $200,000. I regret my inability to obtain more satisfactory information upon this most important industry of the county.

GRAZING.

The number of cattle now being fed or fattened on the alfalfa fields of the county, upon which taxes are paid in other counties, is estimated at about 30,000.

The number of horses, mules, sheep, and hogs is not known, but is very large.

EXPORTS.

The following are some of the products of the county, which are exported every year in large quantities: Wheat, flour, barley, fat cattle, hogs, sheep, dried and green fruit, bran, hides, wool, ore, honey, onyx, building stone, raisins, alfalfa hay, alfalfa seed, gold, silver, copper.

COMMERCIAL TIMBER AND FUEL.

The county is deficient in commercial timber, though the mesquite and iron wood could be profitably utilized in the manufacture of furniture as a veneering. They are hard and durable, and susceptible of a very high polish. The colors are variegated and beautiful. At present they are used for fuel, fence posts, etc. Cottonwood, Lombardy and Carolina poplar, mountain ash, and China umbrella trees grow quickly and make beautiful avenues and shady parks. The cottonwood and poplar cut green and planted as posts on border ditches soon take root and become living posts for wire fences.

PREHISTORIC RELICS AND RUINS.

Maricopa County is rich in prehistoric relics. Ruins of ancient cities, towns, and temples can be traced in many parts of the valley. Lieutenant Cushing, of the Hemmingway archæological expedition, informed the writer hereof that he had traced the foundation of a city south of Tempe a distance of nearly 6 miles. He also expressed the opinion, from investigation, that what is now Maricopa County at one time contained a population many times greater than the entire population of the Territory.

Many remains of irrigation works are to be found, and some of them have been utilized by modern engineers.

CITIES AND TOWNS.

Phœnix, centrally situated, is the county seat and the capital of the Territory. It contains a population of at least 12,000, and is probably better equipped with modern improvements than any city of its age and size in the country. It has 2 electric plants, 2 electric street railroads, 2 large steam flouring mills, 2 ice factories, 2 foundries, 1 gas plant, 3 large modern school buildings, 1 high school, waterworks, natatorium, 4 parks, 1 business college, Territorial Insane Asylum, 1 county hospital,

city hall, 9 churches, 3 large hotels, a great number of lodging houses and restaurants, 1 soap factory and packing house, and an excellent sewerage system. There are 3 daily newspapers and 4 weeklies. Two railroads enter the city—the Santa Fe, Prescott and Phœnix, connecting the city with the great Atlantic and Pacific system, to the North, and the Maricopa and Phœnix, connecting the city with the great Southern Pacific, to the South. These roads have shown great liberality and public spirit in assisting in the building up of the great interests of this valley and Territory.

OTHER TOWNS.

Tempe, situated about 9 miles east of Phœnix, contains a population of about 1,500. It has one large flouring mill, driven by water power, one street railroad, ample hotel and boarding-house accommodations, and a fine public-school building, and is the seat of the Territorial Normal School.

The Maricopa and Phœnix Railroad connects it with the Southern Pacific system. Tempe also has one daily and one weekly newspaper.

Mesa City, situated about 18 miles southeast of Phœnix, contains a population of about 2,000. It has one large steam flouring mill, one large public-school building, one weekly paper, and is surrounded by a magnificent agricultural and horticultural region. It is connected with Tempe and Phœnix by a branch of the Maricopa and Phœnix Railroad. Near it are some magnificent water powers, soon to be developed for milling and other manufacturing purposes.

Lehigh, situated 4 miles northeast of Mesa, is a prosperous agricultural village, and has a commodious public-school building.

Gila Bend, situated about 65 miles southwest from Phœnix, on the Southern Pacific Railroad, is a prosperous town of about 500 inhabitants. It has one weekly paper; has a prosperous trade, and is destined to become a place of considerable importance on the completion of the great lines of canals now under construction in that neighborhood.

Agua Caliente, Sidney, Alhambra, Peoria, Glendale, Phœnix Mine, and Fort McDowell are all prosperous villages, and offer abundant inducement to the home seeker.

The following are some of the enterprises to which the attention of capitalists and investors is called, and is believed would prove highly remunerative: Reduction works for the treatment of ores; a sanitarium for the treatment of lung diseases; brewery, and mattress factory.

HOTELS, SALOONS, AND RESTAURANTS.

There are in the county, under license, 10 hotels, 23 restaurants, and 78 saloons.

STATEHOOD.

The sentiment of the people of Maricopa County is largely favorable to the immediate admission of Arizona to the sisterhood of States.

RESERVOIR SITES.

In the mountain gorges and along the streams mentioned are to be found many magnificent reservoir sites, some of which are being utilized by private and associated capitalists.

The construction of storage dams of sufficient capacity to reclaim all the lands, arable and irrigable, of the county would require a large amount of capital. Such enterprises should receive Government aid. A speedy return in money from the sale of these lands under existing Congressional enactments, in the almost immediate increase in the taxable wealth of the country, and the satisfaction to be derived from making it possible to create homesteads of inexhaustible fertility for thousands upon thousands of worthy citizens where now the coyote and the jack rabbit roam at will, surely ought to be sufficient inducement for lending the comparatively light aid and assistance here alluded to.

In furtherance of this important matter, when making up your report to the Interior Department, I most earnestly invite your excellency's attention.

IRRIGATION.

In all farming and kindred occupations in the Salt River Valley irrigation is wholly depended upon. Great progress is being made in reducing the system to exact scientific treatment.

During the past year much activity has been going on in enlarging the older canals and the extension of laterals.

PEORIA CANAL DAM.

Two new canals of large capacity (which I have added to the list contained in my last annual report) will soon be ready to turn in the "precious fluid." Great activity in clearing and otherwise preparing for cultivation the lands under them is in progress. These two great enterprises (Rio Verde and Agua Fria canals) will cover about 350,000 acres of what is known as "desert" land, a large part of which is now open to entry under the desert and homestead acts of Congress.

Under these two canals lies, largely, the great orange, lemon, and semitropical fruit belt of the lovely Paradise Valley (a large body of high mesa land), protected on the north by a high range of mountains and on the east and southeast by a low range of hills, traversed its entire length by the Rio Verde Canal. Here, under the magic effects of water, the visitor will soon find a paradise in fact as well as in name.

The Agua Fria Canal begins its course to the west and southwest where the Rio Verde ends, and along its course lies a vast stretch of country of a very high grade of fertility and productiveness. The following is a list of the twenty canals in the county, eighteen of which are completed and in full operation:

Name of canal.	Flow (miner's inches).	Length.	
		Main canal.	Laterals.
		Miles.	*Miles.*
Highland	6,000	18	30
Mesa (consolidated)	40,000	7	100
Utah	6,000	3	16
Tempe	20,000	3	51
San Francisco	5,000	7	12
Arizona	40,000	60	156
Grand	12,000	25	30
Salt River Valley	6,000	15	20
Maricopa	6,000	8	20
Farmers	1,500	7	15
St. Johns	1,200	26	15
Buckeye	5,000	40	70
Peoria	35,000	6	90
Riverside	1,500	8	15
Noonan	1,500	15	16
Citrus Belt	2,000	16	20
Agua Caliente	3,000	15	20
Castle Dome	3,000	.....	28
Agua Fria*	.....	.....	.....
Rio Verde*	.....	.....	.....

*Under construction.

Many smaller canals are owned and operated by individuals, covering many thousand acres, but of which at this time I have no accurate information. Roughly estimated, I place the lands under these individual canals at 7,000 acres.

In this connection I regret to report that the unprecedented floods of last year carried away a large section of the Peoria Canal dam, and that the affairs of the canal company have been further complicated by litigation with the original promoters of this enterprise. It is rumored, however, that a compromise of all disputed rights is being effected, and that the company will immediately replace the broken section of the dam. This canal, when completed, will open to settlement (in the vicinity of Gila Bend) one of the most beautiful sections of the county.

RAILROADS.

The Southern Pacific owns and operates in this county 71 miles of its main line. It runs through the southern part of the county from east to west, and connects with Phœnix by a branch road known as the Maricopa and Phœnix, 34 miles in length.

The Santa Fe, Prescott and Phœnix, which connects with the Atlantic and Pacific at Ash Fork, owns and operates in this county 58.8 miles of its road. This road is soon to be extended to Florence, thence to Bisbee, on the Southern Pacific, where it will connect with the Sonora system of roads running to Guaymas. The Maricopa and Phœnix and Salt River Valley, a short line about 9 miles in length, connects Tempe and Mesa City, making in all about 173 miles of railroad in the county.

Preliminary work looking to the construction in the near future of several other important and badly needed lines of railroad is being actively pushed by citizens of the county, notably the San Diego and Phœnix road, which has about 400 miles completed in this direction. No better field for investment of capital can be found anywhere than exists here in this valley, as production and population keeps constantly in advance of carrying capacity.

COST OF RECLAIMING LAND.

The amount of the purchase money to the Government ($1.25 per acre), the cost of clearing the land, and the incidental expenses of final proof and patent is about $4.25 per acre. Twenty-five cents per acre to the Government, to be paid in cash at the time of filing, and the balance ($1) at the time of final proof, is all the cash outlay required by the Government. The $3 per acre remaining must be expended on the land; $1 per acre each year, to show good faith on the part of the entryman, and this may be done in clearing the land, in ditching, or in the purchase of water for irrigation. Many of the canals rent to the farmer at a small cost the quantity of water desired. Many own shares in the canal under which their land is situated, and do their own assessment work, while others own their shares and pay into the company fund each year a small sum per acre, to be used in keeping the canal in repair.

Under all of the canals now being constructed, entrymen, if they wish to do so, can find work, and in this way secure water rights in such canals, and these water rights give them water for all time, under such rules and regulations as they (being members of the company) may from time to time adopt. All of the original settlers of this valley have secured their beautiful and valuable homes in this way.

The wages per day allowed for work of this nature, at this time, is as follows: Man, $1.50 to $2; man and team, $3.50 to $4. Laborers furnish their own teams, implements, and board. These prices prevail throughout the county for all ordinary work.

As every acre of irrigable land in this county is susceptible to the very highest state of cultivation for nearly the entire year, small holdings are advisable; 20 to 80 acres, according to the available force controlled by any one family, is sufficient. This applies to agricultural pursuits, for cattle feeding and grazing, and for the exclusive growing of alfalfa and grain hay. For shipping or fattening cattle, and such purposes, the acreage needs be limited only by the ability of parties who may wish to engage in such special agricultural lines.

IMPROVED LANDS.

As has been stated, improved lands in this county are mostly in a very high state of cultivation, and when offered for sale with water rights usually bring from $30 to $100 per acre, according to improvements and location.

A conservative estimate of the yearly productive value per acre of some of these lands would stand about as follows:

Alfalfa	$30 to $40
Deciduous fruits	100 to 200
Strawberries	300 to 500

This has been the annual return to many for a number of years past.

Thus it will be seen that though improved lands in this valley are comparatively high, they are really very cheap when compared with the yearly returns of products. Lands held under desert entry may be purchased at from $3 to $8 and $10 per acre, according to location and extent of reclamation work done on the land.

DESERT ENTRIES.

Under the desert-land act of Congress of March 3, 1877, as amended by act of 1891, a desert entry can be made only in Arizona by one who is at the date of entry a resident of the Territory. No particular prior duration of personal presence within the Territory, however, is necessary to constitute a former nonresident a resident of Arizona. Residence is largely a matter of intention.

These matters are mentioned here for the information of those in the older sections of the country who may desire such information, or who may contemplate seeking homes in our midst.

ARTESIAN WELLS.

At Fort McDowell, an abandoned military post, flowing water has been obtained at a depth of about 500 feet, thus demonstrating the fact that anywhere in this valley artesian water can be obtained by skilled labor and proper tools and machinery. The advantages to be gained by proper efforts in this line are incalculable.

HOMESTEAD EXEMPTIONS.

In answer to many inquiries concerning homesteads and homestead exemptions, the following statement is made:

Under Congressional enactments 160 acres of the public domain (not mineral) is

secured to every head of a family who enters upon and occupies the same as a homestead.

Our Territorial laws are also liberal. Section 1, paragraph 2071, Revised Statutes, reads as follows;

"Every person who is the head of a family may hold as a homestead exempt from execution and forced sale, real property to be selected by him or her, not exceeding in value the sum of four thousand dollars."

Paragraph 1956, section 1: "There shall be reserved to every family, exempt from attachment and execution, and every species of forced sale for the payment of debts, personal property not to exceed in value the sum of one thousand dollars."

MOHAVE COUNTY.

By Anson H. Smith, Kingman.

Mohave County lies in the northwestern corner of the Territory and is one of the four original political divisions into which Arizona was divided. The Colorado River is its western boundary for fully two-thirds of its length; Nevada on the northwest, Utah on the north, Yavapai County on the east, and Yuma County on the south. It contains many mountain ranges and broad valleys covered with nutritious grasses. Since its organization, in 1864, it has been the scene of active mining operations. For years its only means of communication with the outer world was by the long and tedious and uncertain route of the Colorado River, consequently its progress was slow. But with the advent of the Atlantic and Pacific Railroad its advantages are becoming better known. Its area is 12,000 square miles and its population at this time about 2,500. With proper energy rightly directed it would soon rank with the best of our counties in population and wealth.

LANDS.

The number of acres of land now under cultivation in this county is estimated to be 1,200, and the arid lands in process of reclamation fully 400.

CANALS.

The irrigation canals of this county are of a purely lateral nature and are simply built to carry water over small tracts of land. The nature of the streams of the county do not permit of extensive ditches or waterways for the reclamation of mesa lands, but rather the fertile bottom lands lying close to the streams. The Big Sandy Valley contains about 10 miles of main canal and fully 25 miles of laterals. On the Colorado River above Fort Mohave fully 250,000 acres of land can be irrigated by means of water wheels and the other crude appliances in use in the Indies and Egypt.

LAND RECLAMATION.

There are in the county of Mohave, not including the high mesas, over 4,000,000 acres of land that can be readily reclaimed. Lands along the Colorado River, in the Mohave Valley, grow every semitropical fruit. No frost falls in the lowlands. In the mountain ranges are many springs, the waters of which are used to irrigate small patches of land. West of Kingman several of these springs have been converged at Beale Springs and a beautiful fruit orchard propagated. This year the frost killed a great deal of the late fruit, but nevertheless thousands of dollars' worth was shipped to outside points. The peaches raised on this ranch are of the most luscious flavor and are of enormous size. Forty unselected peaches, picked in July, weighed 32 pounds. North of this ranch is Oak Creek, the largest orchard in the county. Nectarines, peaches, apricots, figs, apples, pears, plums, pomegranates, almonds, grapes, and many other fruits are here grown in abundance.

AGRICULTURE.

The amount of barley produced for the year ending June 30, 1896, was 250 tons; wheat, 100 tons; corn, 25 tons.

On the Big Sandy and in many parts of the county a good business in the culture of bees has sprung up in recent years and now there are over 600 stands. Owing to the unusually dry spring and the nonblooming of many of the annual flowering shrubs, the product of honey will be light for the year, but the crop this fall will more than make up the deficiency.

HORTICULTURE.

In bearing orchard there are 40 acres in the county. The fruit is so well known that it readily sells in the outside markets at figures far in advance of the California products. Seven cents per pound is realized for the fruit delivered in Kingman. Peaches, figs, apricots, apples, nectarines, and grapes bring the same price. Little patches of land in the vicinity of villages net the owners enormous profits.

LIVE STOCK.

The cattle industry of Mohave County received a severe check by the great drought of the past year, and in consequence of which fully 20,000 head were shipped to the pasture lands of Kansas and Colorado. Yet with the loss and shipments there are fully 100,000 head still in the county, although but 25,155 head show upon the assessment roll. Cattle assessment is the same as the other sources of revenue. Where the actual assessment should show between $3,000,000 and $4,000,000 but $1,087,203.21 appears.

MINING.

On the product of our mines depends the welfare and prosperity of our people, and the mines have never deceived the horny-handed toiler. For years the output of gold and silver has been phenomenal. In thirty years the mines of this county have turned into the channels of commerce fully $40,000,000. When it is understood that on an average less than 300 men have been employed in the mines the magnitude of the product will become apparent to all.

For the year ending June 30, 1896, the product of silver has been $1,080,175 and gold $418,000. The recently discovered dry gold diggings are adding and will add thousands of dollars annually to the county's product. Many new companies are coming into the county to do business, and the output for 1896–97, it is confidently expected, will be greatly increased. Three mountain ranges traverse the county from north to south, and their rocky ribs are studded with ledges of gold, silver, copper, and lead. Near Mineral Park occurs a vein of turquoise, but of late years it has not been worked.

CLIMATE.

The climate of Mohave County is indeed delightful. In the mountains it is cool and exhilarating during the summer months, while in the valleys it never becomes oppressively hot. For an all-the-year-round climate it surpasses anything in the world, and some day in the not distant future it will be the resort of invalids from all parts of the country.

SCHOOLS.

Mohave County boasts of more schools to the population than any county in the United States. Wherever the necessary number of children can be found there will also be found a school. There are 13 school districts with 14 teachers. Kingman has just completed a handsome brick schoolhouse capable of accommodating 200 children. Hackberry has also a good school building.

CHURCHES.

There is but one church in the county, and Kingman is the proud possessor of that one.

NEWSPAPERS.

There are two newspapers in the county, The Mohave County Miner (independent) and the Our Mineral Wealth (Populist).

HOTELS.

There are 14 hotels and 18 saloons in the county.

UNDEVELOPED RESOURCES.

We would call the attention of our chief executive, and through him the Interior Department, to the great undeveloped wealth of our valleys, rich in nature's fertile soils, only awaiting the moisture of our mountain streams to make them yield a golden harvest. Mountain gorges there are in which to impound the flood waters sufficient to irrigate thousands of acres, and were this not feasible, there runs through

BIRD'S-EYE VIEW OF WINSLOW—LOOKING EAST.

our northern border one of the mightiest streams on the continent—the great Colorado of the West.

The water runs through the canyon like a mill race, and will generate millions of horsepower, and this power can be utilized in pumping water onto the uplands.

Capital to carry out this immense project is all that is necessary to develop these millions of acres.

Wallapai Valley is overrun with the canaigre plant, and a factory to extract the tannic acid could be carried on successfully. Another industry that could be carried on here successfully is the production of cement from the immense gypsum beds lying along the Colorado River northwest of Kingman. Tanneries could be run successfully at any of the towns along the line of the railroad.

STATEHOOD.

Our people are a unit in favor of statehood. In conclusion, I would say to the worker that Mohave County offers an unexcelled field. In no place is the labor of the farmer, mechanic, or miner better repaid than here. There are thousands of mines open to location in our mountains, while our valleys are rich and unsettled.

NAVAJO COUNTY.

By Commissioner J. F. Wallace, Winslow.

This county was created by an act of the eighteenth legislative assembly, taken from the western part of Apache County, and lies in the northern portion of the Territory.

It is about 240 miles long, north and south, and about 53 miles wide, east and west, containing about 10,000 square miles, or about one-tenth the total area of the Territory.

The whole of the northern portion of the county is occupied by the Moqui and a part of the Navajo Indian reservations, while the southern portion is a part of the White Mountain Apache Indian Reservation.

The county proper, or that which is outside of the Indian reservations, is about 100 miles, north and south, by 53 miles, east and west.

The county has a population of about 4,000, the principal towns being Winslow, Holbrook (the county seat), Snowflake, Taylor, and St. Joseph.

The principal industries of the county are cattle and sheep raising and farming.

Winslow, the largest town in the county, has a population of about 1,100. It is the end of a freight and passenger division of the Atlantic and Pacific Railroad, and there are about 350 men employed at that point.

Snowflake, Taylor, and St. Joseph are agricultural towns, while Holbrook is the county seat and distributing point for supplies for Fort Apache military post and the Moqui Reservation.

So far this season there has been shipped from Holbrook and Winslow over 20,000 head of cattle, mostly steers, fully as many sheep, and in the neighborhood of 1,000,000 pounds of wool.

There are in the county thousands of acres of the choicest kind of farming land and an abundance of good and pure water to irrigate the land with, the only thing required being a small amount of capital to be invested in reservoirs to store water for use during the irrigation season.

There is a good demand in the home market for all the farm produce that can be grown here for years to come.

The soil and the climate, with the assistance of irrigation, will produce in abundance the following crops: Alfalfa, wheat, oats, barley, corn, beans, potatoes, and nearly all kinds of garden truck.

The total amount of property in the county, as shown by the assessment roll for 1896, is $370,000, and the rate of taxation is $3.10 per $100.

Among the industries which could be established with profit are woolen mills, beet sugar refining works, tanneries, cement works, and the cultivation of the canaigre plant, a cheap and effectual preparation for tanning hides.

There are throughout the county twelve or fourteen natural reservoir sites, which could be made available with little cost, in comparison to the value of lands that would be reclaimed by their construction. Southeast of Winslow there are two living streams which could be thrown together by the construction of a dam in each, building a ditch and diverting the water into one reservoir which would easily hold water enough to reclaim 50,000 acres of land.

Another reservoir site, 8 miles northwest of Winslow, can be utilized by ditching from the first-named storage reservoir and running the water during the winter

months into it. The last-named site would make a lake from 5 to 6 miles wide by 10 miles in length, with an average depth of 10 feet, and would reclaim from 75,000 to 100,000 acres of as fine land as can be found anywhere. With an outlay of $200,000 that many acres of land can be reclaimed in the immediate vicinity of Winslow, 100,000 acres of which is specially adapted to the cultivation of the sugar beet, having just about enough alkali in the soil to produce the root almost to perfection. From experiments made, the sugar beet raised here contains from 18 to 20 per cent of saccharine matter. In all beet-raising districts of this and other countries land once cultivated successfully to sugar beets commands from $250 to $300 per acre. The land northwest of Winslow is a rich sandy loam, on which can be cultivated successfully all the small grains. Any kind of grass and fruits of the hardier varieties would grow to perfection.

In the southern portion of the county there are numerous reservoir sites that could be made available as cheaply as those surrounding Winslow, and that would reclaim rich and fertile land on which all small grains, alfalfa, vegetables, and fruit could be successfully raised. In short, there are opportunities in this county for the investment of capital that would pay a certain and safe interest for an indefinite period and furnish comfortable homes for hundreds of families. The general character of the soil in this county is black loam, sandy soil, and gravelly clay, all rich and fertile wherever water has been applied.

Very little snow fell in the mountains during the past winter, which is one of our sources of water supply, and so far this summer the rainfall has been under the average, yet if all the water that has run to waste down our streams could have been impounded there would have been sufficient to insure crops.

The land of the county is about equally divided between valleys, low, rolling mesas, and mountains. About one-third of the county is mountainous and is heavily timbered by pine, piñon, oak, and cedar. The first-named variety would make splendid lumber; the oak and piñon can not be beaten for fencing purposes.

AGRICULTURAL PRODUCTS.

There were produced in the county during the year 18,000 bushels of grain, bringing $1 per bushel; and 8,000 bushels of corn, worth 60 to 75 cents per bushel; also 4,200 tons of hay, which sold at an average price of $10 per ton.

Wheat, corn, oats, and alfalfa are most successfully produced. Bee culture has not been entered upon in this county.

DAIRY PRODUCT.

The dairy product for the year is only sufficient for home use, although it could easily be made much larger.

LIVE STOCK.

There are 75,000 cattle on the ranges in this county. There are 7,000 horses, 125,000 sheep, and 1,500 swine in the county, an increase during the year of 40 per cent. These are assessed at $252,058, although the real value thereof is about $500,000.

MINING.

Navajo County is essentially an agricultural county; no mines have been discovered.

CLIMATE.

With an average elevation of 5,000 feet, the climate of this county is healthy and invigorating. There is generally a light fall of snow during the winter months and frequent rains during the summer. Snowflake is the best built town in the county, and scattered throughout the county are points of natural interest, such as the famous petrified forests, splendid hunting and fishing grounds in the White Mountains, the Painted Desert, and the great Natural Bridge in the northern part, while scattered from one end to the other are ruins of Aztec villages.

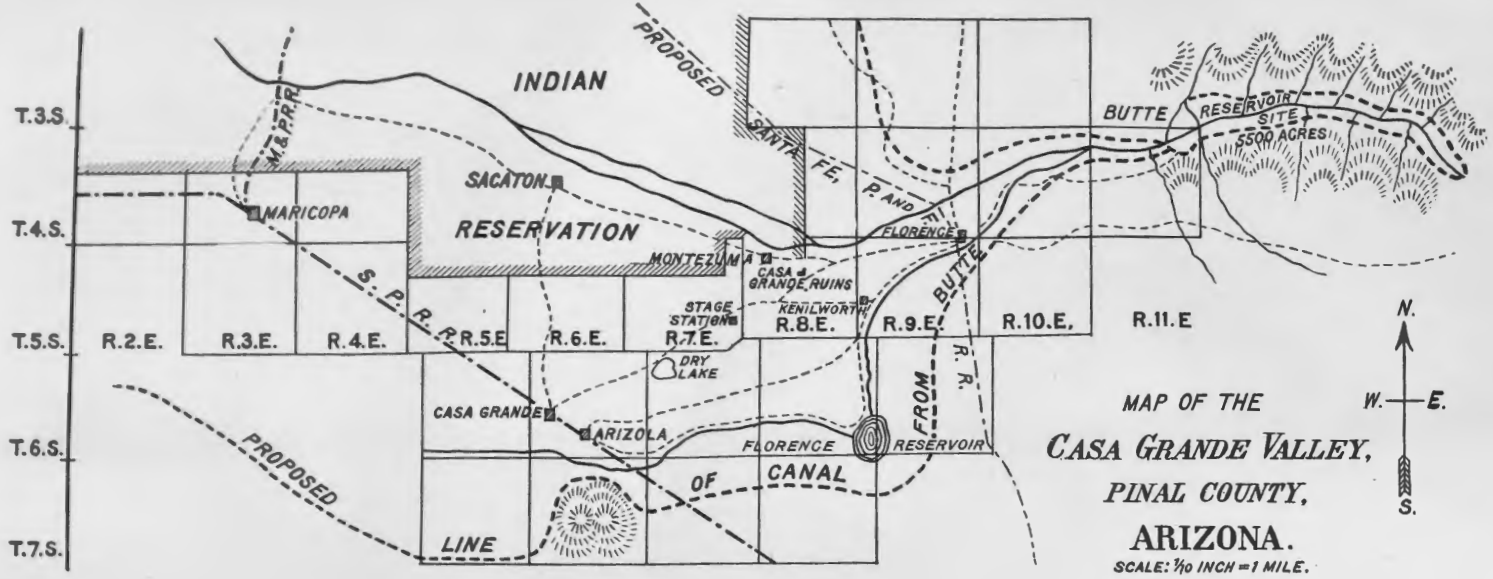
EDUCATION.

There are 10 public schools, employing 15 teachers, and attended by 600 scholars. The schools are open on an average of seven months of the year.

CHURCHES.

There are seven churches in the county.

BRIDGE ACROSS THE LITTLE COLORADO RIVER AT HOLBROOK, NAVAJO COUNTY, ARIZONA. RIVER DURING DRY SEASON OF 1896.



MAP OF THE

CASA GRANDE VALLEY,

PINAL COUNTY,

ARIZONA.

SCALE: 1/10 INCH = 1 MILE.

PRESS.

There are two newspapers published in the county, The Mail, at Winslow, and The Argus, at Holbrook.

HOTELS.

Eight first-class hotels are in operation, with about the same number of restaurants. There are only six saloons in the entire county.

STATISTICS SHOWING RESOURCES AND DEVELOPMENT OF NAVAJO COUNTY.

The population for the year ended June 30, 1896, was 4,000, as shown by the great register, school census, and other sources of information, an increase of 1,000 for the year.

The value of the taxable property, real, personal, and mixed, as assessed, was $1,370,000, and the estimated actual value thereof $2,500,000.

The area of land under cultivation is 6,000 acres, of which 1,000 acres have been reclaimed during the past year.

Eighteen irrigation canals are in constant use, having a capacity of 4,000 miner's inches, with 45 miles of laterals. Of this number, 7 miles of laterals were constructed during the year ended June 30, 1895. Active preparations are now being made for the construction of 60 miles of canal in the northwestern part of the county, which will reclaim and make fertile 150,000 acres of land at an average cost of less than $2.50 per acre.

Work is now being pushed on 11 miles of canals, having a capacity of 17,500 inches. Twenty reservoirs can be used for storing the water. As yet no artesian wells have been developed.

PINAL COUNTY.

By Commissioner Charles D. Reppy, Florence.

Pinal County was organized in 1875 from portions of Pima, Maricopa, and Yavapa counties, and contains an area of 5,338 square miles, or 3,435,520 acres, one-third of which could be made productive by a systematic storage of the surplus water now running to waste. Next to Maricopa it is the most important agricultural county of the Territory. It is traversed from east to west by the Southern Pacific Railroad, and a branch of the great Santa Fe system is now approaching from the north. The locating engineers are at this writing in Pinal County, and will be in Florence within a week or ten days. The objective point of this road is a connection with the Sonora road, of the same system. The Southern Pacific is also building in this direction from Tempe, and it is confidently believed that work will not cease until the Deer Creek coal fields are reached and connection is made with another branch of that road running from Bowie to Globe and now completed to Fort Thomas.

Thus it will be seen that Pinal County is the theater of railroad building at the present time, and inside of a year Florence, the county seat, will be a railroad center. At present it contains a population of about 1,500, but with the completion of these two roads and the Butte reservoir no city in Arizona can approach it for natural advantages, and a large increase in population will follow. Florence is at an elevation of 1,553 feet above sea level, situated near the Gila River, 26 miles northwest of the railroad station of Casa Grande, with which it is connected by an elegantly equipped daily stage line. Going and coming stages run by the old Casa Grande ruins, and passengers are allowed a short time to inspect them. There are many handsome private residences in Florence, several brick stores, good hotel, an excellent graded school employing four teachers, churches, secret societies, a commercial club, a newspaper (the only one in the county), and the handsomest courthouse in the Territory. Here is held the United States court for the district composed of Gila, Graham, and Pinal counties. The streets are lined with shade trees which impart an air of comfort on the warmest days.

During the past year our people have been blessed with copious rains, plenty of grass, and an abundance of water for irrigation. Under the Casa Grande Valley Canal the amount of land under cultivation has been increased to 6,520 acres. There are 24,400 acres with water rights, mostly patented land.

An important step has been taken since my last report toward solving the problem of water storage for this valley. About June 1, 1896, a survey of the Butte reservoir and dam was completed, under the direction of Mr. Arthur P. Davis, of the United States Geological Survey. This survey occupied several months, and the report on

the same, when published, will be found most exhaustive. To the writer Mr. Davis expressed himself as well pleased with the location, and he will recommend that the Government build it in order to supply water in unlimited quantity for the Indians on the Sacaton Reservation. This was the object for which he was sent out, but incidentally the work will be of great benefit to our county.

TAXABLE WEALTH.

The assessed valuation of property, real and personal, is $1,552,697, which is probably less than one-half of its real value, as land with water rights is only assessed at $10 per acre and land without water rights at $5 per acre.

The following table will show, in a condensed form, the property of the county:

Number of acres with Government title	50,000
Assessed valuation of same	$376,275
Assessed valuation of improvements on same	$174,048
Number of cattle	25,625
Number of horses	2,170
Number of sheep	3,300
Number of swine	347
Live stock:	
Assessed valuation	$226,539
Actual value (estimated)	$300,000

CANALS AND RESERVOIRS.

There are 75 miles of irrigating canals in the county, the principal one being the Florence Canal, 49 miles in length, with 75 miles of laterals. It has a reservoir which covers a surface of 1,600 acres, with an average depth of 12 feet, and contains about 8,000,000,000 gallons of water.

In order to make the water system most effective, however, it will be necessary to build another reservoir at the Buttes, 12 miles above Florence. Lieut. W. A. Glassford, of the United States Army, has made a personal examination of the proposed site, and his report to the special Senate Committee on Irrigation and Reclamation of Arid Lands is well worthy a careful perusal. Other eminent engineers have also made favorable reports.

POPULATION.

The population of the county by the last census was 4,251, and it is not less than 5,000 at this time.

MINES AND MINING.

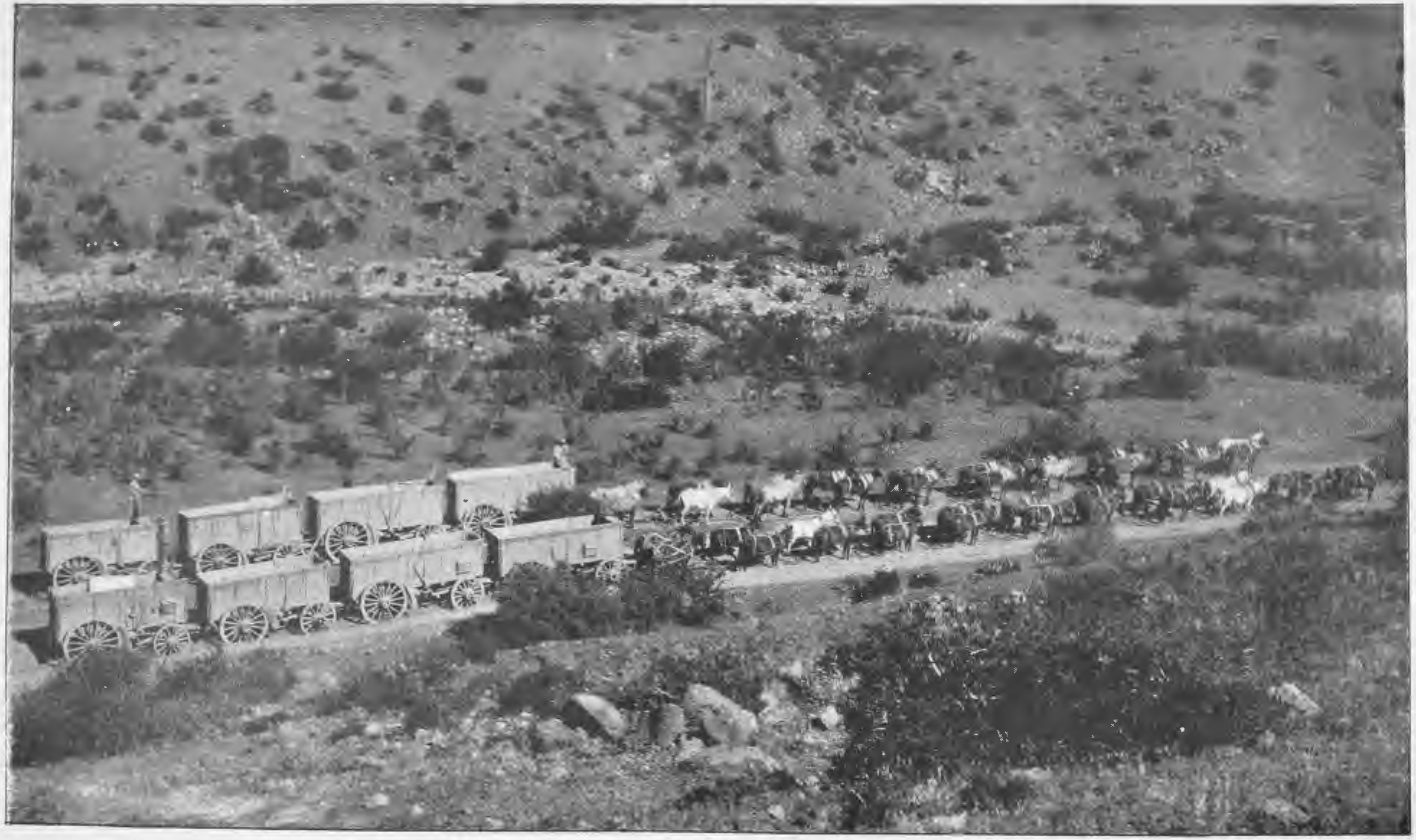
The silver mines of Pinal County being largely low-grade ore, the output of the white metal has been next to nothing for the past year, the present price being so low that they can not be worked with profit. The Silver King is an exception, and work has been recently started up on this property, which has in time past paid over $2,000,000 in dividends to its stockholders. In gold mining, however, there has been considerable activity at Mammoth, Goldfield, Ripsey, and other points, and the bullion output of gold for the year has been about $250,000. With the new machinery that is being put in this will easily be doubled the coming year. The principal mines of the county are the Silver King and Reymert (both silver and each with 20-stamp mills), the Reward (copper), and the following gold mines:

	Stamps.
Mammoth	50
Mammoth, at Goldfield	20
Mohawk, at Mammoth	50
Bulldog, at Goldfield	10
Reksom, at Mineral Creek	5
Victoria, south of Casa Grande	10
Mammon, south of Casa Grande	20
Southern Belle, at Catalinas	20
Norman, at Ripsey	20

A small amount of placer gold has been taken out in the Catalinas and sold in Tucson. There is an evidence of awakening in all classes of mining, and the prospect for the coming year is flattering.

CASA GRANDE RESERVOIR.

The reservoir of the Casa Grande Valley Canal Company is the largest in the Territory. It covers a surface of 1,600 acres, with an average depth of 12 feet, and contains about 8,000,000,000 gallons of water. It is situated 15 miles southwest of



ORE TEAMS, PINAL COUNTY, ARIZONA.

CASA GRANDE RUINS, PINAL COUNTY, ARIZONA.

Florence. A levee of earth has been thrown up across a depression in the plain 14,000 feet in length, 125 feet in width at the bottom, and 25 feet in width at the top, 2 to 1 slope on each side, and an average height of 25 feet. The waste is regulated by three cast-iron pipes 3 feet in diameter, set in solid masonry, regulated by gates and tower. This reservoir cost $150,000 and supplies water for 6,000 acres.

METEOROLOGICAL.

The Signal Service of the General Government maintained a station at Florence from 1874 to 1882. The reports covering the period from July, 1880, to April, 1882, give the following statistics, which may be given as a safe guide for the prevailing temperature, which varies but little from the mean temperature given during the series of six years:

Month.	Mean.	Maximum.	Minimum.	Month.	Mean.	Maximum.	Minimum.
1880.	°	°	°	1881—continued.	°	°	°
July	86.6	111	61	June	83.7	113	44
August	86.5	112	60	July	87.9	112	64
September	81	107	48	August	84.5	110	62
October	68	96	32	September	77.5	103	50
November	52.1	80	25	October	67.4	98	36
December	50.9	77	27	November	52.4	80	26
1881.				December	52.2	81	28
January	45.7	78	21	1882.			
February	54.7	85	21	January	46.4	79	23
March	54.7	93	29	February	49.5	72	27
April	69.1	100	48	March	57.3	92	25
May	74.7	104	45	April	62.1	100	32

The heat, as represented in the above table, during the months of June, July, and August, is nothing like as unbearable as in the Eastern States, and death from sunstroke is unknown. In fact, in a residence of sixteen years in Arizona, the writer has only known two persons to be overcome by the heat, and they recovered. Their condition, however, was more the result of whisky than heat.

UNTOUCHED BY FROST.

Orange and lemon trees require slight protection during the winter for a year or so, until the wood is sufficiently hardened.

While it is a popular thing for one to say that he is "not here for his health," it is an undisputed fact that for all pulmonary ailments no climate on earth is equal to southern Arizona, and there are numbers of active, industrious citizens with but one lung, who came here years ago expecting to live but a few weeks. But for all that the wonderful Casa Grande Valley is something better than a health resort.

PRODUCTS.

The waters of the Gila River are fresh and pure; the soil contains no alkali, is a deep rich, gray ash, especially adapted to the growth of the prune, olive, almond, peach, fig, pear, apricot, and fruits of all kinds, which pay largely on the investment. It is also the natural home of alfalfa, which grows in the most prolific manner. The grape does exceptionally well in this valley, and wine and raisin culture is destined to become a prominent industry. Citrus fruits have been cultivated to a limited extent; there are a number of orange trees in the neighborhood of Florence which bear the golden fruit each year without protection, and a few date palm trees are also in full bearing. The season is from six weeks to two months earlier than southern California, which gives fruit growers an appreciated advantage in the early markets.

The absence of fogs and nightly dews is a formidable obstacle to the existence of the destructive and unsightly scale bug, and the fruits of the valley are all bright and clean. All the agricultural products of the temperate and semitropic zones are easily grown here, the long seasons giving a succession of crops that double or treble the productive value of the land.

PRICES OF LAND.

Improved lands, with Government title and water right, can be bought for from $20 to $50 per acre, according to location and improvements. In the immediate neighborhood, and to the south of Casa Grande ruins, there are thousands of acres

covered with a heavy growth of mesquite timber yet open to settlement. These are among the choicest lands in the valley. Water in inexhaustible quantity is found at a depth of from 20 to 30 feet; in fact, a river seems to be flowing underneath. Here is a splendid opportunity to take up and improve land with a pumping system of irrigation, which is said to be successful on small tracts.

However, with the completion of the Butte reservoir pumping will be a thing of the past, and it is only mentioned here for the purpose of showing what can be done, and to magnify the further fact that what was once considered an uninhabitable desert is in truth the most productive land on the globe, and that there is water in abundance to bring every foot of it under cultivation, only waiting for the magic wand of capital to develop it. There is no water-storage scheme on the Pacific Coast that has one-half the advantages and so few engineering difficulties as the Butte reservoir. Here nature has built the abutments in everliving rock, and all that is left for man to do is to put in the head-gate, the bluffs which form the gorge being only separated by a paltry 220 feet. A country is drained through this narrow canyon 200 miles square, representing 40,000 square miles, or larger than Maine and Massachusetts combined. The rainfall is sufficient to fill this reservoir twice a year, and the land to be brought under cultivation is practically limitless. This may read like a fairy tale, but it is every word true, and has been verified time and again.

PIMA COUNTY.

By Commissioner Herbert Brown, Tucson.

UNIVERSITY.

THE UNIVERSITY, *Tucson, Ariz., August 1, 1896.*

SIR: Pima County may well congratulate herself that in the apportionment of the various Territorial institutions to the several sections of the Territory the University of Arizona fell to her as her portion. Located in what must remain one of the leading cities of the Territory, upon a great transcontinental railway, this institution, destined to become the pride of the whole Territory, can not but be specially prized by that locality which is so fortunate as to possess it. No less than seven cities in ancient Greece contended for the honor of having been the birthplace of the poet Homer. Among men intellect is, after all, the crowning distinction. A worthy institution of learning is sufficient distinction for any city.

The various sections of the Territory are to be commended for that moderation which has hitherto prevented them from locating the institution, bit by bit, in as many sections of the Territory. The cause of higher education in the United States, perhaps, suffers from the presence of a large number of small institutions without incomes sufficient to enable them to provide buildings and equipments and a teaching force adequate for the most thorough and most extended training.

Our condition in this respect as compared with our sister Territory of New Mexico is most favorable. New Mexico has located her university at one point, the agricultural college at another, and her school of mines at still another.

Teachers and buildings and equipments must be needlessly duplicated for a limited number of students; and this is a great hardship while the population is small and the tax rate high, and it must necessarily retard the work of building up an institution of the first rank at either of the three points.

Fortunately for the educational interests of Arizona, all available resources, both national and Territorial, have been combined in the support of an institution required by the conditions of which it receives the funds of the National Government to give training along those lines which enable it to meet the demands of all classes of students in the Territory seeking an education.

The university is organized to meet the needs of its Arizona constituency. The agricultural, horticultural, and mining industries are kept particularly in view. Five courses have been arranged with special reference to these interests, general agriculture, civil engineering, electrical and mechanical engineering, and mining engineering. Special effort is made to provide facilities for students desiring to do special work with reference to these industries.

For careful and thorough training in these departments the university has secured the services of fourteen competent instructors, several of whom received their training in the first schools of this country, and have besides wide and varied experience.

As an aid to them in their work, the university, although just fairly started, has provided apparatus in the several departments at a cost of not less than $50,000. In this particular the oldest and best mining schools in the country are hardly better equipped to give a young man just what he needs in this line.

COURT-HOUSE AT TUCSON, ARIZONA.

Three fine buildings have been provided for dormitory purposes. Here from 65 to 70 pupils, in nearly equal proportions, may find excellent living and boarding accommodations, under direct care of the faculty and competent matrons, and at such a cost as puts an education within the reach of all.

With buildings and equipments already aggregating fully $140,000, a capable faculty, the members of which deeply feel how much they owe to the cause of education in the Territory, an earnest and enthusiastic student body, which has reached the 100 limit, in the finest climate in the world, it seems not unreasonable to hope great things for the University of Arizona in years to come.

Very respectfully, yours,

HOWARD BILLMAN, *President.*

Hon. HERBERT BROWN,
Commissioner of Immigration for Pima County.

PUBLIC SCHOOLS.

Number of public school districts in Pima County	25
Number of teachers employed	39
Number of pupils enrolled	1,774
Average number of months school was maintained during last year	6½
Number of children of school age	3,471
Average attendance	953.6
Number of private schools in the county	5
Number of pupils attending private schools	597
Population (estimated)	12,000
School population	3,471
Voting population	1,948

CHURCHES.

The Catholic, Episcopal, Methodist, Congregational, and Baptist denominations have erected church edifices in this county.

PRESS.

The Citizen, daily and weekly (Republican), Tucson; Star, daily and weekly (Democratic), Tucson; Fronterizo, Spanish weekly (independent), Tucson; Oasis, weekly (Republican), Nogales, and the Border Vidette, weekly (Democratic), Nogales, constitute the press of the county at present.

HOTELS, ETC.

Tucson has 5 hotels and Nogales 3. Restaurants: Tucson, 7; Nogales, 4. Saloons: Tucson, 14; Nogales, 4; and possibly 1 in each of the other towns in the county.

UNDEVELOPED RESOURCES.

The undeveloped resources of Pima County are agriculture and mining.

ASSESSMENT.

Property.	Number.	Value of improvements.	Total value.
Acres of land	58,175	$124,784	$329,509
Town and city lots	1,488	754,808	1,100,300
Horses	5,291	.....	71,973
Mules	1,182	.....	4,370
Asses	67	.....	381
Cattle	51,418	.....	437,082
Sheep	2,195	.....	3,108
Goats	234	.....	364
Swine	310	.....	843
All other property	.....	.....	627,908
Miles of railroad	120.20	.....	580,631
Railway, rolling, and personal property	.....	.....	178,060
Total value of all property	.....	.....	3,334,529

WATER SUPPLY.

Well water can be had in the Santa Cruz and Rillito valleys at a depth of 10 to 25 feet, and on the mesas proper from 40 to 100 feet. There are quite a number of bored wells in the county, ranging in depth from 100 to 800 feet. One well in the Santa Rosa Valley was discovered among the bowlders at 680 feet in depth.

COUNTY LANDS.

	Acres.
Total area	6,714,000
Surveyed lands	1,049,160
Unsurveyed lands	5,370,826
Unappropriated lands	6,419,986
Reserved lands	208,053
Disposed lands	85,961

Twenty per cent of the land of Pima County can be successfully irrigated and reclaimed by a system of ditches, subdrainage pipes, and reservoirs for water storage at a reasonable outlay, and 201,420 acres thus added to the cultivable area at an average cost of reclamation of $6 per acre. Wheat, barley, oats, alfalfa, hay, corn, sorghum, tobacco, potatoes, peas, beans, beets, all kind of vegetables, fruit, etc., can be produced on these lands. The yield of wheat, barley, and oats will be from 35 to 40 bushels per acre; corn, from 40 to 60 bushels; hay, 3 tons, and alfalfa, 5 to 7 tons.

ORCHARDS, ETC.

There are 500 acres of land devoted to orchards—peaches, apricots, nectarines, apples, pears, quinces, figs, pomegranates, and grapes being the most profitable crops.

Only about 10 per cent of the present consumption of fruit products is produced in the county.

MINES AND MINING.

At a conservative estimate there are about 175 mines being operated in Pima County. The principal ones produce gold, silver, copper, lead, and iron ores. There are also quarries of marble, building stone, and limestone.

Gold and silver bullion and placer gold were extracted from mines in Pima County, aggregating, probably, $250,000 or more.

The base bullion produced of gold, silver, copper, and lead ore, and shipped by railroad to Eastern smelters and refiners, exceeds 1,000 tons, and in ingot copper and matte about 500 tons.

The Tucson Mining and Smelting Company (a small copper plant operated by foreign capital near Tucson) received for the fiscal year ended June 30, 1896, 2,200,000 pounds of ore and shipped 262,751 pounds of copper bullion and 228,548 pounds of matte.

Mills of Pima County.—McDonald mine, 1-stamp Kendal mill; Royal A. Johnson mine, 5-stamp mill (Kendal); Montana mine, 10-stamp mill and concentrator, together with a cyanide plant; Hartt's mine, 10-stamp mill; Austerlitz mine, 2 Wiswold mills; Crocus mine, 1 Wiswold mill; Yellow Jacket mine, 20-stamps; Sampson & Bent mine, 10-stamp mill; Gunsight mine, 20-stamp complete silver mill; Day mine, 1 Huntington mill; Quijotoa mine, 20-stamp mill; Saginaw mine, 1 Huntington mill and concentrator; Old Hermosa mine, 1 Huntington mill; Arivaca mine, 10-stamp mill; the Old Glory mine, 2 Griffith mills. They are now making extensive repairs and improvements, and will add 30 stamps to the plant. They also have a large reservoir for water storage.

The Hartt and Montana mines have also large reservoirs for water storage.

Smelters in Pima County.—One custom lead smelter at Nogales; 1 copper stack at Rosemont; 2 copper stacks at Tucson for custom work, owned by the Tucson Mining and Smelting Company.

THE CATTLE INDUSTRY.

The number of cattle shipped from Pima County to points outside the Territory, and slaughtered within the county for home consumption during the fiscal year ended June 30, 1896, is shown in the following table, as compiled from the records of the Live-Stock Sanitary Commission of Arizona, by Charles W. Pugh, secretary, showing Pima County to rank second in importance in the live-stock industry in the Territory.

MISSION SAN XAVIER DEL BAC, NINE MILES SOUTH OF TUCSON, IN THE SANTA CRUZ VALLEY.

ALTAR END OF SAN XAVIER DEL BAC MISSION, NINE MILES SOUTH OF TUCSON.

Locality.	Slaughtered in the county.	Shipped from the county.	Locality.	Slaughtered in the county.	Shipped from the county.
Arivaca	88	.....	Pantano	.....	9,013
Buenos Ayres	43	.....	Rosemont	49	.....
Calabasas	.....	4,583	San Xavier	30	.....
Crittenden	167	160	Sonoita	.....	216
Greaterville	30	.....	Tucson	4,403	26,327
Hartt's Ranch	3	.....			
Nogales	643	.....	Total	5,528	40,344
Oro Camp	72	.....			

Range cattle sold for shipment per head, yearlings, $8; 2-year-olds, $11; 3-year-olds, $15. The amount netted to the county through the cattle sales helped largely to maintain the prosperity the county has enjoyed during the past year.

IRRIGATION.

There are 130 miles of irrigation ditches in the county, largely situated in the Santa Cruz, Sonoita, and Rillito valleys. The aggregate cost of building same is estimated at $150,000. A new ditch, 7 miles in length, was recently taken from the Santa Cruz, north of the town of Tucson, and about 15,000 additional acres will be put under cultivation. The irrigation capacity of all the canals in the county is estimated at 12,000 acres.

TEMPERATURE AND RAINFALL.

[Tucson station.]

Month.	Temperature.			Rainfall.
	Minimum.	Maximum.	Mean.	
1895.	°	°	°	*Inches.*
July	67	105	88	0.07
August	67	106	87.2	5.35
September	60	104	83	.78
October	45	91	71	1.03
November	32	83	58.3	3.70
December	20	78	49.9	.03
1896.				
January	21	77	53	.53
February	25	82	54	.10
March	20	90	60	.34
April	30	91	65.7	.03
May	40	107	73.9	Trace.
June	55	112	87.5	.31
Total	.....	.....	*69	12.27

* Mean.

MISCELLANEOUS.

The mesa lands are covered with mesquite trees, whose foliage and leaves furnish nutritious food to stock during the summer and fall months. There are two rainy seasons, producing a summer and winter grass. Oak trees grow at the base of the mountains and fine forests of pine and fir grow on the most of the mountain ranges, which are white capped during the winter months, supplying the mountain streams, especially the Santa Cruz and Rillito rivers, with flood waters during the winter and spring months. Clouds hover over their summits, which are fanned by cool southwest winds passing down to the mesa below, creating a balmy atmosphere. This must be seen to be appreciated.

The old San Xavier del Bac Mission church, built by the padres for the Papago Indians, is in a good state of preservation. It is constructed on the Moorish style of architecture. Its age is unknown, but the year 1797 is marked upon the vestry door.

The St. Augustine church was formerly 3 miles north of Tucson, on the Santa Cruz, but on account of age and decay and Indian troubles it was moved to where the ex-governor's residence now stands. The chapel of the presidio has disappeared and the present church of St. Augustine is of recent construction.

The Escala Pura is an old ruin in the Santa Cruz Valley, under the lee of Sentinel and Saddle peaks. These peaks have old fortifications and lookouts for soldiers, and were constructed by the ancients.

The old Tumacacori still stands, but the San Jose, or San Cavetano, and Arivaca missions are in ruins.

Evidences of the cultivation of the soil by the Papagos and mission padres are very plain at the present date. From the old ruins and foundations of buildings ditches are plainly discernible, and reservoirs, with a part of their embankment still in place, together with a vast amount of broken pottery left there by an ancient people, whose ruined towns are still to be seen in every valley in southern Arizona. Both sides of the Santa Cruz and Rillito rivers were once the scenes of busy life. Fruit trees were still in existence within the past few years in the churchyard at Tumacacori, but vandals have destroyed them.

Fort Lowell, which is about 8 miles east of Tucson and which was occupied by United States troops for about twenty years, has been abandoned. Its first occupati[illegible] as a military post was in 1872.

The prevailing sentiment in Pima County is strongly in favor of statehood and the free coinage of silver.

YAVAPAI COUNTY.

By Commissioner E. A. Rogers, Prescott.

Yavapai County is a mining section, and a large percentage of its population is employed in the mining industry.

POPULATION.

The registration of 1895 showed that there were 3,405 voters in the county. Figuring on a basis of five persons to each vote would give the county a population of 17,020. Of these 3,405 voters it may be safely stated that not less than 2,000 are engaged in the mining industry, and the balance living indirectly upon that industry.

MINING.

There are 28 stamp mills now in operation in the county, dropping 350 stamps. These stamp mills range in capacity from 5 to 40 stamps. The 40-stamp mill is at Congress, where about 300 men are employed. There are 2 smelting plants—one at the Commercial Mining Company's mines in Big Bug district, and one at the United Verde Copper Company's mine at Jerome. At the latter camp about 500 men are employed. There are 3 cyanide plants for the extraction of gold from quartz mill tailings in operation in the county.

There are about 300 men placer mining in the county who average fully $2 per day each when at work. This refers to men who work for themselves with their own appliances, and not placer mining companies who placer mine on a large scale with water power or by Bucyrus steam shovels, and there are several such companies.

The different quartz camps, where mills are in operation, employ an average of about 1,045 men, while several hundred men are working their own claims, milling and shipping first-class ores and leaving the balance on the dumps.

New discoveries are constantly being made and new ore-reduction works going up. There are many different placer districts, and not less than $20,000,000 in placer gold has been shipped out of this county up to date The outflow continues and its production is from the most primitive methods known to hydraulic processes, assisted by great Bucyrus steam shovels. Five hundred thousand dollars in gold was taken from one acre of the Rich Hill district. A solid $600 gold nugget was picked up on top of the ground, and is now in possession of the Bank of Arizona. One hundred and twenty thousand dollars in placer gold has been taken from the Walnut Grove district.

The Hillside mine has produced $200,000 in gold and $180,000 in silver. Ore worth $10,000 to $20,000 per ton has been shipped out of Prescott; $100 per ton ore is not commented on, but the general average of ore handled is about $40 per ton. Much of the ore is known as "rebellious."

A most remarkable feature of this gold belt is the existence of numberless narrow quartz veins known as "stringers," which are rich in "pockets"—that is, bunches of ore, from which gold is taken in amounts from hundreds up to thousands of dollars. These stringers have made this the best poor-man mining country in the world; for they are worked at a small cost, and generally pay wages, at least from the grass roots down. With deep workings they frequently run into large ledges of milling ore.

OLD MISSION OF TUMACACORI ON SANTA CRUZ, ABOUT 60 MILES SOUTH OF TUCSON, IN PIMA COUNTY, ARIZONA.

PRESCOTT, ARIZONA.

Our silver mines have a grand record, and ore is being steadily shipped. The Silver Belt has produced $600,000 in silver, and Dos Oris $600,000; the Peck $3,000,000. In the Big Bug district two large smelters are running on copper ores. A 20-inch gauge railroad connects the two mines with the smelters. The Bradshaw Mountains are full of gold, and the Crowned King is one of the greatest gold producers in the Territory. The Del Paco in this district has produced a quarter of a million dollars in gold. Eleven thousand dollars were taken out from a clean-up of one month's run of an arastra; the mine is still worked. Stage lines ply regularly between these camps and Prescott, and most of them have post-offices. There are many creeks and rivers, and much of the placer gold comes from these streams. Water is found in abundance, from 20 to 60 feet from the surface. There is in the Big Bug district a 320-acre deposit of translucent, sea-green onyx, solid from 10 to 30 feet deep. Lime rock, which affords first-class lime for all purposes, is abundant.

On Sycamore Creek are vast deposits of lithographic stone, pronounced equal to the Bavarian article. There are also quarries of serviceable marble and any amount of building granite and several colors of building sandstone. Great slate dikes lie to the east. On the Verde are large salt deposits, which carry a very large percentage of soda.

In 1893 the gold output of Yavapai County was $339,740; in 1894 it was $867,840; in 1895 it was $1,258,851. In 1894 the silver output was 256,931 ounces, and in 1895 it was 322,036 ounces, and the output of both metals is still on the increase.

ONYX.

Squaw Peak district presents a good field for the prospector—little development in this district. Ores are carbonates of lead and silver, sulphide of molybdenum, manganese; also onyx and lithographic stone of good quality are found.

TAXABLE WEALTH.

The official figures, January 1, 1896, give the total cash in the county treasury at $56,024.84; amount of delinquent tax roll, $26,617.40; value of assessment roll for 1895, $3,494,437.89; the county owns buildings, lots, and grounds valued at $111,000. There will be little difference in the assessment roll of 1895 and 1896, as the main advance has been in ore output, upon which there is no tax.

From the Prescott United States land office report for the fiscal year ended June 30, 1896, it is learned there is the following amount of unappropriated land in the county:

	Acres.
Surveyed	823,467
Unsurveyed	3,926,066
Total	4,749,533
Area reserved	25,750
Area appropriated	481,717
Total land area in county	5,257,000

CATTLE INDUSTRY.

With sufficient rainfall there is no better cattle country in the world than this, but successive dry seasons have caused this industry to languish, and cattle have been shipped out until there are probably not to exceed 75,000 head of cattle in the county, and perhaps but 20,000 sheep at present. Cattle shipments for this season have been about 20,000 head.

AGRICULTURE.

The present area of soil tilled in the county at present does not exceed in all 10,000 acres, being confined to a few valleys where works of irrigation can be constructed at a comparatively small cost along the Verde and Agua Fria, or where sufficient moisture is available for "dry ranching," as in Williamson, Skull, and Kirkland valleys. There are within the limits of the county not less than 2,000,000 acres of land that will some day be cultivated and made to yield all classes of crops and fruits common to the south temperate zone. The Verde Valley offers splendid inducements to the fruit grower, and stock breeder and feeder. Lands are cheap and abundant.

There are numerous fertile valleys, and a general idea of most of them can be gained from the following letter written from the Big Chino Valley, near Prescott, by an owner of a ranch at that point:

"A very small area of our land has been cultivated, it being used for pasture, as the natural grasses are very fine. Our valley, Big Chino, is about 30 miles long by 1 to

SMELTERS. UNITED VERDE COPPER MINE, YAVAPAI COUNTY, ARIZONA.

verdure-covered and timbered mountains, there are hundreds of small and large valleys, broad mesas, and rolling plains, containing not less than 2,000,000 acres of land, fertile as any in the world, upon which any fruit or growth of the southern temperate zone will thrive and from 2 to 4 crops a year be gathered. Most of the lands are covered with native nutritious grasses, upon which thousands of cattle and sheep roam at will. Most of these lands need irrigation for successful cultivation, which must be furnished by water storage or artesian wells. Prosperous farming communities flourish along the living streams, the principal of which is the Verde River, which has a valley of about 30 miles long and 7 miles wide, where there are thousands of acres of land, and this land will probably be first reclaimed, as the Verde flows a large and everlasting stream.

GAME.

Game is abundant, including several species of deer and bear, among the latter the terrible grizzly. Lions and wild cats are plenty. There are foxes and a few beaver. It is the home of the eagle and myriads of lesser birds, among them such sweet singers as the mocking bird. All migratory birds flock here in season. The wild turkey and quail abound.

Antelope are to be found on the plains. Trout fishing is to be had in several of the mountain streams. Rabbits and squirrels of several species abound.

HOT SPRINGS.

South of Prescott, at an elevation of 1,500 feet, Castle Creek hot springs are situated, where a volume of water having a temperature of 150° to 160° gushes from the rocks. Frost is unknown around these springs. The water has no bad taste. The place is largely resorted to on account of its sylvan appearance, mild climate, and curative waters.

Another object of great interest is the Montezuma well, on a plain. The well is 600 feet across, 7 feet from the surface, and the water is 100 feet deep. The crystal overflow passes through a cave and creates an everlasting creek. The well is solid rock.

CITIES AND TOWNS.

Situated near the intersection of the thirty-fourth parallel of latitude with longitude 112°, and built on the rolling table-lands of the Sierra Preta Mountain range, viewed from any peak of the pine and verdure clad ranges which surround it, Prescott, the county seat of Yavapai County, appears to nestle in a beautiful basin dotted with clusters of groves of imported and native shade trees, the waving foliage of which gives the town a spring-like appearance for at least nine months of the year. The landscape is marked and massive, and there is a clear, cool, gray tone in the atmosphere. The town is purely American, being settled by the natives of the older States of the Union. The population is over 3,000, and is steadily growing. It is the central supply point for a county as large as the State of New York. Every acre of this vast domain contains gold in its native state, much of it is rich in silver and copper, while almost every mineral known to science is found in paying quantities. Building and ornamental stone of all descriptions is found in vast quarries, hence the main industry is mining.

Long trains of pack animals are daily seen filing in and out of Prescott laden with supplies for and ores and concentrates from mountain mines only accessible to this method of transportation.

The town is lighted by electricity and owns its own waterworks, which cost over $100,000, and also owns a $4,000 native sandstone city jail building. Bounding the northern suburb is Fort Whipple, now a regimental post with full quota of soldiers and officers. For years it was headquarters of this military department, and will doubtless again be made so, now that a north and south railroad pierces the Territory. The town is noted for its hotels, one of which is a three-story brick, which would be a credit to any section. In the central plaza is a court-house of brick and stone, surmounted by a town-clock tower, the whole costing over $100,000.

Higher up on the mesa are two brick public schools, the building of which cost $40,000. There is a brick opera house and a frame opera house, the latter having a seating capacity of 600 people.

The Episcopalians, Baptists, Congregationalists, Methodists, Methodists South, and Catholics all have creditable church edifices and considerable congregations.

The Catholic church is a grand building of brick and stone, costing about $20,000. There are other church edifices throughout the county, and where there are no churches district schoolhouses are used for that purpose.

There is an ore-sampling works, two planing mills, a sawmill, and two banks.

All of the professions are numerously represented. There are several large wholesale and numerous retail houses, also three large drug stores. Many of the business houses are of brick and native stone. Some of these are three stories in height.

One of the United States land offices of this Territory is located in Prescott. There are two telephone systems.

There is a mining exchange, with a membership of about 200, which has neatly fitted rooms, where are artistically arranged local ore exhibits, and mining journals on file from all parts of the world. The object of the exchange is to give information to mining investors and to secure the erection of much-needed general ore-reduction works in this section.

For the year 1894 Prescott revenues, in the shape of taxes, amounted to $17,958.04; city revenues for 1895 were $27,372.45.

There is a chamber of commerce, composed of our most progressive business men; also elegantly furnished commercial club rooms, maintained principally for the entertainment of visitors.

The town is incorporated, having an elected city government. There is a uniformed fire company, consisting of three hose companies and one hook-and-ladder company. There are bottling works and several soda-water factories.

Plank, stone, and cement sidewalks are on every residence and business street.

There are two daily papers, both taking telegraphic dispatches, one Democratic and one Republican; also a steam laundry and ice factory.

Prescott has a driving-park association, which, at a cost of $5,000, has established a race track and improved grounds in a most beautiful natural park, a short distance west of town. The climatic conditions are peculiarly favorable for blooded horses, and many of the leading horse men of the Southwest announce their intention of establishing branch stables here.

The elevation of the town is 5,600 feet above sea level. The climate is that of the southern temperate zone, the average annual mean temperature for the past ten years having been but a fraction under 58° F. The weather is never sultry, and a covering of at least one blanket is needed every night in the year.

The atmosphere is dry, rarefied, and ladened with oxygen and ozone. There are no fogs, and so clear is the atmosphere that the naked eye can distinguish objects 30 and 40 miles distant more clearly than they can be seen at a distance of 10 miles in older States. There are no blizzards, cyclones, earthquakes, or other disastrous visitations; there are no mosquitoes or fleas. Government observations give an average of rainfall yearly for ten years of 15.18 inches. It is the best climate on earth for people with pulmonary ailments. Dr. Pope, for years stationed at Whipple, pronounced it such. Consumptives having only one lung left, and expected to die in a few weeks when they arrived, have been living here for years and are active, industrious, and useful citizens, and there are a number of them.

People suffering from asthma find immediate relief in this climate. There are many people here so affected who find it almost impossible for them to live elsewhere.

The mountains abound in the most beautiful sylvan retreats. Prehistoric ruins and caves are now the home of the wild honeybee, by whose labors the entire county is well supplied with a most palatable article of native honey. Within sight are cloud-crowned peaks where the snow never melts. For weeks at a time the ranges of mountains which encircle Prescott are covered with snow, while the streets of the town are dry and dusty. Within half a day's horseback ride in several directions semitropical climatic conditions can be had at any season of the year.

Prescott is the principal town on the Santa Fe, Prescott and Phœnix Railroad, which forms a junction with the Atlantic and Pacific Railroad at Ask Fork, in the northern portion of the county, and runs south through the heart of the grazing, agricultural, and mineral regions by Prescott to Phœnix, the capital of the Territory, a distance of 137 miles. The road is a marvel of engineering skill, and traverses one of the most weirdly grand and picturesque regions of America.

The Western Union and Postal Telegraph lines parallel the railroad. The railroad machine shops and roundhouses are located at Prescott; also the main business office and a handsome freight and passenger depot.

A considerable number of villages are springing up in the various mining districts, principal of which is Jerome, at the United Verde Copper Company's great mines, about 30 miles east, where over $1,000,000 worth of machinery is in operation, including three 50-ton water-jacket furnaces and a copper refining plant—the only one in the Southwest. Five hundred men are steadily employed. From two to five carloads of matte per day are shipped over the United Verde and Prescott, a branch railroad which connects this camp with Jerome Junction, on the Santa Fe, Prescott and Phœnix Railroad, and the output could be doubled if the owners so desired. The ledges in this mining group are from 20 to 80 feet in width, and the ore is said to go 20 per cent copper, $8 silver, and $5 gold per ton. Almost every branch of mercantile business is represented in Jerome. It supports a weekly paper and a monthly educational journal; has churches, school buildings, and hotels. The company's monthly pay roll figures up from $40,000 to $50,000.

The Congress mine supports a camp of several hundred people, and a 40-stamp mill runs steadily. The camp is connected with the Santa Fe, Prescott and Phœnix Railroad by a branch railroad, and has several mercantile establishments. It has always been, and is now, a great gold producer.

SCENE ON S. F. & P. R. R. YAVAPAI COUNTY, ARIZONA.

COLORADO RIVER AND BRIDGE AT YUMA, ARIZONA.

Big Bug district, which includes the famed Chaparral Gulch, is a wondrous gold belt.

The Little Jesse mine has produced $350,000 in gold, and its production is steadily increasing, as is that of many mines, just as good, which surround it. These mines are within 20 miles of Prescott. There are about 500 miners at work in this district.

The average wages paid to miners is $3.25 per day; to mill men, $3.25; ranch hands receive $1 per day and board.

CAPITAL NEEDED.

The need of the county is capital for water-storage enterprises and for mining on an extensive scale. Complete ore-reduction works are needed, as the ore being shipped should be treated at home. The supply of labor now exceeds the demand. Any miner with a rocker can make a living in a thousand different gulches. Industrious men with good habits have almost invariably done well here.

Board is $6 per week and room rent $3 per week. Houses are plenty and rent cheap. Residence lots are cheap, and a five or six room cottage can be built for about $600. Good meals can be had at lunch counters for 25 cents.

There is a county hospital and one run by the Sisters of Mercy. The Catholic Sisters also have a college building, in which they conduct a school for the youth of both sexes. All the benevolent orders have strong and prosperous lodges.

YUMA COUNTY.

By Commissioner John W. Dorrington, Yuma.

PHYSICAL AND TOPOGRAPHICAL FEATURES.

Yuma County, one of the four original political subdivisions of the Territory when it was first established by the act of Congress on February 24, 1863, as an independent commonwealth, forms the extreme southwestern portion of Arizona. It lies between 32° and 34° 21′ north latitude, and 113° 20′ and 114° 14′ west longitude. It is bounded by Pima, Maricopa, and Yavapai counties on the east, the Colorado River on the west, Mohave County on the north, and Sonora, Mexico, on the south. It has an area of 10,138 square miles (6,488,320 acres), an expanse greater than either of the seven smaller States of the Union, and larger than Connecticut, Rhode Island, and Delaware combined.

For more than 100 miles it is crossed from east to west by the Gila River, which thoroughly drains the southern and eastern portions, eventually emptying into the Colorado at the town of Yuma, while the Colorado washes its western boundary, effectually draining the remainder.

The topographical configuration of the surface includes a series of wide plateaus, rising gradually from a point situated at the southwestern extremity, with an altitude of 60 or 80 feet above sea level, to an elevation in the north and northeast very much greater, the whole sloping gently in a southwesterly direction.

These plateaus are crossed by numerous mountain ranges, especially in the northern part, the ranges being separated by broad valleys, many consisting of excellent lands. The various mountain systems, though rough and abrupt in character, are highly mineralized, carrying gold, silver, copper, lead, iron, and other metals in paying quantities. The eastern and southern division include gradually sloping plains covered in places with natural grasses and trees, among the latter being the mesquite, ironwood, and palo verde. Here and there are detached hills and spurs of eruptive origin.

All that country embraced within the county confines situated north of the natural watershed of the Gila, owing to the slight rainfall and few streams from which water can be taken for agricultural purposes, is practically worthless, so far, at least, as the feasibility of bringing large bodies of irrigable land under cultivation is concerned. The available arable region, therefore, is limited to broad strips of country lying directly north of the Gila and east of the Colorado rivers, and also hundreds of miles of splendid lands stretching directly southward from the Gila River to the Mexican frontier. Consequently, it is upon these rivers that water-storage reservoirs must be established.

It is more than probable that less is known of the physical and topographical peculiarities of Yuma County than of any other county in the Territory. According to the map of the Interior Department, issued from the General Land Office in 1883, it is shown that less than 10 per cent of the total area was surveyed by the Federal authorities. It is believed that no further surveys have been ordered since the date mentioned; and therefore, so far as official recognition extends, more than nine-tenths of the county is a veritable terra incognito.

The population numbers 3,020 souls; and the valuation on taxable property reaches, in round numbers, $1,500,000.

THE VILLAGE OF YUMA.

Although the town of Yuma is the second oldest community in the Territory of Arizona, it is astonishing how little its resources are known to the world at large, and how slightly developed is the natural wealth of the county. This is owing partly to Yuma's reputation for unbearable heat, and partly to the fact that, lying next to California, it has been assumed that the county has been thoroughly prospected for mineral wealth, and prospectors have, in the main, kept the traveled highways in crossing its territory. As a matter of fact one suffers less from the heat here than in almost all of the settled communities of the East, owing to the dryness of the atmosphere, and there is no healthier climate on God's footstool.

People labor out of doors from the rising to the setting of the sun, and suffer no inconvenience. There has never been known, in this section of country, an authentic case of sunstroke. Our climate, taken in time, never fails to cure pulmonary complaints of any description. Disease such as smallpox, cholera, etc., rarely visit us, and then only in a very mild form, and are never fatal except through the perversity of patients. Contrary to the belief of the uninformed, the dry heat of the summer months is especially conducive to good health and exceptional vigor, acting naturally upon the human system with the same effect as the artificial result of a Turkish bath—purifying and renovating it. As a further matter of fact, this county has never been even superficially prospected, and it is only now that people are beginning to search its hills with any degree of systematic enthusiasm for the mineral wealth hidden there. Owing to the falling off in the price of silver, deposits of gold only are being sought for, and the present result is little short of marvelous. In all sections of the county from the Sonora line to Williams Fork discoveries are daily being made, and the greater the development the greater the wealth displayed. Wherever the prospector plants his foot, ledges of gold confront him or are brought to light by the investigating strokes of his pick.

Portions of the country traversed for years by commonly traveled trails are developing into rich storehouses of golden wealth. New and rich placers are constantly being discovered, and shipments of placer gold from this point through Wells, Fargo & Co.'s Express, are steadily increasing in value. From a mining standpoint Yuma County is rapidly leading the Territory, and yet as far as that industry is concerned, this section has received but little recognition.

Agriculturally the country is vastly improving. Enterprises that have lain dormant the last two years, owing to the general financial depression and consequent dearth of money for investment purposes, are waking up to new life and vigor. Money is being attracted in this direction, and on all sides can be distinguished that indefinable stir which is the precursor of an industrial awakening. Even within these last two years of financial stringency and depression there has been a steady if slow increase in agricultural development and wealth. A greater area of old farms has been put under cultivation, and new lands have been inclosed and new fields started. A large section of Blaisdell Heights has been planted to fruit trees; fields of cereals and alfalfa have been added to the cultivated area on the Colorado River below town; the lands lying under the Mohawk and Farmer's canals have been made to yield heavy crops of every variety of agricultural products, as in other sections of the Gila Valley, and the gardens of Yuma have been added to and beautified in fruits, flowers, and shrubbery to a more than appreciable extent. Altogether we may feel proud of our progress during these last months of business depression and discouragement. It speaks well for the industry and pluck of our people, and the showing made constitutes the best evidence of the merits of our soil and climate and the richness of our mineral resources. Nature has done everything for our county, and all that is needed is a touch of the wand of capital to have our hills and valleys spring into an active life of remunerative industry that will last and endure forever.

Some three years ago, through the energy of H. W. Blaisdell, the Yuma Water and Light Company was incorporated, and by means of its large pumping plant, at the foot of Main street, the town is abundantly supplied with water at reasonable rates, and there have grown into existence new and large gardens and orchards.

CLIMATE.

It is not my intention to dwell in detail upon the sanitary advantages offered by our almost perfect climate; and yet a few words upon this subject may not be inappropriate.

For nine out of every twelve months the climate is simply superb. Three months are warm, but not excessively so, although the thermometer ranges far higher than would be conducive to health or comfort in any section of the East. The conditions, however, are most dissimilar, as may be seen by the following, taken from the official communication of Lieut. W. A. Glassford, of the United States Signal Corps, to the governor of the Territory:

"A few words upon the heat. It is recorded as extreme, yet no one suffers, and

sunstrokes are unknown. This is usually accounted for from the purity and dryness of the air. Both are true, but the dryness is, perhaps, the correct reason. I have calculated the difference between the shade and sensible temperature at Yuma during the heated hour of the day and it is about 30°. At New York or Washington it is only a few degrees less, and often identical. The highest shade temperature ever recorded at Yuma is 118°. When the heat is at this point the sensible temperature is about 88°. The shade temperature of New York being 105°, the sensible temperature is certainly near 100°. The difference between the mean temperature and the mean sensible temperature for July is over 17° at Yuma.

"These considerations of the sensible and shade temperature will account for the absence of any detrimental effect upon the extreme heat of Arizona.

"The air is dry. The moisture in the atmosphere is from 25 to 30 per cent, as against 75 to 85 per cent in other localities. Every afternoon in summer there is a refreshing breeze from the Gulf of California that relieves the day of undesirable heat. It passes over a desert, much of which is below sea level, that acts as a desiccant; so that when the plains of central Arizona are reached the air is dry to the last possible degree.

"There are neither sunstrokes in summer nor pneumonia in winter; neither fever nor malaria live or generate in this section. The air is pure, absolutely free from those compounds that poison the system and bring on disease. In no country is there a greater number of bright nights and sunny days. Hundreds afflicted with lung trouble, after visiting Florida and Southern California, have found relief in this invigorating climate, where the pure air is a tonic to shattered constitutions, a healing balsam to the consumptive."

The meteorological conditions are indeed admirable for the cure of all rheumatic, bronchial, and pulmonary troubles, as has been proven time and again. In summer the rapid evaporation lowers the temperature and promotes comfort; while in winter the mild, equable, and pleasant weather is delightful and health-giving to the invalid.

Herewith is given a table of average temperature, compiled from the official reports, extending over 10 years:

	°		°
January	53.6	July	92.0
February	58.8	August	90.9
March	65.0	September	83.0
April	69.4	October	72.4
May	77.2	November	61.2
June	85.2	December	55.9

The following is the annual meteorological report, rendered by A. Ashenberger, observer, Weather Bureau, Yuma, Ariz.:

Observations by years.

Year.	Mean actual barometer.	Temperature.							
		Mean.			Highest.	Lowest.	Mean daily range.	Mean daily change.	Number of days minimum below 32°.
		Monthly.	Maximum.	Minimum.					
	Inches.	°	°	°	°	°	°	°	
1876	29.76	74	.....	.....	114	30	.....	.....	1
1877	29.73	74	.....	.....	114	30	.....	.....	0
1878	29.73	76	.....	.....	118	29	.....	2	1
1879	29.76	74	88	59	116	27	27	2	4
1880	29.77	71	85	57	111	25	28	2	4
1881	29.76	73	87	59	113	31	28	2	1
1882	29.78	71	85	58	114	27	27	2	3
1883	29.74	74	88	60	117	22	28	2	.....
1884	29.74	72	84	59	113	34	25	2	0
1885	29.76	73	87	60	114	36	27	2	0
1886	29.78	72	86	59	112	30	27	3	4
1887	29.77	72	87	58	116	27	29	3	4
1888	29.74	73	87	58	114	27	29	2	4
1889	29.75	73	87	59	117	34	28	2	0
1890	29.77	73	86	59	115	30	27	2	5
1891	29.77	71	86	57	116	25	29	2	6
1892	29.76	72	87	58	116	28	29	2	6
Means	29.76	73	86	59	.....	.....	28	2	.....

Observations by years—Continued.

Year.	Relative humidity.	Rainfall.	Number of days—				Wind.	
			Rainy.*	Clear.	Partly clear.	Cloudy.	Average hourly velocity.	Maximum hourly velocity.
	Per cent.	*Inches.*					*Miles.*	*Miles.*
1876	.....	1.13	7	287	66	13	.....	.....
1877	35	3.66	15	284	60	11	.....	23
1878	35	2.88	13	294	55	16	6	45
1879	38	3.29	11	308	43	14	5	36
1880	38	.74	2	298	62	6	6	40
1881	44	.98	8	288	69	8	6	42
1882	41	1.78	14	243	106	16	6	38
1883	48	.....	.....	.....	.....	.....	5	44
1884	50	3.86	30	242	93	30	5	33
1885	58	2.72	12	232	109	21	6	48
1886	50	5.35	18	273	71	21	6	44
1887	54	3.90	9	303	55	7	7	41
1888	49	2.95	18	282	61	22	7	46
1889	47	4.69	22	280	49	36	7	46
1890	42	4.67	22	242	97	26	7	46
1891	39	2.67	11	303	45	17	7	48
1892	40	3.35	16	302	58	6	7	43
Means	44	3.17	14	279	69	17	6	.....

*Rainy days are those in which the amount of rainfall is 0.01 inch or more.

Concerning the effect in regard to early fruit, the late commissioner of immigration, Hon. Cameron H. King, has this to say:

"The average spring, summer, and autumn temperatures of Yuma are nearly 9° more than at Riverside. This is sufficient to explain the fact that the citrus and other fruits of Yuma ripen from a month to six weeks earlier than at Riverside or other points in southern California.

"Yuma has an earlier and warmer spring. The trees have an earlier start, and the higher temperature matures the fruit sooner. It is evident, since oranges in Yuma ripen in the first of December, instead of about the middle of January, as in southern California, that the fruit in Arizona can never be injured by any low temperature in the winter season. And since the labor of the tree is for the season practically over at Yuma before the winter season begins, it is better prepared to stand a lower temperature in winter than it could in California, even were the atmosphere as dry in the latter State as in Arizona.

"It is known that Riverside raises better oranges than Los Angeles; and the reason is that Riverside escapes the fogs which hang over Los Angeles.

"It is proper to observe that the maximums and minimums of temperature, as shown by the Signal Service records, indicate little of practical utility, since such extremes may not last more than a second, and may be the effect of one small wave or ripple of air.

"The warm sunshine of the spring, summer, and autumn days causes the fruit in Yuma to mature early, and gives a delicious sweetness, flavor, and color to the orange, lime, lemon, and other citrus fruits which they can not attain on the coast of the Pacific, where fogs dampen the fruit, mildew is produced, and dust coats both fruit and leaf.

"It is undeniable that nowhere upon the globe can a spot be found more favorable for the growth of citrus fruits than Yuma County."

The statements of the commissioner can be thoroughly substantiated, as may be seen by the annexed table showing the time of maturity for certain products:

Strawberries	Jan. 15.
Apricots	Apr. 1 to 21.
Mulberries	Apr. 14 to 20.
Figs	Apr. 10.
Grapes	June 1 to 7.
Watermelons	May 20.
Peaches	June 15.
Pomegranates	Aug. 1.
Limes	Sept. 5 to 10.
Lemons	Sept. 15 to 25.
Dates	Sept. 1.
Oranges	Nov325 to Dec. 1.

SOUTHERN PACIFIC HOTEL, YUMA, ARIZONA.

WATER SUPPLY.

The original source of water supply is comprised in the fall of rain and snow in Arizona, and the States and Territories north and northeast of it. Where the fall is greater than the evaporation the water eventually finds its way to rivers and streams that drain the mountain regions by seepage, percolation, and surface flow. It may also be taken from springs and wells fed similarly.

Water occurs in any portion of the Gila and Colorado valleys at a depth of from 12 to 25 feet; but, of course, the quantity thus obtained is insufficient for extensive irrigation.

But, withal, the supply upon which the settlers are forced to place reliance is the inexhaustible volume that during high water passes along the channels of the Gila and Colorado rivers to the sea. The drainage of much of Nevada, Utah, Colorado, and all of Arizona finds lodgment in the Colorado throughout its 1,200 miles of channel. An admirable feature in this connection is the peculiarity of reaching its highest dimensions in the months of June and July, the very time when other streams are low. But it must be said that there is sufficient at all times to irrigate every acre of land tributary to it. The river supply at the season of irrigation is greater than that of all the utilized streams of California combined.

The Gila at certain annual periods spreads to close upon 2 miles, where the surface contour so permits, with an average depth of 4 feet. In June, July, and August, for 40 miles from its mouth, it is either very low or absolutely dry, although considerable running water can always be found along the bed rock. It happens frequently that where reefs of rock cross the river the water comes to the surface, only to disappear again when the barrier is passed. An excellent site for storing enormous bodies of water has been surveyed by a competent engineer, the location being in the Gila Valley, a few miles east of the county line, in Maricopa County. The hoarding capacity is in every way equal to furnishing irrigation facilities for the entire lower Gila Valley, as well as the outlying mesas and higher plains, while the construction will not be attended with unusual difficulties; nor would the cost prove excessive in comparison with the increased value of the lands, large portions of which are now worthless. Such works would effectually obviate the disheartening effects of the sinking of water to bed rock in summer; for the amount saved during high water, that would otherwise have gone to waste, would furnish the means of livelihood to a large population, as against the present meager number.

The Colorado and Gila are included among the most prominent streams of the Pacific Coast, and afford more than sufficient irrigation capacity for the cultivation of the rich areas included within the county lines. The former drains a catchment area of more than 242,000 square miles of mountainous country; while the latter also drains an immense surface, very similar topographically. Thus it can easily be seen that water is superabundant. Whether the Government, with an overflowing treasury and command over the most advanced engineering skill of the times, will utilize to the best advantage what is placed before it or not, is a question that can be answered only by itself.

TRANSPORTATION.

An important factor in connection with the early ripening of horticultural, viticultural, and agricultural products is the question of easy and rapid conveyance to prominent market centers east and west. The Southern Pacific Railroad, one of the largest transcontinental lines in America, passing through the city of Yuma, runs through the Gila Valley as far as Adonde, a station some 30 miles east of Yuma. It then passes upon the mesas south of the Gila, the track extending upon an average not more than 5 miles from the river until the county line is reached. Thus is afforded convenient egress from any section of the valley, and direct communication from thence to all parts of the United States.

Other roads have been surveyed along both sides of the river. Construction is already commenced on the direct broad-gauge route from San Diego to Yuma, and will, it is expected, be continued from the latter town to Deming, N. Mex.; but nothing decided or definite can be advanced as to the time of completion.

The Colorado River, being navigable, affords easy transportation by the largest river steamers northward from Yuma to the Needles, where connection is made with the Atchison, Topeka and Santa Fe, thence on to the Grand Canyon of the Colorado, and southward from Yuma to the Gulf of California.

CANALS.

Of the several large irrigation canals operating in Yuma County only a few are completed. The remainder, while only partially finished, are nevertheless in a position to meet the requirements of many acres of bottom and valley lands, with the promise of extending their range of usefulness to many times as much again. Almost all head, at some point or other, upon the Gila River, and are mostly confined within the environs of the valley bearing the same name. Canal building is of comparatively

recent origin in the county. A few years since the fertile valleys were almost literally destitute of human inhabitants, while to-day it is safe to say that every acre of valley land along the line of the canals has been filed upon, not to mention considerable mesa land taken up along the line of their projected extensions.

The names of the most prominent waterways, together with the length, carrying capacity, estimated cost, and number of acres tributary to each, are given herewith:

Name of canal.	Length.	Capacity.	Estimated cost.	Number of acres reclaimable.
	Miles.	*Inches.*		
Mohawk	35	11,000	$150,000	40,000
Redondo	5	400	8,000	1,500
Farmers'	13	5,000	15,000	10,000
South Gila	22	8,000	45,000	12,000
Purdy	10	9,000	25,000	7,000
Contreras	7	3,000	9,000	2,000
Saunders	10	5,000	25,000	4,000
Araby	8½	3,500	35,000	2,000
Antelope	7	2,000	10,000	2,500
Toltec	3	30,000	15,000	.....
Total	120½	77,100	337,000	81,000

In the event of the completion of the above-described works, in accordance with the original plans of the projectors, the total length would reach 241 miles, reclaiming 267,000 acres of bottom, valley, and mesa land, at an estimated cost of $1,318,000.

The "duty" of water is not constant, but varies according to the locality. The quantity used per acre under the lower Gila Valley canals is rated at about one-third of an inch. It should be explained that but little of the land has been irrigated earlier than three years ago, and being virgin soil requires more water than will be necessary during the coming seasons. For this reason it is fair to assume that the "duty" per inch will be materially increased.

It may be stated incidentally that by irrigation the fertilization of land fluctuates according to the nature and quantity of the silty matter deposited upon it by the water; and this, it is estimated, is from 30 to 100 per cent. Both the Gila and the Colorado are especially rich in such matter; and, therefore, the constant fertilization affected through the operating canals renders any further enrichment of the soil superfluous, useless, and unnecessary.

SCHOOLS.

There are 9 public schools in Yuma County and 1 high school. Twelve teachers are devoting their time to the education of over 600 scholars. The average school term is seven months.

The high school in the Yuma district is presided over by a thoroughly competent professor, and the graded schools of this district require the services of 4 teachers.

The Catholics have also a parochial school presided over by the Sisters of St. Joseph. It is in a prosperous condition.

NEWSPAPERS.

There are two newspapers published in the county, the Arizona Sentinel and the Yuma Sun. Both papers are published in the village of Yuma.

CHURCHES.

There are two regularly organized churches in the county, viz, the Roman Catholic and the Methodist. These are in a flourishing condition and are well attended.

RIVERS.

The Gila.—The Gila River, though second in size to its mighty rival, the Colorado, is destined, for the present at least, to figure far more prominently in the solution of the problem of redeeming and making valuable to the husbandman the immense bodies of hitherto arid and valueless land tributary to it.

The Gila drains a vast territory. Rising in the western part of New Mexico, it flows in a nearly westerly direction through the entire Territory of Arizona. Its northern and eastern sources are among mountains covered for several months in the year with snows of varying depths, the melting of which, added to the many natural springs emptying into it at different points, form a considerable river long before it passes through Graham County. It enters the Gila Valley some few miles above Florence; thence for nearly 300 miles it winds through the now famous Gila Valley,

COLORADO RIVER AND STEAM BARGE. YUMA, ARIZONA.

eventually merging into the larger stream at the village of Yuma. The total length of the river is 650 miles. Before reaching the eastern boundary of Yuma County it is fed by numerous rivers, among the most important being the San Pedro, a stream rising near the line between Sonora, Mexico, and Arizona. Along the course of this tributary the rainfall is, perhaps, greater than elsewhere in Arizona, being estimated at 24 inches yearly.

Another noble tributary is the Salt River, in itself a large stream, having its head waters in the White Mountains. It enters into the Gila some distance below Phœnix. An important adjunct toward increasing the volume of the Salt River is the heavy rainfall about Prescott, amounting during the last ten years to an average of 15.18 inches annually.

Other rivers, like the Agua Fria, Hassayampa, and the Santa Cruz, bring down further supplies drained from the heavily timbered mountain regions traversed by them in the north, and from the mountainous regions of the south.

Thus for the major portion of the year the Gila carries a large stream, more than sufficient, in fact, to irrigate a domain princely in extent. None of the rivers so far touched upon, however, are navigable.

The Colorado.—The Colorado River is formed by the union of the Green and Grand rivers. The former rises in Wyoming, the latter in Colorado. From their juncture the stream takes the name of the Colorado and, following a generally southerly course, empties into the Gulf of California. The entire length, including tributaries, is over 1,200 miles. It flows during the low-water period at a rate not exceeding 4 miles per hour, although, of course, the speed is very much greater when the river is high. Among its principal feeders are the Rio San Juan, the Colorado-Chiquito, the Bill Williams Fork, and, finally, as already explained, the Gila.

The Colorado constitutes the entire western boundary of Yuma County, its total length between the Sonora line and the Bill Williams Fork, the latter forming its northern boundary, separating, as it does, the counties of Yuma and Mohave, being about 235 miles. It is navigable for nearly 650 miles from the Gulf of California to the Virgin River by steamers registered and licensed through the customs district of Paso del Norte. The river is capable of affording at all periods an almost incredible amount of water for irrigation purposes, sufficient, in fact, to bring hundreds of square miles of fertile lands on each side of the river under cultivation, besides supporting an enormous population.

LANDS AND SOILS.

Within the limits of Yuma County there are large aggregations of Government land. The majority of the most favorably situated in the valleys were the first taken, the early pioneers occupying the tracts nearest the rivers, for the reason that they could be more cheaply irrigated. The mesas are for the most part unoccupied, although they comprise much of the most desirable land, such especially as are adapted to the growth of the citrus and other semitropical fruits. Water can not easily be brought upon them on account of their elevation above the river bed. Canals capable of carrying sufficient water for irrigation would entail comparatively heavy expense, because many miles must necessarily be constructed before the water can be brought to the surface. Such outlay would prove too expensive for the slender resources of the average settler; and so, as matters stand, they lie idle under the rays of a semitropical sun, untouched by the spade and plow. This condition of things, however, can not long continue. Neither physical nor topographical difficulties exist that can not be surmounted by the expenditure of a reasonable amount of capital; and consequently it is only a matter of time when the completion of works of this nature will be effected by private corporations, or, better still, by the Government.

It may safely be assumed, in view of what has just been said, that the large bodies of available agricultural land are confined to the valleys of the Gila and Colorado, and also to the comparatively level plains stretching from the Gila River to the Mexican line.

THE GILA VALLEY.

The Gila Valley is by far the most important of the two from an agrarian standpoint. It extends from the Gila Canyon, near the junction of the San Pedro River, westerly to the east bank of the Colorado, a distance slightly exceeding 250 miles. That portion of it situated in the county of Yuma, known as the "Lower Gila Valley," is about 100 miles long by from 2 to 10 miles wide, all of which is susceptible of profitable cultivation. The river from which it takes its name cuts the valley in two. Its watershed extends some 30 miles north and upward of 50 south of its channel, the land from either extreme inclining more or less rapidly toward the stream. The Gila traverses a marvelously fertile country very great in extent and splendidly adapted to the cultivation of nearly all the products of the temperate and semitropic zones, besides many of the fruits common in the tropics. Nor is this longer a matter of idle speculation, for flourishing ranches in various portions of the

valley, drawing water from several important canals, amply demonstrate the magnificent results that will ensue should the water supply be equitably distributed and rendered permanent and adequate through appropriate storage systems.

The following, taken from that excellent work, The Handbook to Arizona, by R. J. Hinton, alluding to the valley in question, is interesting and accurate:

"This consists of a broad expanse of tillable valley land, sometimes overflowed by the river, which is at times 'mighty uncertain,' and a steep range of volcanic hills coming close to the highways for a dozen miles or so, hot, heavy, sandy. It is hardly fair to say sandy, as it is really a friable, alluvial loam, of grayish hue and loose texture. Several ranches are passed, showing that the Gila bottom is cultivable. With irrigation, every square mile of the Gila Valley is capable of producing prolific crops of grains and semitropical fruits, as well as cotton and sugar in great abundance. The river is able to furnish all the water needed and a good deal more. It would take no very great skill in engineering and not a very large sum of money either to construct reservoirs or lakes in which to receive and store the overflow. There are natural basins or dry lakes into which by simple means the water could be conveyed."

The lands situated in and about the Gila Valley may conveniently be classified as follows: (1) The bottom or overflowed lands; (2) slightly higher valley lands not subject to overflow; (3) mesas or sloping uplands; (4) high but comparatively level plains; (5) mountains.

THE BOTTOM AND HIGHER LANDS.

The bottom lands, as well as those slightly higher, stretch along either side of the Gila River for varying distances north and south, until they meet the more elevated mesas which rise from the valley. The bottoms lie directly along the river and are subject to inundation annually. Immediately following the subsidence of the waters the local Indians were, in former times, accustomed to plant corn, pumpkins, melons, and other vegetables. These sprang into maturity with startling rapidity, rarely failing to yield bountifully without additional irrigation. The custom is occasionally followed by resident farmers to this day with excellent results, although but a single crop can be harvested. These bottoms form perhaps 25 per cent of the valley lands, and may without difficulty be secured from further invasion by a system of dikes and levees, if deemed necessary or desirable. The soil throughout the valley is a rich brownish-yellow sandy loam, generous, mellow, and porous, with a depth ranging from 6 to 20 feet, the whole resting upon underlying stratas of gravel and sand that readily carry from the surface such excess of water as might otherwise prove injurious to seeds and growing plants.

Concerning the geological formation of these lands the following, from the report of the citizen's executive committee, is sufficiently comprehensive:

"There is unmistakable geologic evidence that the entire lower Gila Valley was, during some prehistoric period, covered with water, constituting, in fact, an enormous lake, the surface rising in places to the upper portion of the outskirting mesas. The soil lying at the bottom was made by the washing and erosion of the surrounding mountains. The soda from the decomposed vegetation, the magnesia and lime from the magnesium-lime formation, and the potash from the decomposing granite rocks were carried with unceasing regularity, year by year, until deposited in the bottom. Eventually, upon the disappearance of the lake, the rich, fertile alluvium, than which there is none better, was left to reward the efforts of the modern husbandman. But nature, not yet satisfied with her handiwork, directed the accumulation of the detritus washed from the distant mountainous region. As a result, the soil is extremely rich in the elements best adapted to thorough fertilization, for it contains a certain amount of organic matter, which on decomposing further enhances its agricultural value. By constant overflow and change of channel the deposits are evenly distributed over considerable areas, the process continuing through centuries. These soils are further enriched by decomposed inorganic contributions, including the sandstones, marls, limestones, shales, etc. Besides the ingredients mentioned, a chemical analysis shows that iron, ammonia, and phosphoric acid enter into its composition in the proportions best adapted to add to its fecundic qualities. The extremes of temperature are somewhat greater than on the highlands, but there is also more moisture.

"The bottom lands are so easy of cultivation that it is not uncommon, after clearing the surface from brush and stubble, to pass over the ground with an ordinary cultivator a single time, and afterwards sowing to grain and grass. In three or four months large crops are harvested, the soil meanwhile being entirely innocent of the plow. All plants seem to grow rapidly, maturing remarkably early. Indications of ancient ditches are apparent throughout the valley, showing plainly the existence of irrigation works by the ancient Aztecs. Curiously enough, in certain instances, the identical routes of these long extinct people have been followed for considerable distances by their modern successors."

THE MESAS.

The mesas are warmer and better adapted to the cultivation of citrus fruits. The soil is also somewhat different, being of a reddish color, loose enough to receive water without causing the ground to bake, and, while of a loamy nature, is more sandy or gravelly. It is, in addition, lighter, but therefore better adapted for the raising of the fig, the olive, and the various kinds of wine grapes. Indeed, it has been asserted by several of the most experienced wine growers of California that these very mesas are better calculated for the production of the true port and sherry grapes than any of the lands within the borders of their own grand State. It is claimed that wine can be made possessing greater preserving qualities, such as would allow of improvement year by year, instead of deterioration. These lands are greater in area than those directly upon the river, and almost imperceptibly slope away from the distant mountains. The drainage is admirable, not too excessive, and just sufficient to carry off surplus water. Vegetables, grasses, grains, sugar beets, cane, cotton, and, in truth, almost everything, can be successfully raised.

HIGH PLAINS.

These include extensive bodies of land connecting with the mesas along the south side of the Gila Valley. So gradual is the slope that they hardly deviate from the horizontal. At the highest points southward they gently incline toward the Mexican line, the slope in this case being directly opposite to that along its northern bank. In the latter instance it is first toward the mesas, and from thence indirectly to the river. The soil is very similar to that of the mesas, the two classes exhibiting common characteristics. Like the mesas, these plains are susceptible of the highest cultivation, provided, always, that ample irrigation facilities are afforded. Here and there they are crossed arbitrarily by mountain ranges, which do not all trend in the same direction, but they present no important engineering obstacles to the canal builder.

The wonderful fertility of the bottoms and other valley lands, as well as the mesas and plains, is established beyond denial by actual experiment. Neither is the soil likely to degenerate in the future, for in answer to the question, "Will it last?" O. L. Wheeler, D. D., LL. D., a recognized expert in such matters upon the Pacific Coast, says:

"To this query the answer in general is, the longer land is properly cultivated and properly fertilized, the stronger and more productive it becomes. While the mountains surrounding the valley continue to disintegrate under the operation of the elements, and while the detritus thus eliminated continues under the laws of gravitation to descend and work its way over the plains, so long will there be perennial additions to the amount of producing element in a state of refinement and assimilation. And so long as the water flowing from these mountains, holding in solution the débris, which always, in some degree, is spread upon the land in irrigation, so long will the fertilizing properties of the soil continue to receive additions, and its fecundic power continue to be increased. And so long as the water containing more or less of salts and ammoniacal compounds, as all water does, is used for irrigation purposes, and so long as the process of cultivation continues to throw up the soil, exposing it to the indispensable and ever-fructifying influence of the atmosphere, so long will the soil continue to be refreshed and invigorated, and prepared to give large rewards to the labor of the husbandman."

MOUNTAINS.

The mountains forming the last and outer environments are, of course, in no way to be discussed. Nevertheless, they play an important part in the advancement of the agricultural interests of the valley by shielding more or less the lower lands from the effects of the high, strong winds that prevail at times. They also form a protection and shelter to range cattle.

The total acreage of the Gila Valley and outskirting lands, as just described, is 600,000 acres, of which there are 33,000 acres of bottoms, 97,000 acres of higher valley lands, and 470,000 acres of mesa and level plains. By far the largest portion of the valley has been filed upon under one or other of the Congressional enactments. The entire amount under actual cultivation will probably not exceed 15,000 acres at the present time, but it is believed that during the coming autumn and winter from 3,000 to 5,000 acres additional will be worked.

THE VALLEYS OF THE COLORADO.

Concerning these we print the following, taken from the report of the citizens' committee of Yuma County, which report has already been referred to:

"Several miles above Yuma, in the neighborhood of Explorer's Pass, near the Purple Hills, the great Colorado Valley proper commences. From this point northerly the river is shut in by cliffs, which, with intervening mountain systems, absolutely preclude the possibility of canal construction. Passing southward, the cliffs are seen to gradually disappear, until they become merged in the low bottom lands.

The valley meanwhile widens with every mile until the Gulf of California is reached. There are large quantities of land which could be made productive were irrigation practicable. These are generally fertile bottoms, inclining toward the river, and covered in spots with dense undergrowth and cottonwood and mesquite trees. Considerable of the valley is raised above the river as much as 100 feet, and to this height water must be brought, as the bottoms are, during certain months, completely overflowed by the waters of the swollen stream. The soil is extraordinarily rich, and particularly adapted to the cultivation of sugar, rice, and all the textile plants, in addition to an extended list of tropical, semitropical, and temperate products. According to a careful chemical analysis, the fertilizing reddish mud carried by the Colorado closely resembles that of the waters of the Nile, while its volume at low water has been estimated by competent authority as sufficient to easily irrigate more than 1,750,000 acres."

MINES.

There is no section of the United States, or probably of the earth, more rich in mineral wealth than the county of Yuma. All the country north, east, and south of Yuma lies directly within the main gold belt that commences in Alaska and ends in Mexico. From the San Bernardino Mountains in California to the Sonora boundary line the mountains and hills are exceptionally rich in the precious metal, as though demonstrating the theory often advanced that the richest gold mines are found bordering the beds of extinct oceans. The great Colorado desert was once an inland sea, cut off centuries and perhaps ages ago from the main ocean, leaving its waters to evaporate in this intense heat. Throughout all the country bordering the desert, including this section, rich mines are being constantly discovered, and some of recent location are already producing immense profits. In the neighborhood of Yuma, claims exceedingly rich on the surface are daily being located, and all signs portend a great mining boom for this county which will culminate as early as the coming fall in an inroad of much capital. Experts are arriving every week and mines are being bonded at more than heavy prices. It seems wonderful to believe that all this mineral wealth has been lying at our very doors for so many years without a taker, but the tendency of prospectors is to go a long distance off into strange lands rather than to seek for mines in a county as old as Yuma County and so accessible. The greater the distance, the hardship, and the danger, the greater the fascination for the prospector. Distance seems, indeed, to lend enchantment to the view.

So it is that this county is almost a virgin field for the mine hunter, and now with the few hundreds searching in its mountains its mineral secrets are still in effect secrets, for thousands upon thousands might be wandering through the rock-ribbed fastnesses of our mountain ranges and their presence be almost unknown, so vast is the extent of country.

Recent rich discoveries of gold deposits, particularly in ledges, have given a great impetus to mining throughout the county.

New locations are being constantly made, and all show well upon the surface. The La Fortuna mine, recently put in operation, has a 20-stamp mill running night and day, and the production of gold averages $75,000 per month. This mine is situated about 30 miles southeast of the village of Yuma.

Rich gold discoveries have also been made in Castle Dome, Harqua Hala, Centennial, Palomas, Pot Holes, and other mining districts, and, although the mining outlook in the county was never better, still most of the silver and lead mines are idle, owing to the low value of these metals.

PRODUCTS.

Fruit culture has so far been prosecuted upon a somewhat limited scale, but enough has been learned from experimental tests to demonstrate the positive feasibility of not only producing an excellent quality of the most profitable fruit, but also the ability to raise them for market from three to six weeks earlier than any section of California.

Concerning the various products of the county, we quote again from the report of the citizens' committee:

"The orange, lemon, and lime, finding soils and climate congenial, yield in abundance large, clean-skinned, and exceedingly luscious fruit. They color handsomely, contain the requisite acidity and sweetness, and are very juicy.

"The fig and pomegranate offer a character of fruit that almost stamps them as indigenous. The latter is not yet recognized to any great extent, but it will certainly become an important factor in arboriculture when its economic qualities are better known. As to the fig, the most desirable variety has yet to be determined. The true White Smyrna would probably prove the best, and that its yield would be prodigious goes without saying, for the tree will bear three crops annually. This assertion is based upon actual productive results of the Mediterranean white fig, that is known not to be the true Smyrna.

"The grape seizes upon what is proffered to it and becomes hardy, thrifty, and adaptable. The choice naturally inclines to the earliest for table purposes. What

BRANCH OF LEMON TREE GROWN AT YUMA, ARIZONA.

LIME TREE IN GARDEN OF J. W. DORRINGTON, YUMA, ARIZONA.

those varieties should be is in process of experiment upon a scale that will soon solve the question, but it may be said that all kinds mature from three to four weeks before they do in California. They attain great size, cluster tightly on the bunches, are firm and highly colored, and possess exquisite flavor. Heavy wines and brandies of a superexcellent character can be made, but with light wines the reverse is true, for everything apparently goes to saccharine. For ripening wines the climatic conditions are admirable. A quantity of common white wine, costing 45 cents per gallon, was brought here from California by water years ago and, on being found unsalable, was placed in cellars and its history almost forgotten. Nine years later the wine was brought to light, when it was discovered that it resembled a brown sherry, rich in bouquet, smooth as oil, and delicious to the taste. It was carefully drawn from the casks, bottled, and sold at $2.50 per bottle.

"The olive grows luxuriantly, and will, in the future, become a most profitable investment. Whatever its characteristics elsewhere, here it requires water and cultivation—the more water the better.

"The mulberry matures rapidly, and when firmly rooted vigorously withstands great heat and lack of water. It produces an early, large, and sweet fruit, and is a highly desirable tree to plant along the canals for its grateful shade.

"The plum can be easily raised from seed. It fruits early, though so far the product does not commend itself particularly for table use, but as a stock upon which to engraft prunes, or even superior varieties of plums, it is everything to be desired. An experiment in this line with the best prune known in California showed a growth of 23 inches in forty days from the insertion of the graft.

"The date has passed beyond conjecture. The plant produces magnificently, and its cultivation will be prosecuted more extensively this winter than ever before. The soil is in every way suitable, and with occasional cultivation and intelligent irrigation a quick and early growth is assured.

"Apricots and peaches have been tested. They mature rapidly, bear choice fruit, and are always healthy, giving flattering indications of future success.

"As facilities increase, other fruit trees will be introduced, and with the same care that is bestowed upon them elsewhere will, so soon as they become acclimated, come to a yield materially in advance of the place from whence they came. The field is too large to admit of extended comment at this time, but it may suffice to refer briefly to certain other products which may in time equal, if not surpass fruit growing as a commercial proposition, as, for example, cotton, wild hemp, ramie, sugar cane, sugar beets, etc.

"Cotton has been tried from time to time for years with varying but always satisfactory results, and even then without care. If watered regularly, it becomes a large bush, and if properly pruned, a tree, being in flower, boll, and cotton the year round. These bushes and trees have in instances borne steadily for fourteen years. The staple, of course, diminishes in course of time, but at ten years it is not inferior to the average staple of western India.

"Wild hemp is a textile plant indigenous to the country. It grows freely and luxuriantly to a great height, often averaging from 15 to 17 feet. It has a long, strong fiber, and is frequently worked into nets and fishing lines by the Yuma Indians. Convulsive attempts have been made to utilize this plant, with the practical result of fixing its value among the fibers used in the manufacture of cordage at about $160 per ton of 2,000 pounds. After proper bleaching and manipulation a beautiful fiber has been produced and manufactured into colored fabrics, taking the dye and retaining the elasticity and luster exactly as well as the fabrics of true flax and ramie. It seeds itself annually, and immediately following the overflows of the Colorado River takes possession of every nook, corner, and open area to the exclusion of everything else. It covers not less than 100 square miles in an unbroken stretch, commencing near the boundary line of the Gadsden purchase and extending southward along the river to Hardy's Colorado, below the point where the rising tides of the Gulf of California force back the flow of the Colorado River proper.

"The fibrous plant ramie has been given a partial trial. The soil, on analysis, was found to contain all the essential properties to render the most favorable results; but the absence of water, together with injudiciously planting the roots too late, retarded the growth. Enough data have been obtained, however, to warrant the belief that this will eventually become one of our most important industries.

"Sugar cane has been fairly tested with the Sonora cane. The growth was surprisingly great, and the percentage of juice much increased over the yield at the place from which it was originally brought. A superior quality of panocha and sirup was manufactured, the prices realized leaving handsome margins for profit. The capriciousness of the water supply, as in the case of ramie, dissolved the industry, and it has not since been revived.

"The sugar beet promises better results for the future than many of the products already mentioned as prominent in the same direction. Samples not fully matured polarized 17 per cent. With proper cultivation the percentage can be raised to from 20 to 25, and besides will harvest two crops each year.

"Wheat does splendidly, but complete data are not at hand from which to compute the average yield. In one instance, however, 483 pounds, seeded to 20 acres, about 9 miles east of Yuma on the Gila River, returned 52,750 pounds, after having been irrigated five times. This was sold in San Francisco, bringing 50 cents per cental over every other kind then in the market. The grain is remarkable for its plump, berry-like appearance. The winter and spring are warm enough to insure a vigorous growth and cool enough in April and May to allow the heads to fill out without shriveling. It is so perfect as to sell for seed, and, so far as known, is proof against rust. Two crops are raised annually.

"Barley also does well, and will produce two crops, the first yielding from 35 to 40 bushels of barley and the second a large amount of hay.

"Corn is produced in great quantity, yields enormously, and can be grown the year round. The 'cocopah' corn is noted for sweetness, plumpness, earliness, and for its firm and solid grains. Five weeks after planting roasting ears are plentiful. This variety commands a ready sale at higher prices than any other kind.

"Alfalfa will cut from 5 to 7 times, at an average of 2½ tons to the acre. Eight acres but 1 year old have this year yielded 74 tons, with more cuttings yet to be made. The hay brings $15 per ton.

"Sorghum, raised for feed, is both valuable and prolific. It frequently reaches 15 feet in height, yields from 15 to 20 tons per acre, and is worth $15 per ton. Several crops can be harvested annually.

"Vegetables, kitchen and garden stuff, melons, etc., grow all the year round in unlimited quantity and excellent quality. Some time since a Gila Valley farmer planted 15 pounds of Irish potatoes on a piece of bottom land that had been overflowed, from which he harvested over 700 pounds; and this record, it is believed, has rarely, if ever, been excelled. The sweet potato produces enormously, and equals the choicest brought from South Carolina.

"Peanuts mature rapidly and abundantly, yielding a nut both plump and toothsome."

Whenever there is sufficient moisture the natural flora abound in profusion and variety. They are of rare beauty and delicious fragrance, the bulbous plants particularly. The lily surpasses the famous imported Japan. It has been claimed by experts that at no distant period opium will be manufactured from the poppy and attar from the rose, both flowers thriving vigorously. There are but few trees and shrubs capable of adorning the surroundings of a lovely modern home that can not be satisfactorily grown.

Every plant, vine, or tree mentioned in the foregoing list has been actually proven adaptable to our soils and climate. Many others have been omitted through lack of space, but there seems no doubt that time will demonstrate our ability to profitably raise all the semitropic and most of the tropical and temperate productions.

CONCLUSION.

In the valleys of the Colorado and the Gila rivers there is room for thousands. It is not too much to say that nowhere within the limits of this broad Union can be found a more desirable region for the making of a home. No laborious clearing of the land is required; it lies almost ready for the plow. Trees and shrubbery have so rapid a growth that withing eighteen months the immigrant can surround his abode with attractions which would require years to mature in less favored climates. Fruits ripen and are ready for market a full month before the California product. The bright sunshine makes life a luxury, and the pure dry atmosphere brings health to all who inhale it. For the establishment of colonies, such as are made in southern California, Arizona presents unrivaled opportunities. Thousands of acres now profitless can be made productive by the construction of irrigating ditches, and there is no investment which assures larger or more permanent returns.

The statements in this article on Yuma County are not exaggerated; in fact they fall short of doing justice to this wonderful bit of country. Pineapples, dates, almonds, and walnuts will do well. Strawberries, raspberries, blackberries, currants, gooseberries, and all varieties of small fruits can be successfully cultivated. Indeed, Yuma County is not only the natural home of the citrus and semitropical fruits, as almost every fruit, nut, plant, grain, grass, or vegetable which can be produced in either tropic or temperate zone will thrive in its rich and fertile soils.

With the bright prospects ahead of the town of Yuma and Yuma County there can be no better investment for capital seeking large and remunerative returns than is afforded here. With a matchless climate, where all forms of disease known to the damp and rigorous regions of the East and North are unknown, where the bright sunshine kisses into bloom and fragrance every form of vegetation, and where the clear days and cool and balmy nights are one long-continued poem of happiness and delight, we can offer to capitalists an ideal field for investment and to home seekers a veritable paradise in which to settle.

TERRITORY OF ARIZONA.

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,
HON. SILAS W. LAMOREUX, COMMISSIONER.

Scale of Miles
10 0 10 20 30 40 50 Miles

1896.

Compiled from the official Records of the General Land Office and other sources
under supervision of
HARRY KING, C. E.,
Chief of Draughting Division G. L. O.

Revised and Reconstructed by R. H. Morton.

Lettered by M. Hendges and R. M. Towson.

Longitude 112° West from Greenwich

Longitude 35° West from Washington

LEGEND.
- U.S. Surveyor Generals Office
- U.S. Land Offices
- Indian Reservations
- Military "
- Forest "
- Private Claims Confirmed
- " " Unconfirmed
- Townships not Subdivided

UTAH
COLO.
NEVADA
NEW MEXICO
ARIZONA
CALIFORNIA

NAVAJO INDIAN RESERVATION
Ex Orders: Oct. 29, 1878
Jan. 6, 1880
May 17, 1884
Nov. 19, 1892

MOQUI INDIAN RES.
Ex. Order December 16, 1882

NAVAJO APACHE

HUALPAI INDIAN RES.
Ex. Order Feb. 20, 1893.

COLORADO RIVER IND. RES.
Ex Orders:
Nov. 22, 1873
Nov. 16, 1874
May 15, 1876

SUPAI IND. RES.

LOS WARAGACK
BRANT MTS

GRAND CANYON FOREST RESERVE

GREAT COCONINO FOREST

Black Forest

SAN FRANCISCO MOUNTAINS

SALT RIVER IND. RES.
Ex. Order Nov. 15, 1879

GILA RIVER INDIAN RES.

GILA BEND INDIAN RES.
Ex. Order May 5, 1882

PAPAGO INDIAN RES.
Ex. Order Jan. 2, 1874

WHITE MOUNTAIN INDIAN RESERVATION
Ex. Orders:
Nov. 9, 1871 July 24, 1874
Dec. 14, 1872 April 9, 1876
Act. of Mar. 3, 1873 Act. of Mar. 30, 1877
Gila Pk. Act. of July 10, 1896
Act of Feb 20, 1893.

Camp Grant Mil. Res.
Camp Apache Mil. Res.

1st Standard North
2nd Standard North
3rd Standard North
4th Standard North
5th Standard North
6th Standard North
1st Standard South
2nd Standard South
3rd Standard South
4th Standard South

Navajo Base Line
Old F. Pechanga

Gila and Salt River Meridian
BASE LINE

Colorado River
Little Colorado River
Gila River
Salt River
Verde River
Rio Grande

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.