ARIZONA

THE NEWEST STATE

Santa Fe

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The Great Roosevelt Dam
Salt River Valley, Arizona.

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THIS folder is printed for the information of prospective homeseekers, who may be attracted to Arizona by the natural resources and other opportunities the state offers for the prosperity and comfort of men; especially that part of it traversed by the Santa Fe Railway. It is the youngest of the states of the Union, but it is a land of great promise, possessing a fertile soil and a splendid climate; its mountains stored with rich deposits of gold, silver, copper, and other valuable ores, and mountain and plain covered with the greatest forest areas in the country.

Area. The new state is an area of mountain and plain, lying within the 109th and the 115th degrees of longitude, and the 31st and 37th degrees of latitude. Immediately north of Arizona is Utah; east, New Mexico; south, the Republic of Mexico; west, California and Nevada. The exact area of the state is 113,956 square miles, of which 99.9 per cent is land surface. Its extreme width (east and west) is 340 miles, and length 390 miles. This great area is divided by geologists into two distinct climatic regions, by an irregular diagonal line extending from about the 33d parallel to the intersection of the 115th meridian and the 36th parallel, where the Colorado River, which is the western boundary of the state, turns southward. The region north and east of this line includes comparatively level plateaus, lying at altitudes of from 5,000 to 8,000 feet above the sea, and broken by isolated buttes and short mountain chains; and by deep canyons which carry the wash of mountain and plateau to the sea. The altitudes of the southwestern half of the state are not so great, and the plains, which it includes, are crossed, from northwest to southeast, by chains of low mountains; and by rivers and their wide valleys, broad and fertile mesas rising between. The greatest altitude is San Francisco Mountain, an extinct volcano, 12,794 feet high, in the north central part; and the least, eighty-three feet, at low water in the bed of the Colorado River, on the Mexican border.

Important Streams. The Colorado River, which enters Arizona from Utah through the famous Grand Canyon of Arizona, midway between the 111th and 112th meridians, turning almost at a right angle on the Nevada border, thence flowing southward, finally pouring its waters into the Gulf of California beyond the Mexican border, carries off the greatest loss of moisture precipitated over the state. The most of this flows, by the Little Colorado from the northeastern and mideastern plateaus, into the Grand Canyon. This loss is decreasing, yearly, by the greater use of water for irrigation, and by conservation for

"dry-farming." The upper tributaries of the Little Colorado take their rise on the western slope of the Continental Divide in McKinley County, New Mexico.

The headwaters of the Gila, the greatest river in the south, likewise are in New Mexico, flowing off the Continental Divide in Grant County. Here the waters of the stream have been appropriated for local use, but below in Arizona the flow is augmented from many sources until it becomes useful for irrigation in its extreme western reaches. The Gila and its tributaries drain the southwestern, middle, and southeastern sections of the state. Here, excepting floods, the flow of the streams is taken for irrigation; and even the floods of one, impounded by the Government's great Roosevelt dam in Tonto Basin, are saved for irrigation.

This is Salt River, the greatest tributary of the Gila. The more important streams flowing into the Salt River are Black River, flowing out of the Apache National Forest; White River, flowing out of the White Mountains; Tonto Creek, whose waters are impounded in Tonto Basin; Verde River, rising in Yavapai County, whose flow is caught at Granite Reef, in Maricopa County, by a barrage of the Salt River Valley Reclamation Project, and diverted into canals; and the Agua Fria and the Hassayampa, which, flowing out of the Prescott National Forest in Yavapai County, empty into Gila River in Maricopa County. The Agua Fria and the Hassayampa are not included in the Salt River Valley Reclamation Project; but their waters will be conserved by other enterprises, and used for irrigation, as will be seen further along in these pages.

Rainfall. The annual precipitation of moisture over Arizona varies. At Yuma on the Colorado River in the southwest, altitude 141 feet, the precipitation is 3.13 inches; at Phœnix in the Salt River Valley, altitude 1,108 feet, 7.27; at Prescott in Yavapai County, altitude 5,320 feet, 17.40; at Flagstaff, county seat of Conconino County, altitude 6,907 feet, 23.87; at Holbrook, county seat of Navajo County, altitude 5,069 feet, 8.99; at Fort Defiance, Apache County, near the intersection of the 36th parallel and the 109th meridian, altitude 6,500 feet, 14.01; at Fort Mohave, Mohave County, where the Colorado River crosses the 35th parallel, altitude 604 feet, 5.07; at Bisbee, Cochise County, on the Mexican border in the southeast, altitude 5,500 feet, 17.46. In the Salt River Valley the winter rains exceed those of summer, thus favoring the winter growing annuals which are indigenous there.

Population. The population of the state was 204,354 by the census of 1910. In the year following, this increased about 25,000, mostly farmers; and since then the gains of new settlers have been in increasing ratio. The mines are growing in importance and

production, but not so fast as agriculture, and, wherever farms are possible, the greater gains of population are found. The mining districts are growing, as the cities of the agricultural districts, in addition, the spread of agriculture in the valleys has made new towns, all prospering in trade, and growing in population, wealth, and culture. For example, Phœnix, county seat of Maricopa County, and capital of the state, had a population of 11,134 by the enumeration of 1910; and within two years, it is estimated that, by its share of the great influx of new population in the Valley, the city had grown to a population of 15,000 or 18,000. In addition, the good town of Glendale, has gained in the same ratio, and towns have sprung up along the Santa Fe in districts which were desert a short time ago. Likewise, south of Salt River, in the southern and eastern portion of the county, Tempe and Mesa have grown. All this by the nourishing touch of water! In the north, Prescott has grown both by mines and agriculture.

Railway Transportation. The railways of the state are the Santa Fe and the Southern Pacific systems. The Santa Fe crosses the northern half of the state from east to west by its Coast Lines, and enters the Salt River Valley by a north and south line from Ash Fork. Another line of the System is a cross-country line from Salt River Valley to Los Angeles. From Williams on the Coast Line, a branch runs to the Grand Canyon of Arizona.

Markets. The markets for the farm products of Arizona could not be better. Excepting livestock, hides, wool, citrus and other orchard fruits, olives and olive oil, and figs, all staple products are consumed within the state. Besides local population in the irrigated valleys and uplands, where agriculture is practiced, the mining districts are great buyers of all farm products. Indeed, the mines buy more than all other customers. The surplus livestock and livestock products, fruits, and olive oil are in great demand from outside, and are cash f. o. b.

Boards of Trade. The several cities and larger towns have boards of trade; as Phœnix, Glendale, and other cities of Maricopa County; Prescott and Jerome, of Yavapai; Parker, of Yuma; Flagstaff and Williams, of Coconino; Winslow, Holbrook, and Snowflake, of Navajo; and St. Johns, of Apache. These organizations are active. Their several secretaries reply to inquiries promptly.

Education. Education has been fostered since the beginning of the Territory. On this subject, Governor Sloan, the last of the territorial governors, in his annual report to the President of the United States, said: "The Territory has just reason to be

proud of the result. It approaches statehood with the knowledge that it has an excellent school system, maintaining a high standard for teachers, and affording advantages to our children equal to those found in the older states."

Besides common schools and grammar schools of high standard, the state has a state university (Tucson), and two state normal schools (Tempe and Flagstaff). In addition to the ordinary academic courses, the university teaches civil engineering, mine engineering, and metallurgy, and will add electrical engineering and agriculture. The university also maintains a preparatory course. In 1910, the institution had 195 students, and its graduating class numbered eleven.

The school population of the state (between six and twenty-one years of age), in 1911 numbered 39,611, of which 31,686 were enrolled in the common schools; 1,343 in the high schools, and 2,104 in private schools. The average daily attendance of the common and high schools was 21,776. There were 876 teachers employed, of whom 140 were males, and 736 females. The average salary paid the males was $110.92, and the females $79.91. The cost of school maintenance for the year was $778,159.57. In 1910-11, thirty-eight new schoolhouses were built.

Penal and Charitable Institutions. The state maintains a penitentiary at Florence; a hospital for insane at Phœnix; an industrial school at Bisbee; and a home for pioneers at Prescott. The last named occupies a beautiful site of six and a half acres, overlooking the city. The main part of the home is 60 by 50 feet, with two wings, each 37½ by 40 feet. It is designed to be a home for pioneer settlers of the Territory, who may desire to avail themselves of it. Its capacity is 130, and in 1911 forty persons were sheltered beneath its roof; the eldest eighty-eight years, and the youngest sixty-one.

Good Roads. Arizona is becoming a land of good roads. Once made, good roads stay made in Arizona, and the people take great pride in building well. The great ocean to ocean highway lies through Arizona, and in 1911, tourists who passed that way by automobile carried the fame of the state's good roads from one end of the country to the other. The work is done under a Good Roads Act of the Legislature. The state engineer and local authorities have been active, especially in Yavapai and Maricopa counties.

Assessments and Taxation. The assessed valuation of property in the state for the purpose of taxation in 1911 was $99,813,809.64, distributed as follows: Land and improvements, $14,139,689.31; mines, $19,242,331.26; town and city lots and improvements, $26,476,175.66; livestock, $7,780,554; railways, $19,052,313.94; all other property, $13,122,055.47; total, $99,813,809.64. The real value of this property was

$300,000,000. In 1910, the assessed valuation was $82,913,371.50. The basis of valuation is about one-third of cash value.

In 1911, the assessed valuation of Maricopa County was $21,889,224.24; and in 1910, $17,779,924.99. The county and state tax levy in 1911 was $2.36 on the $100. Of this, sixty-five cents was the territorial (or state) tax.

In 1911, the assessed valuation of Yavapai County was $11,634,351,21, and in 1910, $9,719,993.81. The county and state tax levy was $2 on the $100. Of this sixty-five cents was the territorial (or state) tax.

The rates of taxation are even less in Yuma, Mohave, Coconino, Navajo, and Apache counties, where runs the Santa Fe: the Santa Fe all the way.

Mines. Mining is the industry of greatest value and profit in the state. The year's production of the mines was $42,229,282.56. Arizona leads the Union in the production of copper. The richest copper mine in the state is the United Verde property at Jerome in Yavapai County. The production of this mine has become so great that a new smelter and a new town are designed for it in Verde Valley, to cost $3,000,000.

Besides ores now mined, there are coal areas within the Navajo and Hopi Indian reservations, which lie in the northeastern part of the state. The United States Geological Survey estimates that these areas contain eight billion tons of coal.

Agriculture. The industry of second importance in the state is agriculture, and, by the spread of cultivation especially in Maricopa and Yavapai counties, it soon will become the first. Since the old territory maintained no board of agriculture, no official information of farm production is obtainable, and what little information available on the subject is only fragmentary. In 1910, Arizona produced hay and forage worth $2,533,000; barley, $715,000; wheat, $410,000; corn, $294,000; alfalfa seed, $157,000; oats, $130,000; no information of the production of alfalfa hay, which is the greatest farm crop; or of the cereals, citrus fruits, deciduous fruits, olives, olive oil, garden vegetables, poultry and poultry products, dairy products, or honey is available.

Livestock. During the year ended June 30, 1911, 184,760 head of cattle were inspected for shipment outside of the state, and 65,373 head for slaughter; total, 250,059 head.

Other official information of the livestock industry of Arizona is a bulletin of the United States Department of Agriculture issued January 1, 1910. At that time there were 121,000 horses and mules in the state, worth $7,778,000; 25,000 milch cows, worth $1,075,000; 626,000 cattle, worth $12,082,000; 1,020,000 sheep, worth $3,774,000; hogs 22,000, worth $500,000. The income from the industry, in 1909, was, horses (sales) $185,670; milch cows (dairy products), $1,000,000;

cattle (slaughtered and sold for slaughter), $5,659,261; sheep (slaughtered and sold for slaughter, and wool), $4,260,000; hogs (pork), $500,000; total, $11,604,931. This was a year's income without impairing the herds.

Besides these herds of quadrupeds, the same authority says that there were 5,000 ostriches worth $1,000,000 in the state, which in 1909 yielded an income of $125,000 by the sale of feathers. The ostriches are kept on farms in the Salt River Valley.

Although the livestock industry of the state is supported by irrigation only partly, the irrigated areas are an essential factor; especially in dairying, and in finishing cattle and sheep for market. The Salt River Valley, by its mild climate especially is favored by sheepmen, who drive their herds here for shearing and lambing. This is in February and March, after which the herds are returned to the pastures in the mountains. During the shearing season, agents of eastern houses are established at Phœnix for the purpose of buying the wool. Many thousand sheep are sheared every spring, and more than a million pounds of wool are sold.

Lumber Forests. There are within the state 14,811,145 acres forested areas, which the United States Government has reserved from sale, or homestead entry. These are greater in extent than the reserved areas of forest within any other state. The Forestry Service estimates that the trees available to be manufactured into lumber in Arizona would yield 6,263,800 thousand feet of lumber board measure, and 14,142,604 cords of firewood. The Flagstaff, Williams, and other mills of northern Arizona, cut 50,000,000 feet of lumber, worth $750,000, annually. There also are small areas of pine and other timber in private ownership.

Estimating an increase of one per cent of saw timber and one and one-third per cent of cordwood, the annual growth in Arizona is 62,638 thousand feet of saw timber, worth, at $3.75 per M., $203,573, and 188,520 cords of firewood, worth, at sixty-seven cents per cord, $126,308. This is $329,881 of matured timber coming on annually. The matured trees are sold to the mills. The presence of these timber areas and mills in the state make lumber cheap for settlers.

Free Lands. The public domain within the State of Arizona, which may be taken by actual settlers for uses of agriculture, includes 41,585,555 acres: (1) Under the Homestead Act (160 acres), (2) Enlarged Homestead Act, (320 acres), or (3) the Desert Land Act (320 acres).

The lands of the first class are scattered widely, and there is little left; likewise the third class. Of the second class there are many millions of acres open. These are "dry-farm" lands.

United States Reclamation Projects. The United States Reclamation Service has completed two great projects in the state (Salt River and Yuma), and the Government now has under way a pump plant, which will cost $50,000 for the irrigation of lands of the Colorado Indians in the Colorado River Valley, south of Parker. These enterprises are mentioned more fully further along in these pages.

Water Rights. A water right is a right to divert water from any stream for the purpose of irrigating the soil; or to divert water from any stream into a reservoir for storage, afterward turning it upon the soil. A right first granted by a court, or other authority of law, has a priority over all others. Rights are recognized in the order of precedence, and the earlier are given water ahead of rights which come behind them when stream, canal, or reservoir be drawn upon. Early priorities, therefore, are important; adding to the commercial value of both the right and the land which it waters. Water rights, usually, are units of irrigation systems, owned and administered by associations of farmers; or, sometimes, based on contracts with irrigation corporations, which own the sources of supply, headgates, ditches, and reservoirs. These associations, or corporations, are given rights of appropriating water from streams, according to priority of the decrees of the courts, which adjudicate and declare them. This is the law, absolutely safeguarding the rights of water users.

Duty of Water. Dr. Elwood Mead defines the duty of water to be the quantity necessary to produce crops on a given area of ground. An approximate knowledge of the duty of water is as necessary in irrigation as a knowledge of a unit of value in finance of trade. The duty of water varies widely according to species of plant, quality of soil, condition of the field, season, seepage, evaporation, and intelligence of the farmer. One farmer may obtain 50 per cent greater efficiency with a given quantity of moisture than another. The production of crops by irrigation requires the best class of farmers, and, in return, the net profit is greater than on the same crops grown by natural precipitation of moisture.

Units of Measurement. There are three units of water measurement, which all farmers should understand fully. They are the *inch*, the *cubic foot per second*, and the *acre foot*.

Every inch is considered to be equal to an inch-square orifice under a five-inch pressure, and a five-inch pressure shall be from the top of the orifice of the box put into the banks of the ditch to the surface of the water; said boxes, or any slot or aperture through which such water shall be measured, shall in all cases be six inches perpendicular, inside measurement, except boxes delivering less than twelve inches, which

may be square, with or without slides; all slides for the same shall move horizontally and not otherwise; and said box put into the banks of the ditch shall have a descending grade from the water in ditch of not less than one-eighth of an inch to the foot.

The *inch* is the earlier unit adopted for the measurement of water, borrowed of the placer miner who first adopted it; and so we have in the vocabulary of irrigation the *miner's inch.* It is a practical unit for measuring small quantities of water, but it is not so for streams or great canals.

The cubic foot per second is the unit of volume for gauging rivers and measuring the flow of ditches and canals.

The volume of water passing over a weir (device for measuring water) in a second of time is measured in cubic feet.

The *acre foot* is a unit for measuring stored water. It is the quantity of water necessary to cover an acre to the depth of one foot; equal to 43,560 cubic feet. One cubic foot per second of water, flowing continuously for twenty-four hours, equals, approximately, two acre feet; so we have a means of converting cubic feet per second units into acre feet, or *vice versa.*

For the convenience of water users, all canal companies and associations of water users have "ditch riders," who distribute the supply equitably and economically among farmers who own rights.

The People's Electricity. The great Roosevelt dam of the Salt River Valley Reclamation Project at Tonto Basin, not only sends water out of the mountains for the irrigation of the plain below, but illuminates it far and away in town and country; and, in addition, furnishes power for the operation of street railways, pumps, mills, and other machinery in the Valley. This is the people's electricity, generated by the great force of the water at the dam, seventy-five miles from Phœnix. For the present, only 7,000 horsepower is generated, but the plans contemplate 27,000. Already, Phœnix takes 2,000 horsepower for street railway, illumination, pumps, mills, and other uses, and Glendale, Mesa, and Tempe proportionate quantities. On the mesa, the Government is using this power for pumping water upon Indian lands.

In the fulfillment of the plans of the United States engineers in charge of construction, the journey of the water, following its discharge from the dam, will be a story of utility. First, power is generated directly under the dam by a penstock already completed. Further plans contemplate a short tunnel seven miles below, primarily designed to save 7,000 feet of distance and the consequent loss of water by evaporation, and also to make a force which will generate 3,500 electric horsepower. Returning to the original riverbed, the water flows without interruption

for twenty miles, where its journey is to be again shortened, this time by a tunnel 3,500 feet long, which will add 2,500 electric horsepower. Again the water returns to the old riverbed, but, almost immediately, it will be diverted into a canal and carried on the hillsides for some miles, and then dropped a sheer 100 feet through machinery which will generate 5,000 horsepower. The water now will flow in the old riverbed so far as Granite Reef dam, where it is diverted into main canals on either side of the stream. On the south side 2,000 electric horsepower will be made immediately by the fall. On the north side, after flowing evenly for twenty miles, a drop of 126 feet makes an opportunity for from 3,000 to 5,000 horsepower. At another place on the north side, is a fall of 700 horsepower, and one on the south side again for the same quantity.

All this, of course, is in prospect, but it awaits only the demand for power; for the force of water now is running to waste, and it can be harnessed without impairing the usefulness of the project for irrigation. Having served the use of making power at the several tunnels and falls, the water flows without interruption on its mission of agriculture, until, finally, it all is taken up by the soil.

Private Reclamation Projects. It is estimated by authority of the United States Department of Agriculture that there are 1,000,000 acres of land, in the state, which may be irrigated from streams; and areas, not included in projects undertaken by the United States Reclamation Service, have been taken over by private enterprises. On some of these, substantial irrigation systems, already, have been completed.

An example is in the Verde Valley, Yavapai County, where 5,000 acres are cultivated, intensively, by direct flow from an abundant stream. In the same county, outside capital has bought 32,000 acres in Chino and Lonesome valleys, which will be irrigated from a storage reservoir to be fed by Willow Creek near Prescott.

In Maricopa County, the waters of the Hassayampa are to be impounded and turned upon a large area of the public domain, wherever settlers may take homesteads. In the same county, the flow of the Agua Fria has been appropriated by authority of law, and a canal costing $70,000 has been constructed for the irrigation of a tract of 3,500 acres near Marinette on the Santa Fe Railway.

In Mohave County, opposite Needles, California, a gravity project designed to water 40,000 acres, ultimately, is under way. This enterprise already is delivering water over some of the tract.

In Yuma County a private corporation has in contemplation a diversion dam in the Colorado River designed to irrigate lands. This project includes 300,000 acres in the Valley on both sides of the stream.

In Navajo County, gravity enterprises, already delivering water, or contemplated, have undertaken to irrigate small areas of the valley of the Little Colorado, and small tributary valleys. Along the same stream, eastward, lie lands in Apache County, which private enterprises has undertaken to irrigate. All of these are mentioned more in detail in the after pages of this brochure.

Irrigation by the Pump. The pump is coming to play an important part in the reclamation of arid land by irrigation in Arizona, as elsewhere in the West. In Maricopa County, the United States Reclamation Service already, is furnishing electric power from the great dam, which confines the waters of Salt River and Tonto Creek in Tonto Basin. Electricity, likewise, is available for pumping water for irrigation in Yavapai County.

Water for irrigation by the pump is available in Maricopa County from the underflow along the Hassayampa, the Agua Fria, the New, and the Salt rivers, in addition to water delivered by gravity from these streams; and in Yuma County along Bill Williams Fork. However, the greatest area in the state, where the pump has come to reclaim the soil, is the wide mesa of 50,000 or more acres, lying on either side of Salt River in Maricopa County. This is a part of the Salt River Valley Reclamation Project, and will be watered by electric pump.

The underflow along the rivers named lies at depths of less than fifty feet, and on the mesas the lift is little greater.

Artesian Water. Since 1885, there have been flowing wells in the southeastern part of the state, their discharge sufficient to irrigate about 12,000 acres. Lately (1911) good wells of artesian origin have been found in the Verde Valley, in Yavapai County, and the settlers design to use the water for irrigating; supplementing the canals from the river on the bottomland, and nourishing farms on the mesas.

Dry-Farming. There are in Arizona 26,500,000 acres of unappropriated and unreserved public lands, which may be pre-empted in units of 320 acres under the "Enlarged Homestead Act". These lie in "dry-farm" areas all over the state, but the more desirable are in the greater altitudes where annual precipitation of the moisture is greatest; as in the southern parts of Mohave, Coconino, Navajo, and Apache counties. Lands of the same quality lie in the national forests reserves, which spread over the northern portions of these counties, but, except in open areas they are not subject to entry.

MARICOPA COUNTY

The great seat of agriculture in Arizona is the Salt River Valley. This was so even in prehistoric times, when the Indians occupied Arizona. In this

valley, are found, even now, unmistakable traces of reservoirs and canals; and, also, the communal houses of tribes, which had settled in the country, and been scattered by subsequent invaders, centuries before the advent of the Spanish adventurers, led by Coronado in 1541. The remains of no less than 150 miles of these canals have been traced by archaeologists in the Salt River Valley. These canals, evidently, were designed to water 250,000 acres of land, although it is not probable that the whole area was watered at any one time; an area even greater than that designed to be irrigated by gravity in the valley in the present period. In the ruins of habitations of grouted clay are found, preserved through the ages in the arid atmosphere, relics of corn, cotton, beans, tobacco, and squashes. Succeeding these prehistoric people in the possession of these valleys, the Pima and Papago Indians have continued to farm the soil by artificial irrigation.

Irrigation by Americans in the Salt River Valley began following the close of the Civil War, when military occupation was resumed; the army posts affording settlers security from Indian depredations, and fair prices for their products as well. The first canal was constructed in 1867. Dams and ditches, however, were crude, and the annual precipitation of moisture in the mountains, and the consequent flow in the stream below, so irregular, that there never was any certainty of what the river would do. Even excessive rains caused drought; for floods meant the loss of dams, leaving the planted fields without moisture.

Finally, the dry years of 1898-1904 caused the settlers to get together in an organization, which led to a discussion of remedial measures. From this grew the National Irrigation Congress, which caused the Congress of the United States to create the United States Reclamation Service, designed to conserve the floods and reclaim the desert throughout the West. By this legislation, the United States, already, has undertaken projects which will cost 70 million dollars, and its greatest gift so far completed is the Salt River Valley Project. Before this project was undertaken by the United States Government, land here was offered for $30 per acre; now, since the completion of the great reservoir in Tonto Basin, storing a year's supply of water ahead, and delivering it evenly and equitably upon fields, garden, meadow, and orchard, unimproved land sells for from $75 to $100, and improved land for from $100 to $200; even $1,000 for good orange groves.

Salt River Reclamation Project. The great Roosevelt dam, which the United States Reclamation Service has constructed at Tonto Basin, below the junction of Tonto Creek and Salt River, for the Salt River Valley Reclamation System in Maricopa County, is the most massive so far completed by either government, or private, enterprise in the United States. It is a gravity dam, the blocks of stone of which it is

made are of stupendous size and weight, and quarried from the granite hills hard by. It is an arch of rubble masonry, with a radius of 400 feet, built for all time, and designed to hold behind it 1,284,200 acre feet of water in a lake covering, when full, a surface of 16,329 acres. The depth immediately above the dam is 220 feet. The dam stands 284 feet above its foundation, which is sunk thirty feet into the bedrock. At base, the dam is 168 feet thick, and at top twenty feet. The length of the wall at riverbed is 235 feet. At top, is a roadway for the passage of vehicles 1080 feet long, including bridges which span the sillways on either side. This roadway is protected by parapet walls. The dam is completed and delivering water.

On the plain below, canals are to be extended and widened; electric wires strung across the mesa, and pumps installed; tunnels bored along the river, and at the several tunnels and the several falls of the canals machinery for generating electric power installed. All this will take some time, but for the purpose of irrigation, and even of electric power, the project even now is capable of delivering more water and more power than the present demand. The demand will increase with the growth of population, which means more land to be irrigated, and more machinery to be driven. Already, all of the water possible for the irrigation of land under the project designed to be irrigated by gravity is conserved by the dam, and the installation of more generants, when the pump begins to perform its full part on the mesa, is only a matter of time and expense, which will be more than met by increased revenues. Indeed, the revenues from the electric power are expected to pay the expense of the maintenance of the whole project. For it is calculated that the full 27,000 horsepower, which the dam, tunnels, and canals are expected to generate, at $50 per horsepower, will bring in a gross annual revenue of $1,350,000.

The project complete contemplates an expenditure of $10,200,000, and about 95 per cent of the work has been done. The area contemplated to be given water by gravity is 200,000 acres in round numbers, and by pump 50,000 acres. The canals ramify over nearly 400 square miles, and the levels which cannot be given water by gravity will be supplied by pumps from the abundance which lies in the ground at shallow depths.

Electric power was turned on in October, 1909, when the Phœnix street railway began to use it. Since then, other contracts have been made with the Reclamation Service for various uses of the power, and the Government itself is using it for pumping water for irrigating the Indian lands. This power, also, is used for pumping water upon a tract of 3,500 acres in the valley of the Agua Fria, near Marinette on the Santa Fe Railway, in the northern part of Maricopa County. Really, this electricity, in the full

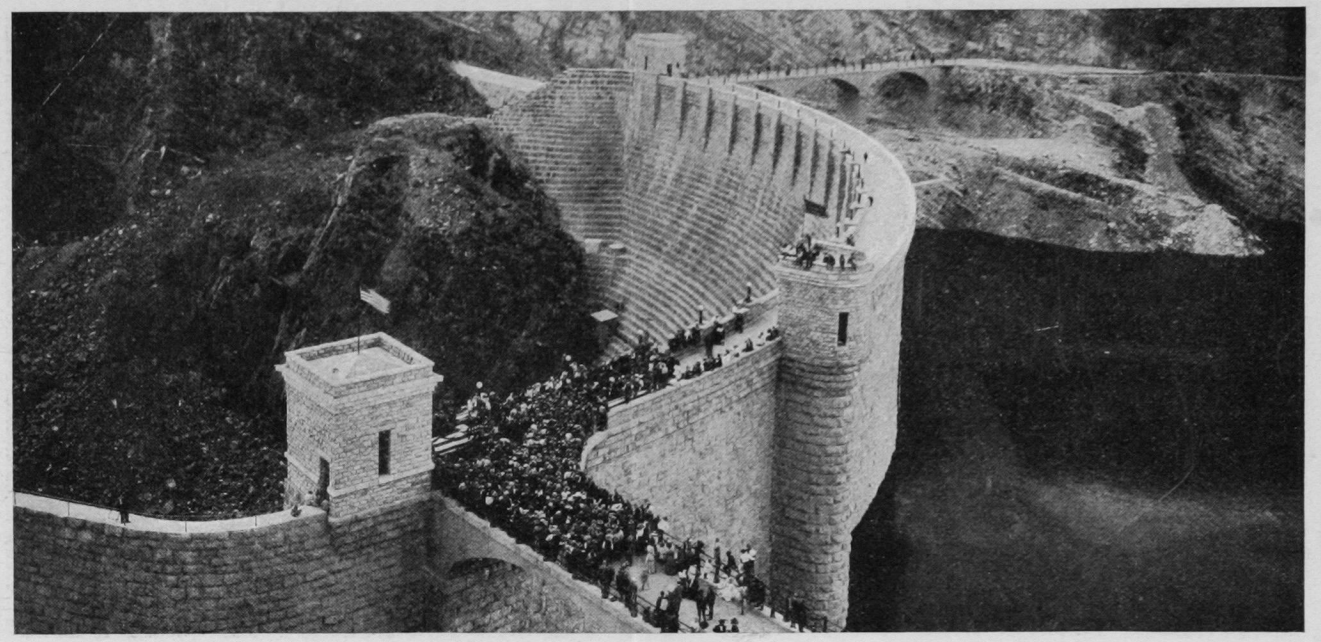
development of its usefulness, will come to be no less a factor in the reclamation of the soil by irrigation, than the river itself.

Production. Production in the Salt River Valley varies with the season, soil, and intelligence of cultivation. The extremes per acre are:

Alfalfa hay	6 to 12 tons
Alfalfa seed	65 to 650 lbs.
Barley	1,800 to 2,500 lbs.
Wheat	1,500 to 2,400 lbs.
Barley hay	4 tons
Wheat hay	3½ tons
Sugar-beets	9 to 19 tons
Potatoes	3,000 to 15,000 lbs.
Watermelons	13 tons
Cabbage	14,000 lbs.
Onions	5,000 to 20,000 lbs.
Tomatoes	10,000 to 27,000 lbs.
Cantaloupes	100 to 345 crates
Strawberries	3,500 to 14,000 ¾-lb. boxes
Egyptian cotton-lint	400 to 1,000 lbs.
Corn	2,000 to 2,800 lbs.
Seedless raisins	6,000 to 8,000 lbs.
Oranges (young trees)	½ to 5 boxes per tree

Little Landers. The Salt River Valley is destined to become a land of Little Landers. The soil is so fertile that intensive cultivation is the way to make the most of it, and twenty acres are enough for even the most industrious man. If he undertakes more, he must employ help, which means waste; for work done by hire ordinarily is not well done. If a settler has little money, he would better begin with ten acres. Really, a market garden of five acres, if it be intelligently and providently planted, beats all other farming.

An example of "a little land well tilled" was the enterprise of H. J. Biggs, who since has died, a newspaper man who came from Los Angeles to the Salt River Valley for his health. Mrs. Biggs came with him. He chose the soil for his livelihood, and, buying ten acres, began to derive an income after the first three months. Following this, besides their own living, he sold from $800 to $1,500 of produce, yearly. He began with so little money that the neighbors helped him to plant; one even sending his foreman to plow five acres and sow it in alfalfa, nursing the early growth with oats. The oats saved the alfalfa from the heat of the sun, and kept the pot boiling besides. In the second year, this alfalfa was cut every thirty days for eight straight months. Mr. Biggs helping, they planted five acres of oranges and grape-fruit, and the trees began to make money in 1911, although after the death of Mr. Biggs. Between the rows of trees sweet corn was planted, and roasting ears sold. Before Mr. Biggs died, they built a bungalow, with all modern comforts, costing $2,000, and surrounded it with graceful drives and walks, bordered with date palms and pepper trees, alternating; and in nooks they had rose gardens and pansies, and violets, and lilies, and carnations, which they cut, selling them in town.



THE GREAT ROOSEVELT DAM—SALT RIVER VALLEY

Everything was turned into money on this ranch, and in the spring of 1911, three years after it was started, it was sold for $700 per acre.

This is not a mere *instance;* it is an *example* of what all industrious and resolute families may do here, if they turn their hands to it. So many settlers here seek a little land, with a will to till it well, that the owners of great ranches are dividing them into small tracts, and selling them on easy terms; even planting the ground ready for settlers to begin with assured incomes.

More than One Crop a Year. The soil of the Salt River Valley, if intelligently planted and cultivated, will grow five different crops, annually, on the same acre.

P. I. Edson, a business man of Phœnix, experimented with two, and he found that the labor, for the returns received, was less than the single crops of his neighbors. Of course, where two crops are produced, they must be plants which will grow quickly. He selected for his first crop irish-potatoes, planting February 10, and digging May 10. On this crop he made a profit of $100 per acre. The potatoes out of the way, he plowed the ground and let it rest without irrigation until July 25, when he planted corn. October 15 he had roasting ears for market, and his profits were $60 per acre. Really, he made three crops on this land, sowing wheat between the rows of corn, which made good pasture.

Mr. Edson, that year, also, followed corn with watermelons on the same ground, making $125 per acre. At other times he has followed melons with beans, and the beans with cabbage, and the three, severally, have made good money. However, to do so he ran the year into thirteen months. Fancy a crop of melons, then a crop of beans, and then cabbages from the same ground, all within thirteen months!

In 1911, George Alkire, whose postoffice is Phœnix R. F. D., planted fifty acres of oats. He planted in January, and in May harvested sixty-three bushels per acre. The crop sold for $43.45 per acre. In August, he planted corn on the same fifty acres, and the yield was more than fifty bushels per acre. Much of this corn sold at fancy prices for seed, but average runs of the crop sold on the market for from $1.75 to $2.25 per hundredweight.

Alfalfa, Melons, and Fruits. The three leading products of the Salt River Valley are alfalfa, melons, and orchard fruits. Alfalfa is the mainstay, and the other two come close up. If alfalfa be grown for seed, two crops are cut and threshed. Before this, one crop is cut for hay, and one afterward. The straw of the seed crops makes an inferior hay, but it is marketable. The first crop of seed is 500 pounds per acre, and the second 300 pounds, selling for thirteen and three-fourths cents and fourteen and one-half cents per pound; or something like $125 per acre. This is one of many records. Often a farmer does not do so well, but he can if he will try intelligently. The best of the hay sells for from $10 to $14 per ton. If a farmer

A TYPICAL ORANGE GROVE, SALT RIVER VALLEY, ARIZ.

hires his work done, the expense of growing alfalfa is about $27.75 per acre. The yield is about eight tons per acre, annually, which at the low price of $10 per ton is $80. This leaves a profit of $52.25 per acre.

In 1908, the Glendale cantaloupe growers organized an association. That year they planted 157 acres, which yielded 57 carloads, or 20,000 crates.

Ralph Murphy, of Glendale local, planted twelve and a half acres of cantaloupes in 1911, and the returns less shipping expenses, were $6,484. The expense of picking, packing, and crates, was $1,243.34, or $99.46 per acre; net profit of $419.21 per acre. The labor was hired. A farmer doing his own work might have made $22 per acre additional profit. One carload of these cantaloupes sold in Boston for $5.35 per crate. This is rather high for cantaloupes, but such is the Salt River Valley cantaloupe.

Orange groves begin to make good money here in their sixth year. In 1909, the late George W. Cowgill, Secretary of the Phœnix Board of Trade, published statistics of production, as follows: Fourth year, one-fourth of a box per tree, or 19 per acre; fifth year, one-half box per tree, or 38 per acre; sixth year, 152 boxes per acre; seventh year, 228 boxes per acre; eighth year, 266 boxes per acre; ninth year, 304 boxes per acre; tenth year, 456 boxes per acre. These yields sold for from $836.32 per acre in the sixth year to $2,580.96 in the tenth. Salt River Valley oranges ripen in time for the Thanksgiving trade in New York.

Of the deciduous fruits grown in the Salt River Valley, the peach is of the first importance. There are thirty-five or forty different varieties, and they ripen in order from the first of May until December. Early peaches sell for fifteen cents per pound, and later ones for eight. The average of a season is about five cents. The most of the peaches are free-stones.

The olive also is profitable in the Valley. The olive oil manufactured here took a gold medal at the St. Louis world's fair. Olives, also, are preserved, green and ripe. A well kept olive orchard here, trees planted forty per acre, will yield from $400 to $700 per acre. The fruit is sold on the tree, the buyer picking it. Picking begins November 1, and ends March 1. Between the rows of young trees, alfalfa is grown.

In addition to citrous fruits and olives, pears, plums, apples, crabapples, apricots, nectarines, cherries, quinces, figs, grapes, blackberries, raspberries, loganberries, dewberries, and strawberries are grown here for the market, and mulberries for the birds. All fruits make money, and are a valuable aid in making the family's fortune.

Strawberries. P. I. Edson, whose experience in growing two or three crops on the same ground in the same year is related elsewhere, also, tells of strawberries. This crop is exacting of one's time, but since the berries arrive when the temperature is mild, the work is not minded. Picking begins March 1, and continues until June 15, even later. If the season be

ONE VIEW OF THE HOTEL, CASTLE HOT SPRINGS, ARIZ.

favorable, the berries bring $600 to $800 per acre; but, no matter what the season may be, the crop always makes a good profit.

Poultry. December 1, 1910, C. H. Tidd, whose postoffice is Phœnix, R. F. D., began with 110 white leghorn hens. Of the increase the subsequent season, ninety-five were pullets. In August, 1911, he sold some old hens, and he began the next season with 150 hens in his flock. From December 1, 1910, to December 1, 1911, he sold 15,564 eggs. Of these, 4,249 went to the incubator trade for hatching, and the others were sold to the stores for from fifteen to fifty cents per dozen. For all the eggs sold that year he received $394.50, and for hens and friers $85.45, a total of $479.95. All this, besides chickens and eggs used by the family.

C. W. Alexander of Tempe, secretary of the local egg and poultry association, makes his living and much money to spare by poultry. He has four or five cows, a span of horses, and some orchard, but his business is chickens. He sells only poultry and poultry products. He has fifteen acres of land, ten of which are in alfalfa, and the chickens have the run of it. His flock numbers from 1,500 to 2,500 hens, according to circumstances, and their feed, mainly, is alfalfa. Once a week, he hauls grain from town. During one year he sold eggs for $3,417.26, and roosters and hens for $450; total $3,837.25. He paid for feed $1,724; for hens and pullets, $225, and for day-old

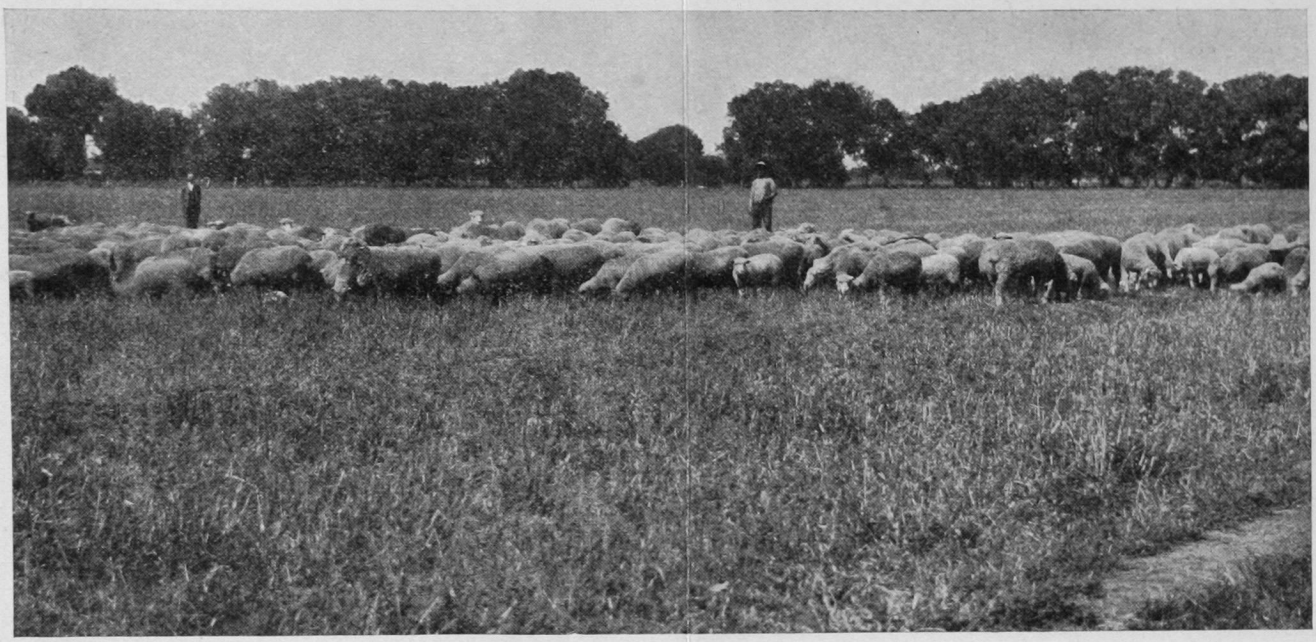
chicks $135; total $2,084. This left a net profit of about $1,800.

Eggs retail to customers of the stores of Phœnix for thirty-five, forty, and fifty cents per dozen, and hens lay the year through, feeding on green alfalfa.

The Dairy. The dairy is very profitable here. In Salt River Valley, cows may have green feed nine months of the year, and, if a dairyman be foresighted and provident, he may stretch it out to twelve months, by the addition of a little hay. C. T. Hirst, a reputable citizen of Phœnix, testifies that for three seasons, following the first calf, a Jersey cow, has returned from $100 to $125 every season, besides milk used by the family. This cow is given dry feed wholly (alfalfa hay and bran). During the month of November, 1911, Mr. Hirst sold $33.75 worth of milk from this cow, and the family used from four to seven quarts, daily. The hay cost $7, and the bran $3. The milk was sold for eight and one-third cents per quart.

One herd of ten high-grade Jersey cows, which Mr. Hirst knows of, averaged a little more than a pound of butterfat, daily, per cow. Some of the best cows of this herd gave more than 500 pounds of butterfat, annually. This was sold for from thirty to thirty-five cents per pound, making the best cows return $170 per head. The average per cow was $124.

Mr. Hirst tells of a herd of sixteen cows and five two-year-old heifers, which in 1910 yielded 13,870 gallons of milk. The sales from these were 4,550



SHEEP AND ALFALFA A PROFITABLE COMBINATION

gallons of milk; 1,105 quarts of cream, 438 gallons of buttermilk, 2,417 pounds of butter, besides 500 gallons of milk, and 125 pounds of butter used by the family. The cash receipts for milk, cream, and buttermilk were $2,914, and for calves sold $420; total $3,334. The feed cost less than $1,000, leaving a net credit to the cows of $2,334. In 1911, the same cows earned a net profit of $2,635. The farm contains twenty-five acres. The entire care of the herd is the work of one man. If the product of a dairy farm be sold to a creamery, the profits are less, but the labor is less as well.

There are many splendid dairy herds in the Salt River Valley, including thoroughbred Jerseys, Holsteins, Ayershires, and Durhams. The greater portion of the products of these herds is sold directly to the creameries. The dairyman separates the cream, and the creamery wagons call for it. The milk is kept at home for the calves and pigs. The wagons call all over the district.

Another advantage of the dairyman in this mild climate is that expensive barns and other shelter is not necessary. It only is necessary for the farmer to have a clean milking place. The most of the farmers milk in open corrals. Dairy cattle break all records here, if the breed be superior, and they be properly nourished and otherwise given good care. This and the mild climate give the dairy cow a proper chance to earn a living for the family and something to spare. Twenty-five cows and 100 acres of land will make

$1,500 a year clear. A good, average cow will make from $75 to $108, yearly, in milk and butter. Three-year-old cows with second calf properly nourished will give nine gallons of milk daily.

Cities of the County. Phœnix, which, since the completion of the Salt River Valley Reclamation Project, has been making rapid strides, is the most beautiful city of the Western Mountains and the pride of the state. It is a city of handsome architecture, imposing public edifices, enterprising business men, and cultured people. There is not a more intellectual community in the entire country. The churches are numerous, and the public and other schools the best. The climate is superb. For summer rest many families go to Iron Springs and Flagstaff; and for the winter to Castle Hot Springs, fifty miles distant.

For the present, the journey to Castle Hot Springs, from either Phœnix or Prescott, is made by the Santa Fe and automobile; but before long a graded highway will be completed directly to the springs. In the winter of 1912, while the weather was 22 degrees below at Kansas City, it was 65 above at Castle Hot Springs; and the temperature of the springs, and the outdoor pools which they feed, was 115. In the winter every day at the springs is suitable for outdoor life, and the sun-cure is found in a little park set with orange and lemon trees, yellow with ripe fruit, surrounded by pepper, palo verde, and palm trees; at one end American

AN ARIZONA TRUCK FARM

Beauty roses in full bloom, a growing vegetable garden in the distance. This in December, January, and February at the altitude of 2,100 feet above the sea! The waters of the springs are a cure for rheumatism, or neuritis, if resorted to in time.

For information of the curative waters of these springs, address the manager, Castle Hot Springs, Ariz.

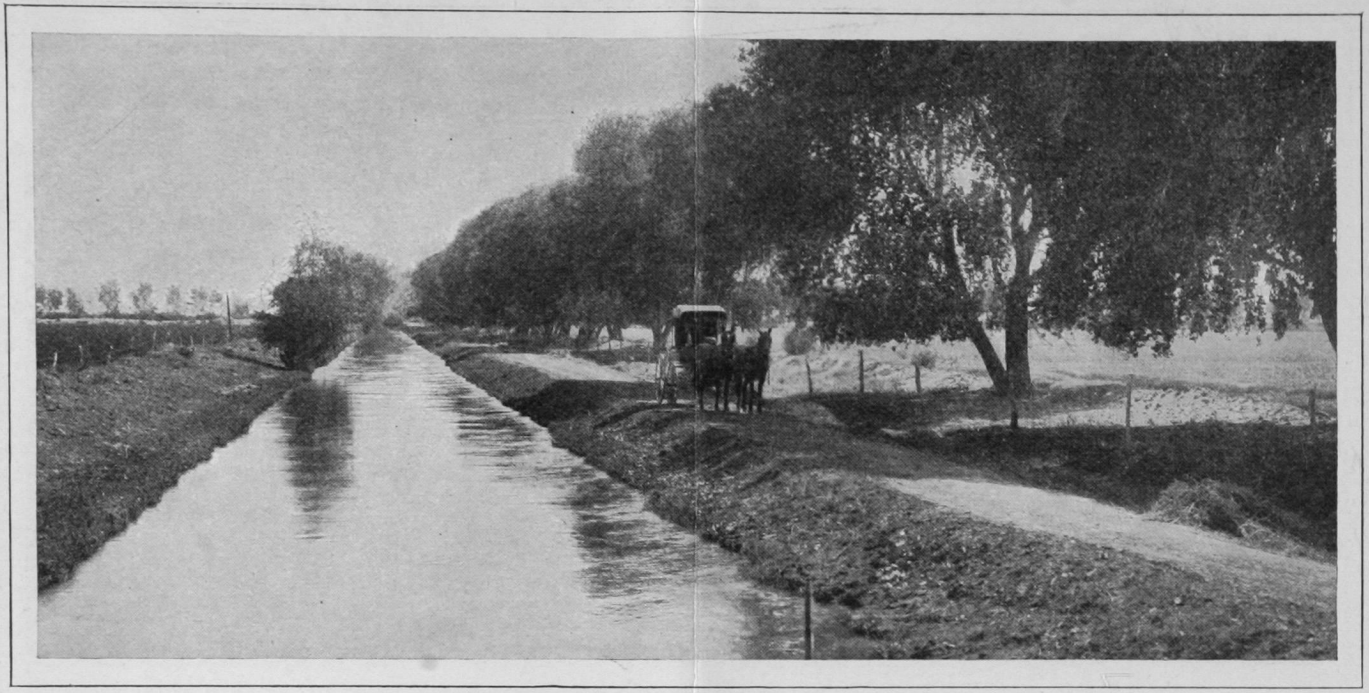
Other good towns of the county are Glendale, Buckeye, Mesa, and Tempe.

YAVAPAI COUNTY

Yavapai County, which lies at altitudes of from 3,800 to 5,500 feet, until now celebrated only for its mines, lately has become a part of the domain of agriculture as well. For many years the valleys of the county have been cultivated by gravity irrigation from the streams, and settlers now are growing crops by "dry-farming" on the upland. Indeed, there is so much water underlying these plateaus, that the pump has come to help settlers in their work of subjecting them to the uses of agriculture.

Verde Valley. In the Verde Valley, in the eastern part of Yavapai County, water from the river has been appropriated for 5,000 acres. The farms lie along the stream under the low mesas, beginning at Upper Verde, and ending at Lower Verde, a distance of thirty miles. The most cultivation lies between Cottonwood postoffice and Camp Verde. Outlying eastward, are smaller valleys, as Oak Creek, Beaver Creek, Clear Creek, Fossil Creek, and East Verde River valleys. In the Red Rock district, Henry Schuerman, an old German, has a grape vineyard, from which he has been making wine, selling it at Jerome, for many years. The altitudes of the several districts are Upper Verde 3,300 feet; Camp Verde 3,000; Lower Verde 2,800. The altitude of Jerome, where the famous United Verde Copper mine and smelter are located, is 5,000 feet.

The farms along the river, with their water rights, are held at from $100 to $200. On the mesa, westward, lie 10,000 acres of the public domain which may be homesteaded; land office Prescott. At the base of the foothills, which rise above this mesa, springs break out. One of these, the Haskell spring, irrigates twenty-five acres of orchard, and ten acres of garden. This ranch, lately, has been sold to W. A. Clark, owner of the United Verde property, who paid $10,000 for it. Springs also break out of the base of the mesa, notably one on the ranch of C. B. Hopkins, a civil engineer. In the bottomland, below the mesa, artesian water has been discovered, and the flow seems to be abundant. It is believed that this water will be found on the mesa. Deeded land on the mesa is held for $20 per acre. The public domain may be taken under the Homestead Act. The important market for the farm products of this valley is Jerome on the mountain, population 3,000, six miles east of Cottonwood postoffice. In the valley east of Jerome a new smelter is to be built. This is designed to have a capacity of



A TYPICAL CANAL, SALT RIVER VALLEY, ARIZ.

three times that of the present smelter. It will smelt, not only United Verde ore, but ores which will be bought of other mines. A town will be built at the new smelter. The new smelter, including railway tracks, will cost $3,000,000. The Santa Fe is building a branch line down the valley from Cedar Glade station, a distance of forty miles. This will cost $1,500,000. For the present, the southern terminus will be the smelter; but, inevitably, the line will be extended into the farming districts.

The soil of the Valley grows apples, peaches, pears, alfalfa, indian corn, barley, wheat, oats, irish potatoes, sweet potatoes, cabbages, squashes, carrots, celery, cauliflower, beets, onions, grapes, strawberries, pumpkins, and so on.

Apples are the pride of the Valley; a full-grown tree producing ten or fifteen boxes. The trees are planted fifty per acre, and the price, delivered at Jerome is from $1 to $1.50 per box. A Phœnix dealer, who regularly buys apples in the Valley, paid $7,000 for the crop of one orchard in 1911, "guessing it off", and picking it himself.

Alfalfa yields about five tons per year, worth, baled, at Jerome $18.50 per ton. The meadows are cut four or five times, yearly. Products of the Valley are shipped by railway from Jerome on the hill, to Prescott and southward even so far away as Phœnix. Shipments also are made to Flagstaff on the Coast Line of the Santa Fe, and by wagon into the mountains.

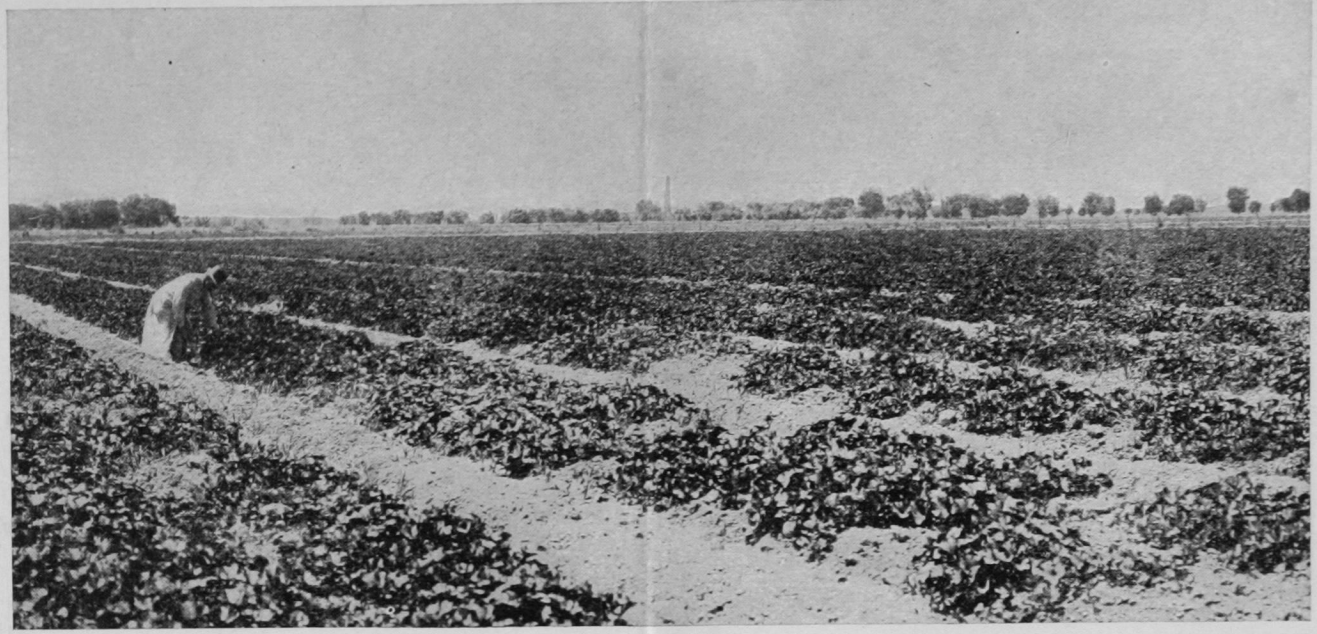
On the farm products, of course, are not worth as much as at Jerome. The difference is the wagon haul.

For example, at Camp Verde, ten miles south of Cottonwood, the price of alfalfa on the farm is only $11.

C. C. Calloway, who owns 200 acres here, variously planted, sold $7,000 of his crop of 1911, and in January had stuff left. From forty acres, he took forty tons of indian corn, which he sold for two cents per pound. At present the products of the Camp Verde district are hauled over the mountains by wagon to Dewey, a station on the Santa Fe Railway, and shipped to Prescott.

Dry-Farming. Northwest of Prescott, lie on the upland broad open valleys, where in the fall of 1911 settlers homesteaded 7,000 acres. For some years, small areas of this plain have been farmed, and so new settlers have certainty of success to begin with. These valleys are Williamson, Lonesome, Big Chino, and Little Chino in the north, and Skull in the south. For the present, these valleys, mostly are owned by cattlemen, their ranch houses set in bottomland, and their herds running in the mountain pastures. The lands in the northern portion of the valley, if for sale, may be bought for $20 per acre, taking hill with valley. They are underlaid with shallow water, which rises to the surface in lower trends forming running streams. Once in cultivation, and the soil conserved by "dry-farming", these farms make good crops. In Skull Valley, which lies south of Prescott, where cultivation is older and farms more numerous, lands, probably, are held for more.

In 1909 the brothers Lee took over the American



A STRAWBERRY FARM THAT HAS MADE ITS OWNER INDEPENDENT

ranch of 300 acres of arable land ten miles northwest of Prescott. They found a neglected orchard, which they pruned and cultivated. This orchard contains one and a half acres, and the gross from it in 1911 was $1,500. Indian corn grown on forty acres of this farm averaged twenty-five bushels per acre in 1911. On ten acres they grew 10,000 pounds of milo-maize, which they sold for two cents per pound. This was by "dry-farming". The ranch is underlaid with water, which, in wells twenty feet deep, rises, in the driest periods, to within seven feet of the surface. The Lees contemplate the irrigation of much of the land by pumps.

George Murray, in the Agua Fria district, about eight miles east of Prescott, has 160 acres of land. Eight acres are in apples. From 1,000 apple and pear trees, he produced $4,000 worth of fruit in 1911, when the trees were five years old.

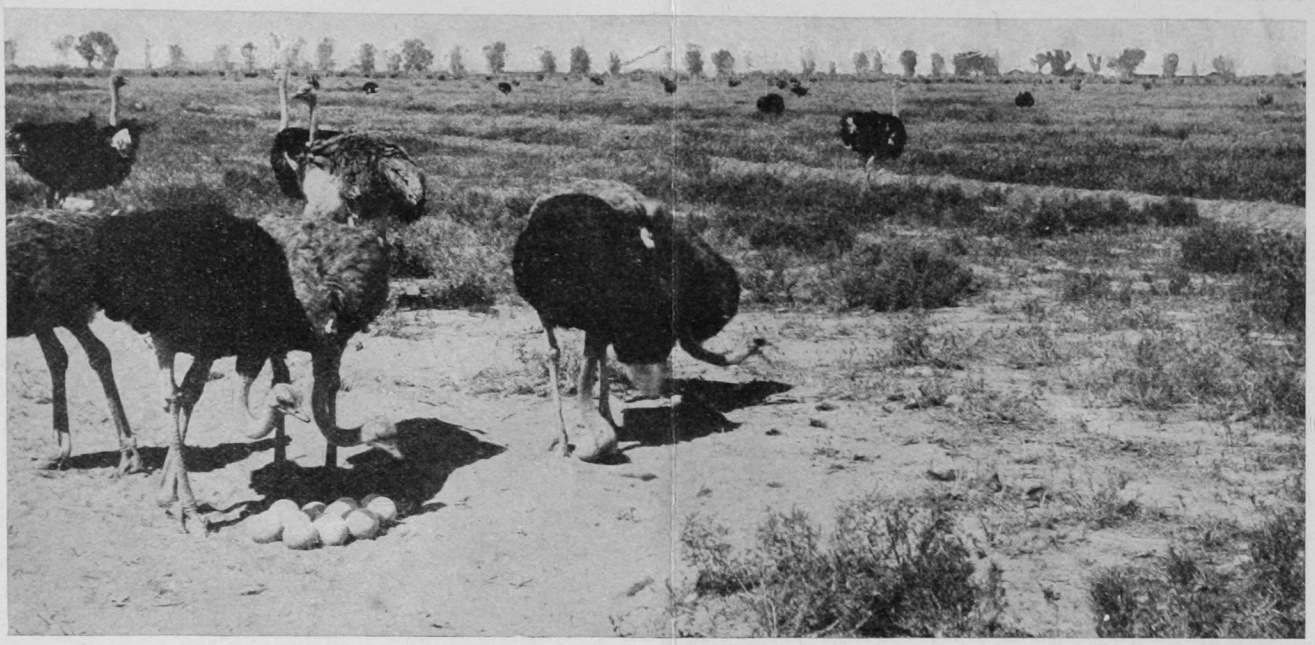
In 1909, D. M. Wynkoop purchased 800 acres, five miles north of Prescott, for $5,000. He found good water at a depth of thirty-five feet, sufficient to irrigate a garden of eight acres, which in 1911 made him more than $1,000, besides furnishing his table. Ten acres of potatoes made $2,000. In November last Mr. Wyncoop sold his ranch for $20,000 cash.

S. S. Reed, a New England farmer of Williamson Valley, homesteaded 160 acres in 1909. He is growing cattle and hogs, and feeds with corn and sorghum produced on his own land. His yellow dent corn took the silver award at the International Dry-Farming Congress.

There is an abundance of water in Williamson Valley, Lonesome, and other valleys here, for growing indian corn, hay, milo-maize, sorghum, and deciduous fruits. Timothy hay and red top clover yield two tons per acre, yearly. Mexican pink, bayous, white navy, kentucky wonder, and other varieties of beans, make a splendid and almost absolutely sure crop both on dry lands and on the irrigated areas of Yavapai County. These varieties sell in the Prescott and Phœnix markets at five cents per pound.

South of Prescott, traversed by the Santa Fe Railway, is Skull Valley, where famous orchards produce prize apples. The land here mostly is in private ownership. Apple orchards in this Valley yielded, in 1911, something like $500 per acre.

The Dairy. Fred Mickle, a dairyman, who owns thirty acres and rents forty in the Verde Valley, came to this Valley in 1907 without a dollar. He rented land and bought holstein cows and hay on credit in the beginning, and now he owns thirty acres of land and 100 holstein cows. The cows are worth $110 apiece, and each produces $85 yearly. In the winter of 1911 the cows gave 140 gallons of milk, daily. For milk he gets eleven and one-half cents per quart, and for the cream fifty cents per quart, delivered to



SCENE ON AN OSTRICH RANCH, SALT RIVER VALLEY, ARIZ.

customers, who live at Jerome. He has refused $11,000 for his farm.

Joe Matli, a dairyman, on the upland in the Williamson Valley, leased a few acres of land in 1901. He had little capital, but was an experienced dairyman. After four years, he bought a piece of land for $11,000, and in 1910 made another purchase, bringing his ranch to 800 acres. From 120 holstein and durham cows he makes 350 pounds of butter, weekly, in winter, which sells for forty cents per pound; in summer 650 pounds, which he sells for thirty-three cents per pound. Besides making this quantity of butter, he supplies many customers with milk and cream.

With an average of 325 hens on this ranch, during the last ten years, Matli made $600 per year. His eggs sell in Prescott during the summer for an average of thirty-five cents per dozen; in winter fifty cents per dozen.

These are examples only of the profit of dairying here. There are other dairies in the county which make no less money. In Del Rio Valley, Fred Harvey, who conducts the Santa Fe Railway's hotels and eating houses, has a dairy farm of 1,000 acres.

Cities of the County. Prescott, a city of 5,000 inhabitants situated at an altitude of 5,300 feet, is completely surrounded by mountains. It is a city of beautiful architecture and hospitable homes. The educational facilities are equal to the best in the state. The people are cultured, and famous in the state for social leadership. Fort Whipple, where a detachment of the United States military is stationed, augments society here. Ninety-two per cent of the population of the city is Caucasian.

Another city in the county is Jerome. This has been built by population drawn by the United Verde copper mine. This city has 3,000 inhabitants, and is supported by the mine and smelter, and, lately, somewhat by agriculture in the Verde Valley. The city has a perfect system of schools.

YUMA COUNTY

South of Parker, in Yuma County, where the Santa Fe's short line from the Salt River Valley to Los Angeles crosses the Colorado River, lies the Colorado Indian Reservation, and below, this, a large area in private ownership. The Reservation lies mainly on the Arizona side of the stream, and the other mainly on the California side. The Reservation contains, approximately, 180,000 acres, and the other, approximately, 120,000 acres. On the California side, crops have been grown by irrigation from the river for many years. On the Arizona side, the Government has tried to make farmers of three generations of Indians with ill success; and now it has been determined to allot land in the northern end of the Reservation, giving the Indian farmers a powerful pump and canals and ditches. For this purpose the last Congress granted an appropriation of $50,000: the machinery,

DAIRY COWS IN ALFALFA PASTURE, SALT RIVER VALLEY, ARIZ.

already, has been delivered. This soil, proved by results on the California side, produces the same crops as are grown in the Salt River Valley, and in equal abundance. Since there is more land in the Reservation than the Indians can use, the Government's next step, will be the sale of the surplus to white settlers.

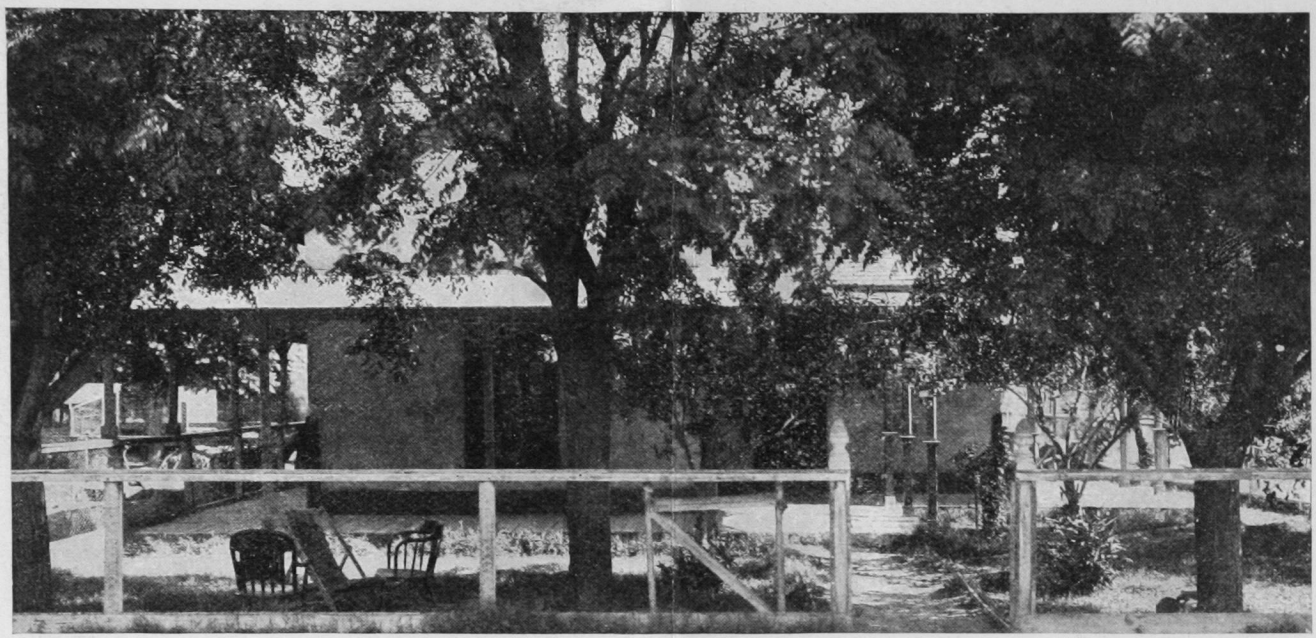
For the irrigation of the land on the California side, immediately, and of that on the Arizona side, ultimately, a private corporation has been granted a franchise by Congress for the construction of a barrage across the Colorado some miles north of Parker, by which water will be diverted on either side of the stream, and delivered by canals far and away over bottom and mesa. There is abundant water in the Colorado for the irrigation of all land south of Parker within possible distribution by gravity. Two million acre-feet, annually, are sufficient for this district, and the river at Parker carries a safe average of 12,000,000 acre-feet. The watershed of this great stream is 300,000 square miles. Great quantities of silt are carried in suspension by the stream, and this is carried by canals and ditches wherever the land is irrigated from the river, constantly enriching the soil.

MOHAVE COUNTY

An irrigation project, designed to reclaim 26,000 acres of the Colorado River Valley, opposite Needles in Mohave County, has been undertaken by a private

enterprise incorporated as the Colton Land Company. The scheme is to irrigate 8,000 acres of the corporation' sland, 8,000 acres of government land, and 10,000 acres of Indian land. Already, there have been completed seven miles of main canals and levee, and nine miles of ditches; and six miles of main canals and ten miles of ditches are under way. The corporation has sold something like 3,000 acres for from $45 to $60 per acre. This includes stock equal to about five acre-feet of water per acre, annually, which is abundant for all crops. Added to the original cost is the expense of clearing and grading the ground, which is from $5 to $15 per acre. The soil grows alfalfa in great abundance. All small grains and the early varieties of indian corn make fifty or sixty bushels per acre. It is possible to grow two crops of grain, annually, on the same acre; planting small grains not later than February, and early corn the latter part of June, or the first of July.

The Secretary of the Department of the Interior will add a part, or all, of the Indian lands to the project, paying $25 per acre, whenever allotment be ordered; and surveys giving fifteen acres *per capita* to the Indians have been made. Five acres will be held by the Government to be sold for the benefit of the several allotees. Besides the 26,000 acres, there are about 14,000 acres of other lands, which, by extension of the canals, might be given water from the dam. There is abundant water in the river. The main office of the corporation is at



A TYPICAL ARIZONA BUNGALOW

Needles, just over the river in California. The Coast line of the Santa Fe Railway crosses the river here.

COCONINO COUNTY

In Coconino County, which is traversed by the Coast Line of the Santa Fe Railway, and its Grand Canyon branch, and includes the good towns of Flagstaff and Williams, and the Grand Canyon, and the country beyond to the Utah line, the surface rises to great altitudes. Here, the annual rainfall increases, and, on the plateaus outlying from the bases of the short chains of mountains, good crops are grown without the aid of artificial irrigation. At Flagstaff, for example, where the altitude is 6,870 feet, the average annual precipitation of moisture since 1894 has been 23.87 inches, and the same quantity no doubt falls over the plateaus which surround the San Francisco mountains.

Sharlot M. Hall, State Historian of Arizona, who explored Coconino and Mohave counties, even the "Arizona strip" lying north of the Grand Canyon, in the summer of 1911, found farms and permanent homes in the little parks and open valleys of the forest. Originally, this district was given over to cattle and sheep, but since 1908 settlers have been taking land here for farms. Outlying from the San Francisco Mountains, she found late in July green fields of oats and barley, and in the little parks of the Mogollon Mountains, potatoes in blossom. For many years Arizona's best potatoes have been grown in the Mogollons. Over the area traversed by Miss Hall, heavy

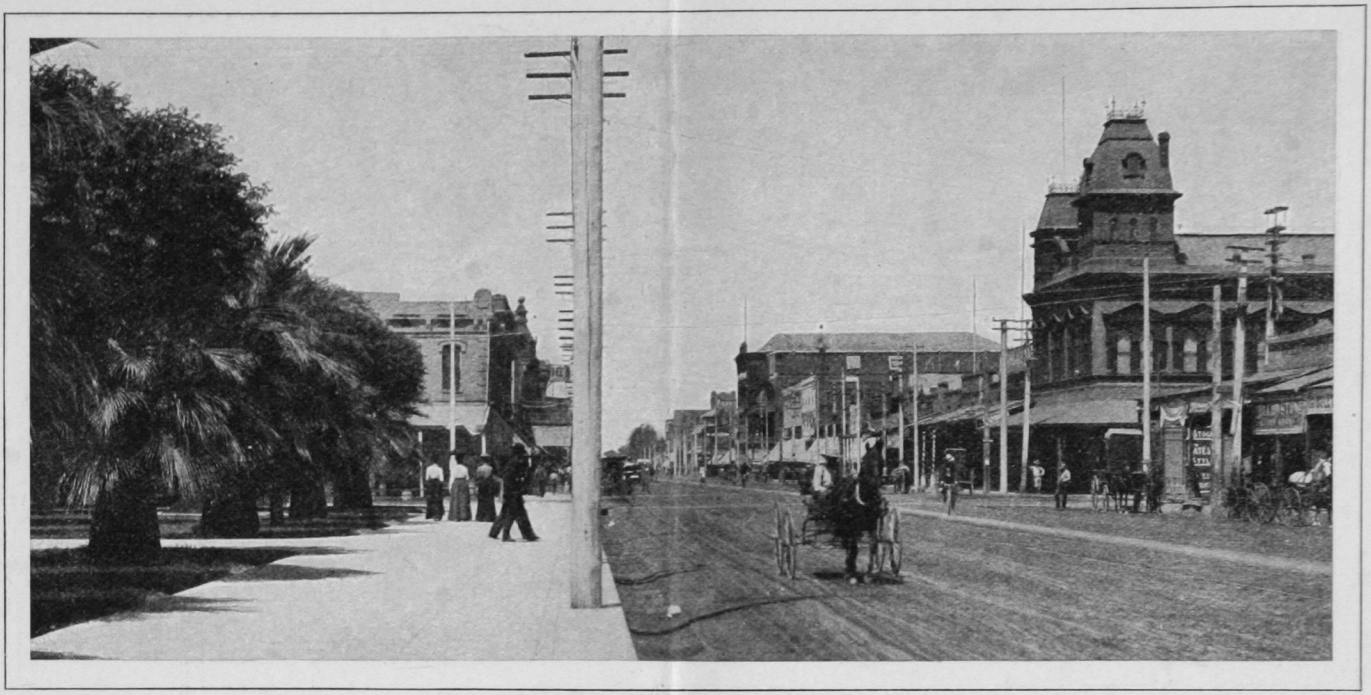
showers fall frequently; in the summer, almost daily. These rains, besides nourishing the soil for growing crops, keep the pastures green for livestock.

These rains also make it possible for heavy growths of forest, and at Flagstaff and Williams, on the railway, are mills manufacturing pine into lumber. Open land, here, as elsewhere in the county, is abundant and fertile, and great crops of potatoes and oats are grown. Near here, also, are productive market gardens. Around Williams, where the altitude is 6,733 feet, potatoes, oats, timothy, and alfalfa are grown. The soil, here, as at Flagstaff and elsewhere in the county, is adapted peculiarly to the growth of hops, but at present there is no demand for the product.

The atmosphere is exceptionally transparent, and for this reason an astronomical observatory, famous in the world of science, has been established at Flagstaff. This city, also, is the seat of one of the State Normal Schools. The summer temperature is from 62 to 93 degrees. The population of the city is 3,000. Williams, which sits at the base of Bill Williams Mountain, has a population of 2,000. Here the Santa Fe's Grand Canyon line branches from the main line, and travelers, waiting for their trains, find rest and refreshment in the "Fray Marcos," one of the Santa Fe's Harvey hotels.

NAVAJO COUNTY

Navajo County, where for many years livestock has been, and still is, the industry of greatest importance



LOOKING UP ADAMS STREET, PHŒNIX, ARIZ.

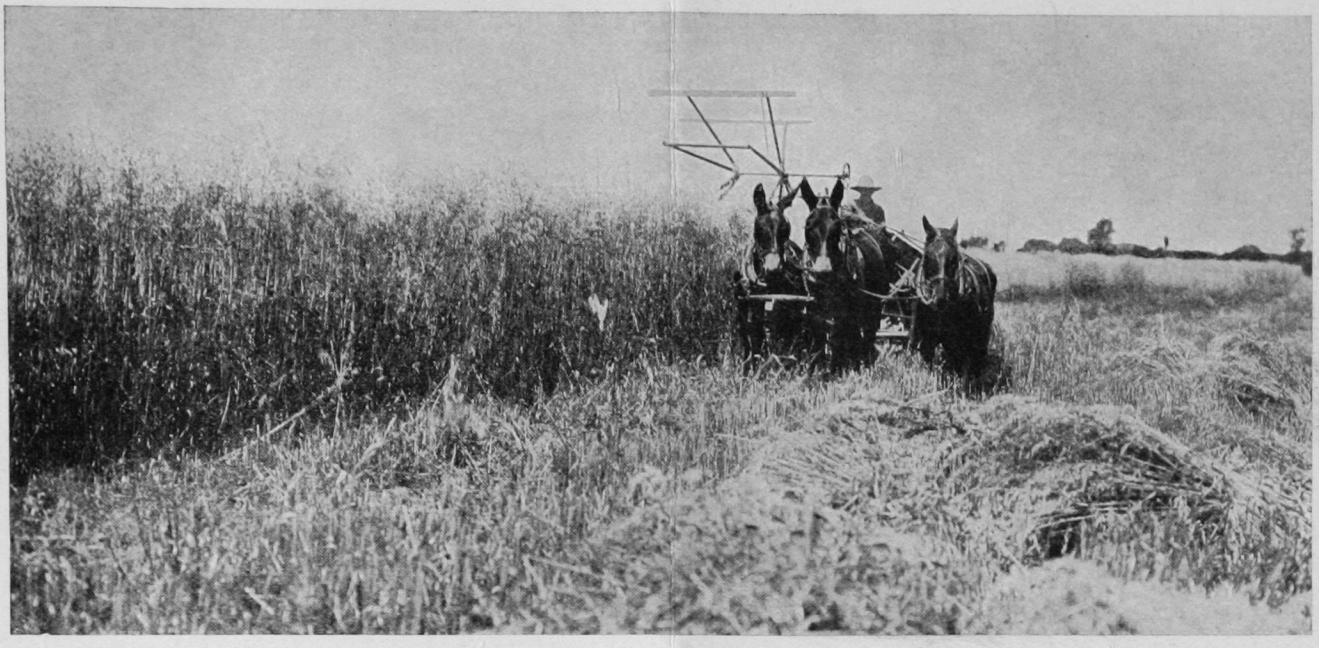
and profit, lately is coming into crop cultivation by irrigation from the streams. The county contains an area of 9,826 square miles, and over its mountains and plains many thousand cattle and sheep are pastured. Annually, 15,000 head of cattle, 35,000 to 60,000 head of sheep, and 1,500,000 pounds of wool are shipped from the county. From the Santa Fe Railway, which follows the Little Colorado through the county, travelers see many stock farms, with their windmills and water tanks, herds feeding on the range. Approximately 20,000 acres are irrigated in the county. At St. John's, Concho, Snowflake, Taylor, and Showlow on the lower mountain slopes, and at Holbrook, Woodruff, St. Joseph, and Winslow on the Little Colorado, areas of from 1,000 to 3,000 acres are under the ditch. Elsewhere in the county, are isolated ranches where Mexicans make gardens and grow alfalfa in small patches. During the summer, much of the land is short of water, but the settlers are enterprising and the several communities are building reservoirs, in which flood water will be stored. It is contemplated, also, to use pumps, especially where there are no reservoir sites. This water is the underflow, and lies at from ten to thirty feet beneath the surface.

Below the junction of the Rio Puerco of the West and the Little Colorado, beginning immediately above Holbrook, lies a valley of from one to five miles wide. Below Winslow, this valley spreads to a width of eight miles. Within this valley, lie, approximately, 175,000 acres of arable land, which may be

subjected to irrigation from the river. There are irrigable lands, and some irrigation, also, in the valleys of the tributaries of the Rio Puerco and Little Colorado, as Le Roux Wash, Silver Creek, Cottonwood Wash, Showlow Creek, Clear Creek, and Chevelon Fork. These never become dry. They are fed by springs, winter snows, and spring, summer, and autumn rains. The annual snowfall is from four to six feet.

The principal crop is alfalfa. It is cut three times, annually, and the yield is from three to four tons per acre. By the storage of water in reservoirs, the production of this hay is increasing. Since livestock is a great industry here, alfalfa hay is in great demand, and commands good prices. Other products of the soil here are oats, sorghum, barley, wheat, indian corn, apples, plums, cantaloupes, watermelons, and berries. Sugar-beets grown at Winslow contain eighteen to twenty per cent saccharine, but are not planted extensively. On the mountain slopes, especially around Snowflake and above, great crops of irish potatoes are grown. Potatoes grown in the Heber district have taken first prize at the Arizona State Fair.

Holbrook, the county seat, is an ambitious settlement of 500 population, with good schools, churches, two banks, wholesale and retail stores, a newspaper, four hotels, a commercial club, the usual fraternal lodges, and other accessories of civilization. The irrigable land lies west of Holbrook, but large shipments of field products are made from this station, and the banking and trading is done here. W. H. Clark,



HARVESTING OATS, SALT RIVER VALLEY, ARIZ.

commissioner of irrigation for the county, lives at Holbrook.

St. Joseph, a settlement of 200 population on the Santa Fe, sits in the midst of good farms which cover 1,000 acres. Two dams here divert water into twelve or fifteen miles of canals.

Winslow, the only incorporated town in the county, has a population of 2,000, and is the end of a passenger division on the Santa Fe, and the head-quarters of a freight division. A Harvey hotel and eating house is located here. The town has excellent water for municipal and domestic use furnished by the railway company under contract. The source of this water is Clear Creek, a mountain stream. The city has a high school and grammar schools, churches, fraternal societies, two banks, two newspapers, volunteer fire department, wholesale and retail stores, comfortable homes, electric light, sewers, and all the other comforts of civilization.

Woodruff, twelve miles south of Holbrook, possesses a dam which has stood up against the floods of the Little Colorado since 1890; irrigating some hundreds of acres of farms and gardens. The community has the usual good schools, churches, stores, and comfortable homes.

Snowflake, thirty miles south of Holbrook, has a population of 300, and is the third town of importance in the county. The townsite is washed by Clear Creek, from which water is obtained for irrigation. Although

the town is not on the railway, it is prosperous, and the local demand takes the products of the surrounding farms. The community has a good public school, housed in a handsome edifice. The chief pride of the community is Snowflake Academy, where the higher branches of education and trades are taught. This institution, lately has added a gymnasium and amusement hall. The homes are of brick, mostly, the streets lined with trees, and, altogether, it is a very pretty place. The town has a strong bank, stores, churches, and all the comforts of life. The headquarters of the Sitgreaves Forest Reserve are here.

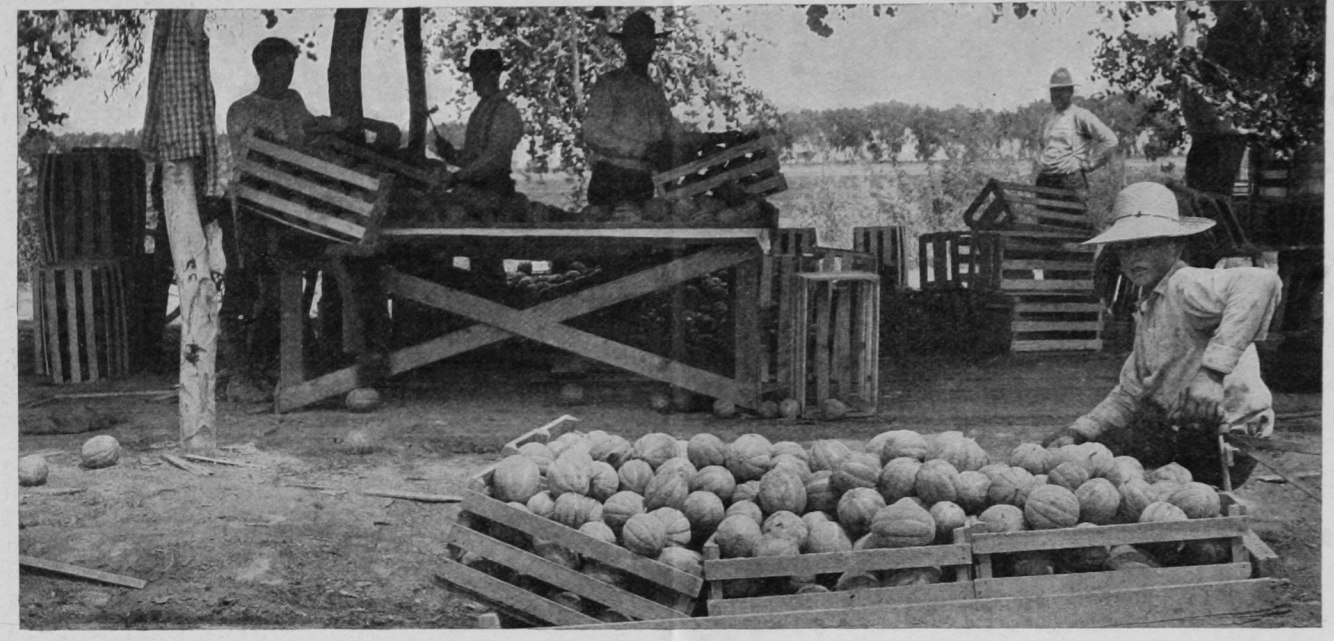
Other good towns on Clear Creek are Taylor and Shumway, where irrigation has made prosperity. At Shumway, is a flour mill driven by water power. The wheat for this mill is grown in Clear Creek Valley. The apple is an important product of these settlements.

Showlow, on a creek of that name, sits in the midst of a pine forest at an altitude of 6,000 feet.

Lakeside, Pinetop, Woodland, and Heber, are prosperous communities made by "dry-farming". About 3,000 acres are cultivated, and the annual precipitation of rain and snow is sufficient. Many sheep and cattle ranches are near here.

St. Joseph is irrigated by gravity, reservoir, and pump; the farmers planting about 1,000 acres.

There are in round numbers 1,300 children of school age in the county, instructed by thirty-four teachers.



THE FINEST CANTALOUPES GROWN COME FROM THE SALT RIVER VALLEY

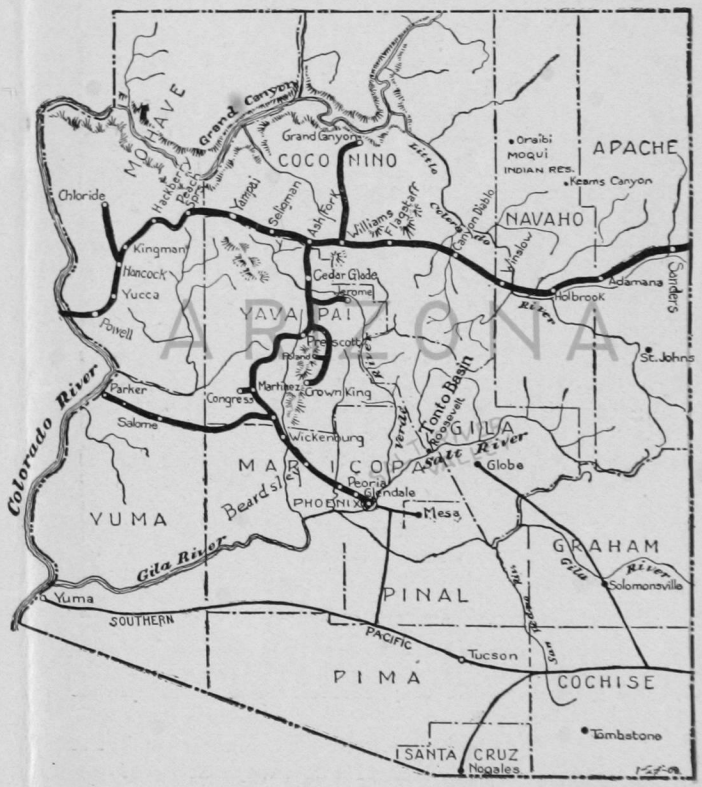
The annual expense of the schools is about $22,000. The school property of the county is valued at $27,530.

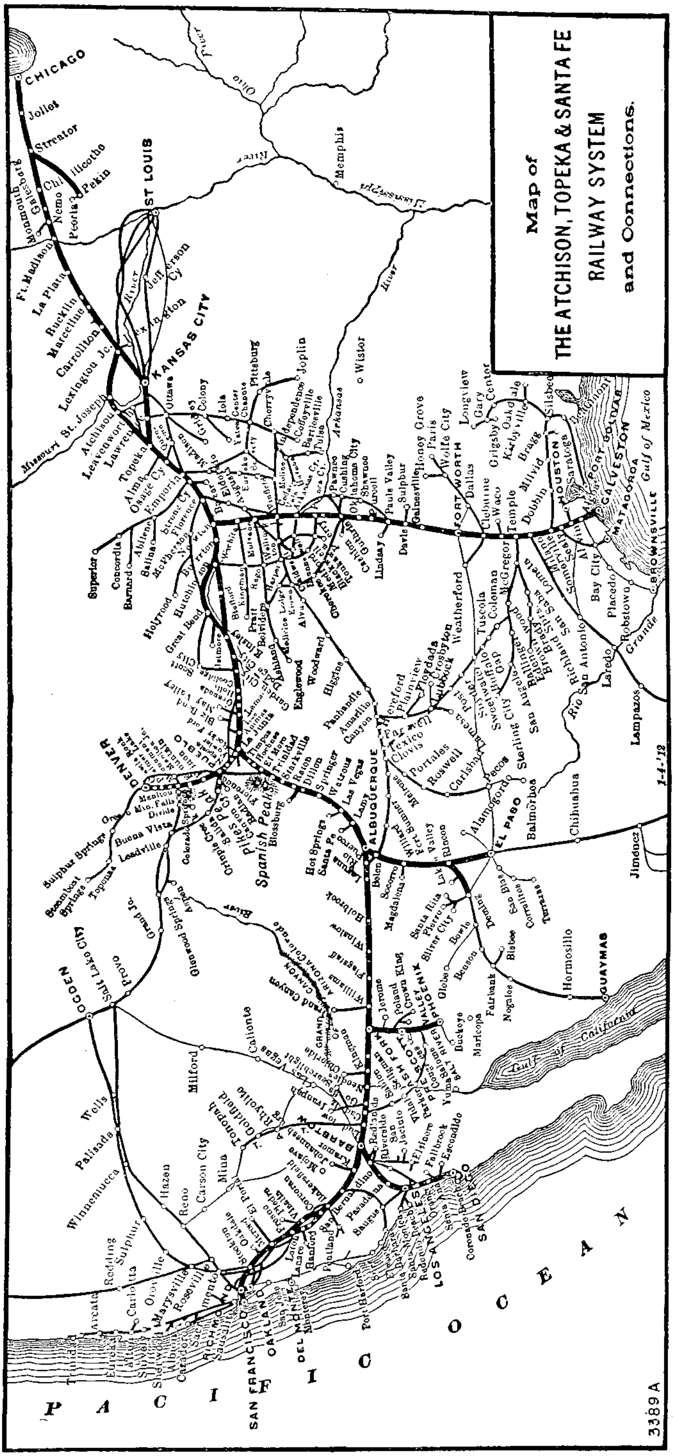
APACHE COUNTY

Around St. John's, county seat of Apache County, which lies on the border of New Mexico, and is watered by the Little Colorado, the Zuni, the Rio Puerco of the West, and other streams which converge here, the irrigation of 15,000 acres has been undertaken by Denver and local capital. Twelve miles above (south) St. John's, a reservoir has been formed by the construction of a dam across the Little Colorado. The dam is the joint enterprise of the Denver corporation and local citizens. The reservoir covers 1,500 acres, and is designed to water 15,000 acres of land in the valley below. Of this, 9,000 acres belong to the Denver people, and 6,000 to local people. Purchasers of land buy also one share per acre of the stock of the reservoir company. The nearest railway station is on the Santa Fe forty-five miles distant. A stage goes to Holbrook, daily.

The soil, if given seasonable water in sufficient quantity, will grow alfalfa, orchard and vine fruits, oats, rye, barley, wheat, corn, and sorghum. Livestock is the most important industry of the county.

The altitude of St. John's is 5,600 feet above the sea. The town has schools, churches, the usual hotel accommodations of a small town, stores, and comfortable homes. The southern portion of the county lies in the Apache National Forest Reserve.





If you are not certain just where you wish to locate, I will be glad to offer you every facility of this department to secure information about any section of the Southwest served by the Santa Fe.

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Adv. 646. 4-24-12. (10M.)

Rand McNally & Co., Printers, Chicago