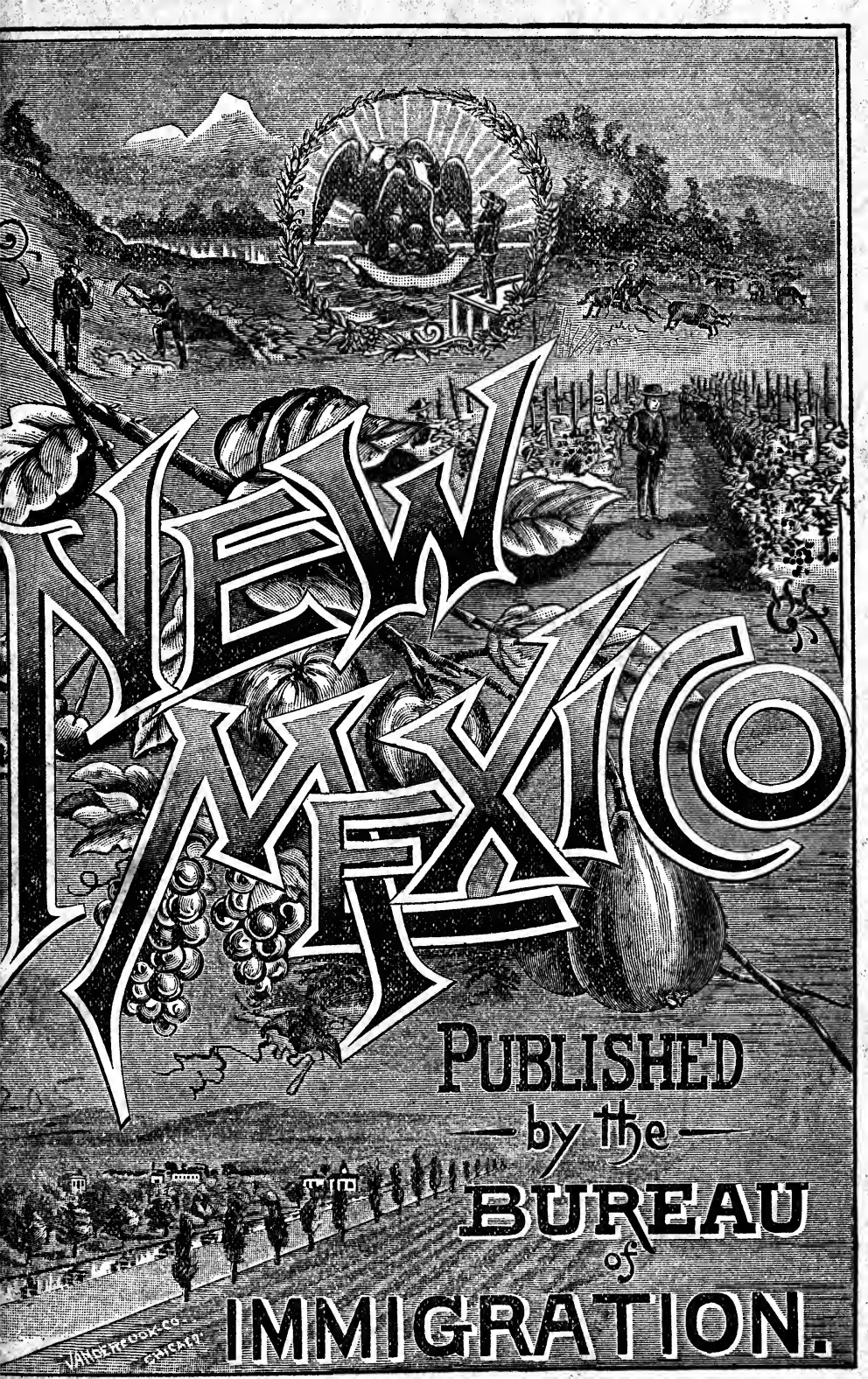


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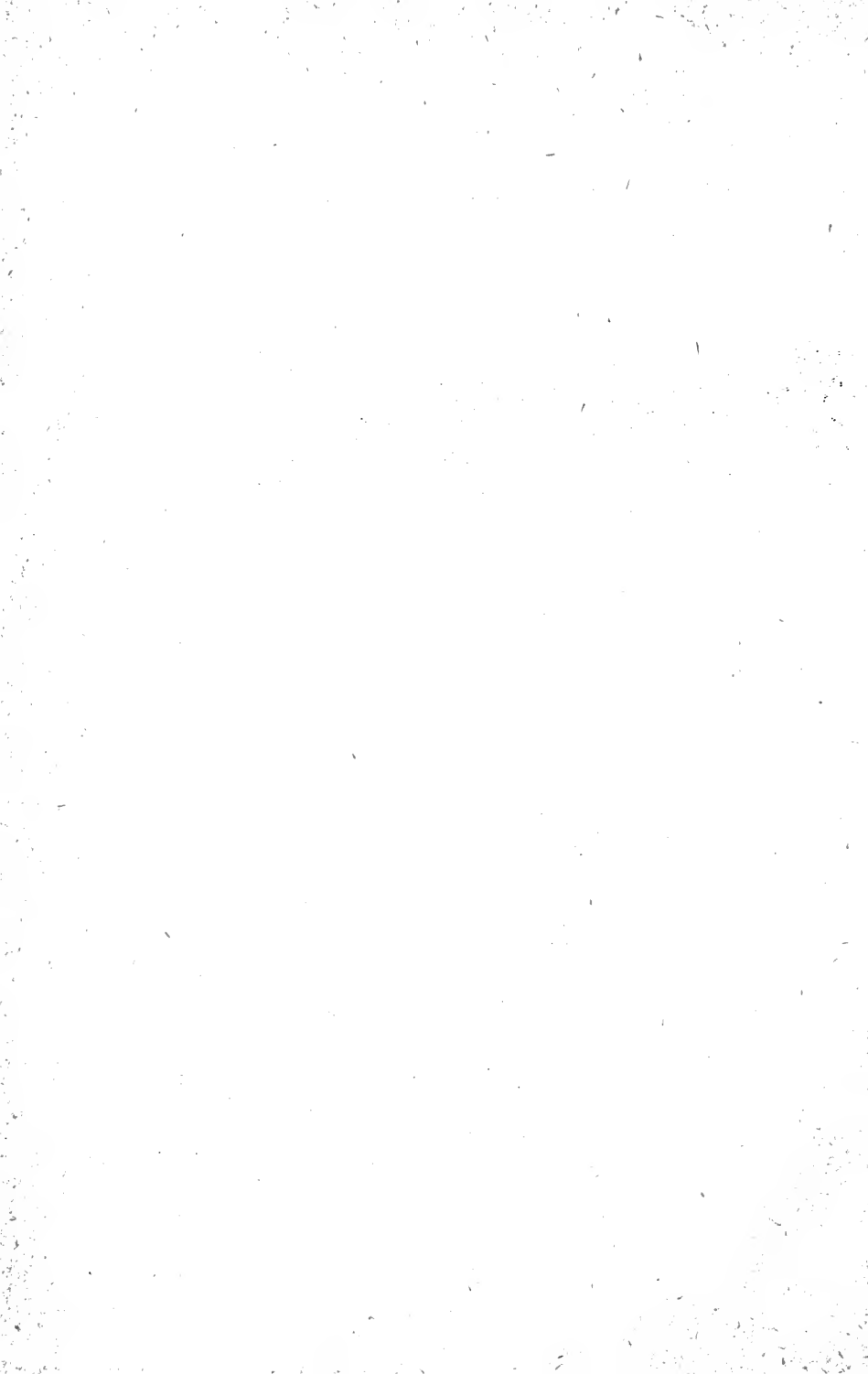




NEW MEXICO

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Headwaters of the Pecos River.

10097 P. O. CIV.

NEW MEXICO.

ITS RESOURCES, CLIMATE, GEOGRAPHY, GEOLOGY,
HISTORY, STATISTICS, PRESENT CONDI-
TION AND FUTURE PROSPECTS.



OFFICIAL PUBLICATION

OF THE

BUREAU OF IMMIGRATION.

Arranged, Compiled and Edited by

MAX. FROST.

Secretary of the Bureau.

SANTA FE, N. M.:
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NEW MEXICO.



When Cortez and his followers were battling for the possession of Mexico, they were constantly informed by the natives of a fair land to the north, and at last, having a breathing time from slaughter, they sent out expeditions to discover new lands and annex them to the empire of Spain. Traveling north they found the great river that now divides the two republics. Traveling up its banks and noting the fertility and resources of the valley and the volume of the flood, they called it the Rio Grande Bravo del Norte. As settlement progressed the land was parceled out to the conquering discoverers and their descendants for the purpose of colonization. These were known as land grants. When the country passed under the control of the United States the treaty of Guadalupe Hidalgo guaranteed these titles, but Congress delayed action thereon until a few years ago, when it instituted the court of private land claims, which is now engaged in rapidly determining these titles, and the blight of unstable tenures of land which has so long characterized New Mexico is now removed. When purchasing a piece of land now it need not be feared that a lawsuit is bought on account of a counter claim of some concealed owner or claimant. The titles hereafter will be as perfect as the government guaranty can make them.

New Mexico is an unknown land of wonderful resources. The ancients had more knowledge of the mythical Atlantis than the average practical American of to-day has about New Mexico. A few epigrammatic slanders, away back in the '50s, from men high in the national councils, but who never saw the borders of

the Territory, detracted from its good reputation. Although some of these utterances were on the floors of Congress, their reading would hardly make polite literature to-day. The New Mexicans of Spanish descent are among the most honest dealing people of the world. They have not to be sued for a debt, but will pay it to the last cent either in money or service. The task of portraying in straightforward, unexaggerated language the facts about this unknown land is very difficult. Enthusiasm often amplifies a fact. This, however, is unnecessary concerning New Mexico, and the purpose of these pages will be to prune all statements to less than the facts rather than to expand their proportions.

New Mexico stretches in abundance and beauty, waiting for those who are wise enough to investigate its resources. El Dorado is said to lie "over the mountains of the moon, in the valley of the shadow," but here may certainly be found comfort and even wealth. New Mexico is as large as the New England States, New York, New Jersey and Maryland combined. It exceeds in area the United Kingdom of Great Britain and Ireland, and comprises part of that famous New Spain wherein Don and Grande dreamt of power and influence in the new world. Its history is romantic, and its thousand valleys offer a multitude of opportunities to the industrious. At present the population, exclusive of the civilized Pueblo Indians, is over 180,000, or greater than the population of any Territory on its admission to statehood. In topographic features it is a high plain, called by the Spaniards mesa, or table land. At Santa Fé this plateau rises to 7,000 feet, while in the Lower Pecos valley it is depressed to about 3,500 feet above sea level. Its peculiar physical geography, so favorable to all species of animal life, will be more fully dilated upon later. The precious and useful minerals abound, and the commoner precious stones are plentiful. Coal is found in every county, but is exceptionally abundant in the two northern tiers. New Mexico is more blessed than Pennsylvania or West Virginia with gigantic deposits of this mineral. In variety it runs from anthracite to bituminous,

from the glistening peacock to the brown lignite. The deposits now being worked show 80 per cent of fixed carbon and only 5 per cent of ash.

The Land of Sunshine.

New Mexico is known as the "Land of Sunshine." That she deserves this name is shown by the official statistics. Santa Fé is a city more than a mile and a half above sea level. The winter months in any climate are supposed to be somewhat gloomy and dark. The following is the official record of the sunshine at Santa Fé for the 148 days prior to February 25, 1893:

SANTA FÉ, N. M., February 25, 1893.

To the Secretary of the Bureau of Immigration:

As requested by you I herewith transmit an exact copy of the number of cloudy days during the past five months.

Our official records show there have been 17 cloudy days in the last 148 days, including to-day, as follows: During October, the 21st, 22nd, 23rd, 29th, 30th and 31st were cloudy. The sunshine, as per sunshine recorder, on the 21st four hours, one-half hour each day on the 22nd and 23rd, made no record on the 29th, on the 30th two hours, on the 31st one hour. The cloudy days during November were the 1st, 2nd and 5th; sunshine on 1st one hour, on 2nd none, and two and one-half hours on the 5th. Total cloudy days during December—the 12th was the only cloudy day with no sunshine. During January, the 16th and 17th were cloudy with no sunshine, but the sun could be seen through the thin layer of stratus clouds during the greater part of the two days. During the present month (February) the 1st, 5th, 8th, 9th and 13th were cloudy.

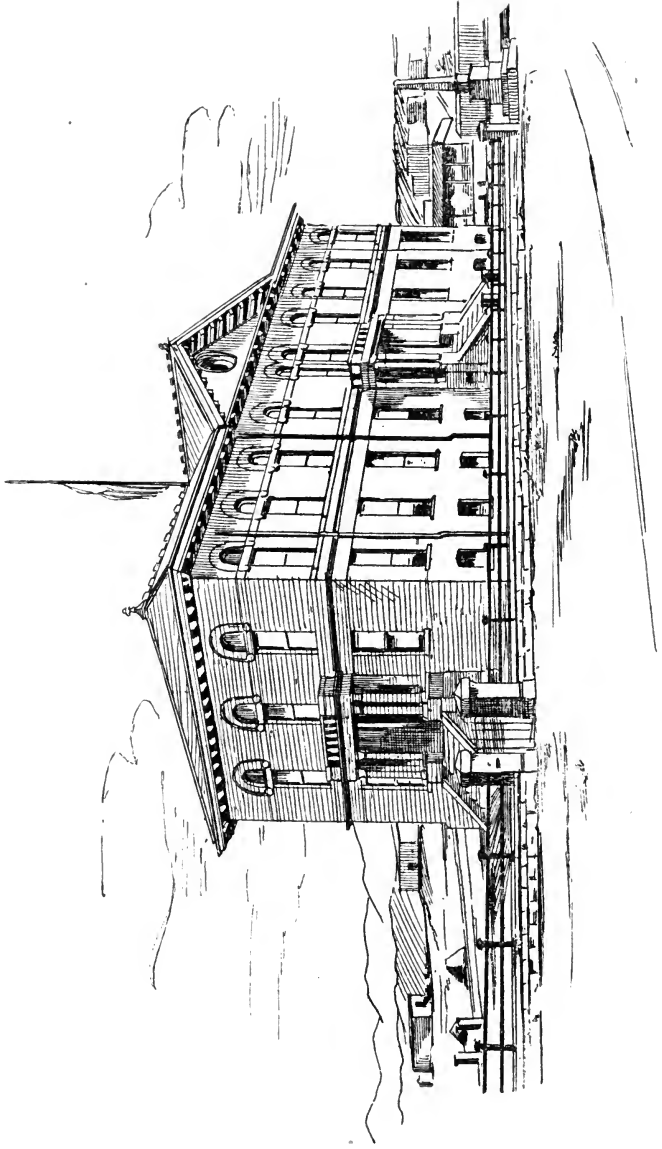
A cloudy day is one on which the entire sky is covered during eight-tenths of the day or more.

Respectfully yours,

H. B. HERSEY,

Director N. M. U. S. Weather Service.

To show that the weather observed at Santa Fé is only a general average of the whole Territory, the following data concerning Las Cruces, 300 miles south and in the extreme southern



Federal Building at Santa Fe.

part of the country, are given. The observations were taken by Dr. Alphonse Petin, and extend over a period of three years, ended on May 15, 1892.

April 15, 1889, to June 14—Continued sunshine.

June 14—Thunder storm; precipitation one-sixtieth inch.

June 15—Light thunder, no rain.

June 23—Thunder storm; one-third of an inch.

July 26—Light storm, no rain.

July 29 to Sept. 20—Lightning every afternoon, but no rain.

Oct. 14—Eight inches snow; melted completely by 9 a. m. next day.

Nov. 15, 16—Light shower, not gauged.

Nov. 18 to Jan. 28, 1890—Light frost every morning.

Jan. 30—Top of mountains capped with snow, lasted three days.

Jan. 30 to May 7—No rain.

May 7—Light rain.

June 23—Light rain.

July 3—One fortieth inch.

July 25—Thunder storm, one-sixtieth inch.

Aug. 6—Thunder storm, one inch.

Aug. 15—One-seventieth inch.

Aug. 23, 24, 26, 28—Storms, two to two and a half inches.

Nov. 8—Light snow on top of mountains; freezing every morning until 9 a. m.

From Nov. 8, 1890, until April 15, 1892—One and three-fourths inches of rain and snow fell.

All the rest of the days were uninterrupted sunshine.

The sunshine record for last year of Las Vegas, in the northern part of the Territory, is equally good. It is as follows:

	Cloudy.	Partly Cloudy.		Cloudy.	Partly Cloudy.
January	6	8	August	0	4
February	1	9	September	0	2
March	2	9	October	6	2
April	0	3	November	2	2
May	3	9	December	1	1
June	1	5			
July	0	8	Totals	22	62

or, for the year 1892, 22 cloudy days, 62 fair or partly cloudy days, and 281 clear days.

Climatic Characteristics.

These figures, however, do not tell half the story. The altitude of Las Cruces is about 3,600 feet, of Las Vegas somewhat over 6,000 feet and of Santa Fé about 7,050. This allows the seeker after health a wide range of choice in selecting his climate. Silver City in the south, Albuquerque in the center, and Eddy in the southeast, offer equal advantages of climate and altitude.

It is to be remembered that these figures give no idea of the warm genial days and refreshing nights, the glorious morning sunbursts and the brilliant close of day, when the mountains shade from cerulean blue base to opal peaks, and the sky, splashed and streaked with all the prismatic colors, looks like the palette from which the Great Artist had painted the shimmering day. Add to this the high light of an azure sky, bright and sweet as the smile of heaven, and you only have half the picture. Every rock, hill, mountain and plain has its own peculiar tone. No description or painting can tell the gorgeous wealth of color everywhere displayed in lambent light, and when the whole is viewed from some garden mingling the gold and green of bloom and harvest it is not at all wonderful that the New Mexican is an enthusiast about his land, and that visitors chant its praises far and wide.

Mountains as Climate Makers.

This ideal climate is induced by the mountain ranges, and, as it has an important bearing on the agriculture and life of the people, some attention will be devoted to its explanation. At Marshall Pass, in Colorado, the Rockies divide and enter New Mexico in two main limbs, one stretching to the southeast and one to the southwest. To the west of these, in Arizona, the plateaux and mountain chains rise like a flight of steps until they reach the continental divide, which runs just within the western boundary of New Mexico. The prevailing winds, funneling through the Gulf of California from the wide Pacific, come laden with moisture, and meet this ever rising rampart

until they careen over the summits of the Rockies and along the northern slopes of the Raton range, leaving the vast stretch to the east and south free from the influence of the Pacific passage winds except for such precipitation as is left on the summits.

Physical Geography.

With this description of the contour in mind it requires but a slight knowledge of climatics to understand the aridity of the New Mexican valleys and the water supply for their irrigation from the snow laden mountains. Arizona, height over height,



presents her weather face to the humid winds, and the western boundary of New Mexico is guarded by the bluff, bald faced peaks of the continental divide. The winds are thus dessicated before reaching the valley area. The ranges depending on the New Mexican or eastern side of the divide therefore present a very slight surface to the passing clouds, and little resistance is offered to their eastern journey. The study of climatic conditions in New Mexico is therefore intermingled with the correlation of mountain chains. The western chain of these mountains is known generally as the Atlantic and Pacific divide, and its course is broken up into the Cumbres, San Mateo, Ladrones, Socorro, Datil, Zuñi, San Francisco, Black, Burro and Mogollon ranges; while the eastern limb takes the distinguishing names of Sangre de Cristo, Raton, Taos, Santa Fé, Sandia, Sierra

Blanca, San Andres, Jumanas, San Cristobal, Organ, Sacramento and Guadalupe mountains. The minor details are that the Raton mountains trend to the east, forming the northern wall of the Canadian valley. The rest of the eastern limb of the Rockies is the western wall of the Pecos, which is closed on the east by the Llano Estacado. The two chains described form the valley of the Rio Grande, which bisects the Territory from north to south. In the northwest the San Juan drains the country toward the Pacific. In the southwest the Gila carries a considerable amount of water in the same direction, and in the same section on the eastern side of the divide the Mimbres drains a large area into an inland sink of which Palomas lake, in Old Mexico, is the center.

Valley Areas.

The Rio Grande valley includes the counties of Rio Arriba, Taos, Santa Fé, Bernalillo, Valencia, Socorro, Sierra and Doña Ana.

The Canadian valley embraces Colfax, Mora, Union and the northern part of San Miguel county.

The Pecos takes in southern San Miguel, Guadalupe, Lincoln, Eddy and Chaves counties.

San Juan county lies in the basin of the same name, while Grant county, in the extreme southwest, contains the valleys of the Mimbres and the Gila.

Nature's Provision for Irrigation.

Such is a pen sketch of the Territory. The many problems of regeneration and creation that must be solved before New Mexico will have realized her true dignity will be further discussed, and the first proposition that presents itself is the low average of rainfall in the valleys. It must always, however, be remembered that these figures representing precipitation of snow and rain relate only to the valleys where shelter is afforded from storms, and that no account is taken in these statistics of the tremendous downfall on the mountains. It is esti-

mated that the annual flow of the Rio Grande is sufficient to cover every acre of its wide valley two feet deep with water, the great majority of which comes from the mountain snows. If this water were evenly distributed through the twelve months of the year the problem of irrigation would be comparatively easy. The facts are, however, that during the first months of the growing season this rapid flood disappears. This is caused by the abrupt descent of the land and the depletion of the snow reservoirs in the mountains. The skill of man must therefore be exerted to delay these waters and properly distribute them over the land.

Expert Testimony.

Col. Richard J. Hinton, condensing from the report of 1st Lieutenant W. A. Glassford, of the Signal Corps, U. S. A., says in his report on irrigation and the cultivation of the soil thereby made to the Secretary of Agriculture:

“The several drainage basins of New Mexico are marked by the great divides which characterize the peculiar parietal formations of New Mexico. The Continental range is the first and forms the southwest water-shed between the two oceans. It enters the Territory in Rio Arriba county and passes into New Mexico along the Sierra de Las Animas. It contains two large basins, the San Juan and the Gila, and the one small one made by the Zuni drainage. There are ten peaks within the borders ranging in elevation from the Animas at 6,105 to the Jemez at 11,260 feet. The second divide approaches the meridian at the middle of the Territory. Its northern ridge is found along the Sangre de Cristo range until it finally sinks into the high mesa below Santa Fé. It then forms a high plateau across the Gallinas to the Sierra Blanca and disappears in Texas by way of the Sacramento range. It contains eight outlying peaks, ranging in altitude from the Franklin at 6,890 to the Truchas at 13,150. The western shed may be related to the Pacific and the eastern to the Atlantic divide. Geologically speaking there are within the area four distinctly marked epochs. They are the archæan, entering from Colorado; then follow the palæozoic and mesozoic periods. The cretaceous covers most of the lower surface and outlying areas. There occurred four distinctly marked upheavals of eruptive rock at wide intervals. As

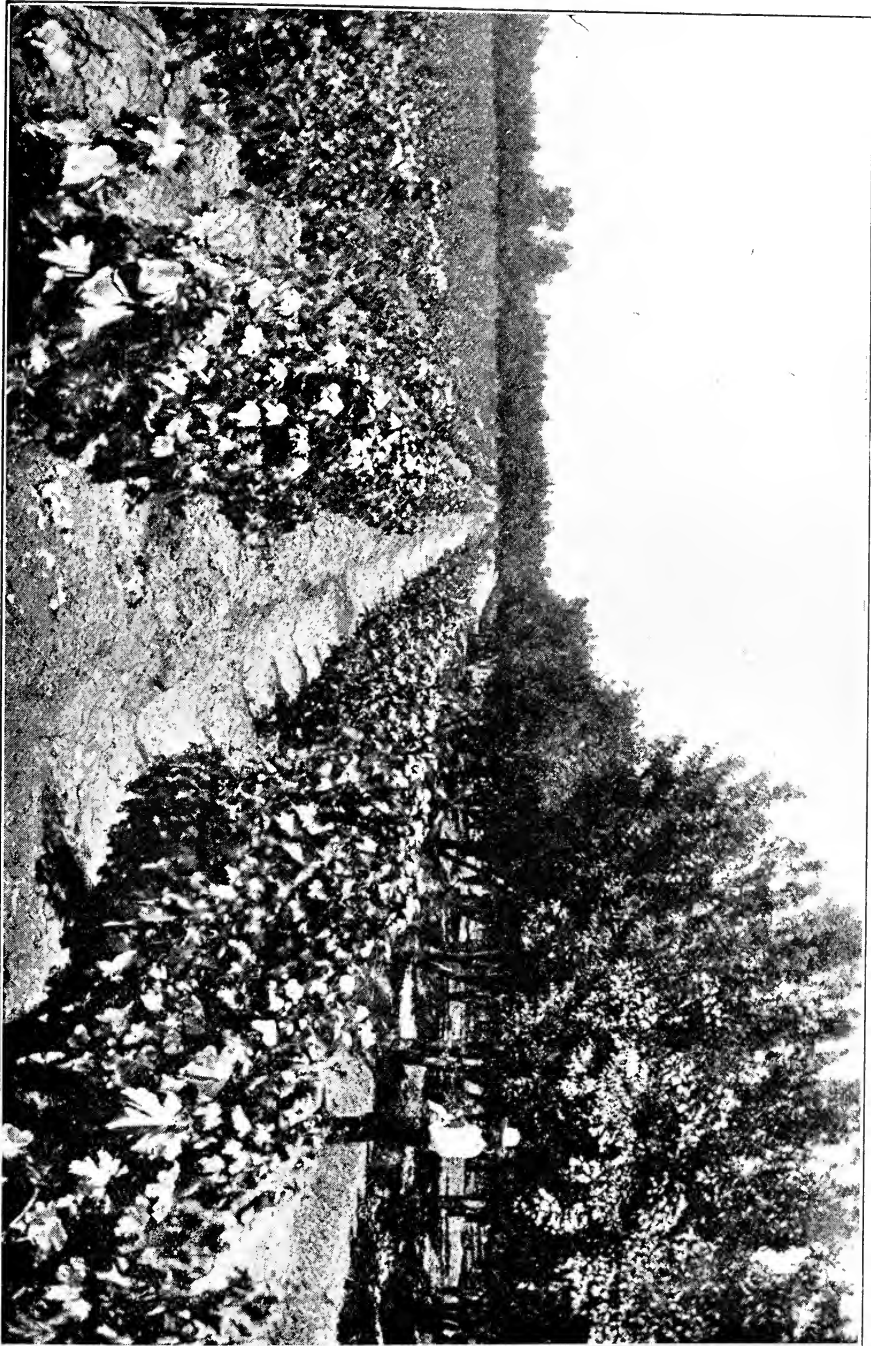
conditioned by these general characteristics the rivers of the country are few. The river systems of New Mexico then are, the San Juan in the northwest, the Gila and Mimbres in the southwest, the Rio Grande through the center from north to south, the Canadian in the northeast and the Pecos from north to south in the section lying east of the mountain ranges that easterly border the Rio Grande. In this division there is to the east a sub-diversion about the latitude of Las Vegas, north of which line the waters drain through the Canadian and Cimarron into the Mississippi, and south of which the Pecos drains the rainfall into the Rio Grande. Two very important systems of irrigation are found within these drainage basins.

Irrigation at High Altitudes.

“In Colfax county, in the north, supplied by the head waters of the Canadian, the owners of the Maxwell grant with other large land owners are carrying forward an extensive system of open storage and distribution by which 75,000 acres of table land are being brought under ditch, and some *6,000 acres of which are already under cultivation.

“Besides these enterprises in the mountain table land and under the waters of the Canadian there are a number of local irrigations in progress for orchards and farms in Colfax and Mora counties. Some of these are of value in illustrating the altitude at which fruit may be grown and good grain and forage fields harvested. One of the largest land owners and ranchmen, whose home residence, Chico Springs, Colfax county, is at an altitude of over 8,000 feet, has his fruit trees, berries and vegetable garden supplied by water through a half inch pipe from a little but constant phreatic flow obtained by an opening made in the side of the bluff at the back of the dwelling and outbuildings. He is engaged in constructing reservoirs on the table land for the purpose of storing local rainfall and storm waters. In the counties of Lincoln, Chaves and Eddy, also San Miguel, formed out of the Pecos basins, there are two extensive systems of storage, distribution and cultivation by means of irrigation now in progress. One of these in Eddy and Chaves counties has irrigation works constructed to irrigate 500,000 acres. Artesian waters have also been obtained at Roswell, and large promises of an important supply are found in several directions. The southwest basin of the Upper Gila is small and not more

*The above was written two years ago. This area has been considerably increased.



A Scene in the Lower Rio Grande Valley.

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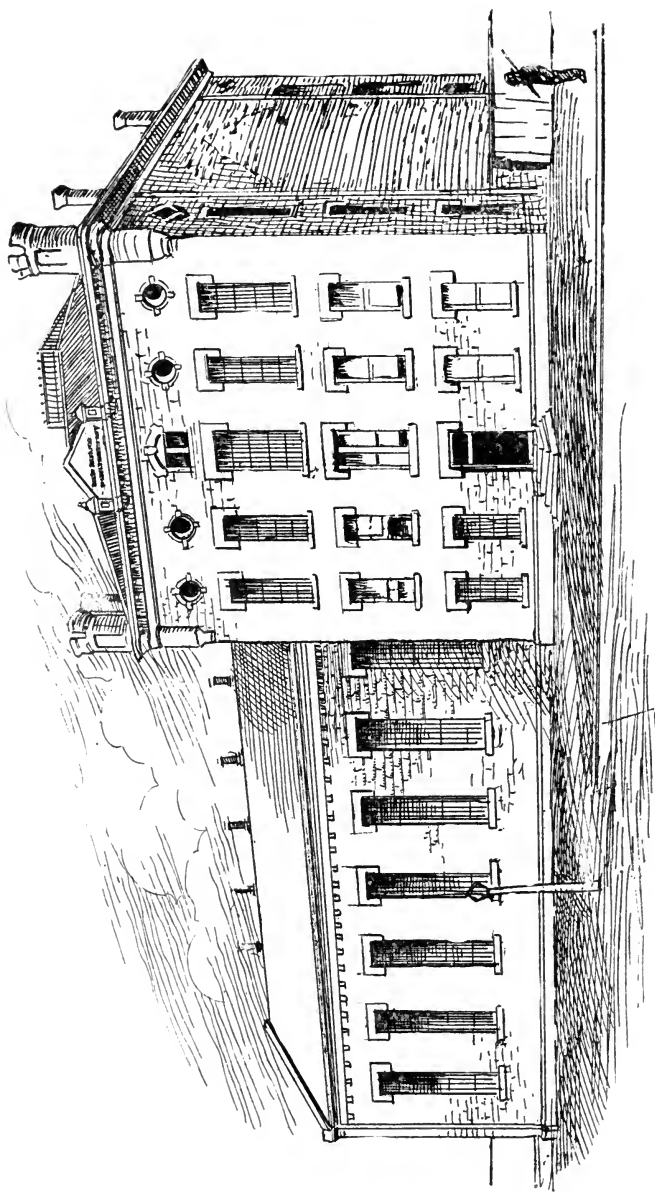
than fifty miles in width. Like that of the San Juan basin in the northwest, it belongs climatologically to the Pacific group. There is a growing activity in the San Juan basin. From there directly southward the areas of possible reclamation are small. There will, however, be an increase of small acreage at favorable points as farmers and settlers comprehend more clearly the conditions under which a drainage supply may be tapped, dug out, bored for and recovered for use in cultivation. In the Upper Gila basin the rainfall is commonly sufficient to make a success of the ranchers' rude but profitable dry farming.

"The central basin, that of the Rio Grande, forms not only the principal pathway north and south, but it is also the chief seat of population at present. Its waters are mainly from the snows of the Continental range within the borders of Colorado, though replenished by the local precipitation of subsidiary basins. The tributaries are numerous in its upper course, but after leaving the Taos cañon they become less frequent; in fact it has below the point where the Santa Fé and Galisteo pour their torrential flow no affluents of any magnitude. The oldest irrigations within the United States are to be found within this valley, unless exception be made of the phreatic cultivation whose evidences are to be traced in connection with ruined Pueblos in the Rio Chella, etc., and the Salt River valley, Arizona. The eighteen Indian Pueblos now existing in New Mexico are sustained as to cultivation by the Rio Grande's hydrological conditions, and they long antedate the present Mexican farmers. The oldest of the latter settlements is undoubtedly that of the Mesilla valley, the rich soil of which has been in constant cultivation for over three centuries. Portions of the Santa Fé valley above the settlements of Albuquerque and others in Bernalillo county are next in order, and later still are the farming communities of Conejos and Costilla counties in Colorado."

Rains and Their Causes.

The climatic laws governing New Mexico will be more readily comprehended after this summary of its topographical conditions. Lieutenant Glassford says:

"The Pacific ocean is the reservoir of Arizona. Its evaporated waters are carried by the prevalent southwest winds over plateau systems which gradually increase in altitude, and every such step opposes its maximum condensing surface to the char-



Territorial Penitentiary at Santa Fe.

acteristic wind. The culmination is reached in the system of lofty ranges which overtop the highest plateau. From this local action of condensation and differentiating the circulatory inspiration of continental lows which move east of the Rocky mountains, there arise two systems of precipitation which present a noteworthy difference in character. The winter rains are diffuse as regards the area of territory affected. They are moderate in force, and they are interrupted by the anticyclonic types of high barometer and cloudless skies, which are distinctive of the Pacific coast weather; they are in unmistakable correlation with the systematic climate of the country. The summer rains are different; in extent they are concentrated; they are uniformly local and attributable to local influences; they are characteristically of great violence, which often seems to justify the mistaken appellation of cloudbursts. One other point which needs to be held in mind, and that is the records show in reality only the minimum fall of rain, since observers' stations are mainly in the valleys, where their gauges make no record of the heavy rains which are in sight upon the surrounding mountains. That the rainfall of New Mexico is but a continuation of the Arizona system, a projection of the Pacific humidity across a congeries of condensing mountain bodies, the ratio of whose efficiency is geometrical, will appear from a study of the phenomena here presented.

"In New Mexico the winter precipitation does not begin until the earlier days of January. By April the winter rains are definitely ended, but in the eastern or Atlantic divide section (the Pecos valley region) an area of considerable precipitation remains. This follows the high summits of the Sangre de Cristo range until it sinks into the table land of 4,000 feet, thence it tends southeasterly across the Pecos head waters region as far as Gallinas Springs, where it sharply curves to the north and extends over the Raton range. The winter rains according to the nomenclature of the meteorologist are marked by curves of from one to seven inches of precipitation running nearly parallel. These curves are outside the mountain lines, and indicate the diffusive and diverting influence of topography on the aqueous currents borne to New Mexico from the South Pacific ocean across Arizona.

"The summer rains are otherwise influenced, and the highest precipitations appear upon the levels west of the Canadian river, and upon the cañon course of the Pecos, which includes Las

Vegas and Fort Union; at this point the fall reaches 17 inches. The lowest summer precipitation is found in sections most favorably influenced by the winter rains. The minimum is found in the southwest.

“Step by step the humid winds are drawn across over graduated plateaus and extrusive summits, and at each higher step discharge so much of their moisture as is a surplusage over the saturation amount of atmosphere of a given tenuity at a given temperature. There is nothing violent in these systematic draughts of humid air from the sea towards the continental cyclones or vortexes, the air is chilled by the seasonal causes which make the winter climate. The earth surfaces soon become largely covered with snow, and their radiating influence is thus mechanically obliterated; the air lies in practically even strata of uniform temperature. The humid wind is drawn along these ruling conditions; on every plateau it discharges down to the point of saturation; the diminution in actual amount of moisture is constant and large; by the time it overlies the Rio Grande trough its last available moisture has been condensed by the heights of the continental divide, and sifts down to leeward. Such precipitation as is induced appears as snow, which forms a storage reservoir whose supply is constantly utilized until July. With the vanishing screen of snow the conditions proportionately alter. The surface of elevation with its soil and rock masses ceases to reflect the incident heat rays of the sun, but absorbs much of it; at the same time it radiates the heat which it receives, currents are formed in the surrounding air and the mountain becomes a focus of activity, about which are currents rushing rapidly skyward and a lateral draft to supply the place of the air withdrawn by its action of convection; its excess moisture and consequent precipitation therefore reaches the maximum.”

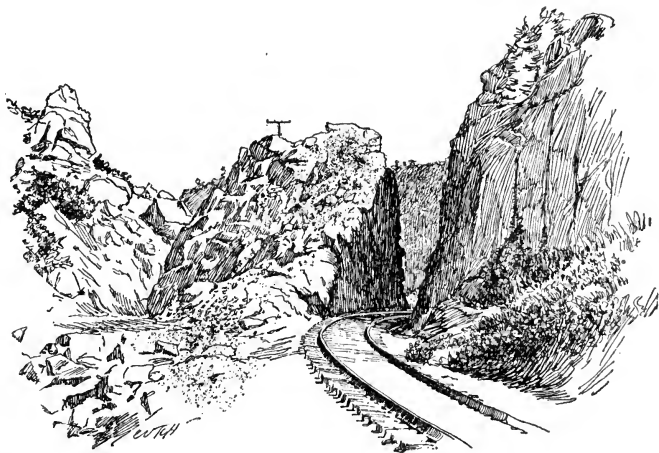
Even a cursory study of the foregoing must convince any one of the wonderful advantages of the climate of New Mexico. Its effect on invalids is surprising; its effect on vegetation and especially its influence in producing the greatest possible amount of saccharine matter will be further noticed in the proper place.

The contours of the country described heretofore promise a large artesian development, and the number of such wells in New Mexico is surprisingly large. Some of them are what are

termed negative artesian wells, that is the water rises in the bore but does not flow over the top of the pipe at the surface. At Springer, Roswell and Eddy bores have been sunk. At Deming nearly 100 such wells have been sunk and their waters are raised by windmills into tanks for domestic and garden supply. Artesian water has also been found on the Jornada del Muerto, on the Florida plains, south of Galisteo creek, and in the extensive valley between the Organs and the Guadalupe ranges, also in the Manzano valley. There is little doubt that all these regions, together with many others as yet unexploited, are extensively supplied with underflow or phreatic waters.

Geologic Formations and Mineral Deposits.

We may consider the mountains of New Mexico as a nucleus of granite and gneiss overlaid with quartzites, sand and limestones and shale, these latter being sometimes between 1,000 and 3,000 feet thick. In the upper strata coal is a very widely



distributed deposit, varying from anthracite to bituminous, from the brown lignite to the brilliant peacock. In Santa Fé county anthracite and bituminous are found in close proximity, often in the same mine lying in alternate strata. Natural coke has also been discovered, having been probably caused by the heat of

the porphyric dykes that cross the country. These fields as now known cover little short of a million acres, scattered in the different counties, but there are important areas which have not yet been visited and whose exploitation will amply repay the prospector.

Where Minerals are Found.

Colfax: Coal, iron, aluminum, copper, gold and silver.

Taos: Large deposits of mica on the west side of the Rio Grande, tin, silver, copper, gold quartz and placer gold.

Mora: Copper, gold quartz and placer gold.

Rio Arriba: Copper, coal, mica and placer gold.

San Juan: Coal, copper, iron, and there are gold placers on the San Juan and Pine rivers as yet but little developed.

Bernalillo: Placer gold in limited areas and extensive mines and veins of copper, coal and silver.

Santa Fé: Coal, iron, auriferous copper, also sulphates of copper carrying

silver, gold quartz, and extensive gold placers near the Ortiz mountains, also superior turquoise.

Valencia: Coal, iron, silver and lead.

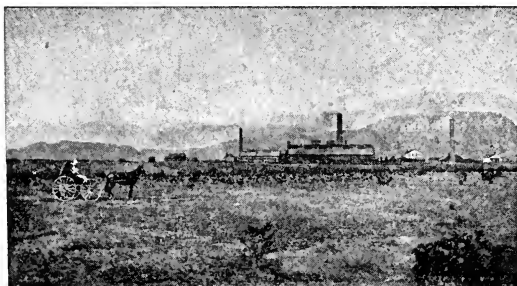
Socorro: Malachite, lead, silver, gold and coal, with extensive deposits of fire clay and kaolin.

Sierra: Copper, zinc, lead, silver and gold. True fissure veins are found in some places and rich chimneys and pockets are often struck. Coal exists in large beds.

Grant: Silver, lead, gold, copper, turquoise, coal and alum.

Doña Ana: Immense beds of gypsum, silver, lead, copper and pure white marble.

Lincoln: Copper, galena, gold, silver and coal.



Smelters at Socorro.

San Miguel: Copper and coal.

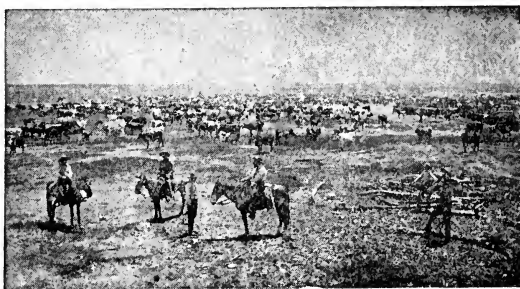
Eddy and Chaves counties have not yet been closely prospected, but it would seem certain that the eastern sides of the Sierra Blanca, Sacramento and Guadalupe mountains bear large beds of various minerals. Immense gypsum deposits have been discovered in Eddy county.

Manufactures.

New Mexico has as yet little or no manufacturing interest, but in this lies the advantage of the skilled, thrifty or wealthy immigrant. A plethora of coal and iron and other industrial metals lies idly waiting the hand of the artizan. Train after train load of hides are shipped to the East, while leather may be tanned cheaper in New Mexico than any other place in the United States.

Many Tanneries are Needed.

Caña agria, a species of the sour dock root, grows wild by the thousands of acres. This plant contains $33\frac{1}{3}$ per cent of tannic acid, the highest average of any known agent. It yields as high per acre as ten tons wild and from thirty tons upwards under cultivation. At Deming, Grant county, there has been erected splendidly equipped extracting works, but it should have a tannery in connection with it. Each tannery in New Mexico may be furnished with a home supply of tanning



On the Round-up.

matter without the cost of a cent of freight. This caña agria is being shipped to Europe at a cost of between \$80 and \$100 per ton, several firms there using it for the preparation of their best grades of leather.

Wool Cleaning Establishments Would Pay.

Annually a heavy toll is paid on the dirt and soil shipped along with the 12,000,000 pounds of New Mexican wool, which might just as well receive at least its first treatment at home. The Navajo Indians are the principal manufacturers of wool in the Territory, and their weaving has been famous for centuries and among the finest on earth. The reputation of the Navajo blankets is too well known to need comment. Numerous mountain streams furnish ample power for machinery, and a woolen factory would receive substantial aid in the way of donations as well as patronage.

Opportunities for Potteries.

In the production of pottery and glassware, New Mexico has advantages surpassing any rival. In Bernalillo, Santa Fé, Socorro and San



Indian Pottery.

Juan counties fire-clay and kaolin are found in immense quantities. Volcanic action or the burning of underlying coal mines has fired mountains of this material, specimens of which are as smooth and free from blemish, blister or sand marks as

the best English ware. Vast beds of fine quartz sand and all other components of glassware are neglected; but from New

Mexico will before many years be shipped the clearest and hardest glass ever made. The facilities are simply wonderful.

These, broadly, are a few of the many opportunities outside of agriculture, but every variety of manufacture is needed and would obtain support and profit.

The Old Order Changes.

In the early days, when the farmer of the New England and Atlantic States abandoned the stony and sterile farm on which he had been raised and nurtured he pushed across the Alleghany into the wilds of Ohio, Illinois or Indiana. He found a land where his ploughshare slipped through the rich black prairie much like a ship's keel through the water, and he sang the praises of the new land. His sons of the next generations have moved to the trans-Mississippi region, and when they come to New Mexico they will find a soil and climate as far surpassing the Middle States as did Ohio the bleak fields of the Eastern Atlantic States. In this new country they will make new homes and dwell in peace and prosperity. In the older States the farmer depends upon the inconstant chance of the weather for the maturity of his crop. Blind chance can never be depended upon as a factor in any systematic business. Here in New Mexico agricultural products are scientifically manufactured with no more risk of failure than is experienced in the manufacture of a bolt of cloth or any other material. The only prerequisite here is a sufficiency of water to mature the crop, and this factor can always be relied upon and determined beforehand by any farmer.

Irrigation Laws.

It will therefore be interesting at this point to give a synopsis of the irrigation laws of New Mexico, as the farmer from the East and South will be interested in learning the regulations under which water for his fields may be obtained.

Under the statutes of New Mexico water for irrigation has the right of way; no building, no footpath, no work of human hands must be allowed to obstruct its free flow. When a com-

munity or colony move onto unoccupied lands which they desire to cultivate, if each member of the community owns the land he desires he irrigates so that all are to be benefitted, and no one shall be bound to pay for the land through which the ditches or acequias run, but the course of ditches or acequias must not be disturbed. All rivers and streams in this Territory are declared to be public acequias. The owners of acequias and lands irrigated by them elect overseers, or, as they are called here, mayordomos, for each district yearly. All fees collected for infraction of the irrigation laws of the Territory must be expended in keeping the acequias in repair and building bridges where public roads cross them, if deemed necessary.

All plants, of any description, growing on the banks of ditches belong to the owners of the lands through which they run. All acequias, public or private, are the property of the person or persons holding them, and no person or persons shall be allowed to use them without the consent of the owner or the majority of the owners of such acequia, and on payment proportionate to their share of the primary cost, or the quantity of water proposed to be used. All of the inhabitants of New Mexico have the right to construct either public or private acequias, and to take their water supply wherever it can be obtained; but they must pay the owners of the land through which their acequias pass a just compensation for the land used; but if the owner of the land taken demands an exorbitant price, the probate judge appoints three experts who fix the price to be paid.

Mayordomos are elected annually and have control of the acequias that furnish water for the lands of their district, and can call out the owners of lands irrigated by such acequia to perform the necessary labor to put or keep the distributing ditches in repair; and can apportion and distribute to each land owner under the ditches the amount of water to which he is entitled according to the land cultivated by him, considering the nature of the crops he cultivates. The pay of the mayordomo is fixed by a vote of a majority of the owners of the land irrigated by the ditches under his control. In large irrigation districts, where long ditches are in use, with many branches, there is a mayordomo with an assistant mayordomo, and their acequia companions, who shall settle the questions which may arise in regard to the keeping in repair of ditches, the distribution of water, and see that the water is kept running vigorously during the cropping season.

All persons interested in a common ditch or acequia, be they owners or lessees, shall labor thereon in proportion to their land, and any person so interested who shall refuse to perform his share of such labor, when called upon, shall be fined for each offense a sum not exceeding \$10.

Any person obstructing or interfering with such acequia, or using water from it without permission, is liable to a fine of \$10 for each offense.

The mayordomo shall see that no water currents so run as to injure lands or tenements of private owners, to do damage to public property or inconvenience the public.

Laborers on the repair of acequias must work until the work is completed or they are released by the mayordomo, having completed their share of the work.

No owner of irrigable lands shall leave his district for more than three days at one time during the crop season without notifying the mayordomo about the person who will remain in his stead; and any such person so left shall have all the responsibility in regard to working the ditches that the owner would have had if present.

Any person traveling through the Territory shall be free to water his animals, necessary to his transit, at any river, stream or acequia, but must not water herds at acequias or private water ponds, or springs, without consent of the owner. This provision of the law does not apply to wells, which are private property.

Any person who shall foul the water of any stream, or throw into any ditch, river or spring of flowing water any dead or pestiferous animal, or other impurity of any kind that might injure the health of any of the inhabitants of a town or settlement, is liable to a fine of not less than \$1 nor more than \$10.

Ditches Exempt from Taxation.

The above is a compendium of the water code of New Mexico, a code which is the outgrowth of local regulations that have been in force since the advent of the Spaniard, and appear to be well adapted to the protection of the tiller of the soil whenever enforced in their spirit. They relate, however, only to the communal ditches. The last legislature enacted that all irrigation systems, reservoirs, ditches and canals hereafter con-



Cacti on the Jornada del Muerto.

structed or old ones extended and improved shall be exempt from taxation for a period of six years from the date of such construction and improvements. By federal and territorial statute irrigation systems, reservoirs and canals have the right of way free over the public domain.

The laws and customs for the government of the community ditches are based on the Spanish and Moorish traditions of the art, which for centuries have had the sanction and authority of use, and may be accepted as very good. They proceed on the theory that water is subjected to beneficial public servitudes, and that the greatest good of the greatest number is the end to be achieved. At the same time the New Mexicans are an extremely conservative and rigid race, and strenuously believe in the validity and stability of any interest that once becomes established or vested.

Non-irrigated Crops.

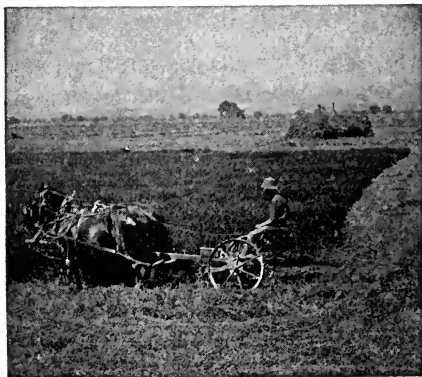
It must not be understood from the foregoing that crops may not be matured in New Mexico without the aid of irrigation. Along the western and eastern slopes of the continental divide a good harvest may be had without the artificial application of water. The farmer, however, will quickly learn that it pays to insure his crop by expending the average cost of irrigation, which is usually about \$1.50 per acre annually. The actual figures will be given under the head of the various counties. As a general proposition, the farmer of the East who realizes from \$18 to \$20 per acre on the ordinary crops raised in his section would be willing to pay any insurance company \$1.50 per acre that would assure him his crop. How much more easily can the New Mexican farmer pay this small insurance. He raises an average of 35 bushels of wheat to the acre, and his gross alfalfa crop will run from \$50 to \$80. The Eastern farmer soon learns that when he cultivates fields in New Mexico he has all the advantages of a manufacturer. If his land is under a good ditch it yields crop after crop without danger of failure.

Natural Advantages of Irrigation.

According to Prof. Saunders, the venerable botanist of the U. S. Department of Agriculture, plant life depends on four elemental properties: light, water, heat and, as he expresses it, poison, meaning the soil. Given the first three and any plant known in nature will grow. The last is only important as an alembic for mixing them. Experiments have also shown that flint sand, washed of every bit of humus and fertilizing matter, in which seeds have been planted for a number of crops and which is then dried out will weigh a great deal more than before the process of cultivation began. This experiment shows conclusively that irrigation instead of depleting the soil, as does every other form of cultivation, enriches it. In New Mexico we have an almost constant sunshine, a genial heat, and our mountain waters are filled with the very best fertilizing matter. It is a fact that fields and orchards subjected to a long series of irrigation become yearly richer and more productive. This is because the chemical food of the plants carried in the water is in excess of the needs of agriculture.

Irrigation in this Country and its Spread.

Irrigation in the United States outside of New Mexico and Utah is just 23 years old.



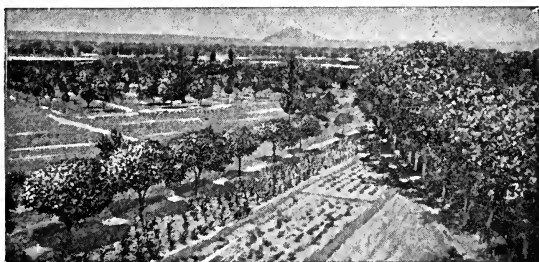
Cutting Alfalfa.

It began in Colorado and California at about the same time, 1870. In this year the Greeley ditch in Colorado and A. Y. Easterby's canal in the San Joaquin valley were taken out. In each place the soil was dry and unproductive. In the San Joaquin valley it was ninety feet to water. Up to 1880 the progress made outside of these enterprises was insignificant,

and many vicissitudes marked the progress of the art, and it was not until 1886 that any notice was taken of it. In this year the U. S. Agricultural Department issued a monograph by Col. Richard J. Hinton, which came as a revelation to the farmers of the East. Up to that time the arid region stretching from the 100th meridian of west longitude was supposed to be an irclaimable desert; but when once the advantages of the country were explained, neither money nor men were lacking to develop the new empire. Until 1886 the great West was regarded as only valuable for mining purposes, but under the beneficent influences of irrigation the arid States now produce a greater amount of annual wealth from agriculture than could ever be expected from minerals.

New Mexico's Advantages.

New Mexico has far more advantages in water, soil and sunshine than any other State or Territory. Its climate is equally if not far more bracing than that of Colorado. It is not subjected to the sudden changes of temperature of that State. It is superior in tonic effect to that of California. No claim can be made by New Mexico



Orchard and Vineyard.

to ability to produce the orange and the lemon, although some misguided enthusiasts claim this advantage. It is, however, essentially a fruit producing country, but the farmer should restrict his efforts to such as grows in the temperate zone.

Advantages of Market.

For two reasons New Mexico has superior advantages to California and Colorado, its principal rivals. It has an earlier season by about three weeks than Colorado, and because of its more

central location commands the market about ten days ahead of California in selling all hardy fruits. Fruit plucked in New Mexico one morning will be in Denver and on the breakfast table next morning. It will be in Kansas City in 36 hours, in Chicago in 48 and New York in 52 hours. For this reason we have another advantage: fruit can be allowed to remain longer on the trees in New Mexico before shipment than elsewhere. Thus it preserves a better flavor and appearance. For these reasons it commands about 30 per cent better price. Fruit that comes from California and sells for 2 cents a pound, if raised in and shipped from New Mexico will bring 3 cents a pound or over.

A Timely Rainy Season.

Another thing that should be borne in mind is that the rainy season in New Mexico comes in July and August, just when needed to wash the leaves and the fruit free of all impurities. All the sweet and luscious qualities of flavor and every beauty of appearance are therefore enhanced.

These facts, briefly outlined, will be more carefully reviewed in succeeding chapters of this book, and every statement will be amply proven from incontrovertible deductions of fact and quotations from the public records.

Principal Irrigation Works.

At the present time the principal irrigation works of the Territory are confined to four main systems of irrigation. Under the Maxwell and Springer works in the northeast there are about 100,000 acres now under excellent canals. The reservoirs and canals of the Pecos valley cover nearly 500,000 acres of land. So great has been the development here that a railroad 250 miles long has been partly constructed and is now being completed to handle its immense business.

In the Rio Grande valley under numerous systems of small Mexican canals there are about 300,000 acres under ditch and cultivation, and the completion of the works on the Mimbres river will put 25,000 acres of land under cultivation. In San

Juan county there are now under ditch about 30,000 acres, and the close of this year will see that figure largely increased. There are available in this county about 150,000 acres of the best fruit land in the world, and there is more water than can possibly be used.

Altogether New Mexico has about 20,000,000 acres of agricultural land to offer for settlement, but so little has been known of her resources that it is only of late years that attention has been attracted to the great advantages presented for agriculture. While she has the lowest average of native paupers and criminals, her people have been maligned, and a misinformed public press has perverted public opinion. However, better information is now being sent abroad, a large share of immigration is settling within her borders, and the true knowledge of her resources is becoming more general.

Prices of Agricultural Products.

Another point that must be borne in mind in regard to New Mexico is that the prices for agricultural products are very high, and likely to so continue for many years. Adjacent to every

farming community is a mining district and this tends to raise the prices. As an instance of profit, a young man in San Juan county, named Moss, son of one of the county commissioners, planted as an



Alfalfa Meadow.

experiment an eighth of an acre of onions and cleared in net profit \$125, or at the rate of \$1,000 per acre. Grapes range from 2 to 4 cents per pound, apples from $1\frac{1}{2}$ to 5 cents, peaches from 3 to 7 cents. The lowest price for baled alfalfa is \$10 per ton on the cars, and it ranges from that to \$22 or \$23 in parts of the Territory. Other crops are in like proportion.

Below is given a careful estimate of yields per acre of various crops and wholesale prices for the same. The farmer who could not get along in New Mexico should quit the business.

Average Yield per Acre.

	Bushels.
Wheat	30 to 35
Corn.....	60 to 80
Barley	40 to 50
	Tons.
Mangel Wurzel Beets.....	50 to 63
Sugar Beets.....	30 to 50
Onions.....	5 to 10
Turnips	10 to 15
Alfalfa	4 to 10
	Pounds.
Cabbage.....	30,000 to 40,000
Beans.....	3,000 to 4,000
Apples)	25,000 to 30,000
Pears)	
Grapes.....	5,000 to 10,000

Wholesale Prices of Produce in Season.

	Per Ton.
Alfalfa	\$10 00 to \$20 00
Mangel Wurzel Beets.....	7 00 to 9 00
Turnips	6 00 to 9 00
	Per Cwt.
Wheat.....	1 00 to 1 10
Corn.....	1 05 to 1 15
Oats	1 00 to 1 55
Barley	1 00 to 1 50
Onions.....	1 50 to 2 00
Beans.....	2 60 to 3 00
Potatoes.....	1 50 to 2 00
Turnips (table).....	3 00 to 4 00
Carrots.....	3 00 to 4 00
Beets.....	2 00 to 3 00
Cabbage.....	1 40 to 1 60
	Per Doz. Bunches.
Lettuce.....	25 to 45
Lettuce (early hotbed).....	75
Radishes	25
Radishes (early hotbed).....	40
Celery	60
	Per Pound.
Peas (fresh).....	06 to 08
Beans (table), fresh	06 to 08
Cauliflower	07 to 08
Apples.....	03 to 05
Pears.....	05 to 08
Peaches.....	02 to 08
Grapes.....	02 to 04
	Per Doz.
Melons.....	1 00 to 2 50

Information Concerning the Counties.

The following general information concerning the several counties of New Mexico will be found interesting:

Bernalillo County.

Total area is 5,024,136 acres, and the available area for agricultural and pastoral purposes is 2,000,000 acres.

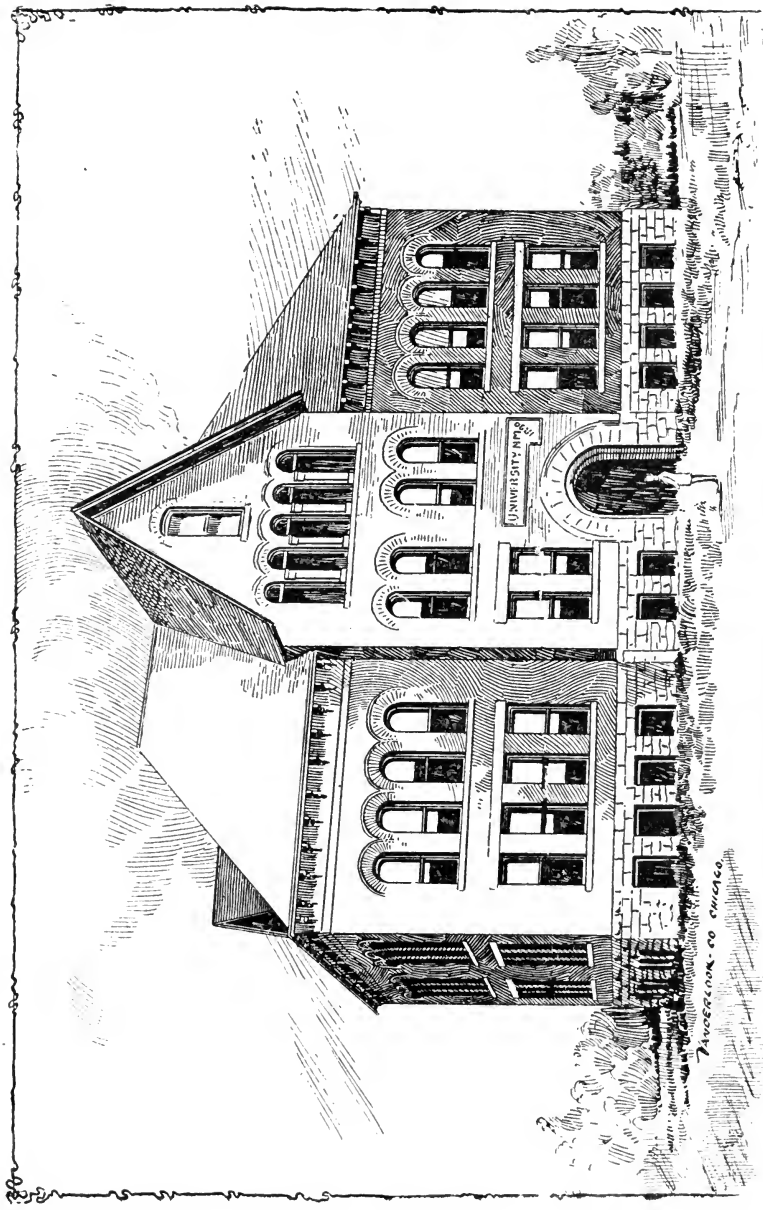
Albuquerque is the county seat. The principal resources are agriculture, cattle and sheep raising and coal mining. At Gallup, near the Arizona line, a large coal mining industry has been established. About 135 cars of coal are shipped daily. Fine timber is to be found in the mountains, and an impetus has lately been given to colony settlement along the various streams. The county has good railroad connections through the Atchison, Topeka & Santa Fé Railroad and the Atlantic & Pacific Railway. The Rio Grande and tributary valleys in the neighborhood of Albuquerque are especially adapted to fruit raising. Bernalillo county has a population according to the last census of 20,469 persons, but this has been largely increased during the last three years. Albuquerque is a growing railroad center and one of the most thriving towns in the West.

Chave's County,

Situated in the southeastern part of the Territory, has a total area of 6,635,600 acres, and an area of 2,000,000 acres available for agriculture and pasturage. A goodly proportion of this is well watered. Its principal sources of water supply are the Pecos river and its tributaries. Its irrigation works are among the most important on the continent. The population is 3,310 according to the census, but the development has been greater in this and Eddy county during the last three years than in any other part of New Mexico, and therefore the proportion of increase will be greater. Roswell is the county seat.

Colfax County,

With Springer as its county seat, has a population of 10,655 according to the census, but it contains now about 13,000 peo-



Territorial University at Albuquerque.

PAUCERSON & CO. CHICAGO.

ple. It is in the northern part of the Territory. It has two railroad systems, the Atchison, Topeka & Santa Fé from north to south, and the Union Pacific Railroad from north to southwest. Where the soil is not tilled it is covered with a heavy growth of grass, encouraging cattle and sheep raising. The finest cereals, potatoes and grasses are raised. In the fruit line apples are the profitable crop. Timber cutting and mining are also very profitable. The Canadian river and tributaries furnish water for irrigation. The average rainfall is sufficient to mature the native grasses.

The total area is 3,658,073 acres, and of this 1,520,250 acres are arable or fit for good pasture.

Dona Ana County.

Total area of this county is 6,251,900 acres, and of this there are available for purposes of cultivation and pasture 3,920,000 acres. The famous Mesilla valley, fifty miles long by from three to five miles wide, is in this county. The fruit from this region, owing to the early spring and summer, has about three weeks advantage in the market over that from other sections. Its quality and flavor are of the very best. The country is divided into mesa and plains dominated by several detached mountain ranges from twenty to twenty-five miles long. Las Cruces is the county seat. The total population of the county according to the census was 10,000 persons, but is much greater to-day.

Eddy County.

The total area of this county is 4,562,290 acres, and of this 1,970,000 acres are arable or fit for pasture. The Pecos river and its tributaries supply water for irrigation. The lands of this county and Chaves are under practically the same system of irrigation. Within the two there are now reclaimed 500,000 acres of land; 60,000 acres have been sold to bona fide farmers, and there are about 20,000 acres actually under cultivation. According to the census the population is very small, but the immigration of the last three years has increased it to over 7,000 persons. Eddy is the county seat, and, although only three years

old, has a permanent population of nearly 3,000 inhabitants. It is one of the best regulated and most delightful towns in the West. There are no saloons allowed in it.

Guadalupe County.

The total area is 3,124,160 acres, and the available area is over 2,000,000 acres fit for cultivation and grazing. It was created by act of the legislature February 26, 1891, and includes a long stretch of the Pecos valley and tributary streams. The Llano Estacado or Staked Plain has its beginning in the eastern part of this county. The country is as yet somewhat sparsely settled; but the Pecos river offers splendid opportunities for irrigation works of a kind that will reclaim thousands of acres. Puerto de Luna, on the Pecos river, is the county seat. The population is about 3,050. Its resources are well worth examining.

Grant County.

The total area is 5,736,920 acres, and of this 3,450,000 acres are available for pastoral purposes. The land now cultivated is mainly confined to the creek bottoms and along the Gila river. On the Gila plateau they claim to raise crops successfully without irrigation, and in a general sense this is true; but this kind of farming, here as well as in the East, is subject to the caprices of the weather, and many of the farmers are taking out small ditches to insure their crops. At Deming the water of negative artesian wells is somewhat extensively used in garden and small orchard irrigation. Silver City is the county seat, and Deming in the southern part is an important town. The population of the county numbers about 11,000. This county is rich in mineral resources, and in the Mimbres valley two large schemes to raise the underflow of that river for use in irrigation are underway and promise success.

Lincoln County.

The total area is 5,483,320 acres, most of it fit for pasture and agricultural purposes. The census states the population at 4,210 persons, but this may well be increased by 2,000 owing to a

large immigration that has come in for the purpose of mining and farming. The county is well watered by numerous small streams fed by springs that percolate from the mountain areas. The Mescalero Apache reservation is within this county, and is one of the best watered and most grassy tracts in the west. The mountains afford plenty of good timber. The pretty little town of Lincoln is the county seat, and the town of White Oaks is an important mining camp.

Mora County.

The total area is 1,618,600 acres and 1,200,000 acres are arable or fit for pasture. The population is about 10,500 souls, who are engaged in cattle, sheep and general farming. The principal products are rye, wheat, barley, corn, oats and alfalfa. Apples and potatoes will grow well in this climate. The county is especially adapted to the raising of horses. There are over 20,000 acres in annual cultivation. The surface elevation ranges from 4,000 to 7,000 feet above sea level, and the mountain elevations reach the height of nearly 13,000 feet. The Atchison, Topeka & Santa Fe Railroad crosses the county. Mora is the county seat and is situate in the beautiful Mora valley.

San Miguel County.

The total area of this county is 4,122,000 acres, of which there are available for pasture, timber and agriculture 3,000,000 acres. It is a very wealthy county, and in the old Spanish annals is known as the "imperial county of San Miguel." Las Vegas is the county seat. The total population according to the census is 16,000 persons. At present the county is principally devoted to sheep and cattle raising. Farming, lumbering and fruit raising are however profitably engaged in. The Canadian and Pecos rivers have their principal sources of supply in this county and constitute its drainage channels. Much land could be placed under irrigation here.

Sierra County.

The total area is 5,735,920 acres, of this 3,450,000 acres are good for pasturage, agriculture or timber cutting. Cattle raising,

agriculture and mining principally occupy the people. In this county are found in the neighborhood of Hillsborough the true gold fissure veins so profitable for mining. The annual output of metal is very large. There are dozens of mining camps in this county and all are very rich. At Lake Valley, in the Bridal Chamber, \$3,500,000 were taken from one pocket in almost pure silver. Other such strikes of varying richness have been made. Untold wealth of metal exists in this county. Hillsborough is the county seat and Kingston is an important mining camp.

Socorro County.

The total acreage is 8,939,520 acres, over 6,000,000 acres are available for pasturage and agriculture. It is one of the best counties in New Mexico for farming, stock raising, horticulture or mining. The population is 10,875 persons. The county seat is Socorro, where very important ore reduction works and smelters are located. The lands of the county are divided into the bottom lands of the Rio Grande, where irrigation is easy, and the uplands or mesas especially adapted to grazing, and large quantities of whose soil may be placed under irrigation by high line ditches. From one-third to one half the county is covered with sparse forests, while the Black Range is thickly timbered with good merchantable timber of yellow and white pine. The Piñon, Datil, Magdalena, San Francisco mountains and Mogollon range also afford wood for fuel, and in some instances good lumber.

Santa Fe County.

Total area of this county is 1,498,609 acres, and there is available out of this area about 975,000 acres for the purpose of pasturage and agriculture. Santa Fé, the county seat, is the oldest civilized town in the United States and the capital of New Mexico. The county's population is about 15,000. It is a fine fruit county, and the next two years promises a very great development of irrigation. One splendid reservoir is already built to supply Santa Fé with water for domestic purposes. The coal

mines near Cerrillos and the gold placers at San Pedro and on the Ortiz grant are justly famous for their richness and extent. In deposits of coal, silver, lead, copper and iron, Santa Fé county is almost without rival. All it needs is capital to develop its riches. The Galisteo, Nambe, Pojoaque, Tesuque and Rio Grande furnish water for irrigation, and it is the purpose of the company having in view the building of reservoirs to store the waters of all the small streams and place it on upwards of 100,000 acres.

San Juan County.

The total area of this county is 3,542,000 acres, of which there is available for irrigation 250,000 acres. It lies in the northwestern corner of New Mexico, and is one of the best watered counties of the whole arid region. The immense ruins of Aztec pueblos and irrigating canals would indicate that a large population once inhabited these valleys. Aztec, on the Animas river, is the county seat. The population according to the census is 1,890, but this has increased to nearly 3,500 persons. There are about 250 miles of irrigating canals in the county, nine tenths of which are owned by the farmers. The fruit of this county is magnificent. Agriculture and stock raising are the principal industries.

Taos County.

Total area of this county is 1,751,975 acres, of which there is available for agriculture, pasture and timber cutting about 950,000 acres. The wide valleys of this county are well watered and in the old days, before railroads, furnished the bulk of the wheat raised in northern New Mexico. It is a garden county, furnishing good grazing and agricultural lands. It has a population of 10,841 persons. Taos, one of the oldest towns in the Territory, and located in a very fertile valley, is the county seat. There are splendid mines of gold, silver and mica in this county. In the Taos mountains, during the past year, the development has been wonderful. A new town, Amizett, has sprung up and miners are crowding to it from every part of the country. It

is not a boom camp, but one based on good mines of paying gold and silver ores.

Union County.

The total area of this county is 4,120,000 acres, of which 350,000 acres are unsurveyed. It was created by act of the territorial legislature, approved February 27, 1893, and installed its first officers January 1, 1894. Three-fourths of the county are arable, but the amount of water available for irrigation is unknown. It is safe to say, however, that from all sources about 100,000 acres will be put under ditch. The county is traversed diagonally by the Texas, Fort Worth & Gulf Railroad. The principal industries are stock and sheep raising. Clayton, its county seat, is a thriving town. Several field parties are examining the country with a view to locate irrigation works. The population is estimated at 4,126 persons.

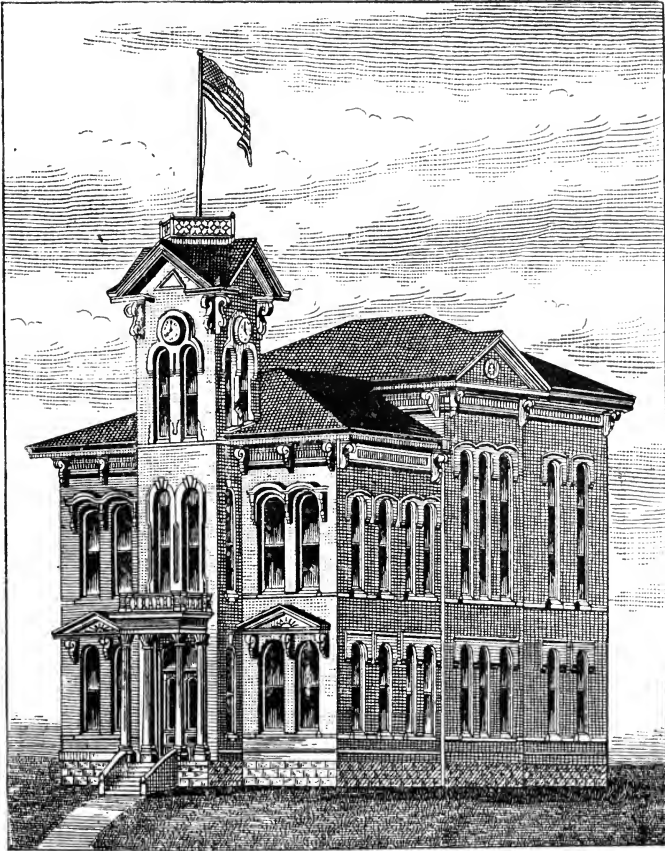
Valencia County.

The total available acreage of timber, grazing and agricultural land in this county is 2,900,000 acres. The total area is 5,621,760 acres. This county is crossed by the Rio Grande river. It is famous for grape and wine culture. Peaches are also largely raised, but cattle and sheep growing are important industries. Fine wheat is amongst its principal products, and all kinds of vegetables do well. The Zuñi mountains afford an almost unlimited supply of lumber. Los Lunas is the county seat, and the population is 13,876 people.

School Systems.

New Mexico has a very fine public school system, affording even in the most sparsely settled regions, ample facilities for education.

The public schools are supported by an ample revenue made up of a poll tax of \$1.00 on each voter, a territorial tax of three miles on the dollar, the income incident to liquor and gambling licenses and the proceeds of fines. The total enrollment of pupils in the public schools of the Territory was 23,708, and



The Agricultural College at Las Cruces.

the average daily attendance for the last year was 15,832. In the higher branches of education the Territory supports the University at Albuquerque, the School of Mines at Socorro, the Agricultural College at Las Cruces, normal schools at Las Vegas and Silver City, and an orphan asylum at Santa Fé. The Catholics through the Christian Brothers and the Sisters of Loretto and Mercy have several fine schools and colleges with about 2,500 scholars. The Presbyterian missions, the Methodist schools and the New West Educational missions have an average daily attendance of 4,000 scholars. When we also consider the great number of Catholic parochial schools it will easily be seen that New Mexico offers better opportunity for education and has a greater average of scholars in daily attendance than many richer and more populous communities.

The Territory contains three Indian schools, supported wholly by the U. S. government, and about thirty schools at the different Indian towns supported in part by the United States and in part by religious denominations.

Area and Boundaries.

New Mexico has an average breadth of 325 miles; length of eastern boundary, 345 miles; length of western boundary, 390 miles, the whole covering an area of 122,444 square miles. By geographical divisions, it is bounded on the north by the State of Colorado, on the east by Oklahoma and the State of Texas, on the south by the State of Texas and the Mexican States of Chihuahua and Sonora, and on the west by the Territory of Arizona.

Of the 122,444 square miles, or 78,374,363 acres, there are:

	Acres.
*Estimated land grants (confirmed and unconfirmed)	19,180,884
A. & P. Railroad grant	2,349,880
Indian reservations	2,832,205
Military reserves	134,952
Government land entered	2,908,932
Total	27,406,853

This leaves an available area of 51,376,442 acres of government land that is obtainable under the land laws of the United States, homestead, mineral and otherwise.

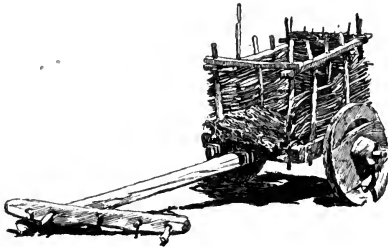
The Territory is divided into four land office districts:

1. SANTA FÉ DISTRICT—Office at Santa Fé, comprising the country bounded on the west by Arizona, on the north by Colorado, on the south by the base line of the Territory, on the east by the range line between ranges 24 and 25 east of the principal meridian of New Mexico.

2. CLAYTON DISTRICT—Office at Clayton, Union county, comprising the remaining portion of the Territory north of the base line and from the above range line east to the boundary of the Territory, bounded on the north by Colorado and on the east by the Texas Panhandle.

3. LAS CRUCES DISTRICT—Office at Las Cruces, Doña Ana county, comprising the country bounded on the north by the base line, on the west by Arizona, on the south by Mexico and Texas to the range line between ranges 14 and 15 east, on the east by the old western boundary line of Lincoln county.

4. ROSWELL DISTRICT—Office at Roswell, Chaves county, comprising the remaining eastern portion of the Territory south of the base line, and bounded on the east and south by the State of Texas.



IRRIGATION.

The progress of American irrigation during the last twelve years has been very great, but it has been along special lines. Its general possibilities are almost unknown in quantity. As yet only areas favorably located for speculation or the advancement of individual ideas of the art have been reclaimed. Specialists with rooted convictions and enthusiasts of bounding faith and belief clash as to the ultimate amount of land available for reclamation, the sources of water supply and how the distributing works should be constructed. The most conservative observers hesitate to announce final opinions on these subjects. The history of agriculture and the lesson of the immediate past give such men food for thought. The fairest way to state the possibilities of reclamation in the West is that it is limited by the ingenuity and labor of man. Water may be developed in some way on more land than is now supposed.

Irrigation in the Past.

If we look back to the early ages we find the great cities of Babylon, Tyre, Carthage, and later the splendor of the Mahomedan civilization, all desert born. Their grandeur and wealth were drawn from the canals and ditches that fertilized the lands surrounding them. To-day the greatest monuments of the people who reared those fabulous trade centers are their ruined works fashioned for the preservation and distribution of the water. Of the great city of Carthage not a stone remains, but the magnificent aqueduct that supplied her water still exists and waters the city of Tunis.

Irrigated Cultivation Sure as Manufactures.

There is a great reason for this. Given four months of constant sunshine and water at the right time and the exact and

best conditions exist for the manufacture of food. With such conditions there is no more chance of a farmer losing his crop than there is of the manufacture losing a lot of cloth after the material has actually entered the loom. If a constant supply of food is assured a community, its success in the other avocations of life is a certainty. For this reason the monuments of antiquity are often its water works. They were the main stay of the people and most carefully looked after. They assured a con-



Irrigated Lands and Farm Reservoir.

stant food supply, and upon this foundation the olden nations builded their greatness.

Little Practiced by English Speaking People.

Among the English speaking nations the art of irrigation has been almost entirely neglected. In Great Britain and Ireland an almost too copious rainfall has operated against its practice, but even in these countries the scientific farmer has long ago realized its importance. Near Edinburg and other parts of the

United Kingdom there are "water meadows" as they are called, whose rental is greatly increased. In India, England ruthlessly destroyed the best system of modern irrigation, and it was only when the appalling famine of the early '70s confronted the Indian Empire, that serious attention was directed to the restoration of the great canals and reservoirs. In India and Egypt the art is being now practically pursued, and millions of pounds, ten years of labor and the talent of the best English engineers have been expended to restore in India a small part of the value so ruthlessly wasted during the conquest.

In Australia until recently, when Mr. Alfred Deakin aroused attention to the advantages of the island continent as an irrigated domain, little had been done. In the Eastern United States the fortuitous circumstances of deep friable soil and copious rainfall did not compel an interest in it. The pioneers who swept over the Alleghanys found easy way for their ploughshares in the rich prairie loam, and they were satisfied with the abundance of the uncertain harvest. It was not then necessary to chide nature or to supplement her efforts, and it was not until 1870, when the land hungry pioneer had arrived at the foot of the Rockies that the importance of immigration began to dawn on the minds of the Americans. Horace Greeley, in the New York Tribune, was the first great American prophet of irrigation and the new agriculture. He took up the scheme of one of his staff writers, N. C. Meeker, and encouraged the plantation of Union Colony, on the Cache le Poudre River, Colorado. Mr. Meeker commanded this colony and the town built by it was named Greeley.

A First Attempt—Failure and Success.

At this date very little was known of the state of the art. The purpose was to place 60,000 acres of land under ditch with sufficient water during the first season. Edwin S. Nettleton was employed as the civil engineer to lay out the necessary works. Two ditches were built, the largest only ten feet at bottom and carrying only three and a half feet of water. This also tapered

in width to five feet at the further end. Another small town ditch was also constructed, and when the two were full of water they irrigated barely 2,000 acres instead of somewhere in the neighborhood of 60,000. The colonists, however, turned in and after a series of years corrected all the original mistakes of construction or plan and are now in a most flourishing condition.

In 1891 a careful examination of the enterprise was made by agents from the U. S. Department of Agriculture. This was done under the direction of Col. Richard J. Hinton, special agent of the Irrigation Inquiry. This report contains much data of general interest in the way of the elements of cost, the causes of their failures and of their subsequent successes. An extract from it will be valuable here.

“The history of Number 2 Ditch is the only part of the story of Greeley colony that is important in this report. It takes its water out of the Cache le Poudre, seventeen miles west of Greeley. The first work was done on it in the fall of 1870 and the spring of 1871, but it was then only a small affair. As originally constructed it was twenty-six miles long, with a fall of three to four feet per mile, ten feet wide on the bottom for the first five miles, nine feet wide for the second five miles and diminished in the same proportion throughout its length. It carried about two and a half feet of water. The cost amounted to \$27,000, and only about 2,000 acres were irrigated partially. The situation of the colony at the close of 1891 was very critical. Instead of four ditches and an irrigated area of 60,000 acres the farmers were confined to about 2,000 acres of partially irrigated land. At this time besides Number 2, Number 3, a small ditch, furnished a little water. Water rights in Number 2 had been sold for 320 80-acre tracts. To meet the difficulty two assessments, amounting to thirty-five cents an acre in all, were levied on the lands to be watered by Number 2, which realized about \$7,960. This sum was paid by the farmers themselves, independent of the liability of the colony organization. The colony, out of the funds received from the sale of its membership certificates, made up the balance of the cost of the first enlargement. This work was completed before the close of 1872. There are no records from which to ascertain the exact cost of this enlargement; but assuming that it cost as much as either of the other two subsequent enlargements, it must have

been in the neighborhood of \$20,000. In 1887 the canal was enlarged for the third and last time, and from that time forward it has furnished sufficient water for all the water rights or 320 cubic feet per second.

“In 1878 the organization known as the Union Colony of Colorado turned over all the rights in the canal to the farmers under it, who organized and incorporated as the Cache Le Poudre Irrigation Company, and since that date the farmers have managed the canal by a board of directors. The question of the cost of Number 2 ditch is much mooted, and it is only by analysis that the same can be obtained. Union Colony expended the first cost, \$27,000, out of the colony funds. To provide for the first enlargement the farmers assessed themselves thirty-five cents per acre. This being insufficient, Union Colony as such, contributed \$12,040 additional, making in all for that enlargement \$20,000. The colony thus paid for the ditch before its interest ceased \$39,040. The minutes of the assessment since 1885, the earliest record in the office of the Cache le Poudre Irrigation Company, are as follows:

Year.	Assessments for water rights (80-acres).	Total amount.
1885.....	\$20 00.....	\$ 6,400
1886.....	14 00.....	4,480
1887.....	12 00.....	3,840
1888.....	9 00.....	2,880
1889.....	9 00.....	2,880
1890.....	16 00.....	5,120
1891.....	16 00.....	5,120
Total for seven years.....		\$ 30,720

“During the seven years mentioned this would be an average annual assessment of \$13.72 per water right for eighty acres, or seventeen cents one and one-half mills per acre. The officers of the present company, the secretary of the colony, Henry T. West, and all the original colonists agree that the expenses for the thirteen years previous to 1885 would average no higher. Therefore, up to 1885 the cost of the ditch to the farmers would be \$59,075.20; cost to colony organization \$30,040; cost of maintenance since 1885 of \$30,720, which would make a total cost of \$126,835.20. The Greeley Ditch No. 2 has therefore cost the owner of each eighty acre water right during twenty years a total of \$386.36, or \$3.94 per acre.”—PP. 138-9 Pat. 1 Re-

port on Irrigation and the Cultivation of the Soil Thereby, by Richard J. Hinton, Agricultural Department.

About 320 families own farms under this ditch, and at the small cost given above have brought them to such perfection for potato cereal and alfalfa production that they are to-day probably the dearest of their kind in the United States. No land is for sale under this ditch. The last sale made was at the rate of \$100 per acre, and in addition to this the purchaser paid \$2,200 for an eighty acre water right.

The above will pay the prospective immigrant to peruse and study. New Mexico offers to colonies all the advantages set forth. A party of 100 families and upwards can make as good if not better arrangements in New Mexico.

They will really be at less expenses, as any reliable engineer can now lay out a ditch that will carry the necessary water without any danger of a false experiment.

The only other irrigation systems extant in the United States at this time, that is in 1870, were around Salt Lake City by the Mormons, and those of the Mexicans and New Mexicans in the almost unknown southwest.

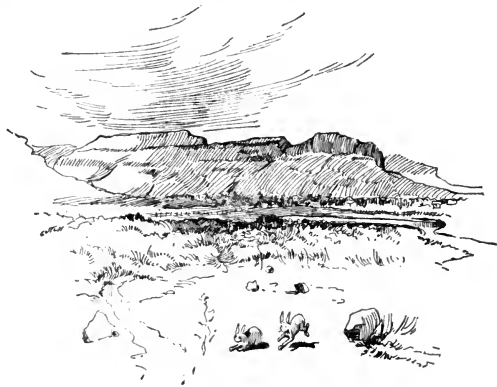
General Features and Statistics.

The arid area of the United States may be reckoned from the 100th western meridian to the Pacific Ocean and from the British to the Mexican boundary lines, or allowing for local areas of abundant rainfall, a block of over 1,000,000,000 acres.



A New Mexico Grape Vine Four Years old.

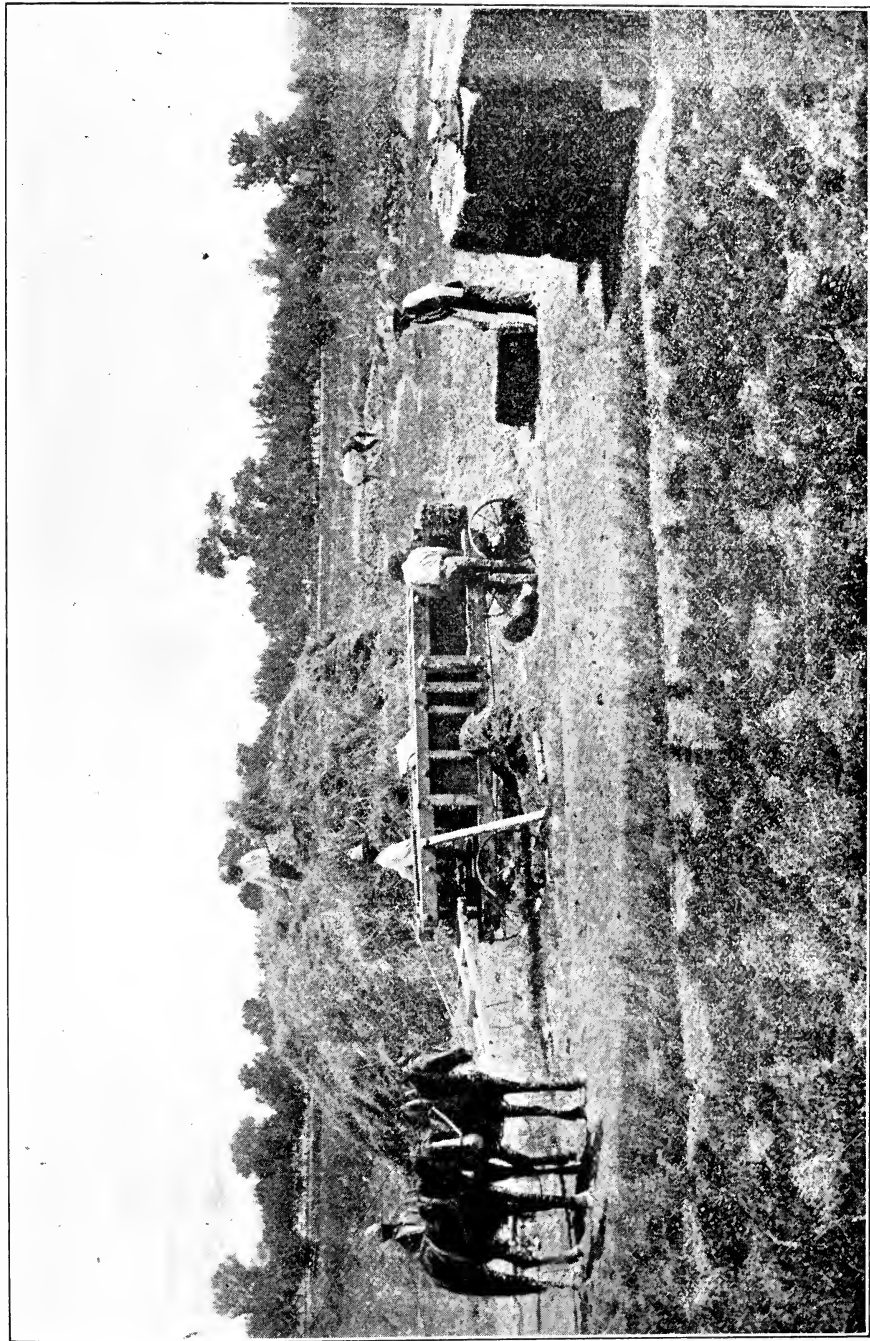
It is necessary for a complete industrial use of land that it should have a constant annual rainfall of twenty-eight inches. The arid region of the United States ranges from twenty inches downward. If it were possible to have a total rainfall of sixteen inches confined to the growing and ripening season, crops could be raised with certainty. The processes of nature, however, do not permit this; therefore, man by the preservation and distribution of the rainfall must correct nature's inequalities. In irrigation water is applied without waste to the growing and ripening crop in such quantity and at just the proper time to insure production. Based on these conditions, according to the figures



of the U. S. Agricultural Department, there were in 1891, 8,026,526 acres under cultivation by irrigation.

The advantages of this system of farming are so manifest, that the unknown author of the "Vestiges

of Civilization" predicted many years ago that on the slopes of the Sierras and Rockies would one day flourish the most potent and civilized race the world ever knew. This prophecy has been in part realized. Nowhere on earth to-day does man live in more ease and comfort than in parts of this vast region. Wherever irrigation has reached a high degree of development life is in its highest sense worth living. Bowering orchards and wavy fields contrast in the high lights and shadows with the blue mountains. This plenty and prosperity is known not to be the fortunate accident of a good season; but, until the mountain streams run dry, it is assured that crop will follow crop as certainly as the spring, summer and autumn return. The farmer has no fear of devastating and mud making floods in the spring to interfere with his ploughing and planting; he is not menaced



Baling Alfalfa in the Rio Grande Valley.



with hot, drying winds in summer; drought has no terrors for him; nor does he fear that his labors will be fruitless. A few simple rules and his experience guide him in the spring, his soil is thoroughly wetted from his ditches, care being taken that the water does not course too freely over the land so as to wash or cut it. Throughout the rest of the season the need of further irrigation is judged by examining the top soil. If about four to eight inches from the surface, according to the crop, it becomes so dry that it will not pack in the hand, more water is applied. In the fall after harvest, he gives the land another thorough soaking before allowing it to lie fallow for the winter. This makes it pure and sweet for the next crop and the certain sunshine will do the rest.

A Paradise for the Industrious.

One thing, however, must not be forgotten. An irrigated farm must be intensely cultivated. While this region may be a paradise for the industrious and thrifty, it is the reverse for the makeshift and lazy farmer. A good irrigator must be constantly alert to seize all the advantages of science. His efforts must not only be exerted for himself, but for the community. He is not a segregated unit of the human race, but part of a community whose interests are all interwoven. He must therefore be a neighborly, forbearing man, for the very success of his venture requires that each member of the colony, or each farmer under the ditch from which he draws his water, shall co-operate for mutual advantage.

The first cost of the main supply canal must be borne either by the community or by a capitalized corporation, and its ultimate success depends upon how thoroughly those who use the waters co-operate for the greatest good of the greatest number. If the immigrant assure himself that an irrigating community is financially prosperous he need ask no questions as to its *morale*. The necessities of this situation and environment compel individual good conduct and feeling.

No Isolation or Loneliness.

The irrigating community has also another advantage in a new country in that the terrible isolation characteristic of the settlement of the States as far West as Kansas is a thing of the past. Irrigators live in compact communities on small farms. Their profits are large and they enjoy from the start greater luxury and companionship than their brethren of the East. Pioneer farm life loses the lonely terror that prevailed during the early days, and women especially need fear none of the hardships so often and so graphically described. The community itself may be isolated, but the individual never. Modern science is everywhere pressed into service. The long lines of the main or supply canal necessitate the use of the telephone, and the farmer quickly adapts it to his private needs, so that, without leaving his home, he or his family may communicate with every part of his district or neighborhood. Comfortable as this may be, it is to be remembered that irrigation is not farming made easy. It is farming made sure. It does not agree with the constitution of a drone.

Recent Advances.

The reader must remember that the foregoing is written about a region that twelve years ago was declared unfit for cultivation or tree planting and wholly irreclaimable; indeed that most of it was worthless except to raise scraggy sheep and the broad horned steer. The best answer to this is that works are projected to-day to reclaim 25,000,000 acres. More than 100,000,000 shade trees alone have been planted and are growing since the date of this dictum. The foundation and building up of the commonwealths of the arid region detail a most romantic story. First, Nature and then the Indian, only less pitiless, had to be subdued; but civilization armed with steam and electricity has circumscribed the desert, that in Fremont's time was supposed to stretch from the Missouri to the Pacific, to a few small tracts like Death's valley. Irrigation forces a common and combined effort of communities and not of individuals. Capital has been

wielded with all its concentrated power, until the Mojave and kindred wastes have yielded tributes of corn and wine to the dominion of man. No one, well informed, now dares venture his reputation in the assertion that any particular area is hopelessly sterile or arid. Where the pioneer has gone and died, the engineer follows, "opens rivers in high places," science smiles and the desert blooms. A new condition has entered into American life. The West, so little known, so much disfigured in Eastern literature, now teaches the farmers of the older States the art of crop manufacture. The averages are always higher than in the East.

Advantages of New Mexico.

To swell the record of grand success New Mexico presents the following from the pen of the national authority on irrigation, Richard J. Hinton:

"Owing to many circumstances the Territory of New Mexico has not received the attention it deserves from those who have been seeking farming and fruit raising locations in the far West. New Mexico will average for the rainy season a precipitation of less than eleven inches. Over nine inches must therefore be supplied to insure the raising of crops. The New Mexican segment of the Rio Grande valley, especially in its southern portion, is almost an ideal climate for grape growing. Along its course the Indian Pueblos and the old Mexican hamlets mark with foliage, fruit, grain and garden, its ability to repay the fruit grower and the husbandman. The Mesilla valley, one of the oldest settled areas, embracing about 300 square miles of rich alluvial soil, has been a vine growing, wine making country for the past two hundred years. Apple and pear orchards were not planted, however, until 1867. There are now seventy five varieties, bearing steadily each year."

Add to the above the splendid fruit farms of the Pecos valley, the beautiful orchards of the San Juan county, the Mimbres valley, the Canadian, and the garden like valleys of Taos, Mora, San Miguel, Santa Fé and Rio Arriba, in fact all New Mexico, wherever water can be developed, and the promise of the future is unsurpassed.

Arable and Irrigable Acreage.

In this connection the following statistics of land in New Mexico will be valuable:

Total area in acres.....	77,374,363
Irrigable from water in sight.....	2,064,455
Agricultural and possibly irrigable by storage.....	38,225,267

In explanation of the above it may be stated that all of New Mexico, except the mountain areas, is arable. The soil is deep and free from stones. Water is the one thing necessary to make it fertile. If an accounting is taken of the average rainfall of the plains and valley areas and the heavy snows and rains of the mountains, a sufficient supply is assured for all the available land. This will come about with the future. At present there is sufficient land under good serviceable canals to supply all the immigration that can reasonably be hoped for.

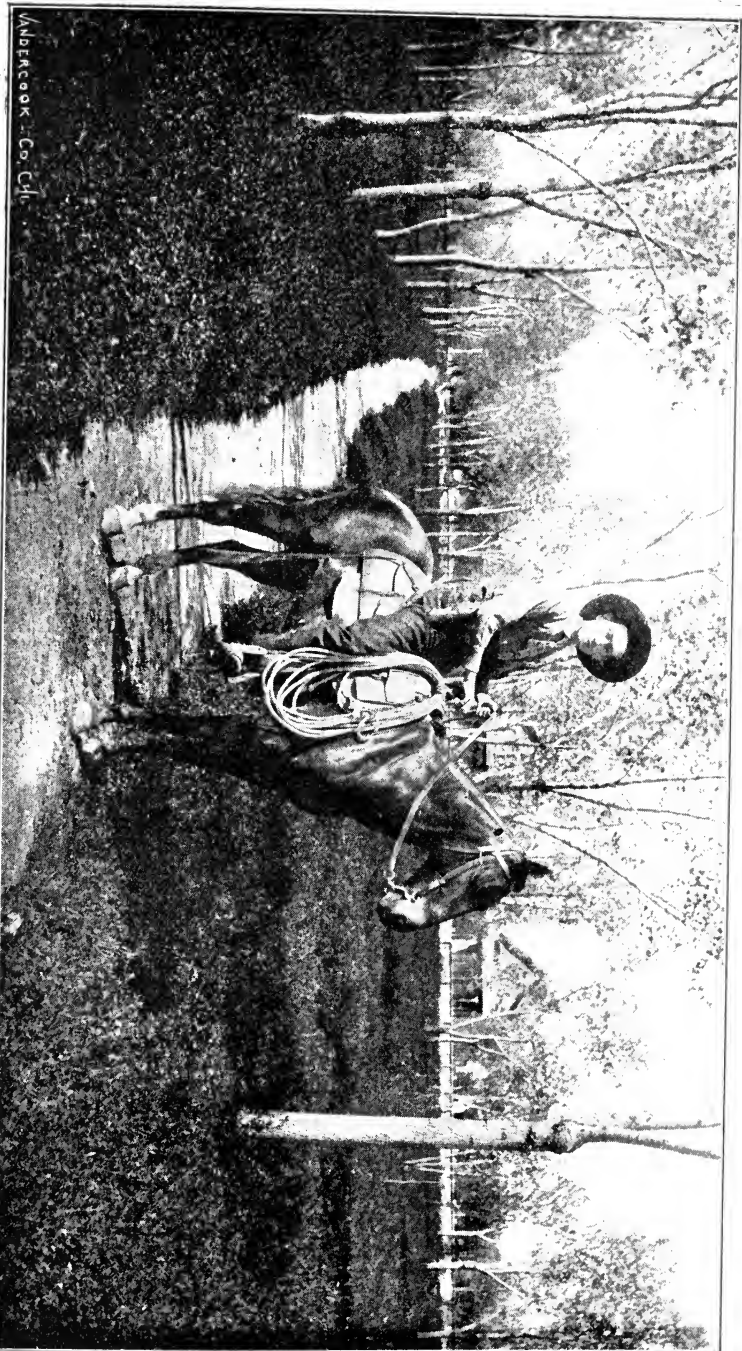
For the present it may be said that the creek and river bottom lands of New Mexico afford about 2,000,000 acres of easily irrigated land, of which about 800,000 is actually under ditch. This does not include what is available if large storage schemes are resorted to.

Irrigation is not a costly art. The official figures given before on the Greeley ditch, show what may be done by colonies. Capitalized corporations may expect a proportionate return. According to the official figures of the last census, irrigation in New Mexico will cost and return values, as follows:

Construction of main canals, laterals, etc.....	\$ 5 58 per acre.
Average annual rental.....	1 54 per acre.
Average cost, clearing, fencing and first cost of cultivation.....	11 71 per acre.
Value of water right.....	18 30 per acre.
Increase in value in irrigated land per acre.....	\$ 50 58
Cost per mile of ditches five feet wide.....	310 00
Cost per mile of ditches ten feet wide.....	581 00
Cost per mile of ditches fifty feet wide.....	6,666 00
Average size of an irrigated farm thirty acres.	

What an Irrigated Farm Will Yield.

These are not isolated instances, but the average of all the figures of cost and value gathered by the census office for the Territory. A farm devoted to roots, such as potatoes, etc.,



Anderson Co. Cal.

An Irrigator's Homestead in San Miguel County.

and cereal and forage crops, will yield annually over \$50 per acre; while a bearing orchard or vineyard will yield gross from \$150 to \$800 annually according to the intensity and thoroughness of culture. Accurate statistics will be presented in this regard as to the several counties. From ten to thirty acres of fruit land carefully cultivated will comfortably support any family and leave leisure for its enjoyment. Thirty to eighty acres of ordinary farm land is also sufficient. Broad acreage is not what tells in irrigation, but the amount of intelligent effort that is used in assisting the crop, is what swells the profit. Of course where a farmer gives similar attention to a large area his profit will be proportionately greater. The small farm is, however, always a sure and large profit payer.

Water as a Fertilizer.

Another and very important factor of irrigation is that it is the best means of fertilizing the land. M. J. Charpentier de Cosigny, the great French agricultural writer and publicist, lays it down as an axiom that water in a natural state never exists in perfect purity. The substances most common and abundant in water are lime, magnesia, aluminium, oxide of iron, generally mixed with silex and carbonic and other acids, most of these substances are found in the tissues of vegetables and also in their ashes. Irrigation is therefore not only beneficial, as it supplies moisture, but it introduces direct to the plant roots under the most favorable circumstances and conditions of assimilation, various minerals and substances which compose the rocks and soil over or through which it has passed. Usually the amount of matter supplied the tissue of the plants is in excess of their needs, and for this reason an irrigated soil never wears out. According to the experiments of Mr. Sainte-Claire Deville it is shown, that one hectare of land (2.47 acres) irrigated with one liter of water per second, (2,113 American pints), receives as much potash, a well known fertilizer, as would be supplied by 87,000 kilograms of well rotted stable manure. A kilogram is somewhat over two pounds of ordinary weight.

Another important point is that nitrogen, the most important element of most plant life, is supplied only through the air and the atmospheric gases of water. Rain water, although the purest of natural waters, contains a high per cent of this important nitric or azotic acid. The drainage of our forest covered water sheds enormously exceeds it, however, in this valuable fertilizer. Nitrogen has a natural affinity for water and is readily absorbed by it. Besides this the oxygen of water is the element that burns away the insoluble parts of the soil and converts them into humus, which is soluble and easily assimilated by the plant roots. This is the principal factor in the complex process by which sap is prepared in the bowels of the earth.

In the Land of Sunshine.

Irrigation in an arid country has another advantage. It is a well known fact that dark, cloudy days retard vegetable growth, and that fruit grown during a damp, gloomy season loses its luscious and sugary quality. There is no such trouble in New Mexico. The statistics taken from the records of the weather office at Santa Fe show that from January 1, 1893, to August 15, 1893, the last date at which such information was available for insertion herein, there were 145 days of absolute sunshine, 64 fair days and only 19 cloudy days. Even of the 19 days noted as cloudy, not a single one was wholly dark. The sun shown for some time every day. In other words, during the first 228 days of 1893, there were only 19 days on which the conditions for the increase of plant life were not as perfect as could possibly be expected. Water was attainable during all of this time, and therefore the exact conditions obtained for food manufacture. New Mexico is a huge laboratory for this purpose. The predominance of sunshine was during the growing and ripening months. The cloudy days also generally represent the dates of timely showers, insufficient of themselves to support vegetation, but of inestimable value in washing the foliage of the crops and opening the pores of leaf and fruit to the healthy influences of light and heat.

Sources of Water Supply.

It may be here asked if there is so much sunshine, from whence does the water come to irrigate? The valleys of New Mexico are all well sheltered. The summer precipitation thereon is the only rainfall that is important. It averages about eleven inches per year. The water supply is drawn from the rivers filled by the slowly melting snows of the high mountain chains that everywhere inclose the irrigable land. The snow usually lies from eight to fourteen feet on the level, and the deep gulches and cañons are filled with packed and frozen masses hundreds of feet deep. This melts slowly during the irrigating months and keeps up the supply of water.

General Methods of Irrigation.

On the supposition that some persons may be ignorant of the general process of irrigation, a short description will be permissible. The valleys of Western rivers and streams have an average direct slope of about ten feet per mile towards the oceans, while on each side of the streams the slope of the lands is very slight until the mountain sides are reached. A canal is taken out of the river at say a grade of two feet per mile, and run away from the river bed so as to preserve this fall. Therefore if a canal is taken out ten miles in length it will be eighty feet above the river bed at its furthest point and a proportionate distance back toward the mountains from the river. The land intervening between the canal and the river is irrigated by means of small ditches running to the highest point on each farm from which water is distributed by means of smaller laterals. If the flow of the stream is not sufficient to water the lands during the whole of the growing months, a reservoir is built at some convenient point, and the flood waters of the spring are stored for use in the late summer. The water is applied to the crops in dozens of ways. Fruit and vegetables are best irrigated by means of small ditches run down between the rows. Alfalfa, grain and broadcast crops generally are best watered by the flooding system, by which the water, carried on to the fields in

plough furrow ditches, is allowed to cover the surface, a system of checks made of low furrow embankments being employed to raise it over any given portion of the field. If the land has been properly prepared by plowing and cultivating the water will sink in a few hours to a depth of from three to four feet. As soon then as the crop becomes workable, cultivators should be run over the land wherever the condition or character of the crop will permit it. A fine tilth of four to six inches deep is the best protection from evaporation. Wetted land under the sun forms a glossy skin, which quickly cracks and curls up. This is nature's medium for evaporation, and it should be destroyed as quickly as possible. Any modern cultivator or harrow will do this. When this tilth is formed it will not only prevent evaporation, but will permit a maximum of air and light to reach the fine roots of the plants, thus forcing the growth to the highest natural development. Wheat, alfalfa and such crops will preserve water from evaporation by the shade they afford the land and cultivating need not be resorted to.

As an example of the fertilizing properties of irrigation it is interesting to note where the little furrows of one year were drawn; an experienced eye can always detect their course by reason of the increased yield over those particular portions. The reason for this is that more sediment was deposited thereon because of the greater amount of water that flowed over the land. This sediment of water is the source of the great fertility of the Nile valley. In New Mexico every stream is a Nile, and the Rio Grande carries more of this rich sediment than even the famous river of Egypt.

Official Statistics.

The acreage under ditch in the Territory of New Mexico at the end of 1891 was placed by the Department of Agriculture at 700,000, with 475,000 acres under cultivation, as against 677,315 under ditch and 450,000 cultivated in 1890. The present area under ditch will amount to 800,000 acres. The average of irrigation in the Territory of New Mexico for the

year 1889-1890 given by the U. S. census, was as follows: Average size of irrigated farms, thirty acres; average value of water rights per acre, \$18.30; average cost of irrigation per acre, \$5.58; average cost of annual rental, \$1.54; average first cost of cultivation, \$11.71; approximate cost of productive system, \$512,000; approximate total value in 1890, \$1,679,000; approximate increase for year, \$1,167,000; approximate first cost with water rights, \$1,701,000; approximate value June 1, 1890, \$4,677,000; increase in value, \$2,976,000; total value of such farms, \$4,467,000; total value of products for year, \$1,174,000; increase in value in irrigation land, per acre, \$50.58; cost per mile for ditches, five feet in width, \$319; between five and ten feet, \$582; over twenty feet, \$6,666.

The figure of principal interest to the farmer in the above is the average cost of irrigation per acre, \$5.58. The average throughout the arid region is \$9.15. It will therefore be seen at a glance how favorable are the general conditions in this Territory. Let the Eastern farmer compare the above with his profits. Let him then consult the census figures as to the condition of his State, and make up his mind if his condition and surroundings justify him in remaining on his hardly tilled and scantily yielding acres. The traditional and historic method of farming is by irrigation. Nearly eight-tenths of the world's population are fed to-day from the irrigated farm. Not only this, but it is the only sure and profitable method. Irrigation farming in this land of sunshine is the road to comfort and wealth.

Reservoirs.

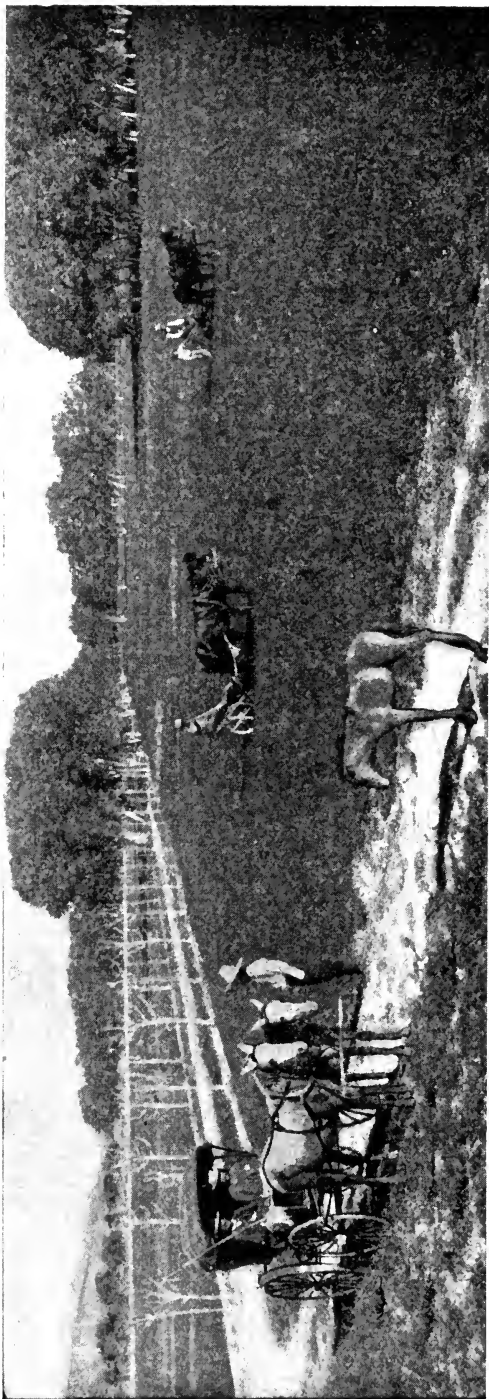
There is nothing less understood in irrigation than the use of reservoirs. They are often not practicable at the beginning because of expense and because the community is poor. A reservoir, to relieve the community under it from expense, should be properly built; that is the best engineering skill should be devoted to its plan, and the very best type of labor put into its construction. Makeshift reservoirs should never be attempted. They

are not only dangerous to human life, but are liable to fail at the most important crop period.

New Mexico, however, is a country peculiarly adapted to the storage of water. Along the beds of its streams occur, with great frequency, large natural basins to which the water can be inexpensively diverted, and there held without danger of the dam breaking. A proposition of this sort is usually practicable with ordinary engineering. Reservoirs built in the beds of streams, against whose dam the full force of the floods come, should only be constructed after all the surroundings have been examined and the plans approved by the very best engineers. The base must be absolutely good, and the sides keyed into the natural formation so as to present the same impervious solidity as if the structure grew there. Another important item is the spillway. It must not only be known that it is large enough to carry off the excess of ordinary floods, but it must also be capable of carrying off in an orderly manner the tremendous floods that sometimes pour through our rivers from what are known as "cloudbursts." It is not frequent, but a fact known, that the summer rains of this country sometimes precipitate from one to two inches or more in an hour or so over an area often of fifty square miles. Every gully, every arroyo and every swale in the land becomes a raging torrent in a few minutes. This violently pours like a solid mass along the main channel. When this momentum is arrested by a dam, its inertia or static strength must be very great indeed to withstand the hurtling power of the flood.

For this reason the Bureau of Immigration strongly advises all colonies who may desire to locate in New Mexico to be very wary of all plans proposed by their agents to locate dams in stream beds. It is true that in February, 1890, a masonry dam in California, only eight feet thick at the base, sixty feet high, and battering to twenty-eight inches on the crest or top, withstood a flood, precipitation of twenty-two inches in forty-eight hours over a drainage area of seventy-seven square miles. This dam, although frail in its cross section, was of the up-stream arch type, was designed by one of the best engineers living,

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A Farm of the Rio Grande Land Company, Near Las Cruces.

and had many advantages of situation and position not to be duplicated. The owners of this dam have since increased its base to over 600 feet, and its crest thickness to about 300 feet. It will be well for small capitalists to leave such enterprises to great corporations or to the State. Indeed it is the settled convictions of experts, that none of these dams should be permitted unless their construction has been sanctioned and authorized either by State or national authority.

There is, however, one storage proposition in New Mexico that is safe and not too expensive. That is to confine the waters in natural depressions out of the stream line or along the course of the irrigating canals themselves. The water is diverted to these reservoirs by means of short canals, and is there held in a state of rest by means generally of very inexpensive embankments. Such a plan is usually well within the means of an ordinary colony, and at the same time is safe. In almost every county of New Mexico, and especially on all its wide table lands such basins are found, and their transformation into reservoirs is easy. Such schemes are highly commendable, and are expected to reclaim large areas.

Underflow.

There is, however, a new method of irrigation whose consideration is of great importance; namely, the restoration of the underflow to the surface. The value of this means of supply was first brought to public attention by Judge J. W. Gregory, of Garden City, Kansas. At his suggestion it has been applied with some success in Finney and Kearney counties, Kansas. His views and methods have been pronounced sound by general consent of the experts engaged under Col. Hinton in the Irrigation Inquiry

In the valley of the Rio Grande this theory might be advantageously followed. In the Pecos valley this water comes to the surface naturally through fissures in the conglomerate. In the Mimbres valley it is already being utilized successfully. This water wherever it occurs may be raised in various ways, the most expensive of which is the submerged, bed rock dam, and the

cheapest and simplest is the gravity canal run back into the water bearing strata. A technical description of this method would be too lengthy for this article. It may, however, be briefly described as a horizontal well from one to several miles long running back on an established grade into the water bearing sands that form the river bed. Even at the lowest stage of the Rio Grande these sands could be made to yield sufficient water to eke out the final irrigations of each season. Owing to the abrupt fall of this river it may be assumed that an underflow gravity ditch from two to three miles long would furnish sufficient water to fill any canal now in existence in its valley. The cost would be about the same as the same length of ordinary canals, and any engineer could cheaply make the tests necessary to establish its feasibility at any given point.

A Few Notable Results.

As stated elsewhere, New Mexico has taken first prize for wheat at the World's Fair, and the second for oats,—Russia alone surpassing this territory.

According to the October bulletin of the United States Department of Agriculture, New Mexico for 1893 presents figures as follows:—

Wheat, New Mexico average yield per acre,.....	16.8	bu.
" Kansas " " " " 	8.4	"
" Colorado " " " " 	13.	"
Oats, New Mexico " " " " 	29.2	"
" Kansas " " " " 	18.1	"
" Colorado " " " " 	26.7	"
Barley, New Mexico " " " " 	21.6	"
" Kansas " " " " 	8.1	"
Buckwheat, New Mexico " " " " 	95.	"
" Kansas " " " " 	67.	"
" Colorado " " " " 	88.	"

The average condition of the potato crop based on a scale of 100, is 64 for Kansas, 81 for Colorado, and for New Mexico 90. It is therefore seen that New Mexico surpasses Colorado and her famous Greeley potatoes.

Sweet potatoes are as follows: Kansas 66, Colorado 90, New Mexico 95.

Sorghum rates in Kansas at 72, Colorado 71, New Mexico 95.

Corn, Kansas, 64, Colorado, 68, New Mexico, 98.

To show how good a report this is for New Mexico, it may be stated that the general average of the country for wheat was 11.2; of rye, 13.3; of oats, 23.5; of buckwheat, 73.5; Irish potatoes, 71.2; of corn, 75.1.

Of course the states mentioned above can not compete with New Mexico in raising fruit; but they are the immediate competitors of this territory in raising the cereals and root plants. The figures above are given to show how successful the careful New Mexican farmer may be. The handicap is heavily in his favor.

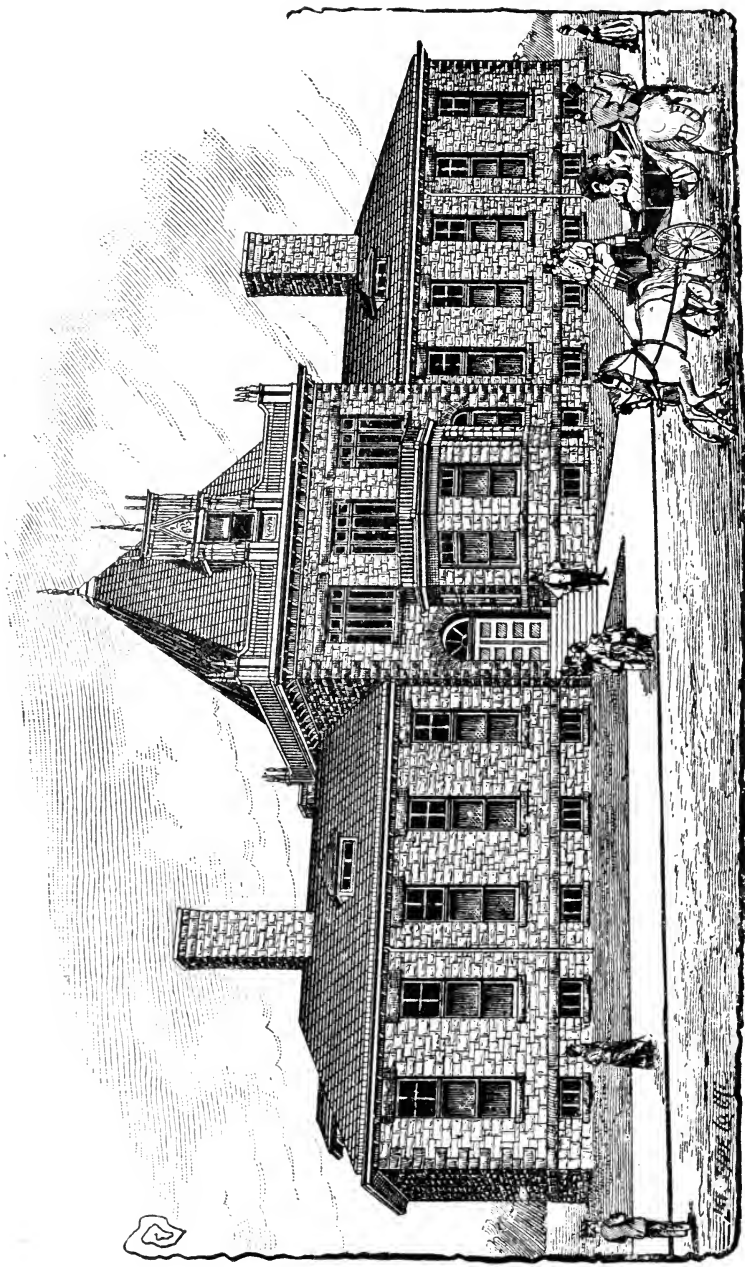
An Endorsement.

The following, clipped from the *Irrigation Age*, is self explanatory:

“New Mexico is one of the Western communities which has probably surprised the public by the extent, the variety and the quality of her products. She claims 480 varieties of wheat, 75 of oats and 27 of rye, and, God bless her, she puts aloft the inscription: ‘All raised by irrigation.’ The samples of these grains are of the highest quality. New Mexico alfalfa, which is unusually prolific, attracts much favorable comment. An interesting feature of the New Mexico exhibit is canaigre. This is a new comer, and is little known to the public. It promises, however, to be a very profitable crop.”

Values Under Irrigation.

In New Mexico there were 9,518 families engaged in farming during the year July 1, 1889 to June 30, 1890. These are the official figures of the Census. Of these 8,393 families owned their own places, and only 251 or 2.99 per cent of them were mortgaged or encumbered. The total of these mortgages were \$373,245. The average for each farm was \$1,487, the average auction value of each farm is \$4,346. Probably nothing can so clearly demonstrate the value of irrigation as these official figures. The number of farming families at this date has increased to between 11,000 and 12,000, but about the same proportion of value would obtain.



School of Mines, Socorro.

MINING.

Mining in the Territory of New Mexico during the Spanish and Mexican rule was very fitful, and as a usual thing was not very profitable. During the Pueblo revolution, from 1680 to 1692, the native or aboriginal people filled up all the mines opened by the Spaniards because the service in them had become hateful. Every artifice of the Indian was used to destroy the marks of the leads and many of the mines were never re-discovered when the Spaniards recovered the possession of the country.

General Geologic Features.

The Territory is seamed and partitioned by gigantic ranges, whose sides are cut by torrential streams, offering splendid opportunities for both lode and placer mining. The Continental Divide, Socorro, Datil, Zuni, Black Range, Mimbres, Mogollon, Burro, Florida and Tres Hermanas are the names of the principal mountain chains carrying precious minerals on the west side of the Territory. In the center are the Taos, Santa Fe, Sandias, Manzano, Ortiz, Sierra Blanca, San Andreas, Organs, Jicarrillas, Sacramento and the Guadalupe ranges. The Raton mountains wall in the Territory on the north and are full of the precious and industrial metals.

Characteristics of the Metals.

Gold and Silver are usually found in about the same neighborhoods. In fact the New Mexico ores are in the nature of a mixture of both. Some of the best gold mines in the Territory carry a large amount of silver and almost all the silver leads contain a paying percentage of lead. There are large areas of the gold and silver regions roughly sketched above that have never been prospected. In proof of this is the large discovery

of precious metal made in the Taos range about a year ago and which is now being extensively worked. Among the principal mineral sections are, that portion of the Territory within a radius of 100 miles of Fernando de Taos; the southern part of Santa Fe County; the whole length of the Black range and its foot hills in Sierra, Socorro and Grant counties; and the Organs and Sierra Blancas in the South. Indeed some of the gold deposits in these regions are so rich that every rain washes out small nuggets. The floods that come down from Pinos Altos carry great quantities of free gold, and it is no uncommon sight to behold men and women washing gold in the streets of Silver City after a heavy shower or freshet. The same is true of the San Pedro district, and in the Placer district in Santa Fe County, also on the upper Rio Grande, where the gold is found so near the grass roots that men earn from \$3 to \$4 per day panning out the refuse that pours from the mountain sides and placer beds after every heavy storm.

Distinctive Features of the Mountain Formations.

As previously described the Mountain ranges of New Mexico enter it from the Northwest and then spread out fan-like over the western two-thirds of the territory. These ranges are a continuation of the Cordillerian chain of the Rockies in Colorado. Their structure is marked by huge eruptive bodies of rock, principally of porphyry, quartz and sedimentary formations. In many places these eruptions have deposited the metal in what is termed fissure veins or deep vertical crevices in the formation, which by some infiltrative or other process has been filled in with porphyry or quartz. The occurrence of these veins is somewhat rare and their working is the most profitable to the miner as they permit him to sink a vertical shaft and the rest of his workings is only such as is sufficient to extract the pay ore by means of stopes. Near Hillsborough, radiating from Animas Peak are a number of these fissure veins of the truest formation.

In the south central portion of the territory these formations

of porphyry and quartz are interrupted by hard lava flows. In the western part of Lincoln County and extending into Dona Ana County is a large flow of this lava resembling a river in appearance. The section is known as the "Malpais" or "bad lands." Whether or not these flows are mineral bearing is as yet unknown to a certainty, but the country to the east and west of them is filled with good leads, and mineral is found plentifully.

Another feature of the country is the deep canons that mark the water courses in the mountains. Their appearance leads frequently to curious conclusions as to their origin. One observer says: "It seems unlikely that these deep canons could have been formed by gradual erosion from the surface alone, and it is quite natural in this country, where subterranean rivers are of frequent occurrence, to think of these as one of the causes of these abnormally deep cuts. The subsequent breaking down of the overlaying strata and the gradual washing out of the loose detritus would appear to be a more reasonable explanation of the phenomenon." Good geologists, however, refuse to endorse this opinion, and it is only cited to call particular attention to the wonderful formations. The cañon of the Rio Grande opposite Taos is one thousand feet deep, very narrow and with walls rising sheerly from the river bed. It is a peculiar and puzzling natural wonder. The Ocate, to the other side of the range, also cuts straight through a mountain in a canon so narrow and steep that it can not be seen from the surrounding country until one stands directly on its brink. Many other equally curious erosions might be described, but these are distinctive of the rest.

Precious Stones.

New Mexico stands pre-eminent among the states and territories as a producer of precious stones. Fine emeralds have been found and mounted, but not in sufficient quantity as yet to make a search for mines of them, even of speculative value. So far they have only occurred as isolated gems. The turquoise,

however, is produced in large quantities. This gem is not valued in this country as highly as in Europe, where the principal supply is drawn from Persia. In New Mexico these gems abound principally in Southern Santa Fe County and in Grant County. Tiffany Brothers have pronounced them the finest in the world and superior to the Persian turquoise in tint, lustre and polish. The American Turquoise Company, owning the turquoise mine at Cerrillos in Santa Fe County, was awarded the first premium at the World's Fair at Chicago. Information is not readily obtainable as to these mines as their owners are reluctant to encourage prospecting. A correspondent from Grant County writes: "Work on the turquoise mines keeps right on. They never diminish or increase their force and are very quiet as to what they produce. They have undoubtedly mined in the past year \$100,000 in turquoise of the best quality, which is claimed to be superior to the best produced in Persia."

In Santa Fe, in Bernalillo, Rio Arriba and San Juan counties a very superior quality of garnet is found. It is easily mistaken for the true ruby, is very hard and takes a magnificent polish.

Coal.

The coal deposits of this territory are of such magnitude and extent as to be truly wonderful. They begin in the immense beds of San Juan County and stretch south and east through the territory in almost unbroken continuity to the Mexican line. The principal mines are located at Blossburg, Colfax County, Cerrillos and Waldo, Santa Fe County, Monero and Amargo, Rio Arriba County, and Gallup, Bernalillo County. All the mines except those at Cerrillos are bituminous.

The statistics of production for the year ended December 31, 1892, are as follows:

Blossburg and Raton	244,995	tons
Cerrillos	18,747	"
Monero	20,000	"
Carthage	49,529	"
Gallup	247,287	"
Total	580,558	tons

For the period from January 1 to August 31, 1893, the following are the figures:

Blossburg and Raton.....	245,907	tons
Cerrillos.....	69,810	"
Monero.....	16,132	"
*Carthage.....	53,093	"
Gallup.....	254,410	"
Total.....	639,352	tons

*The Carthage mines have been shut down since June, 1893.

When it is considered that the Atlantic & Pacific Railroad was idle on account of strikes during the early part of the year and that the general depression of trade throughout the country has to some extent affected coal mining, it will show how great and growing is the coal trade of New Mexico.

At Raton and Blossburg large forces are being worked at this writing. The Cerrillos and Waldo mines have been equipped with the very latest machinery. The Atchison, Topeka and Santa Fe Railroad will henceforth take from these mines for distribution through Kansas and Colorado over 1,000 tons of bituminous coal per day and about 5,000 tons of anthracite per month. Gallup has also increased its facilities for the transportation of coal to Southern California and Arizona. Monero and Armago are also increasing their coal outputs.

True Carboniferous Formations.

There has long been a dispute as to whether the New Mexican Coal deposits were of the true carboniferous type or merely lignite. The Territorial geologist denounces this idea and says the coal is of the unquestioned carboniferous type. Some of it analyzed at Cerrillos showed 93 per cent of fixed carbon and only 5 per cent of ash, moisture and volatile matter. In Socorro County on the Armendaris Grant are also large beds, from which specimens were sent to the United States chemist at Washington, whose analysis shows that this body contains 89 per cent of fixed carbon. Robert T. Hill, the noted geologist, in a recent report on some property in New Mexico, also pronounces the coal to be carboniferous and not lignite.

The San Juan County Beds.

San Juan County Coal beds in the extreme northwest corner of the territory, have not been prospected to any extent. They are known however to contain almost unlimited quantities of coal. On the San Juan River, opposite Fruitland, is a truly notable exposure of this valuable fuel. It stands above the river 34 feet and is over 300 feet long, and extends back into the bluff, on a very slight dip, it is supposed, for miles as there is an immense mesa stretching in that direction. Immediately across on the north side of the river other huge beds appear, and these then stretch up the La Plata, an affluent of the San Juan, for nearly 50 miles. This coal is a hard free burning quality. An experienced Cornwall miner, who is working one of the veins on the La Plata, says he never saw mines so easily opened or that so quickly yielded good merchantable coal. All that seems to be necessary is to strip the outer layer which has been exposed to the weather for ages and the fine, glittering material is found, free from slate or "bone" and ready for use. Some difference of opinion exists as to the quality of this coal, but the Bureau of Immigration can state on the authority of its agent, that it is of a good coking character. Some of it, in his presence, was covered with sand and fired on the ground and in a short time was roasted into a fine silver coke with a ring like metal. The coal in this county is usually found in a thick strata between slate and sandstone of a very fine grain.

Taking the territory by counties and beginning with San Juan, besides its coal, there is a well founded belief that large gold veins exist in the mountains of the county. Prospectors proceeding in a desultory way have found some fine specimens but the lodes have as yet not been even approximately located. Every few years there is a furore about the gold placers of the lower San Juan, which usually brings many adventurous miners to grief. The gold in this river is too fine to be profitably saved, except with very expensive machinery. Specimens of a red cement have been found that assayed well in both gold and silver. These were said to have come from a blanket

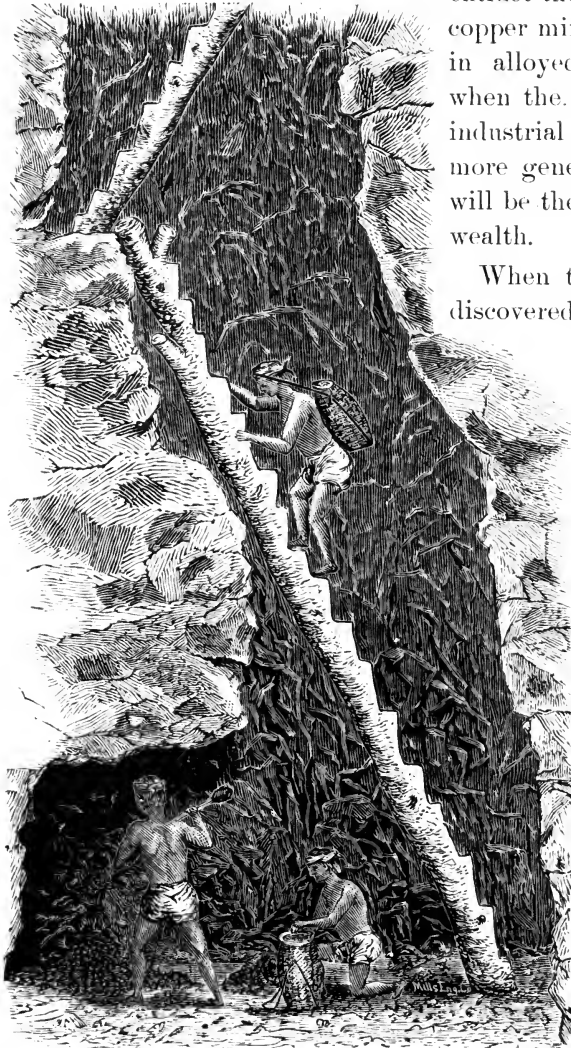
vein stretching from above Largo to below Farmington, a distance of about 40 miles. No further development is, however, known. Miners from the Silverton country in Colorado, who are familiar with the La Plata Mountains in this county, also report large mines of iron, but as this county has no good railroad connections, little is positively known as to its mineral wealth. If facilities were afforded for transportation however this county would doubtless pay the prospector and actual miner.

Rio Arriba County.

This large county is situated in the northwestern part of the territory. Gold is being produced in this county in paying quantities. On the Chama is a stretch of country greatly resembling the famous placers on the Snake River in Idaho. They begin at a point about 6 miles above Abiquiu, and then run up a stream a distance of about 15 miles. The gravel has true placer characteristics. The gold near the surface is of a fine, flourey character but yields well to both pan, cradle or sluice. Prospect holes have been sunk in this gravel from 10 to 30 feet in many places but bottom has never been found. The dirt from these excavations runs from 50 cents to \$1.25 per yard and gets better as bedrock is approached. This dirt runs from 20 or 30 to about 200 colors to the pan and it is rarely that any dirt is washed without showing somewhere between these figures. Recently 30 pans ran \$1.00. One company has recently put in place gold washing machinery at a factory cost of \$22,500. This contrivance is guaranteed to save 90 per cent. of the gold. There are nearly 30,000 acres of good placer ground on the river and its tributaries, and it is pronounced by experts to be of the best paying character.

This county also possesses coal in great abundance, and mines of it are open on the Denver & Rio Grande Railroad at Monero and Amargo. Twenty thousand tons were shipped last year and the coal mining is rapidly developing. It will pay any company to investigate the coal deposits of this county.

On the Arroyo Cobra are situated great veins of copper. These mines were worked by the first Spanish settlers. They yield so freely that the aboriginal tribes found it possible to extract the metal. These copper mines are very rich in alloyed minerals and when the mining for the industrial metals becomes more general, this county will be the source of great wealth.



Mining in New Mexico 300 Years Ago.

When the country was discovered by the Spaniards, all the Pueblo Indians had ornaments of copper, some few had small gold nuggets, and everything went to show that the extraction of mineral was very easy. From the first settlement in 1605 to 1680, the date of the Pueblo revolution, tradition has it that a large treasure was taken from this country.

There are also tales of hoards, hidden away, and lost mines. How much of this

is true can only be ascertained of the careful prospecting; but arguing from what is now known, it would seem that these traditions had some foundation in fact: and that the future will develop some good mines.

Taos County.

Vast mineral wealth is stored in the country between Taos and Santa Fe. Prior to the Pueblo revolution in 1680 the wealth of these mines was famous. The Franciscan Fathers, in the name of the Church, opened many and worked them through the labor of Indians. The Indians, seeing the cupidity of their conquerors had been the cause of their oppression, filled up all the mines, and refused to disclose their locations when the Spaniards returned. There are traditions of many rich mines and the Mexicans firmly believe that the Pueblos have preserved the secrets to many of them. However it is improbable that these aborigines know much about it, as it was the policy of their leaders during the revolution to destroy and eradicate as thoroughly as possible all traces of these mines. The Districts of Arroyo Hondo, Embudo, Picuris, and the Rio Hondo in this county are very interesting. They all lie on the western slopes of the Rockies, and are of such richness that tradition has magnified their value. The story goes that a Mexican named Vigil, discovered in the church at Guadalajara, Mexico, a document in which it was stated that the Spaniards had worked mines in the Taos Mountains near Arroyo Hondo from which millions of silver were taken, and that when the Pueblo Revolution occurred in 1680, they concealed in one shaft their hoard amounting to about \$14,000,000. However apocryphal this may be, the fact is that within the past year two companies, one from Chicago and one from Denver, have opened mines that promise to pay as well as any in the country. A new town called Amizett has sprung up there. Strikes have been made that assay in the thousands of dollars, and the work is being pushed very systematically. To the west of these lode mines lie the Rio Grande and Rio Colorado placers,

and in the Arroyo Hondo and the gulches west of the Canon del Agua gold is found in quantities sufficient to make profitable a good system of hydraulic mining. The ores consist of cyanite and talcose slate, perfectly covered with float quartz. This region of country is peculiarly a gold district. Silver, however, is found in large quantities.

On the Rio Grande there are great beds of mica, and quantities of it are shipped from Tres Piedras. Copper also occurs in bodies sufficiently large to warrant large workings if the trust restrictions on that trade could be removed.

Colfax County.

The principal mines of precious metals in this county are clustered around Baldy mountain, a high peak of the main range of the Rockies known at this point as the Taos mountains. It towers 12,908 feet high and overlooks the valleys of the Monero and Cimarron rivers and Ute creek. Elizabethtown is the center or principal town of this district, and is situated twenty-seven miles west of Cimarron and thirty-five miles northeast of Taos. The principal mining districts are the Ute creek district on the east side of the mountain; Willow creek on the south and Elizabethtown on the west. This region was one of the earliest developed in New Mexico, and a peculiarity of its ores is that the quartz contains a large amount of peroxide of iron, supposed to be induced by the decomposition of iron pyrites. The Aztec mine is among the best known producers of the southwest, and is the principal working in this region. On Willow creek and also near Elizabethtown there are numerous claims and mines. This land is all on the Maxwell grant, but the directors are very liberal in their arrangements with miners. Prospectors are encouraged in every way possible. Not only do good lode mines abound, but hydraulic mining may be profitably pursued in all the gulches and arroyos around Baldy mountain and in the tributary streams of the Cimarron. Men and women have often been seen washing out gold in the acequias or irrigating ditches. Although the Aztec mine has been worked for about

twenty-five years, it recently sold to an English company for \$150,000, and it is the general impression among miners that the purchasers got a good thing. New work will be put in on this property, and it is thought its development will lead to quite a boom for this region. All the indications are that the best veins are as yet undiscovered. The general opinion of miners is that the gulches of Ute district, east of Baldy mountain are not as rich as those on the west side, the Moreno district, but that the lodes of the former are better because of greater regularity of the strata. Nearly all this mining, however, has to be carried on at about 10,000 feet above sea level. The placer gold is very coarse and the lodes run very high in gold.

It is generally supposed that the Moreno valley was a lake until its waters forced a passage through the deep, steep cañon of the Cimarron. Dozens of gulches empty into it, and it is therefore very probable that a large amount of gold has been deposited in its basin. One of the early schemes was to drive a tunnel from the Cimarron cañon to the deepest part of the bed rock in this basin and sluice all the alluvium through it. Such a project should be carefully examined and would probably pay handsomely.

The Taos mountains, both in the county of that name and in Colfax are large silver producers; in fact the bulk of the metal produced by the Spaniards in this region was confined to the white metal.

Coal.

The coal deposits of this county are very large. From Trinidad down to Clifton peak, on what is termed the Raton plateau, the whole country seems to be underlaid with this valuable deposit. The mines at Blossburg and Raton are good payers. Last year the combined shipments from them amounted to 244,995 tons. During the first eight months of the year it has been 245,907 tons. There seems to be an unlimited supply and at an early day these mines will supply Colorado and Kansas with the greater part of their fuel. Iron, aluminum and copper are also found in paying quantities.

Union County.

This municipality embraces the northeastern portions of Colfax, San Miguel and Mora counties. It is known that coal and large quarries of fine building stone abound, but as to whether there will be any great production of the precious metal is as yet not definitely known. It is, however, a new county, sparsely settled and unprospected. Everything is in favor of a good mineral development.

San Miguel and Guadalupe Counties.

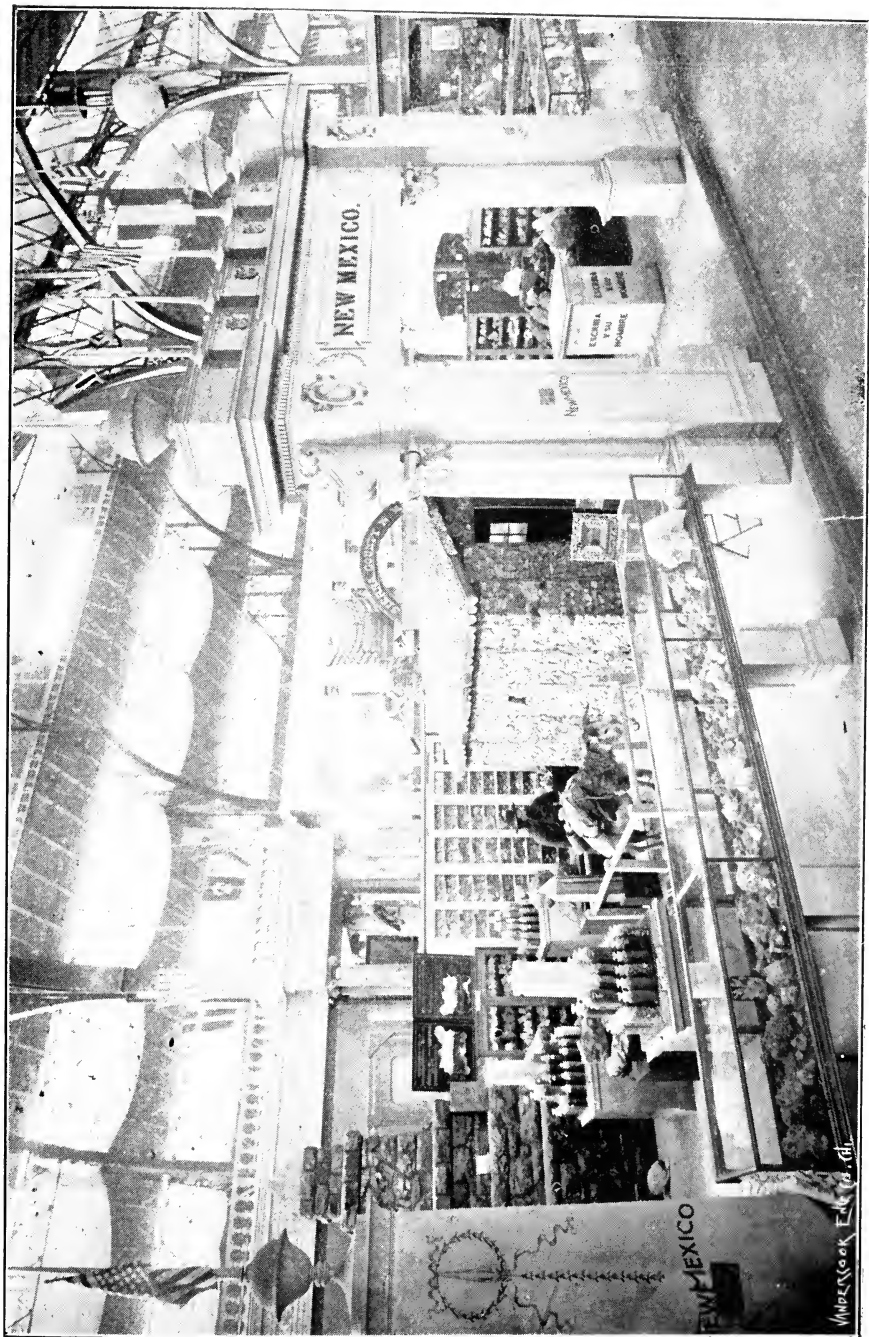
These counties have three mining districts within their borders, the Carizalillo, Mineral City and the Pecos districts. The indications are that large deposits of mineral exist in the section surrounding the Pecos headwaters. Float of various kinds is easily found. The famous Las Vegas hot springs are within this county. San Miguel county and its sister county of Guadalupe, recently segregated from it, are still embryonic in their mineral development, but prospecting is on the increase, and the indications of the existence of precious ores are good.

Mora County.

This county has for its western boundary a continuation of the Taos range. It is easily to be presumed that the rich mineral deposits of this range continue into Mora county, but not much is accurately known. There has been no extensive prospecting, but one good mineral district, that of Mora, near the town of that name is organized. The western slopes and gulches of the Rocky mountains should, however, furnish good placer and lode mining for the precious metals. In common with the rest of New Mexico, colors of gold may be found in dirt taken from almost any portion of the county, and good prospecting will undoubtedly result in the finding of large fields of this metal and silver. The Turkey mountains show big outcrops of coal.

Santa Fe County

Presents a diversified prospect for the miner. The Old and New Placers in the southern part of the county, near the towns of



Mineral Exhibit, World's Fair, Chicago.



Golden, Dolores and Tuerto, are considered by miners the richest in New Mexico, if not in the United States. Under the Spanish rule thousands of men were constantly employed in washing out the gold in the crudest manner. They would dig holes in the drift at the foot of the mountains, pack the dirt out on their backs, and wash the gold out in wooden batias or dishes by means of water procured by melting the snow with hot rocks. Millions of dollars were taken out in this crude manner. After the cession of New Mexico to the United States these miners emigrated to Chihuahua. After every rain small nuggets of gold may be found exposed on the surface, one amounting to over \$1,200 in value was found in this way. The only problem to be solved is a sufficient water supply. Surveys have established the practicability of bringing the water of the Pecos river on to these placers, and as there would be no objection to the use of the giant nozzle, a bonanza awaits the shrewd men who will accomplish this. The soil is mostly sandy and the water would have to be carried for the greater part of the distance in pipes. Two natural basins on the line of the ditch could be used as reservoirs and a constant and sure supply assured. Some of the companies who have used this method of hydraulic mining in California, where it is now prohibited by law, should take this proposition into consideration. The millions extracted by the first crude efforts of poorly informed miners would be very slight in comparison to the riches that might be washed out by some modern process. So rich is the ground in this county that it is stated by Rositer W. Raymond that "color can be found almost everywhere in those regions where the older rocks are the underlying formation or where they are adjacent to gulches. Even in the very city of Santa Fé color can be got."

A Big Proposition.

Aside from this, the gold of these placers can be easily traced to the lodes from which it originated. Considerable progress has been made in this part of the Territory, but what is needed is a concentrated effort to handle these lode and placer mines

under one control or association. Much money has been wasted in the erection of machinery before the grade or quality of the ore was really known, and this misdirected effort and capital and want of professional skill have prevented, thus far, the proper development of these really rich properties. If wise and far seeing capitalists will organize to develop this section, there is no doubt but that they will open mines as rich if not richer than any yet known.

Silver is also a paying product in this vicinity. In this county are found rich beds of turquoise and garnets superior to any other workings in the world. This is the dictum of Tiffany Brothers' expert.

Coal.

The coal deposits of Santa Fé county are well developed. Near Cerrillos and Waldo station, on the Atchison, Topeka & Santa Fé Railroad, in a series of low undulating hills are found rich beds of anthracite and bituminous coal. Often they lie in alternate strata, the metamorphosis having probably taken place on account of great heat during the eruptive period. Last year 18,747 tons were shipped from Cerrillos. This season the arrangements are complete to ship 1,000 tons of bituminous coal per day and about 5,000 tons of anthracite per month.

In the neighborhood of Cerrillos and from there to the placers is a tract of archæan formation filled with large veins of gold bearing copper and magnetic iron ores. The rocks are eruptive. Rhyolite and trachyte break through the cretacious surface and the scene is one of the utmost grandeur and in places becomes awful in its wild and terrible disorder. Hardly any equal area shows such diversified prospects of metals, both precious and industrial and of fuel. This has been taken advantage of by the Santa Fé Railroad, and large coke ovens line its tracks at Waldo. This is an exceptional section for coke burning or for iron manufacturing.

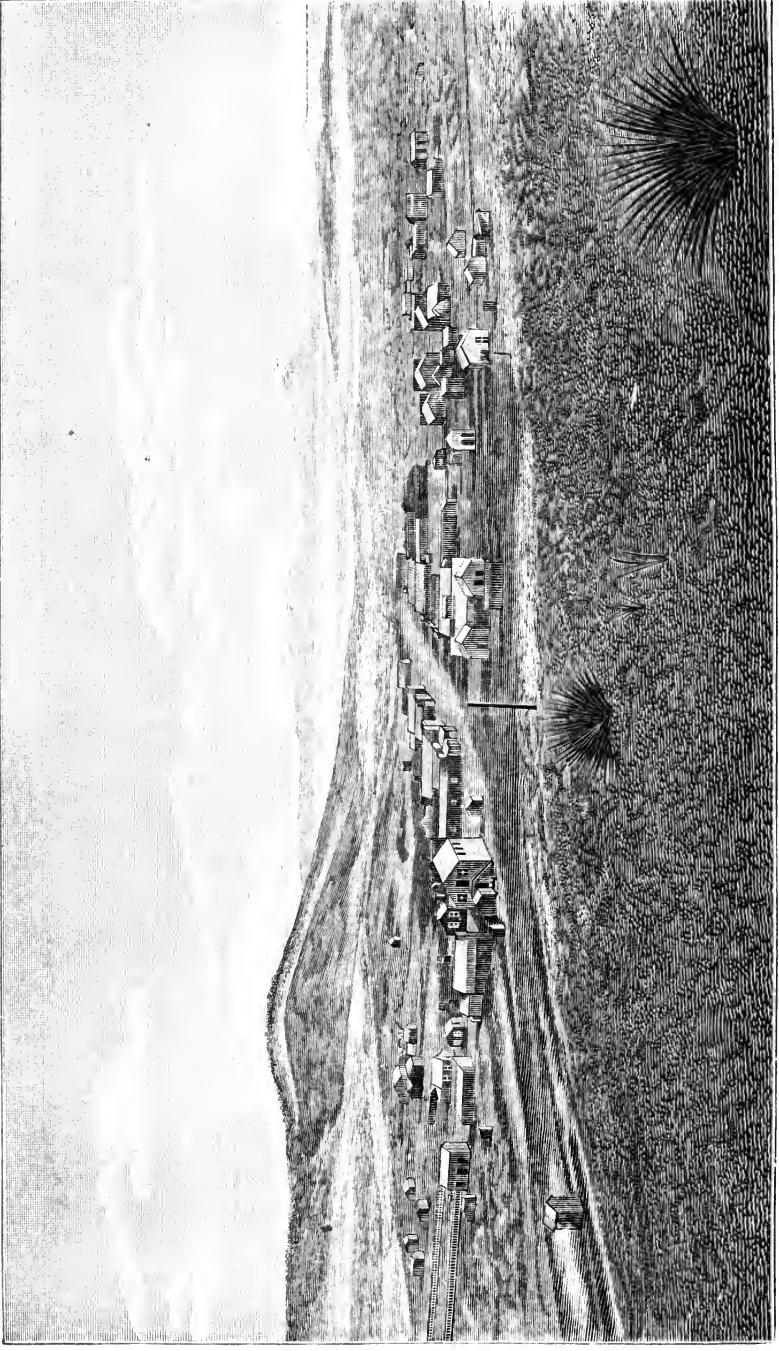
Bernalillo County.

This county stretches from the Arizona line to the east of the Rio Grande. It is diversified in its prospects. On the west, near

Gallup, are immense coal beds, which, through the A. & P. Railroad, supply the largest part of the coal used in Southern California. The shipments from these mines exceeded those of any other district in the Territory, amounting to 254,410 tons for the first eight months of 1893. These beds seem to be a continuation of the immense beds that lie to the north in Rio Arriba and San Juan counties, previously described. In the central portion of the county the Nacimiento and Jemez mountains are of volcanic origin, and near them are the San Mateo mountains in which other immense bodies of coal are found. Says an expert: "Between the Rio Puerco and the Rio Grande, west of Santa Fé, are the Jemez, and still further the Nacimiento mountains; north of them those of Tierra Amarilla and Abiquiu. All of them are known to be filled with minerals, but in most of them prospecting has not been carried on sufficiently to permit of giving details in this connection." It may be said that what is before related as to placer beds at Chama is in a general sense, applicable to all the gulches running down from the mountains described.

No Drawback to Prospecting.

The climate of this region and in fact of all New Mexico is mild and healthy. The sky is a vivid azure, surpassing that of Italy. The air is pure and transparent. In fact the very act of breathing in this and the country previously described is in itself a pleasure. The soil is fertile and will supply the miner with sufficient of the necessaries of life. The wonder and the mystery to persons who know this country is that it has been practically avoided by the miner and prospector. Various reasons are given as to why immigration does not settle in this Territory, but there seems to be no adequate explanation why the miner, who invades the arctic winters of the north and thirsts under African and South American suns should hesitate to explore such a beautiful and wonderfully rich land. It is true that rich mines and placers are covered with more or less valid grants; but as this bar to good titles will now be settled, and as most of the region under description has been passed



Lake Valley Mining Camp, Sierra County.

on, it is hoped that this state of affairs will end. These mountains are covered with pine, cedar, oak, etc., fit for mine timbers and fuel, also for charcoal.

The mineral districts in this county, as now created, are the Nacimiento, Las Placitas, Bernalillo, Tijeras and the Hell Cañon districts. Included also within its area are the great Jemez and Sulphur mineral springs. At Copper City and in the Sandia mountains copper beds are found, and the latter range has a good many placers of value, that if worked and traced to the mother lodes would yield richly. In eastern Bernalillo county are found large deposits of salt and salt lakes.

Valencia County.

The only mineral districts established in this county are the Mt. Taylor and Manzano. This county stands in the same list as Bernalillo. It has unlimited resources of mineral and agricultural wealth. If mining were once begun in earnest, immense tracts of land would be watered and cultivated as an immediate market would be afforded. As it seems now this section must develop on different lines from the rest of the Rocky mountain region. It would seem that the agricultural lands must first be opened, and then mines will be stumbled on by a few lucky ones. Notwithstanding the fact that coal, iron and copper are found and known to exist in abundance, and that there are good indications of the precious minerals, little is being done. Extensive salt deposits are known to exist in eastern Valencia.

Socorro County.

This county is well advanced in mineral development. Eleven mineral districts are already organized therein. They include the Council Rock, Amy, Gallinas, Iron Mountain, Pueblo, Magdalena, Socorro, Oscuro Mountain, Hanson, San Andres and the Cooney or Mogollon districts. The output of the mines includes both gold and silver. In the western part of this county are found deposits of good salt and several salt lakes. Recent prospects have also revealed good beds of coal on the Armen-

daris grant and on the San Agustin plains. At the city of Socorro are located the largest ore reduction works south of Pueblo and north of El Paso. They are convenient to the largest mining district known. The silver mines in this county carry large amounts of lead, and for this reason few of them have shut down even during the late hard times. The leads are found principally in the Datil, Magdalena, Oscuro, San Mateo, San Andres and Mogollon chains of mountains. The San Francisco and Piñon mountains, when prospected thoroughly, will also show good mines. Little trouble is experienced in mining in this county as water and timber are almost everywhere convenient to the workings. The mountains may be described as composed of primitive and granitic rocks in their central and higher portions, and lapping on this are strata of quartzite, limestone and shale, faulted, pierced and disturbed by eruptions of porphyry and talcose. The mines occur along the eruptive lines in the form of contact and blanket veins and are very productive. One of the best known camps in the southwest is Kelly, in this county; there are rich mines in this camp, some of which, the Kelly group and Graphic company's mines have been worked with great profit to the owners and for many years.

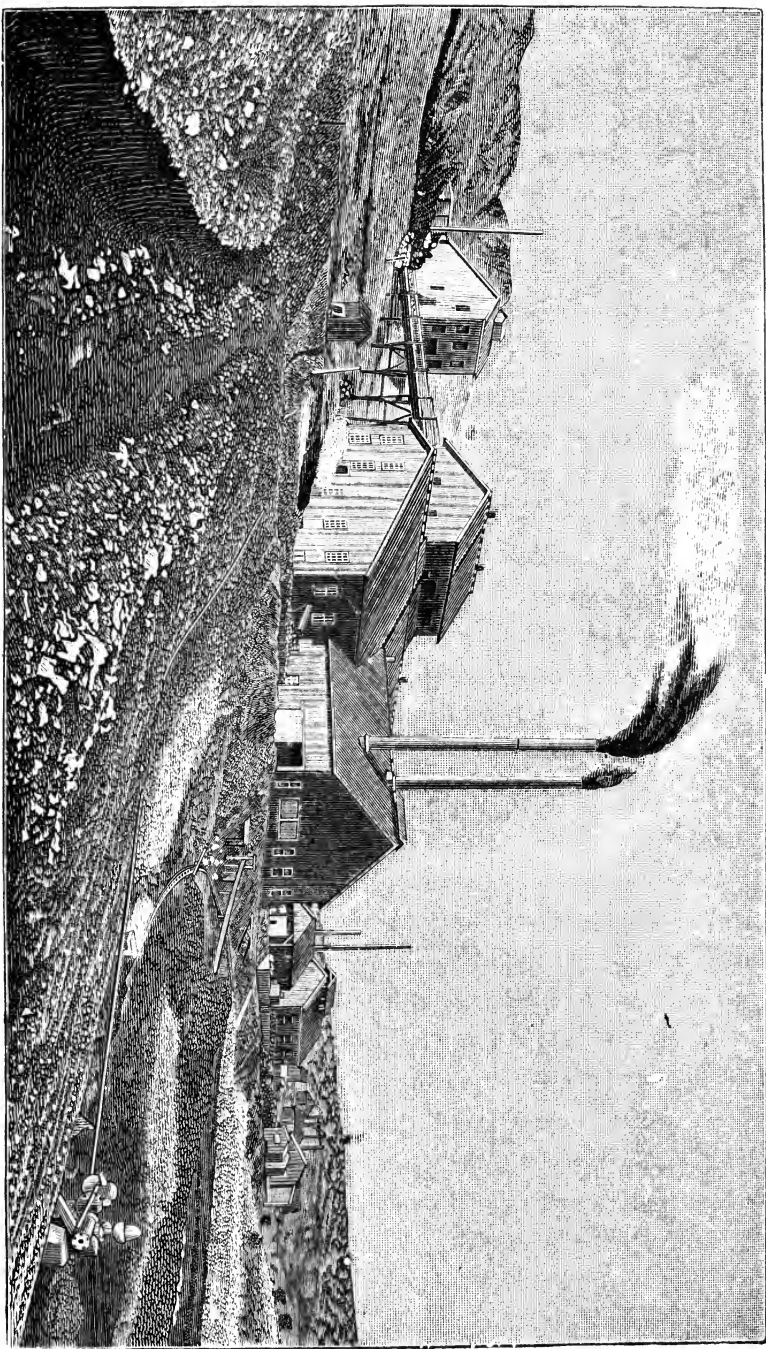
The Rio Grande Smelting company has most extensive and modern works at Socorro; these latter have been conducted for twelve years, and have yielded much profit. All kinds of ores are being treated at those smelters, and ore is bought from all of the camps in central and southern New Mexico, and much of it also comes from the State of Chihuahua.

Near the city of Socorro are extensive beds of fire clay; experiments have proven this deposit to be very valuable and to make the finest of fire brick and pottery.

Carthage shipped 53,093 tons of coal during 1893, but has since been abandoned and the forces and machinery moved to Waldo station in Santa Fe county.

Sierra County.

This county includes the Black range and Caballo mountains. It is exceedingly rich in mineral; indeed it may be termed one of



A Smelter in Sierra County.

the richest counties of the Territory. It includes such thriving camps and districts as the San Cristobal, Apache, Black Range, Cuchillo Negro, Chloride, Grafton, Caballo mountain, Lake Valley, Hillsborough, Animas Peak and the Perchas. The county contains some of the best gold mines, and in the production of silver its history is romantic; for instance, the Bridal Chamber at Lake Valley yielded \$3,500,000 of native silver, another chamber at Kingston supplied \$350,000 to its fortunate finder. Without enumerating the particular mines it will be well to give some extended account of this county.

Around Kingston the mines are found in contacts of porphyry and limestone. The average value of the Kingston output exceeds \$100 per ton, and it may be said that no richer ores, taking into account the extent of country, are found on the continent. Since 1883 \$6,000,000 of silver have been taken from the town of Kingston alone; much of it was found on the surface, and this has been the cause of a slight set back to this rich district. The men who purchased many of the mines did so with the idea that they were finding money. When the bonanza period ceased they failed to respond to the demands for money necessary to carry the workings into the true ore, and many mines were forced to shut down. There are millions still in the hills around Kingston. The ores run in native and brittle, sulphide, chloride and chloro-bromide ores of silver. The ore belt is about five miles wide and twenty miles long, and includes the North and South Percha and the Rio Animas gold fields.

Hermosa, about eighteen miles north of Kingston, is described as a poor man's paradise. It is situated in a small park and is essentially a field for the individual miner. There are about fifty well known mines open in this district. Shipments from this camp have brought over \$1,000 per ton. The ore is principally galena. Tierra Blanca is about eight miles south of Kingston and within twelve miles of the railroad terminus. Masses running as high as \$60,000 per ton have been found in this district in a chloro-bromide ore. The Rio Trujillo mines are

similar to those at Kingston. Lake Valley is a camp whose fame is world wide. It has shipped over \$8,000,000 of silver, which is found principally as horn and native silver.

Chloride, Grafton and Fairview are also good camps. They are in the northeastern part of the county, off the railroads, but are good paying camps.

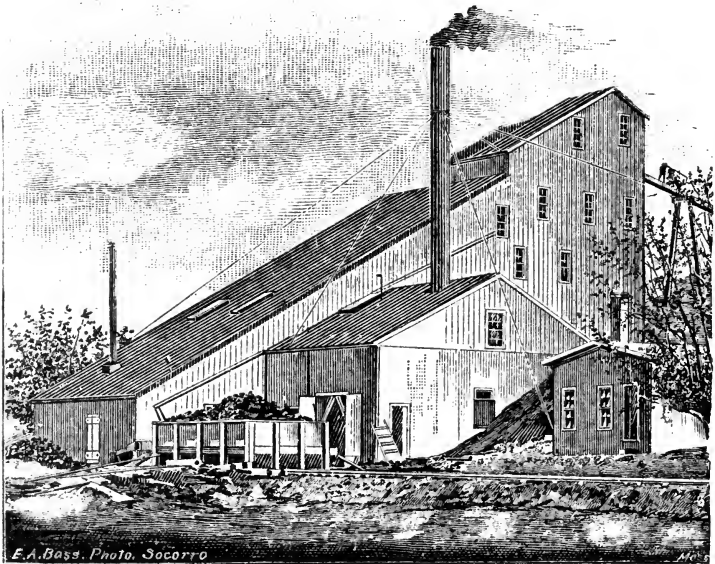
Hillsborough, the county seat is, however, the great mining center at present. It is distinctively a gold camp. The ore veins are found on one or the other side of intrusive porphyry dykes, that cross the country from southwest to northeast, forming true fissure veins whose depth continues in ore growing gradually richer as far as the science of man has yet been able to penetrate. To the west of these porphyry dykes is a large placer field which is being now developed by water brought from the Animas river in a pipe line over twenty miles long. These fields have yielded close to a million dollars already, although they have never been worked except with crude dry washers. Under the giant nozzle these fields will pay well.

A notable project is that now in progress near Hillsborough to tunnel clear through Animas peak, from which the porphyry dykes seem to radiate. This drift, it is believed, will cut a dozen or so of the big veins and produce more largely than any mines yet opened in the West. The capitalists, who are pushing this work, have absolute faith in the success of their venture. In all the lode mines in this district copper is a by-product of considerable value, and is utilized at the smelters at Hillsborough to run the gold into a copper matte. The values of the ore vary from free milling at about \$6 per ton to heavy sulphide ore from \$30 to \$175. The daily production at present is about 100 tons of gold paying ore per day. Four mills, the Bonanza, Standard, Richmond and Hopewell are running constantly on ore from this camp. The average concentration is about ten tons of ore into one of matte; this is then shipped and treated at the big smelters and refineries to about the cost of one ton of ordinary ore. It is believed that this camp alone will next

year put out over a \$1,000,000 of gold. The average for the present year will run about \$800,000.

Grant County.

This county includes twenty organized mining districts, comprising the Mimbres, Georgetown, Santa Rita and Central City district, Lone Mountain, Hanover, Silver Flat, Chloride Flat,



A New Mexico Smelter.

Pinos Altos, Búrrro Mountain, Stein's Peak, Virginia and Shakespeare district, Victorio, Florida, Tres Hermanas, Carrizalillo, Eureka, San Simon, Florida and Mogollon.

The history of this county and its mining development is similar to that of many other places in the West. The pioneers had not alone to overcome the difficulties of nature on account of its isolation from civilization, but the Indians, during the early years here, were very dangerous. In fact, it is only within the last decade that the widely separated mining camps became comparatively free of danger from savage attacks. This county

comprised part of the favorite range of the Apaches; but as early as 1861 the Pinos Altos gold mines were discovered and the hardy miners pushed in to develop them. Many severe battles were fought in this neighborhood; but so rapid was the development of the country that by 1869 the United States Commissioner of Mining Statistics, reports that 213 claims were opened and being worked in the Pinos Altos mountains, and 57 others in the neighboring Central City district. Ores from this district near the surface are a decomposed iron-stained quartz, and contain free gold, sulphurets of iron and copper, auriferous and argentiferous iron and copper, galena and zinc blende lower down. These ores are easily mistaken for the iron-stained ores of Central City, Colorado.

Gold is also produced at Lordsburg, Gold Hill, Shakespeare and Pyramid. The balance are silver mines carrying lead. The mines at Cook's Peak run a large amount of silver to the ton and at the same time are among the best lead producers in the Territory.

One trouble, and about the only one, is a lack of water in these camps during the last summer months; but this is being corrected by pushing plans to store the flood waters and develop water on bed rock. When accomplished these mines may run a full force every day in the year.

Both high and low grade silver are produced. One mine, the Silver Cell, runs upwards of \$25,000 to the ton. The metal is found in the shape of wire and virgin silver between two horizontal blue rocks, and averages about two inches thick of solid silver.

Dona Ana County.

In this county the Organ mountains, the Jicarrilla and the slopes of the San Andres furnish the prospects of mineral. They are principally composed of granite with protruding porphyry interspersed with sand and limestones turning into pure white marble. In the fissures and at the contact of these formations silver and gold occur in large quantities. The Bennet-Stephenson, one of the oldest mines in this section, is a good

free miller. Half a ton of concentrates is shipped from this mine every hour. The ore runs nearly 40 per cent of lead, and the characteristics of this mine may be said to apply to the others now developed.

On the eastern side of the San Andres mountains and the Sierra Oscura there is a vast stretch of "White Sands" as they are called. It is, however, composed of pure saccharoidal gypsum. It runs from for about sixty miles in a southerly direction by thirty from east to west, and will one day be of great value. It requires no more expense to mine it than is involved in loading it onto the cars, as the gypsum is so pure and fine that if granulated sugar were taken in one hand and the gypsum in the other it would be impossible to tell the difference. This probably is the widest extended and best deposit of gypsum known. In the neighborhood of the "White Sands" are also found deposits of borax.

Lincoln County.

In Lincoln county are situated the Jicarrilla, White Oaks, Vera Cruz, Nogal and the Capitan mining districts. In the neighborhood of White Oaks there has been a very considerable development. The Old Abe and the Homestake are the best known mines, but good strikes and prospects are constantly increasing the importance of this county as a mining center. This is one of the newest fields for the miner in the West, it is undeveloped, not much prospected, but known to run high in the precious minerals. In the Sierra Blanca large deposits of pure graphite are known to exist. This, however, has been little worked. Deposits of salt are also found in this county to a considerable extent. The town of White Oaks is the principal mining camp and is flourishing and prosperous. Extensive coal deposits, the coal being similar to the Trinidad, Colorado, coal, have been discovered near White Oaks, Nogal and Lincoln and in the Capitan mountains. The distance from rail communication has so far prevented any great development of these fields, but they are known to extend over many thousands of acres. Ores

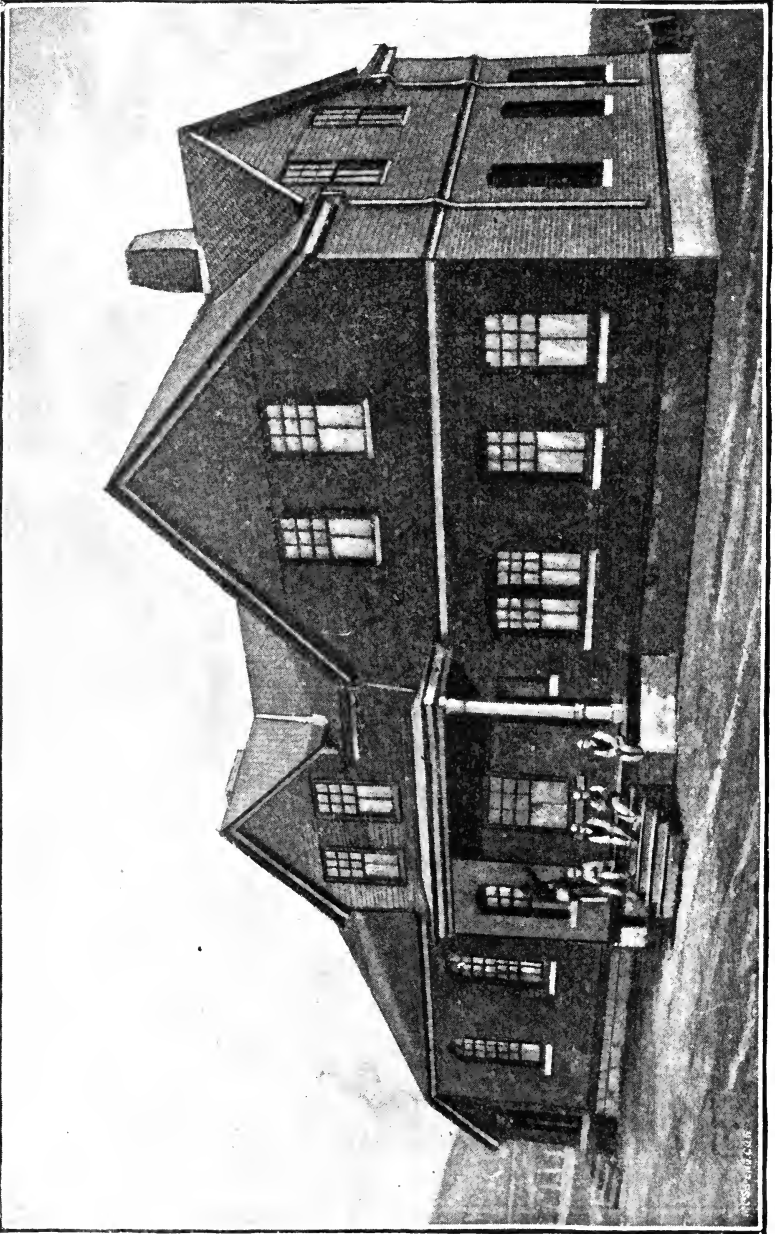
in the mountain ranges occur, like most everywhere else in New Mexico, on the contact lines between lime stone and porphyry. All Lincoln county needs is rail connection, then, it may safely be asserted, mining will become very profitable, and will prove one of the leading industries of the county.

Eddy and Chaves Counties.

These two counties are devoted to agriculture. The only prospecting that has been done is where a man accidentally stumbles on to something that appears to be rich. There are no mining districts organized in either, but large beds of coal and extensive deposits of marble have been discovered in the Guadalupe mountains, and huge beds of pure gypsum have been found. The Llano Estacado is simply a truncated mountain chain and it is possible, that good mineral development may be had on its top and slopes. Coal especially might be supposed to exist upon it.

Conclusion.

In conclusion it is only necessary to say, that New Mexico need not shrink from comparison with any other State or Territory in the way of mineral wealth. There are at present 102 mining districts scattered over her area, and there is room and opportunity for hundreds. New Mexico has natural resources and riches such as make her a queen among the States and Territories, and in some degree her own people are to blame for the fact that she has not attained her true place. This bureau is, however, extending a hospitable invitation to the peoples of the earth and especially of the United States to come and share in the riches that will be developed. With a climate permitting out door work the year round, a soil rich in all that goes to make life happy and mountains of mineral scarcely touched, there is no reason why all who come may not secure riches in many cases, but in all a certainty of a happy and comfortable home.



Ramona Indian School, Santa Fe.

W. S. W. W. W.

NEW MEXICO.

THE RESOURCES and

PROSPECTS of her COUNTIES,

WITH SPECIAL REFERENCE TO

ADVANTAGES FOR INVESTMENT

IN ALL LOCALITIES.

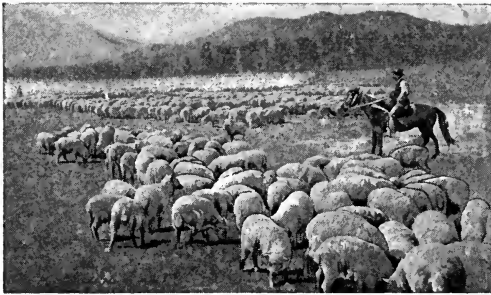
Where Colonies Should Settle,

AND WHAT

Avocations Will Prove Profitable.

SAN JUAN COUNTY.

This county is one of the garden spots of the world, and lies on the western slope of the great continental divide, being part



of the Pacific watershed. Aside from its great resources as an agricultural and stock country its scenery is very beautiful. On all sides great rocky masses, broken into picturesque formations,

are to be seen across wide, fertile valleys. The county is watered by three large rivers, and from their junction below Farmington, the view is grand and impressive.

Beautiful Scenery.

To the west and far down the valley towers Ship Rock, a beautiful peak rising 1,200 feet, like a giant ship with all sails set. In the far southeast on a high crag stand the "Angels," two stone figures of great resemblance to the conventional messengers of heaven. Mystically they tower over the surrounding country as guardians of its peace and prosperity. All along the southern horizon stretch either high rolling mesas, or the bluff weather worn faces of the cliffs. In the north tower the cloud crowned summits of the blue La Plata mountains, and over all is the sheen of an arid sky, tinging from the vivid grey background of the horizon to lovely azure blue of the zenith. Few scenes even in the romantic West present such beauty. This is only one of the many delightful prospects; but it takes in a stretch of country nearly 100 miles long.

Divisions of the County.

As has been shown, the topography is interesting and deserving complete description. The county is divided by arbitrary lines into two unequal portions, the larger of which is included in the Navajo Indian reservation, which occupies somewhat more than the western half of the county. The total area is 3,542,000 acres, and of this about 1,649,860 acres lie without the reservation.

Land and Water.

The irrigable land is found on the table and bottom lands of three great rivers; namely, the San Juan or main stream and the Animas and La Plata, which empty into it from the north. On the south Cañon Largo and Cañon Gallego drain a considerable area, and by a proper utilization of their waters might be made important adjuncts to the irrigation of the county.

Considering these streams in the order of their importance, the San Juan river rises in Archuleta county, Colorado, and drains between eighty and 100 miles of the western slopes of the continental divide. It enters New Mexico at the northeast corner of the county, makes a huge semi-circle, and departs on its course through Utah, at the extreme northwest corner of the Territory; within the county the total length of this stream is about 124 miles, about thirty miles of which is over lands of the Navajo reservation. This river is 275 feet wide, has an average fall of eleven feet to the mile. In the spring and early summer it is only fordable at a few places, and its lowest depth is about two feet. Even as late as October and November its waters will reach to a wagon bed. The lowest flow of this river will be about 4,000 cubic feet per second, or sufficient at the most conservative estimate to irrigate 640,000 acres.

Farm Land on the San Juan.

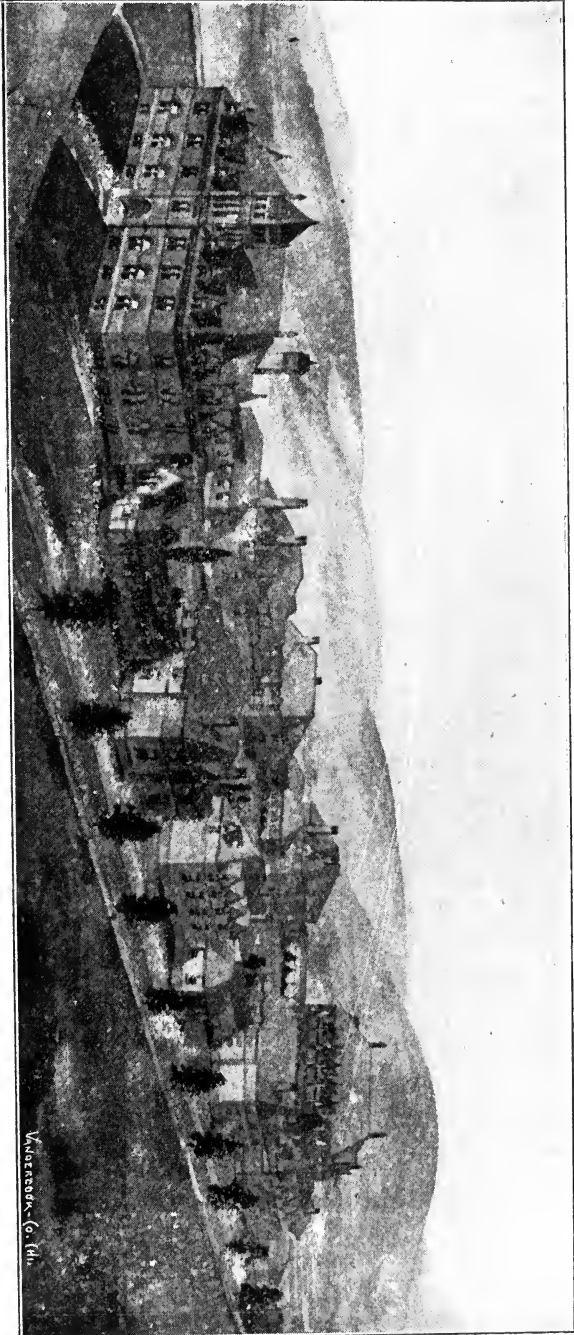
In this valley from a point about ten miles above Largo there is a narrow strip of bottom land on each side of the river. At the town of Largo the river bottom widens out into rolling mesas and bottom lands which are available for cultivation. The

most important of these tracts are known as the Bloomfield and Solomon mesas, which with the bottom lands under them will aggregate somewhat over 20,000 acres. They are on the north side of the river. From thence to the junction of the Animas, the mesa lands are broken into detached plateaus rather difficult to irrigate. On the south side of the river, between the mouth of the Animas and Farmington, is a splendid piece of bottom land twenty-five miles long and from one to two miles wide. The Animas and La Plata empty into the San Juan near Farmington, about midway in the county. On the two points of land formed by the rivers are about 12,000 or 15,000 acres of fine land all under ditch. Beginning then at the mouth of the La Plata, and for twenty miles down the San Juan, to where it breaks through the Hogback, a line of low hills, there is a continuous series of mesas with about a mile wide of bottom land. A little over 15,000 acres here are now under ditch. To the north of this are a series of high meadows, or vegas, estimated to contain 44,000 acres. Besides this, and to be properly considered in the San Juan basin, are the lands on either side of the Cañon Largo, Cañon Blanco and Cañon Gallego. These will include the land along the river and down to the 6th correction line, north; south of this line there are 24 townships of land, the water facilities of which are only about the average of the arid region. They are covered by the headwaters of the Rio Chaco or Chusca and the Amarillo. At present this land is devoted to cattle and sheep raising, but the prospects of using a considerable area of this land for agriculture are very favorable. At present there is no demand for it and most of it is public land.

It may be said therefore that in the immediate San Juan valley there are about 60,000 acres of land, about 20,000 acres of which are now under ditch. A large area outside of this, on the high mesas is susceptible of irrigation, and will ultimately be added to the irrigable area by means of high line ditches.

The Animas Valley.

The Animas river enters the county just east of the 108th meridian. It is formed by the junction of two important torren-



Territorial Insane Asylum, Las Vegas.

Underwood, Co. Phil.

tial streams, and will irrigate, if properly handled, 40,000 acres of fruit land. Of this amount ten or 12,000 acres are already under ditch, and it would not be wise to advise large settlement on any new lands, unless some scheme were devised by which the whole amount of the water could be handled by some comprehensive authority. This river flows thirty miles within San Juan county. The farming lands begin at Cox's crossing and take in a strip varying from a quarter of a mile to three miles in width and about twenty-five miles in length. The Animas is about 150 feet wide, about eighteen inches deep at low water, and has a minimum flow of 2,000 cubic feet per second. One of the peculiarities of this and the San Juan river is that the bottoms are composed of beds of small, round, water-worn boulders, of unknown depth. More water flows in this boulder bed than on the surface. Along in the river valley proper there are about 18,000 acres of good land, the most important area of which is from Aztec to below Flora Vista.

Farmington Glade.

Besides the valley of the Animas there is an important area of land included in the Farmington Glade, an introvale between the Animas and La Plata rivers. It is a strip of country two to three miles wide by eighteen miles long. It will aggregate 25,000 acres of good irrigable land well adapted to fruit raising. The traces of an ancient Aztec ditch may be seen, which once irrigated a large area of this glade from the Animas. At present 8,000 acres of the northern portion are irrigated by a ditch brought in from the La Plata. In the glade and beginning at about the latitude of Aztec is a fine body of public land, subject to desert land entry, that would make homes for a small colony. The ditch would be comparatively inexpensive as a natural opening in the hill side affords easy entrance to the glade. If water were brought to this place there is no better piece of land for raising deciduous fruits. It is protected, fertile and beautiful.

The La Plata Valley.

The La Plata river flows in a deep sandy bed, and its waters generally disappear in the last week of August or the first week

of September. On the upper part of this river after it enters San Juan county there are about 8,000 acres cultivated; and at Jackson, near its mid-course, there is a small Mormon colony, who till about 1,000 acres. The river has an average fall of forty feet to the mile, is about thirty feet wide and has a mean average flow of about 250 cubic feet per second. The ultimate reclamation of lands in the La Plata valley will be large.

Actual Water Resources.

It will be seen from the foregoing that there are available from these three rivers 6,250 cubic feet of water per second. At the low estimate of 160 acres to each cubic foot, this is sufficient to irrigate 1,000,000 acres of land. According to a county pamphlet issued for circulation at the World's Fair, there are 175,000 acres available for irrigation. In addition to the value of the water for irrigation, it is a constant source of water power. The San Juan and Animas are constant streams, not affected by the most enduring drouth. The wasted power of their waters would furnish heat, light and electrical motive force far in excess of any possible need of this county.

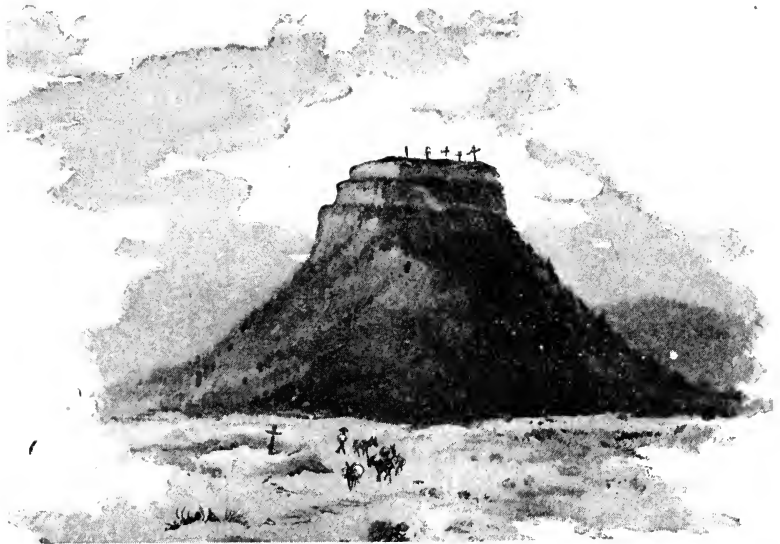
Ditch System.

At present the only use made of all this wealth of water is to irrigate about 25,000 acres, the larger part of which is under ditches owned by small associations of farmers. There are four enterprises, one at the head of the Farmington Glade and one on the Solomon and Bloomfield mesas, under the control of Colorado capitalists; another covering the Coolidge mesa and some land below it near Olio and Fruitland; and one on the south side of the San Juan between Bloomfield and the mouth of the Animas. These are all incorporated companies. There are several very promising schemes for the investment of capital, the principal of which is to take two long high line ditches out of the Animas, one on either side and distribute water to the available lands. On the north side especially this would cover a large area, and it would be practicable to extend this ditch onto "the Meadows," heretofore described.

The ditch covering the Coolidge mesa is under the management of Frank Coolidge, whose postoffice is Olio, San Juan county, and the others are managed by Mr. Joseph Prewitt, of Durango, Colorado. As to the innumerable small ditches; the county commissioners, or county clerk at Aztec, San Juan county, will gladly give the inquirer such further information as he may desire.

Ancient Civilization.

Irrigation and the cultivation of the soil thereby is not a new art in the San Juan country. The traces of ancient Pueblos and



surrounding irrigating canals may be followed throughout the country. On the south side of the Animas and skirting the bluffs is to be noticed a ditch of higher line than any now in use. It covers all that side of the valley down to the San Juan. On the north side of the river is another entering the Farmington Glade. At the town of Aztec the foundations of more than a dozen large houses are to be found; while directly across the river is a large Pueblo, of which one three story house still remains, It is

estimated that this house was originally six stories high and contained upwards of 1,000 apartments. Over 600 rooms are still standing and in good state of preservation. Further down this valley many other ruins are noticeable, and in the neighborhood of Fruitland and Olio the whole valley is covered with them. These pueblos differ from the others in New Mexico in that they are not built in inaccessible places, but out on the open mesas. On the Mancos, however, and at other points are clusters of cliff dwellings, so difficult of access that modern ingenuity has been unable to penetrate them.

The numbers of this ancient civilization are impossible to calculate. That they did not perish from natural causes is plain. Everywhere that their dwellings have been entered, either in the cliffs or the valleys, the scene is terrible. Here a little group with weapons in their boney fingers, skulls cloven and limbs broken, in another room a dozen human beings are found, the doors and windows stuffed with half burned brush, and the skeletons in postures showing that death was from suffocation.

A Tradition.

The Navajoes, Utes and Apaches have traditions that "eight old men's ages ago," about 640 years, their fathers destroyed all these people, threw their bodies in the rivers and that they turned to fishes. This would argue that the population was so dense as to deplete the streams of fish, and that after the massacre their waters were restocked by rapid multiplication.

Aztec.

The modern civilization has followed the same lines of settlement as did the ancient. Aztec is the county seat, situated on the southeast bank of the Animas. The maps erroneously place it on the north. It is on the site of the Pueblo before described, and is a flourishing town. It has a bank, several large stores, hotel and livery and stage stables. The county jail is a well built, steel lined adobe structure. The surrounding country is well cultivated, the farms extending up and down the river for

several miles. At this point the valley is about two miles wide. Fruit, alfalfa, grain, potatoes and all the root crops give abundant harvests. Apples and tomatoes seem peculiarly adapted to the soil. The population of the town and surrounding country is between 550 and 600 persons.

Flora Vista.

This little village and vicinity has a population of about 250 souls. It is situated at about the widest part of the Animas valley, seven miles from Aztec, raises the same crops and its orchards are spreading; alfalfa fields have a particularly good appearance.

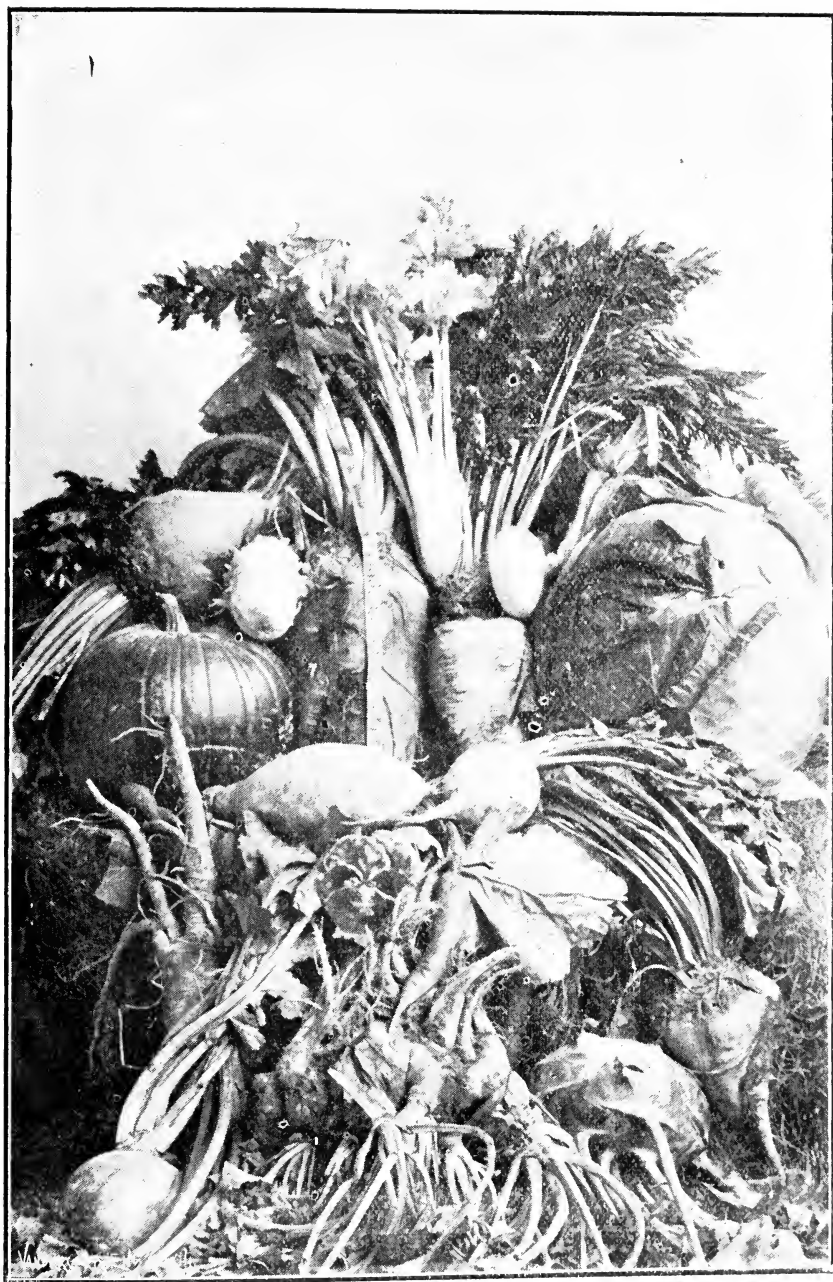
Farmington.

Farmington and Junction City are situated at the mouth of the Animas. The population is about the same as at Aztec. The location is very beautiful.

At this point the full scenic beauty of the valley reveals itself. From a little hill overlooking the town a solid plantation of three or four square miles, including orchards, alfalfa fields, grain and meadow is seen. Here is at present the densest population of the county; and the widest spread of cultivation. The three valleys here converge into the main valley of the San Juan. There are several good stores, public stables, good schools and general facilities. Near this town are located several brick kilns, a saw mill and a roller process flour mill. It is a very pretty, go ahead place. Its citizens are full of energy and public spirit.

Largo.

This town may be considered the center of population on the upper San Juan. Taking in with it the little settlement on Pine river and at Bloomfield, the population is between 1,000 and 1,200 persons, the majority of whom are of Spanish descent. The high culture of the fields, orchards and vineyards speaks well for the progress of the community; while the general use of modern agricultural implements show that the native New Mexican is not at all adverse to their adoption.



New Mexico Vegetables.



The Lower San Juan.

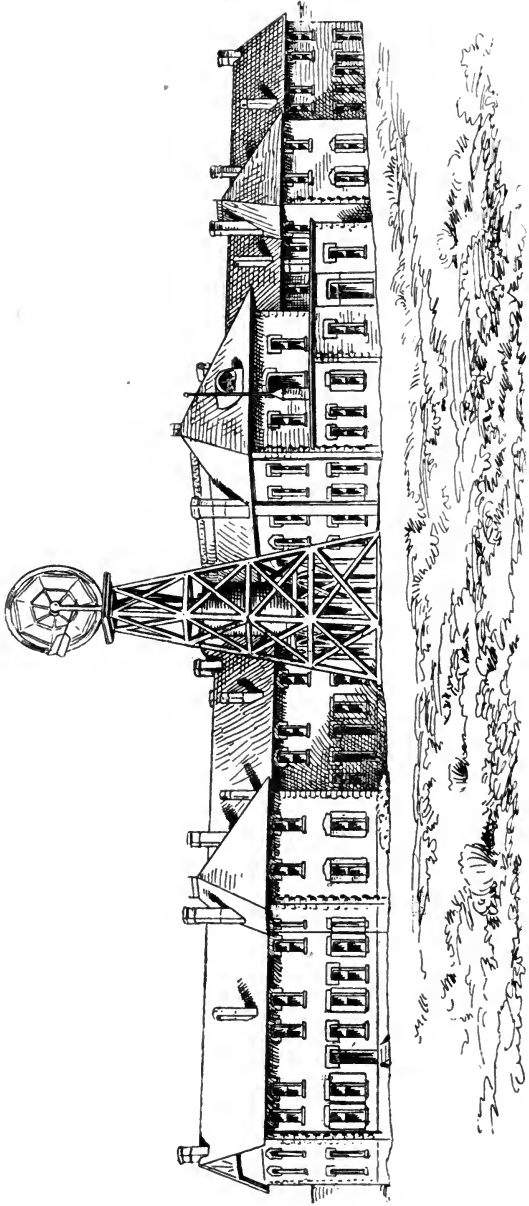
Olio, Fruitland and Jewett are situated on the San Juan below its junction with the La Plata. The population of the three is about 600 persons. The greater part of the land is under a fine modern canal and in a high state of cultivation. At Fruitland is one small orchard of seven acres, from which the annual net return has been over \$2,500 per annum for the past five years. This is the property of the resident Mormon bishop and is cultivated according to the theory of his people, that a small place well cared for is more valuable than broad acreage poorly farmed. It is one of the best instances of extensive culture in the Territory.

La Plata.

This place can hardly be called a town. It is a compact farming community, however, of about seventy well cultivated homesteads at the head of the La Plata valley. On the western side the land rises in three terraces, one over the other, every one of which is highly cultivated. The sight would remind one more of a French landscape than of a western community as yet removed from railroads, and ten years ago given over to the Indians as a hunting ground. Alfalfa and fruit are the principal productions. This part of the county is a very picture in its picturesque fertility. The Aztecs also thought well of it, and many of their monuments in the shape of rudely pictured and sculptured rocks abound. Its early history is interesting. The first settlers, who came in, persuaded the Utes to engage in a target match, and after they had caused the usually wily savages to expend their ammunition, quietly effected a settlement.

Crops.

The first trees were planted in this county ten years ago, and as an experiment seemed very doubtful. The first settlers were principally cattle men, who knew little about farming. They profited by their first mistakes, however, and prospered, so that the reputation of these valleys is known all over the southwest. The southern towns of Colorado, outside the San Luis valley, are



Government Indian School, Santa Fe.

almost wholly supplied from the San Juan orchards. So remunerative has fruit culture proved that in 1891, 23,000 trees were planted, and in 1892 about 50,000. The planting of 1893 is not yet accurately known, but will show a ratio of progress. Last year at the Albuquerque Territorial Fair the fruits of this county took the sweepstakes prize. The peaches in some instances measured nine inches in circumference, apples thirteen to fourteen inches, and weighed sixteen to nineteen ounces. Single acres of fruit land return from \$400 to \$500; and in one orchard near Farmington are three trees, of whose yield an accurate account has been kept for four years past, that show an average return of \$53 per tree.

Cereals of all kinds are grown here, wheat yielding 20 to 40 bushels per acre; oats, 30 to 80 bushels; barley, 30 to 60 bushels; rye, 15 to 30 bushels; corn, 25 to 50 bushels. A ready sale is found at good prices. Current prices for 1893 were as follows: Wheat, per cwt., \$1.40; oats, \$1.50; barley, \$1.40; corn, \$1.50; bran, per ton, \$18. Vegetables of every variety flourish, from the hardier varieties, such as Irish potatoes, turnips and beets, to the more tender melons, tomatoes, egg-plants, etc.

Alfalfa

Is, however, the staple crop in this county, drouth is not to be feared and neither frost nor cold endanger it. Owing to the advantageous situation of the county the farmers have taken to fattening beef cattle. For this purpose the sales of alfalfa are large, frequently amounting to from 500 to 1,000 tons to a single buyer.

From 1891 to 1892, the increase in alfalfa production amounted to 7,000 tons.



Prices and Profits.

The following table shows the estimated fruit yield of the county and the average market price for 1893:

	PRICE	YIELD		PRICE
Apples, per pound..	4 cents	900,000 lbs.	Cherries, per qt.	10 cents
Peaches, " ..	5 "	465,000 "	Strawberries, "	20 "
Pears, " ..	8 "	10,000 "	Raspberries, "	20 "
Plums, " ..	6 "	40,000 "	Blackberries, "	20 "
Grapes, " ..	3 "	412,600 "	Currants, "	8 "
Wine, (new), per gal.	60 "	2,800 gals.	Gooseberries, "	10 "
Cider, per gal.....	50 "	.....	.....	.....
Cider vinegar, per gal	40 "	.....	.....	.....

Alfalfa, potatoes, grain, etc., will average about as given in the table in the chapter headed "New Mexico."

Cost of Land.

The average price of land will range from \$20 to \$40, If bought under a community ditch, this price will also include water right, and the annual incidental charge for water will only amount to a few cents per acre or about a weeks work during the season in clearing the ditch. If purchased from a corporation the land and water will cost about \$30 per acre, and about \$1.25 to \$1.50 per acre annual rental. This is the usual price throughout the arid region.

Mineral Wealth.

This whole county is underlaid with coal. Near Aztec, La Plata, Farmington, Olio, Fruitland and Jewett, large veins are opened. The average price of coal is principally the cost of hauling. The beds are so generally distributed, and the coal so easily extracted that there is very little cost for mining. None of the veins are opened more than 200 feet as yet; but they run from ten to twenty feet thick of pure coal; and one good blast every day at the different veins will supply the demand. The agent of this bureau last year examined all these mines, and the only possible fault to find with them is their thickness, most miners preferring veins about six feet thick, so that they can work

without pillars. The almost complete absence of "bone" or slate in the San Juan coal counterbalances this however.

It is said that gold and metallic iron can be found; and the best building stone, both sandstone and granite, abound. The lower part of this valley is only about 4,500 feet above sea level. Coking coal is found adjacent to it. The best mining camps of Colorado, and splendid mineral belts in New Mexico are contiguous. When railroads penetrate this county the neighborhood of Ohio will afford splendid opportunities for large smelters.

The Navajo Reservation.

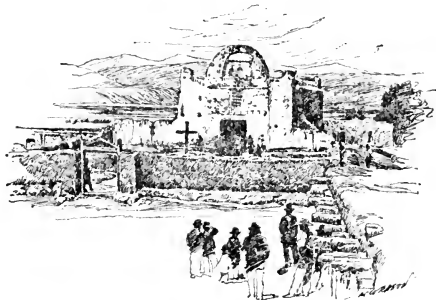
This Indian reservation takes in somewhat more than the western half of the county and covers more than 150,000 acres of prime irrigable land. The Indians make no use of it whatever; and there is no reason why it should remain closed to modern progress. In the north it is watered by the San Juan, and through the center flows the Chaco or Chusca river. As it stands at present it is a barrier. Opened to settlement it would cut down the great Navajo reservation, of 15,000,000 acres, by about one million and a quarter acres, useless to the Indians. On this reservation in plain sight of Fruitland is one of the most gigantic exposures of coal known in the world. No one touches a lump of it, however. The Indian does not want it, and Uncle Sam prevents the white man.

An Experiment Station.

By act of the last legislature \$5,000 was appropriated to establish a branch of the agricultural experiment station in this county. During the summer the board of regents made an examination of the different sites offered for this purpose. Several gentlemen offered to donate 100 acres under ditch, and the board is now considering which one to accept. At an early date this station will be in operation, and the farmers afforded a peculiar opportunity to study the best crops to cultivate.

RIO ARRIBA COUNTY.

This county presents a varied and diversified contour. In the middle and east it is marked by great ranges of mountains. The Continental Divide comes down through its center. On the west



the water flows through the San Juan system towards the Gulf of California, on the east into the Rio Grande and thence to the Gulf of Mexico. It is one of the back-bone counties of the country. Until a few years ago it included San Juan

county and extended to the Arizona line. As now constituted it lies between that county and Taos, and is bounded on the north by the State of Colorado. The area is 4,404,411 acres, of which 2,100,000 is available for arable and pastoral purposes. The eastern and central portions are well watered and mountainous, and the cultivable land here is found in the sheltered valleys, many of which are thousands of acres in extent, others comprise merely the narrow river bottoms. The western portion is included in the high rolling mesas and plains of the Continental Divide. The valley lands of the east are well adapted to fruit and general crop culture. The soils are rich and of deep alluvium. The principal water course is the Chama, fed by the Rio Brazos, Rio Nutrias, the Gallinas, the El Rito, the Ojo Caliente, Cañones, Bear and other streams, the Rio Grande flows through its southeast corner. The Rio Puerco of the East through its southwest corner, and the Los Pinos and San Antonio rivers through its northeast corner.

Irrigation.

The principal agriculture of Rio Arriba county is found on the Chama and its tributaries, on the Rio Grande and San Antonio river. It is all conducted under irrigation, and according to the estimates of the surveyor general of New Mexico, there are at present under ditch in this county and cultivated 29,623 acres of land. The census for 1890 reports a much smaller area. Indeed the figures for New Mexico on this subject have, by some unaccountable method, been reduced and minimized to a mere fraction of the actual facts.

It may safely be assumed, however, that four times as many acres as are now cultivated may be brought under crop by a system of ditches scientifically constructed. The characteristic of the present system of canals is that it covers no more than the first river bottoms or low land. The ditches are all communal affairs, from three to twelve feet on bottom, and run out so as to cover the most easily available land. Wherever the valleys widen out for a few miles the country is characterized by a bottom along the river from about one-half to a mile wide, flanked on either side by a level mesa rising sheer for ten or twenty feet above the water. The first cultivators rarely irrigated these lands which are by far the more valuable. On these slight elevations above the river the frost leaves the ground from ten days to two weeks earlier in the spring than in the bottom, and does not settle till a correspondingly later period in the fall. This is an inestimable advantage. In Rio Arriba county there are available in the first bottoms of the rivers and creeks 108,203 acres, of which, as stated before, 29,623 acres are cultivated. This soil is composed of the best silt, and of actually inexhaustible fertility. In addition to this there are 78,580 acres of mesa or bench lands easy to cover with modern ditches. Therefore there are available and ready for occupation and irrigation at least 195,000 acres in this county.

Colonization.

This would be a rich prize for any large corporation, as the farms of this county should all be gardens. The best thing,

however, would be for several colonies to locate on some of the choicest tracts. Parties of from twenty-five to 100 families could organize, send out a committee, select their land, have their ditch or reservoirs surveyed, and their land practically ready for cultivation on their arrival. The expense of such a project would be very small per capita, and the success that has attended all such well organized efforts in Colorado and California points out a sure method of security. Rio Arriba county is particularly well situated for such projects. There are several large confirmed land grants, whose owners would be glad to make liberal arrangements with colonists, and who can give absolute title to their lands. Another advantage is that in this county there are no large irrigation corporations to overshadow the colonies. They would be as free to work out a comfortable future and establish happy homesteads, as were the Union colonists who settled the country around Greeley. They succeeded in the face of tremendous odds which would not confront the colonist to-day.

The Rio Puerco Country.

The Rio Puerco heads on the west side of the Nacimiento range and has many strong flowing affluents. Its valley is wide and affords excellent opportunities for settlement. Its fertile soil will soon be utilized by a large irrigating company.

Abiquiu

On the Chama river, about twenty miles from Chamita and twenty five miles from Española, is surrounded by a stock raising and agricultural country. It is also rich in minerals. Copper and placer gold abound. On the Arroyo Cobra copper is now being extracted. The gold fields begin where the Cañones creek empties into the Chama. They extend thence north and occupy a space approximately fifteen miles long along the river and six miles wide. Claims have been staked out in an almost unbroken chain from Abiquiu to La Gallina creek. The gravel and mesa lands possess true placer characteristics; and old miners compare the appearance and topography of the country very favorably with the Snake river placers in Idaho. There are large



New Mexico Apples.



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companies engaged in systematically washing out this dirt and gravel; and about \$50,000 worth of machinery will soon be in place. This gold is very fine on the surface, but with proper appliances runs from thirty to eighty cents per cubic yard. A small number of good claims may yet be located on this ground.

Monero

Is the center of a very extensive and productive coal field. It is situated near the Colorado line on the route of the Denver & Rio Grande railroad. Last year 20,000 tons of coal were shipped from this town. These fields are part of the coal beds elsewhere described in this book. They are not mere isolated deposits, but part of a wide stretching area that will one day bring New Mexico to the front as a manufacturing state.

Chama.

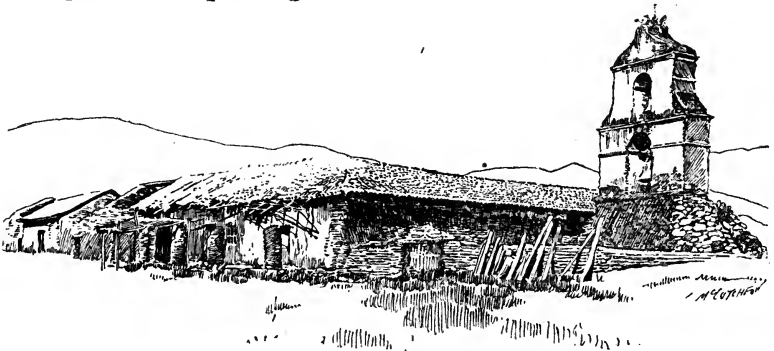
This is an American settlement of great importance, situated on the Denver & Rio Grande road in the extreme northern portion of the county and fifteen miles north of Tierra Amarilla, the county seat. It is surrounded by pine forests, tens of thousands of acres in extent. At and in the neighborhood are located extensive saw mills, whose output supplies the Denver and Pueblo markets. Colonies settling in this county would find a cheap supply of splendid lumber ready to their hands for all purposes. Besides this, it is the shipping point for fine quarries of excellent sandstone, whose product has been used for the erection of the Colorado State Capitol, one of the handsomest edifices in the West. The immense herds of sheep and cattle raised in this county are also shipped from Chama. A private line of railroad runs from this point to Park View and Tierra Amarilla.

The saw mills in the vicinity of Chama employ several hundred men steadily; much wool is also shipped from this point. The country around it raises fine potatoes and large crops of alfalfa and oats. It is located on the Tierra Amarilla grant, which is patented and confirmed by Congress, and title to lots and lands can be had on favorable terms. There is also plenty of mineral in the mountains surrounding this town, and in due

course it will in all probability become an important mining center. Its trade is large and continually growing.

Tierra Amarilla.

This town is the county seat and the center of a finely cultivated country. Los Ojos, Park View, La Puente and a number of small towns surround and depend upon it. Here the land is covered with a number of irrigation ditches and large crops are produced. Denver, Pueblo and other Colorado towns afford a sure and convenient market. The Good Hope, Eureka Gulch and Headstone mining districts are also to the south and tributary to Tierra Amarilla. They produce a considerable quantity of both placer and quartz gold.



A good court house and jail are located here; the trade of this town, especially in live stock, wool and grain, is quite large. It is one of the oldest towns in that section of New Mexico, having been settled under a grant from the Mexican government in the thirties and is an important point. The section, of which it is the center, is well watered by several streams, such as the Chama, Nutrias, Brazos and Willow creek, and the mode of irrigation is improving; several thousands of acres are under cultivation and irrigation in the valleys mentioned. It has a population of about 1,200; its location is picturesque and healthy; good fishing and hunting can be had in the surrounding country.

Besides the above advantages, it must be remembered that this town is the center of all that vast mesa country that stretches

down from the ragged peaks of the Rocky mountains in the eastern part of the Territory, and which gradually swells into the broad rolling plateaus of the Continental Divide in the western portion. This country affords the ideal stock and cattle region. The elevation, grass and water are perfect. Drouth rarely affects this section. The conditions are all favorable for first class stock farms; while the timber that is interspersed in this country in shape of "openings" will eventually yield a large revenue.

El Rito.

This town lies in a healthful valley about ten miles long and from three to five miles wide. Copper and silver mining is carried on in its vicinity, in the El Rito mountains, and is becoming important. A good deal of grain is raised in the valley and the surrounding mountains are well timbered, some of the timber being of good merchantable variety. The trade of the town in wool, live stock and grain is quite large.

General Features.

This county now exports wheat in considerable quantities, principally from the valleys of the Rio de los Pinos, the Rio San Antonio and the Chama. The Gallinas valley is cultivated in the very best modern style by improved agricultural instruments. The El Rito, Ojo Caliente and Bear Creek valleys are all fine producers of the cereals. The fruit region, in that portion of the county in which fruit is raised for export, is south of Embudo; while lower down at Plaza Alcalde the fruit farms are worthy of particular mention, not only on the ground of their variety, but of the abundant yield. The large and small deciduous sorts flourish here in abundance under the care of the intelligent owners and cultivators.

In this county are opportunities for investment or for the making of homes far in excess of any other community outside of New Mexico. Here are wide stretching mesas, and fertile silted bottoms capable of supporting a dense and prosperous population. The mines of gold, silver, coal and copper are sufficient to supply a European kingdom with mineral wealth enough

for the respectable support of a throne. The supply of fine pine timber for all purposes is very large, and will hold out for many years.

The Jicarilla Apaches.

The Jicarilla Apache Indian reservation is situated in the northern part of this county: the reservation contains some good land and some large bodies of water, as Horse Lake, Stinking Springs Lake and several other lakes. The headquarters of the agency are at Santa Fé and a sub-agency is established at Dulce, on the reservation. The Jicarrillas are absolutely peaceable, and have many children at the several Indian schools in the Territory. They number 847 and are celebrated basket makers.

Surveys Needed.

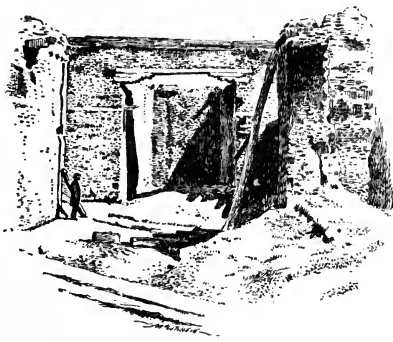
Owing to the large number of grants in this county but few surveys have as yet been made therein; a good many of these grants have been confirmed during the past year, and in the near future surveys of these will be made and much more information as to the topography, water possibilities and resources of the county will be gained. Enough, however, is known now to make the assertion, that in precious and industrial minerals, in coal deposits, in fine and extensive tracts of merchantable timber, in agricultural and fruit raising possibilities this county is great, and could support in ease and plenty at least five times the population now contained therein.

Railroads.

The Denver & Rio Grande crosses the country from East to West in its northern part, and runs through a most picturesque, wild and beautiful mountainous country, specially rich in coal and fine timber; also from North to South along the line between Rio Arriba and Taos counties through the great cañon of the Rio Grande. From Chama several short spurs for the purpose of hauling timber and lumber radiate, and one of these runs from Chama to Tierra Amarilla, a distance of fifteen miles. Daily trains run over the Antonito-Durango division West, and over the Antonito-Santa Fé division South.

TAOS COUNTY.

This, usually known as the "Garden County of Taos," lies in the north central portion of New Mexico, and is bounded by Colorado on the north, Rio Arriba county on the west, Colfax on



the east and Santa Fé on the south. It is traversed from north to south by the Rio Grande river, which within its boundaries receives the waters of the Red, Taos, Embudo and Ojo Caliente rivers and several smaller streams.

This county is located on the west side of the eastern

limb of the Rocky mountains, lying north of Santa Fé and north-west of Las Vegas. Thus far it has been outside of the path of the main lines of railroad, its nearest connection being at Embudo, via the Denver & Rio Grande railroad. Since the completion of the present rail lines the agricultural products of this county have been cut off from remunerative markets; but in the old days before the railroads, all New Mexico standing an equal show, the fruit and grain of this county were famous. Large quantities were transported as far as Old Mexico, and Taos wheat and Taos flour were celebrated and much valued commodities.

Railroad Prospects.

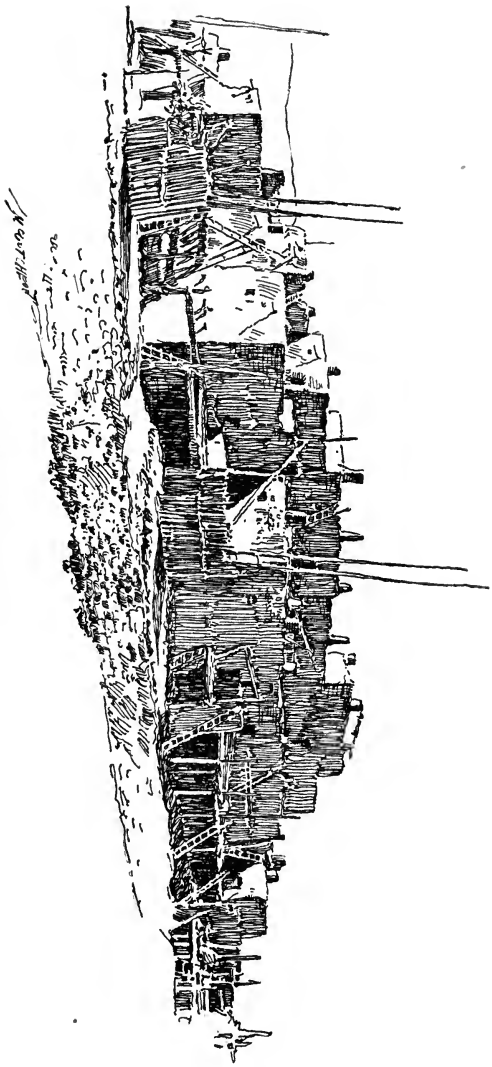
Under the present circumstances of the population of the East pressing for land and homes in the West, if a direct railroad connection were built into this county, say from Maxwell City, on the Atchison, Topeka & Santa Fé railroad, it would doubtless be populated with marvelous rapidity.

A branch of the Union Pacific road now runs from Trinidad, Colorado, to Vasquez, in Colfax county, within ten miles of the eastern boundary of Taos, and is headed for the rich gold fields and agricultural land of the Taos valley. The general understanding is that this road will be pushed on into Taos county. The splendid mines at Elizabethtown on the eastern side of the range, and the rich mineral districts of the Rio Hondo, Copper mountain, Taos, Picuris and Arroyo Hondo on the western side are on the direct line of this road. Besides this it would carry the produce of one of the richest agricultural valleys in the world. With the building of this road a sudden change will come over this valley.

A new survey from Maxwell City, on the Atchison, Topeka & Santa Fé railroad, has just been finished; this survey runs up the Cimarron, then crosses by the Taos pass, the Taos range and ends at a point about a mile east of the present town of Taos, the county seat; it is seventy-three and a half miles long, has a maximum curvature of eight degrees, and a grade not to exceed two per cent; it goes through a country rich in precious minerals, coal, iron, timber and building stone; the chances for the construction of this line during the year 1894 are very good.

The Taos Valley.

The Taos valley is one of the most picturesque. On the east it is surrounded by a half moon of mountains, with no foot hills extending out into the mesas to break the view or diminish their grandeur. Several deep cañones penetrate these mountains for a distance of from twenty to twenty-five miles and pour their floods out onto the valley lands, where they may be easily used for irrigation. Eleven streams issue into and cross this valley in a western direction, draining a great area of high mountains. When these streams reach the valleys the volume of some of them is as much as 400 or 500 cubic feet. Taking the whole course of the Rio Grande valley, this section is usually known as the Taos valley, and it is estimated that there are about 180,000 acres of land subject to the influence of irrigation. Streams cross



The Pueblo of Taos.

the valley at intervals of from three to four miles, and the ditches to irrigate every acre of arable land would be comparatively inexpensive. There are now from 25,000 to 30,000 acres irrigated and cultivated in the valley, and its population is only about 10,000 people. At the very lowest estimate this same land would support fully 20,000 people, and with close and intensive cultivation these figures could be increased to 50,000, which would allow a ten acre fruit farm to each family of five persons. This area to the Eastern man seems very small, but when it is considered that one small orchard of five acres near Taos produced over \$400 an acre, ten acres therefore intensely cultivated would give a gross income of \$4,000. How many farmers of the East realize such a sum from 160 acres of diversified crops? Of course it must be understood that this money return per acre is from trees in full bearing; but it is by no means excessive or a prize yield, it is simply what can be done with average good culture.

Speaking of the productiveness of the soil of Taos county, one of the earliest explorers says: "The harvest for one year is sufficient for seven. When they begin to sow, the fields are covered with corn that has not been gathered." When this was written the population was very much smaller than the present. Taking corn, the crop mentioned, the yield will be well up in the neighborhood of eighty bushels per acre, and other crops will be in proportion.

On the western side of the river the valley is practically devoid of streams suitable to supply water for irrigation. There is, however, in contemplation a mammoth canal, to be constructed from a point near Conejos, Colorado, to water these lands. Large reservoirs to store the surplus waters of the Rio Grande in natural depressions on the table lands are to be a feature of this enterprise. In 1890 a start was made on the building of this canal, but owing to the large amount of money necessary to complete it, the enterprise fell through. Such an enterprise would irrigate more than 100,000 acres of land west of the Rio Grande. This company was known as the Taos Valley Irrigation Company. If this scheme would be carried into effect by some company well



Fruit Exhibit, World's Fair, Chicago.



equipped with capital, there is no doubt but that it would yield large returns on the investment.

The whole of this valley is well sheltered. The average elevation is about 7,000 feet. It is a continuation of the famous San Luis Valley of Colorado; but much better situated in the way of elevation, character of the soil, water and shelter than that much advertised region.

Products.

The fruits and grains of the temperate zone flourish; while it is the home of such vegetables as potatoes, beets, turnips, parsnips, onions and in fact of all the root crops. The quantity and flavor of these are unexcelled. One plant especially would grow well here. That is celery. It is essentially a marsh plant; and the novice in irrigation, but who is acquainted with the general routine of its culture in the humid region, can hardly make a mistake in raising it. The average price of this product on the farm is sixty cents per dozen bunches. The price in Taos county would, however, range from five to ten cents higher on account of the proximity of large mining camps.

Alfalfa is a staple product, and yields about four tons per acre. The price in this county will average about \$12 per ton. This largely productive forage plant seems to find as good a home here as on its indigenous soil.

Fruits.

During the past half a dozen years considerable attention has been given to fruit culture. The cry was that good fruit could not be raised at such an elevation. This, however, has been disproved by the profits realized from several orchards. At Ranchos de Taos there is an orchard of thirty acres. It shows what the Taos valley soils can do under irrigation in the way of raising choice deciduous fruits. Apples, peaches, pears, plums, apricots and nectarines are raised to perfection, and are remarkable for their juiciness, size, coloring and flavor.

It should be remembered, that the irrigator besides controlling the amount of water that his plants receive during the growing

and ripening season to a limited extent, controls the seasons. A late frost does not menace his fruit, for the reason that he can keep the icy cold snow waters running in his orchard until all danger is past. At one and the same time this flow permeates the ground, mellowing it for the influence of the sun when the season once sets in, and retards the buds from starting during



the calm, still, warm days of early spring, to be nipped and killed by a cold night. One nursery man says: "In the spring I keep water running in my ditches even if it freezes every night. The water under the ice is much warmer than the surrounding air, but not warm enough to start growth, while at the same time it prepares the roots for the healthy influence of the sunshine. In the fall

I also keep the water running until the cold weather has well settled. The water is then warmer than the air. It prevents the frost from entering the ground and allows the trees to gradually accustom themselves to cold weather." Taking this hint in connection with the usual methods of irrigation and the problem of fruit raising is practically solved.

The attention of farmers in Taos county will be more generally directed to fruit culture hereafter on account of the growing im-

portance of its mining camps. Hundreds of miners have entered the county during the past year. Their locations are generally turning out well, and their wants must be supplied from the neighboring farms.

Water.

The Rio Grande river is the principal water course; but it cuts through the valley in a cañon about 500 feet deep. At places its bed sinks abruptly from the high table lands or cuts through mountain spurs. The scene is grand, sometimes awful. That part of its course known as the Taos cañon is so deep and abrupt that it is one of the remarkable gorges of the world. The flow of the river is, however, of considerable volume and constant. To utilize it for irrigation the ditches must be taken out of the river at some point in the San Luis valley. This expensive construction will, however, only be necessary to water the western side of the valley. The eastern side is covered by several streams. None of them of great volume, but of sufficient flow to cover the lands on either side of their banks. Capital and population are, however, necessary to utilize these resources. Either large corporations must take hold and make the country fit for occupation, or colonies of settlers each with a small sum per capita, but the aggregate of which would be sufficient to construct substantial works, must take up locations sufficient for their wants. On the eastern side of the valley there are many such opportunities. On the west the proposition is too expensive for a colony to attempt.

Population.

The population of Taos county has been considerably increased during the past year by a great influx of miners. It may be conservatively estimated at from 11,000 to 12,000 persons.

Mining.

The great development of the past year in mining is principally upon the western slopes of the Rocky mountains, and includes the Rio Hondo, Copper mountain, Taos, Picuris and Arroyo Hondo, and two large placer beds on the Rio Colorado and Rio

Grande. During the past year there has been a large immigration to the first four named districts. These include several hundred good claims, both lode and placer mines. It is impossible to give exact figures of the number of miners who have located in this region during the past year, but it is supposed the total will be somewhere in the neighborhood of 1,000 people. A new town — Amizett—has been laid out, and a newspaper with a guaranteed subscription list of several hundred has been started.

The mines here are all rich. Picked specimens of ore from the surface, pounded up in a mortar and washed out have yielded at the rate of \$20,000 of gold to the ton, and the general average of the ore will be about \$250 per ton. The ore as now developed is mostly free milling, and the croppings have been traced and located for miles. This is not one of the widely heralded "booms," so common in western history, but is a healthy and natural growth. Most of those who have gone into these camps are of the sturdy Colorado miner type, who knows ore when he sees it. It is too early to predict with absolute certainty the success of these beds, but none who have located have left, and the general opinion is that some of the finest mines in the world have been discovered. The country has always been regarded as a great gold region.

Mica and Tin.

At Petaca, a small Mexican village some twelve miles west of Tres Piedras, veins of ferruginous ore are found with the mica beds. These have been very carefully assayed, and carry from one-fourth to one-half per cent of tin. None of the leads, however, have been worked more than four or five feet, and it is confidently expected that when the veins are properly opened by thorough investigation, a paying industry will be developed. The dictum that no tin exists in the United States is regarded by good miners as nonsense. Yearly there is sent to England alone \$25,000,000 for tin. The development of these mines would doubtless keep a large percentage of this money at home. Besides this the country around Tres Piedras and Petaca is very

rich and fertile. It is well timbered, has a great amount of agricultural land absolutely idle, and has good railroad facilities. Tres Piedras annually ships from her saw mills a large quantity of lumber, and some of the best mica mined.

Principal Towns.

Fernandez de Taos is the county seat, situated about the center of the county and on the Rio de Taos. It is connected by good stage lines with Tres Piedras and Embudo on the west and Elizabethtown on the east, in Colfax county. This town has schools, churches, a bank, a newspaper and four large mercantile establishments.

Ranchos de Taos

is located about four miles south of Fernandez de Taos. It has several large flouring mills, is surrounded by some beautiful orchards, is the center of 60,000 acres of fertile land, of which about one-fifth is under cultivation, has several schools, is the headquarters of the Presbyterian missions, and conducts a large and growing trade with all the surrounding country.

Arroyo Hondo, Arroyo Seco and Colorado are thriving little towns north of Taos, and are engaged in mining, agriculture and stock raising.

Ojo Caliente,

or Hot Spring, is a well known health resort in the southwestern part of the county. A full description of this spring is given in another part of this book. The town is connected by a daily stage with Barranca, twelve miles east on the Denver & Rio Grande railroad.

Historical Taos.

The towns of Taos, historically speaking, are very important. There are two villages of the Pueblo Indians in the county, namely, Taos Pueblo, containing 374 inhabitants, and Picuris Pueblo, 107 inhabitants.

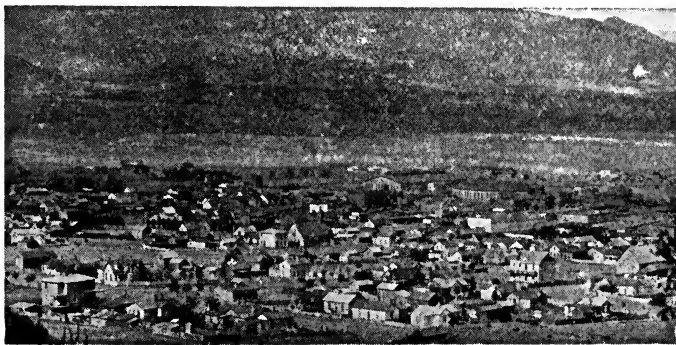
The first printing press in New Mexico was set up in Taos by Father Martinez in 1837. He also taught, what might be called,

the first public school in the Territory about that year. In the revolution of 1680 the Taos Indians took a very prominent part and one of their number, for a while, was chief of the rebellious Indians. There was also here an incipient rebellion against the United States after the occupation in 1846, wherein Governor Carlos Bent was assassinated, and which ended in a very summary manner by some of the ring leaders being captured, tried and shot.

Taos was a halting place, stop-off and rendezvous for the overland traders over the Santa Fé trail for many long years, and a very important trade center during that time. It was the home of the celebrated scout and Indian fighter, Kit Carson, and his remains are buried there now. The towns of Ranchos de Taos and Fernandez de Taos and the Taos Pueblo are really one community, and they occupy one of the richest, most picturesque and best valleys, not only in New Mexico, but in the entire country. Their agricultural, horticultural and mining possibilities are great, and with railroad connection, they will be among the most prosperous communities of the southwest.

COLFAX COUNTY.

Colfax county lies in the northern tier of counties, between Taos and the newly created county of Union. The elevation of its mesa or table lands ranges from 5,000 to 8,000 feet above sea level. On the west the Taos mountains and on the north the Raton range dominate the valleys and define the drainage areas.



Raton.

The scenery is picturesque, and the country rich in mineral and agricultural wealth. The landed values in this county are large, and in improvements on her real estate the county has done well. This is the result of a wise policy of improvement inaugurated by its inhabitants under the lead of the directorate of the Maxwell grant.

Principal Towns.

The principal towns are Raton, Blossburg, Springer, Elizabethtown, Catskill, Maxwell City and Cimarron.

Raton.

This beautiful little town is located on the line of the Atchison, Topeka & Santa Fé railroad. This corporation has built its

largest railroad machine shops south of Topeka at this point. The population is somewhat over 3,000 people, and a person coming into the town and looking at the great number of new houses in course of construction, would probably put it down as a Western boom town. Nothing, however, would be further from the truth. Although during the past summer over fifty new houses have been built, their purpose was to accommodate immediate occupants; and the majority have been turned over to the occupants in fee simple, on long time. This constant and growing improvement is made necessary by the business demands of the town. Wages of artizans and mechanics are good. The compensation of the railroad employes and operatives are, of course, up to the highest figure, and these set the mark for other employments. This also attracts a number of first class merchants, whose stores afford at reasonable prices all the necessaries of life. The people are public spirited and wide awake; and among other public improvements may be mentioned a splendid water works and service, and a public school building costing \$15,000. In addition to this, Raton lies in the center of an immense coal belt, whose area covers many thousand acres. Good mines of this fuel are open, almost in the town limits, and coal retails at this point at from \$1.50 to \$3.00 per ton. The elevation is 6,668 feet, and as Raton lies in a sheltered nook of the mountains, the climate is mild and equable during both winter and summer.

Blossburg.

A few miles from Raton is situated the mining town of Blossburg, with over 1,800 inhabitants. Large coal mines are now in operation, and during 1892 there were shipped from this point and Raton 244,995 tons of coal; and 303 miners were kept in constant employment. In the first eight months of 1893, 245,907 tons were shipped. This coal is sold in carload lots at from \$1.00 to \$1.50 per ton, and retails in the towns of Colfax county at from \$1.50 to \$3.00 per ton. As stated above this coal deposit covers 500,000 acres. It is of the very best bituminous character, makes an unsurpassed steam coal, and its commercial



The Town of Raton.



value is further enhanced by its perfect coking qualities. As a domestic fuel it is very highly prized, and gives out a cheerful glow equal to the celebrated and costly cannel coal.

Future Prospects.

The future of Raton and Blossburg is very auspicious. They lie in the direct pathway of commerce in the table land region. To the east are the vast fields known as the "great plains." Various railroad projects are talked about, and preliminary surveys have been made of some routes very favorable to those places. If other roads should pass their neighborhood, or center at Raton, these coal mines would command the markets of Kansas. As it is they send their product as far as Mexico, where they supply the Mexican Central, the Sonora, and Southern Pacific with steam fuel.

Springer.

The county seat, Springer, is the next town of importance. Its population is about 900 souls, and it is the center of a rich and fertile country. It has fine water works for domestic supply, and is under the big irrigation system of the same name. It is the market of about 25,000 acres of land under irrigation, and will unquestionably become a town of importance and wealth. The county court house is commodious and excellently adapted to business. During the past summer a school house, costing \$10,000, has been erected. The town is progressive, and as it is situated on the main line of the Atchison, Topeka & Santa Fé railroad, getting the full accommodation of its best service, it is bound to go to the front. Near Springer are located three good artesian wells. The country around this town lies in the basin of the Cimarron valley, and the prospects of developing a large artesian basin is as good as at any of the points now known where this water is abundant. Near Springer there are extensive deposits of cement, which are being worked to some extent, and in the near future will constitute a considerable element in the commerce of this section.

Catskill

is a new town of 500 inhabitants, on a lately constructed branch of the Union Pacific railway. Several large coke and charcoal ovens have been erected at this point, and eight large saw mills are in constant operation. The purpose is to extend this branch road on to Elizabethtown, in the Taos mountains, and thence into the fertile valleys of Taos county. This will probably be done during the coming season, and will use all the lumber, coke and timber that can be put out from the neighborhood of Catskill.

Maxwell City

is a new town laid out and projected by the Maxwell Grant company, and contains at present about 200 people. Adjacent to it is the great stock and grain farm of the grant company, comprising over 4,000 acres.

Elizabethtown,

is in the center of one of the best gold sections developed in the United States. It has a permanent population of 300. Its mines and resources were treated at large in the article on "Mining" in New Mexico. As stated above, railroad connection will soon be had, and the country promises a magnificent development.

Irrigation and Agriculture.

To support a permanent population, any region must produce a sufficient food supply. Take two instances in point. The gold and silver discoveries in California and Nevada quickly populated those States, and their admission to the Union was very speedy. The latter, however, neglected her agricultural resources. She has contributed a billion of dollars to the national wealth, and is still a rich state so far as mineral is concerned, but because of a backward agriculture, her population has dwindled to a mere fraction of the number necessary to support her civic dignity. California on the other hand is progressing rapidly in all directions.

The promoters of the interests of Colfax county have wisely determined that agriculture is the basic industry, and that on its development depends the permanency and soundness of future progress. It may be taken as granted that where fertile fields and comfortable communities adjoin rich mineral deposits, some of the more restless and ambitious will be constantly in the hills prospecting. Therefore a short review of the conditions and prospects of the farmer in this county will be timely.

Physical Features.

The Taos and Sangre de Cristo ranges on the west and the Raton range on the north form almost a right angle, the sides of which are about sixty miles long. Within this space rise the Red, Vermejo and Cimarron rivers and their numerous tributaries. These drain a region of perpetual snows, and water a wide and fertile mesa known as the Raton table land. Within this area are two main systems of irrigation known as the Vermejo and Springer.

The Springer Canals.

The ditches known as the Springer system of irrigation take their water from the Cimarron just beyond the mouth of the Poñil river. Six miles beyond the head gate the canal divides into two main laterals. The grade of the main canal is five and a half feet to the mile, twenty feet wide on the bottom and four feet deep; at the water surface it is about forty feet wide. The fall of the Cimarron river is thirty feet to the mile, necessitating a heavy grade in the main ditch to carry the water out of the river sufficiently fast. Besides the direct drainage of the Cimarron and Poñil rivers the water of the Springer ditch is reinforced by the flow of the Van Bremer, Cerroso and Little Cimarron, the combined streams taking up the drainage of forty miles of the Taos and Sangre de Cristo mountains, whose average elevation is over 10,000 feet, and whose peaks tower 13,000 feet high. The Pacific passage winds, in their career over this range, are wrung dry of their last moisture, and by seepage and surface flow, it all finds its way into this system of irrigating canals. Con-

sidering the immense basin, the heavy snow and rainfall on the mountain elevations, which will average from fifteen to twenty feet of snow on the level, 22,000 acres, the area irrigated by the Springer ditch, is very small. This snow fall reduced to water measurement will give about fifty inches of water falling on the thousands of acres of mountain peaks to be used on the irrigated lands.

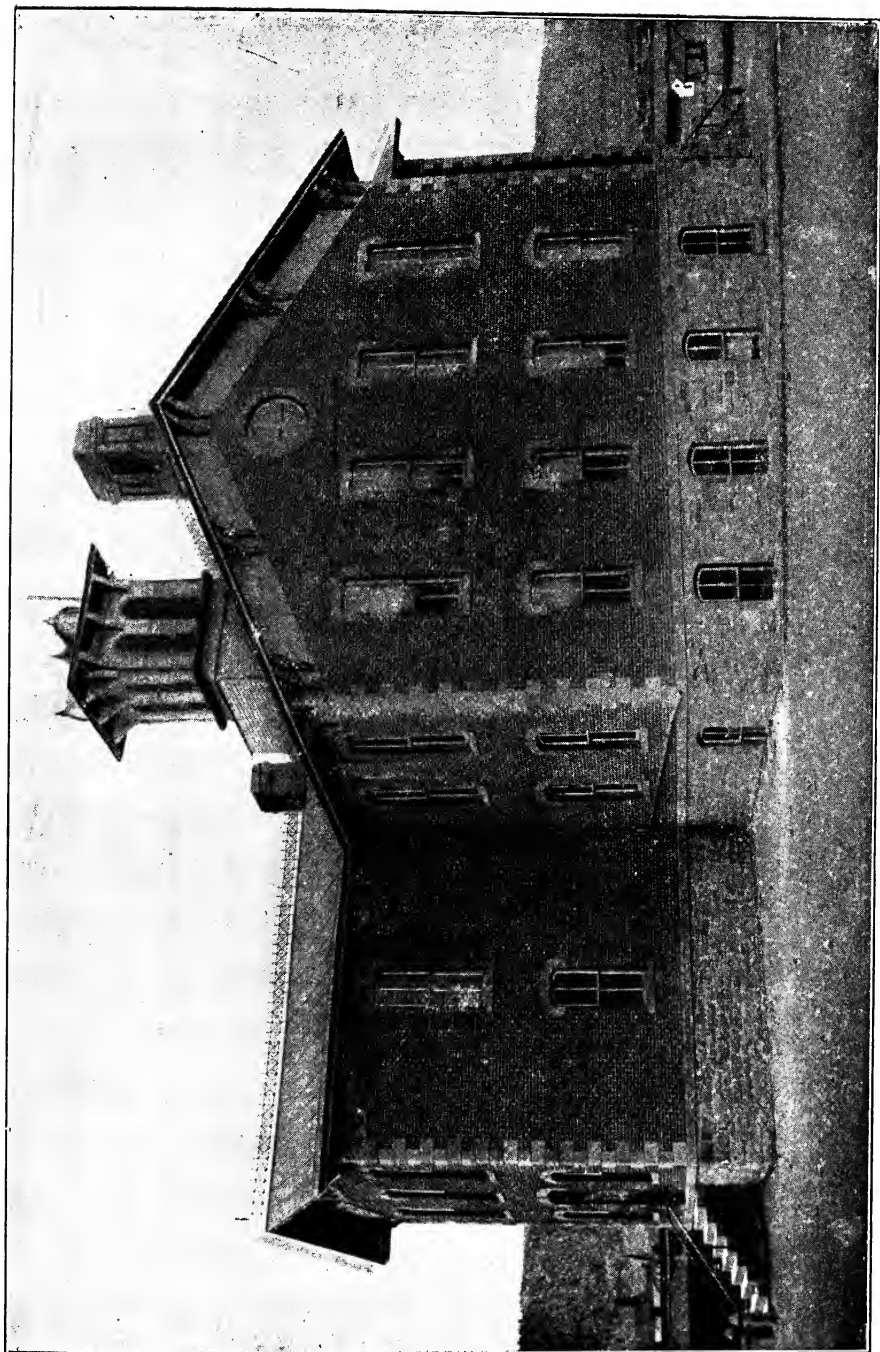
In 1890, the United States Agricultural Department, through the Irrigation Inquiry, caused an expert examination to be made of this country and its irrigation. In a resume of the official report it says: "There is no question of the water supply being equal to all the wants. If all the land were sold under the Springer system, any demand for water would have been satisfied."

Lakes and Reservoirs.

The Springer canals do not, however, depend alone on the flow of the rivers. The grades here are so steep, that the melted snow and rain run off very rapidly. To overcome this, the management of these ditches have constructed a series of reservoirs along the lines of the canals. The Springer Lake reservoir has a capacity of 5,000 acre feet, and besides this there are four smaller reservoirs aggregating 1,200 acre feet. An acre foot is twelve inches deep of water over an acre of ground, and is sufficient, if properly applied, to mature a crop. Besides this, owing to the summer floods in the main streams of this region, these reservoirs can be filled over and over again, thus permitting a continual stream in the ditches for the purposes of irrigation.

Vermejo System.

The headgate of this system of canals is situated above Dawson, on the Vermejo river, a stream which rises in the angle of the Sangre de Cristo and the Raton mountains, and is fed by a perpetual flow of melted snow from their crests and deep cañons. The river itself is fed by a wide net work of cañon streams. The canals are constructed to irrigate 30,000 acres. The main canal is the same size and depth as the Springer works. The



High School, Raton.



fall of the Vermejo is very steep, nearly fifty feet to the mile, and its waters run off very rapidly. This, however, is guarded against by the construction of twenty reservoirs along the lines of the canals. The largest, Lake Nos. 7 and 8, as it is called, holds 11,000 acre feet of water. Two others, Oyster Lake and Laguna Madre, contain 3,000 and 2,000 acre feet, respectively; the seventeen others are rather small and impound a total of 4,200 acre feet. This storage capacity is many times increased by reason of the fact that they may be drained and refilled several times during the season.

The construction of this system of ditches is similar to the Springer works. Both have the same grade, and after a few miles from the headgate divide into two main laterals which distribute the waters to the fields. The capacity of this ditch may be greatly increased by extending the ditches to the north and east. It is also proposed to build a dam in the Vermejo river, at the junction of the Caliente river, about fifteen miles above the present headgate. This will hold 5,000 acre feet, and may be refilled repeatedly during each year by the successive floods.

A Big Lake.

The most important of these reservoirs, however, is the big lake on the Springer system. According to the surveys 3,500 acres will be submerged from the collected waters of the Cimarron and the Cieneguilla, to an average depth of forty-five feet. The dam is located about thirty miles northwest of the present headgate of the Springer ditch, and the Cimarron river bed will be used as a water way for that distance. The dimensions of the dam are 100 feet long on the bottom, 275 long on the crest and 140 feet high, and will contain 312,000 cubic yards of material. It will irrigate 160,000 acres of land.

Other Projects.

Besides this there are other reservoirs surveyed, among them projects to collect the waters of the Van Bremer, Poñil and Cerroso rivers in a series of natural depressions. It is also

proposed to store the floods that pour down the Raton Arroyo and the Bartlett and Chicorica creeks. This last scheme will put under irrigation a large area immediately southeast of Raton, and would cover 12,000 acres, some of which is located on government land, outside of the Maxwell grant.

Areas of Reclamation.

The possible area of reclamation from the surface flow of streams and the storage of flood waters will exceed 400,000 acres. All of this is not located within the boundaries of the Maxwell grant, but owing to the topography of the country the same ditch that reclaims the grant land must be used on the public domain.

Cost of Land and Water.

The cost of land under this system is from \$20 to \$35 an acre. In buying land, to each eighty acres there is reserved one and forty-four hundredths cubic feet per second during the irrigating season, which lasts from April 1 to November 1 of each year, a period of seven months. The cost of land includes a perpetual water right, but a small annual charge is made each year to pay for the maintenance of the main ditches and reservoirs. The amount of water sold with each eighty acres is very high. It is the same amount that was given to each of the original colonists at Greeley, and it has there been found sufficient to irrigate 160 acres. A few years of irrigation on the Maxwell grant will show a similar increase in the duty of water.

An Equitable and Advantageous Arrangement.

Knowing this to be true, the directorate have included in their deeds or contracts with the farmers purchasing their lands, very liberal clauses as to the use of water, and the subsequent disposition of the ditches.

Provision is made, that when the lands under the Springer and Vermejo ditches are all sold, and the water rights paid up at the reasonable charges made, the canals and reservoirs shall be turned over to the farmers as their property without further cost, charge or payment. The community at large will then own

these works, manage them without any interference, and use the water pro rata according to the acreage cultivated by each individual. This gives the farmer settling on these lands all the advantages incident to a communal ownership of the water works. At the same time, during the period that must elapse while settlement is progressing, self-interest will compel each farmer to become an immigration agent. The sooner all the lands are settled, the sooner the community will enter into possession and management.

The company also stipulates that no individual may directly tap the reservoirs for private use of water, but that they shall always remain as feeders for the whole system, to which nobody has any particular right, but in which everybody has an undivided interest.

When the lands now under these ditches are sold the transfer of the corporate rights to the community must take place. The company, however, reserves the right to the use of any surplus water. That is, if the company develops more water than one forty-four hundreds cubic feet per second to each eighty acre tract, and has it ready to use at or before the date of the transfer, they shall have the right to apply it to new lands, and shall retain sufficient interest in the main works to insure them in its use. In other words, they shall have pro rata privileges with the community. This of course is only equitable and according to public policy.

It must be said that a comparison of these conditions with those imposed by any other corporation will redound to the advantage of the Maxwell grant.

Evaporation and Seepage.

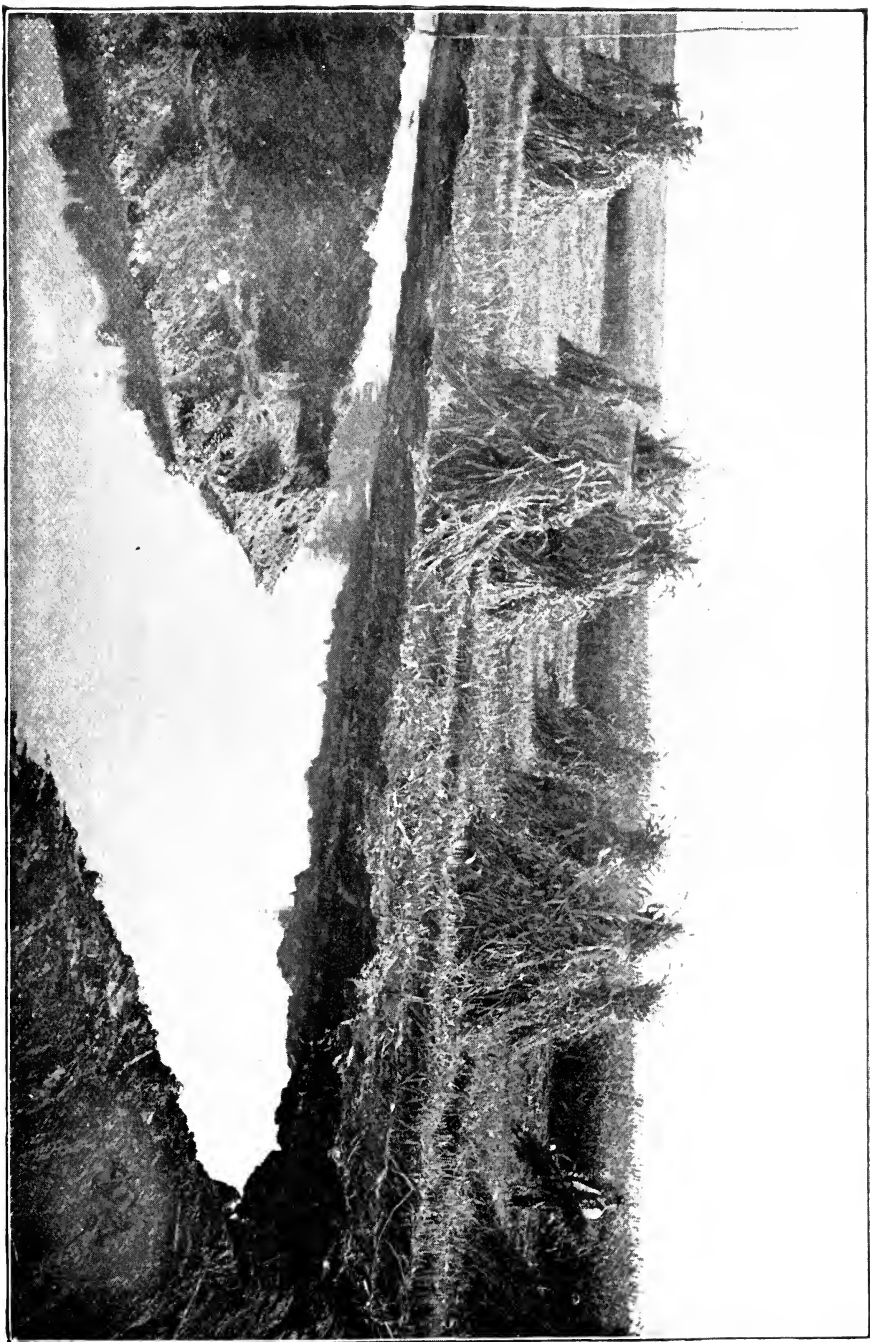
In storing water evaporation and seepage cut a large figure, and provision must be made for a storage proportionately greater than the actual demands of the settler. The great altitude of these lakes reduces the evaporation to a minimum. Observations on the Laguna Madre show conclusively that evaporation is very low. In the month of October, 1891, there was ten feet of water

in this lake. The sun was then very hot, and also in November and the first weeks of December. Water to prepare several hundred acres for ploughing was drawn off; and on March 1, 1892, it was found that the water level in the lake had only fallen one foot. During these months there was no inflow of water to the lake.

Percolation depends on the porosity of the soil. The bottoms of these reservoirs are hard adobe clay, almost impermeable by water. In 1891 foundations were dug for a new outlet to one of the lakes. The trench was dug to a depth of twenty feet below the surface of the water, and about fifty feet away from the lake. No percolated water was struck until the trench got down eighteen feet below the water surface. This shows how stiff is this clay bottom. On the cultivable alluvial soil no bottom has been found.

The Policy of the Company.

It is claimed by the management that it is intended to sell these lands off as rapidly as possible, and at the same time to sell one tenant as small a tract as possible. The tendency has been in taking up government land, for the settler to file on more than he really needed or could cultivate. The policy of irrigation promoters, however, has been to sell each settler only so much land as he was able to handle, and bring to the highest state of cultivation. This made the security for the deferred payments better, and at the same time settles the country with a dense and thrifty population. The board of trustees have therefore made it a rule not to sell to one purchaser more than 320 acres, whether this be irrigated or non-irrigated. Exception is, however, made in the case of colonies. Their agents may purchase in proportion to the number of settlers. If the farmer proposes to devote himself to fruit culture, from ten to twenty acres are sufficient for his needs. If to the raising of staple crops, such as grain and alfalfa, eighty acres is all that he and his family can manage, and if he gets the best results of modern intensive farming out of his tract, he will find that he is doing better than he could possibly hope on 160 or 200 acres of Eastern land.



An Irrigated Farm.



How the Irrigator Thrives.

Take an eighty acre tract. Let it be supposed that land and water have cost him \$35 per acre, and the first expense of fencing and reducing to cultivation runs \$5 more per acre. This will be an actual outlay of \$3,200 or a fixed investment. Suppose that he has forty acres planted to alfalfa. It will average four tons to the acre, and careful cultivation and liberal seeding will raise this figure. The gross money return at \$10 per ton, the lowest territorial price, will be \$1,600. It may possibly cost him for cultivation, baling, taxes on land, and incidental expenses, \$5 per ton. This is a net of \$800 from alfalfa. If he has set five acres to apples, and puts only 100 trees to the acre, according to local prices of three to four cents per pound, they will yield not less than \$2 per tree. It may cost him \$50 per acre for cultivation, commissions, freight, etc. He will therefore realize \$750 net from his little orchard. Suppose that he also puts thirty acres to potatoes. According to New Mexico's prices he will make a big income, as the very least he should get, would be 200 bushels to the acre, for which the average price is seventy-five cents per bushel, or \$150 per acre gross. It is very liberal to put down \$50 for all costs of cultivation, leaving \$3,000 profit from this staple. The other five acres may be devoted to pasture, sugar beet culture, vegetable garden, or what not. A good thrifty family will make it pay for its room. Counting only the foregoing, however, there is a net income of \$4,250 per annum from three staple crops, on a fixed investment of \$3,200. There is only one drawback to this, and that is if the owner wished to sell he could hardly get more than \$100 per acre for the reason that there is so much land, and the price of products is so good, that any sane purchaser would rather invest his money in the raw land. These figures of profit look large at first blush. They represent, however, only \$53.10 per acre. The farmer who can not make that under a good irrigating ditch in New Mexico does not know the business. The above, of course, only deals with crops, facts and figures, peculiarly adaptable to Colfax county.

General Comment on Irrigation in Colfax County.

There are three qualities of land susceptible of irrigation in Colfax county: First, the table land or mesa that lies open to ditches present or prospective; second, the bottom lands of the numerous cañons; third, the higher mountain land, which includes a portion of the stream and cañon land and has some timber.

The irrigator, as shown in the figures given heretofore, will find more profit in cultivating a small tract intensively than in merely scratching a large acreage. Of course there are large farms that pay well, as for instance under the Vermejo ditch, the company has broken and cultivated in one tract over 1,000 acres. Six hundred of which is in alfalfa. This farm will undoubtedly yield first class returns; but this class of culture, on account of the heavy outlay for seed, preparing the soil and ditching is not within the reach of the average settler. It may, however, be taken for granted that a number of persons of moderate means and industrious habits and intelligence will get more out of an equal area of land than even the best corporate management. Looking at this proposition abstractly as to whether a number of small holdings, say ten families, with sixty acres a family, or a company with 600 acres should be preferred, a few years experience always shows a decided advantage in favor of the small holdings. This is the experience of scientific farmers, not only in the United States, but in France, Germany, Holland and Belgium. Besides this, small holdings induce the settlement of the greatest possible number of thrifty, law abiding citizens who have a stake in the general welfare, and whose permanent interest is to advance the wealth and prosperity of their community. Economic growth and social life are broader under these circumstances than where the community is composed of a few large owners and a number of higher laborers. The policy, that encourages small holdings, is to be encouraged in every way.

Upon several of the farms that are now being cultivated in Colfax county there are small farm storage reservoirs. The company has informed, not only the settlers under the ditch

systems, but also the farmers in the river bottoms, that the surveyor has been instructed to locate, free of expense to them, sites to build reservoirs for individual farm storage. The object is to encourage every one to gather all the flood or waste water possible. These basins will be filled by laterals connected with the main ditches, and the farmers, who avail themselves of this liberality, find it much to their profit. Another great advantage is that these numerous standing ponds gradually fill the soil with seepage water, whose influence is to lessen the amount of water needed for cultivation.

Products Adaptable to This County.

It may be assumed that all the products of the temperate zone will thrive. The deciduous fruits prosper, and their product has a fine flavor and appearance. On the Vermejo are two large orchards of pear, prune, plum, cherry and apricots. Apples, however, are the prize crop in the fruit line. Wheat is a crop naturally adapted to the climate, and it is as hard and heavy as the famous product of the Dakotas. The usual yield is from twenty-five to thirty-five bushels an acre. Oats, millet and barley are proportionately good crops. As a hay country this county is unexcelled; and the haying season is always accompanied by dry, warm weather. Besides the cultivated hay, which is principally alfalfa, the black grama grass grows wild, attaining a height of twelve to fourteen inches, and yielding from one-half to three-quarters of a ton per acre. It is very valuable as fodder, and the thrifty man may usually make big wages by taking his mower on the open range and gathering this hay which is free to all. Potatoes, beets, turnips, parsnips and onions grow abundantly, and are of large size. The table of prices contained in the general article on New Mexico will give all necessary information as to possible profits without repetition here.

Stock Growing.

Farmers who intend to locate in this region will find splendid opportunities to increase the earnings of the farm by keeping a selected herd of horses or cattle. The climate is extremely favor-

able to this practice. The warm sun is conducive, preserving the greatest amount of animal heat; while the bracing, tonic airs of the mountains expand the lungs, use up unnecessary tissue, and make the animal hardy, active and bright. The "open range" business, has mostly disappeared with the cow boy who once ruled the wide prairies. The prosperous cattle man now is also a farmer. He is not satisfied to raise and feed undersized ponies and broad-horned steers, but improves his horses by the introduction of good blood, and pastures only the higher grade cattle. He finds it is not necessary to own immense herds, but is sure to have a good one. A carriage horse bred from a Percheron or Clydesdale stallion is worth more than a herd of ponies, while a blooded herd of Jerseys, short-horn or other good cattle are worth hundreds of half wild animals.

Lumber.

The slopes of the Raton, Sangre de Cristo and Taos mountains afford 450,000 to 600,000 acres of merchantable timber, principally of yellow pine, piñon and cedar. The Union Pacific has lately pushed a branch line down the Red river from Trinidad, Colorado, into the breast of this rich timber belt. Eight large saw mills are now at work at Catskill, and the output is reckoned at over 30,000,000 feet of lumber per annum. The swift cañon streams furnish unlimited power to extend this industry. It should, however, be prosecuted with common sense as well as vigor. It is down right crime to ruthlessly denude the mountain slopes, because lumber men are too lazy to select their timber. Wherever waste has been permitted in this industry the punishment has been swift and sure. The spring is marked by devastating floods and the summer by drouths.

Telephones.

The various communities of this county are very closely united. To facilitate its scattered business the Maxwell company has built more than 150 miles of telephone lines connecting every part of the county. There are thirteen main stations, and the people of the outlying communities can communicate in a moment with

the business centers, or send in orders to the principal markets of Raton and Springer and have them filled at once, without waiting on the mails. Women, who come to settle with their families in this county, need not fear the lonesomeness and isolation that once characterized life in a new country. The soil is virgin, it is true, but all the conveniences of civilization characterize the environment. In an irrigated region like this the pioneer farmers have more comforts and facilities for commerce and business than their slow-going, plodding brethren of the East.

Conclusion.

This county, lying as it does at the headwaters of the Canadian river, enjoys very valuable water privileges. Its people are wide awake, progressive and united. The climate, taken the year through, is delightful. Rarely in winter does the cold in the valley areas fall as low as zero, and in the summer 90 degrees in the shade is hardly ever felt. It is not the soft, *dolce far niente* air of Southern California, but a mild open winter, free from drifting snows, and a balmy, genial spring and summer. The constant sunshine makes good crops. They are not retarded by dark, damp days, nor unreasonably forced by torrid heats. In a word it is a good, year round, work-a-day climate, where the men born in the temperate zone find plenty of paying labor during the day and healthful, pleasant rest by nights. The alluvial soil is of unknown depth. Good, potable well water is easily attainable, and the promise of developing artesian water over a wide area is very good. The settler will make no mistake by locating in Colfax county.

UNION COUNTY.

This county was created by act of the legislature, approved February 23, 1893. It took its proper place in the list of counties on January 1, 1894. It is segregated from the eastern portions of Colfax, Mora and San Miguel counties, and establishes the county of Union. It occupies the extreme northeastern corner of the Territory, and has an area of 4,126,000 acres, 350,000 of which are unsurveyed, consisting of a strip on the Texas line. The population is estimated at 4,120. The principal towns are Clayton, the county seat, with a population of 450, Folsom with 200, and Luis with 100. These places are all rapidly increasing in numbers and prosperity. As shown by the books of the counties from which Union county was taken, the total valuation is \$1,897,171. The push and energy that compelled the erection of this municipality, although it was opposed by the representations of three powerful counties, still animate the people. They are planning far ahead, and wisely regulating their efforts. Oklahoma's western boundary touches Union county for a distance of thirty-three miles. Thousands of land seekers failed to obtain a location in Oklahoma and the Cherokee strip, and many of them will no doubt eventually find homes in this new and thriving community. It will therefore be seen that this county is very advantageously situated to attract immigration.

General Characteristics.

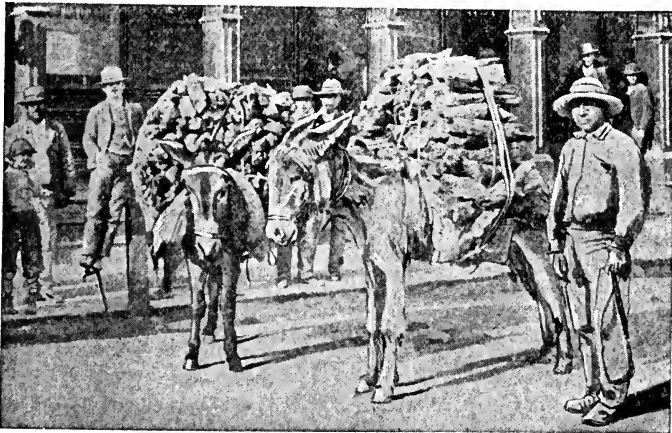
The topography is diversified. Rugged mountains, covered with valuable timber occupy the northern and western portions of the county; thence they slope gradually into valley lands, which sink into grass covered mesas, and roll on into the plains of the Panhandle of Texas. On the Cimarron, Tramperos and Ute creeks are valuable tracts of cedar and pine. These have

not been touched, except to supply a small amount of fuel for domestic purposes. These creeks furnish ample power for saw mills.

The northern part of the county is covered with a net work of small creeks; while in the southern and central part Ute creek and the Canadian afford considerable bodies of land for irrigation.

Industries.

At present the efforts of the people are mostly confined to the raising of cattle and sheep. The range is ample and covered



with abundant grass. It is conservatively estimated that there are 103,700 head of cattle in the county, many of which are highly bred, and the general average of the range cattle has been so much improved that the highest market prices are always obtained. Besides these cattle there are 5,700 head of horses and mules. These are largely raised for shipment to Eastern markets, where, on account of their excellence of blood and form, they always find a ready sale at high prices.

Sheep raising is an extensive industry. From Clayton alone the annual shipments of wool are in excess of 2,000,000 pounds annually; and in addition large clips find a way to market from other points. A careful estimate puts the number of sheep at 355,000 head. The number is rapidly increasing, and the grade

of the flocks is constantly growing better. There are few, if any, counties that afford such excellent opportunities for sheep raising. Grass and water are easily found, and the result is a heavy, fine fleece, and a large carcass when the animal is killed for mutton.

Irrigation.

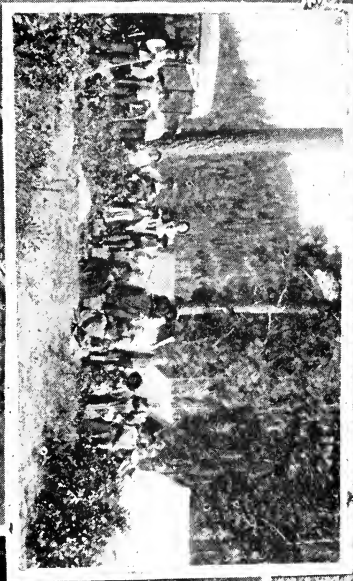
The reports of progress made in farming by irrigation are very encouraging. At present the spread of cultivation is limited to individual homesteads and ranches, and will not cover more than a few thousand acres. However, large works are being planned to reclaim the lands on the Baca Location No. 2, and prospecting parties are examining other promising localities. In some few places crops have been raised without irrigation. As far west as Union county, however, this practice is not to be strongly advised. If the farmer will reckon his annual percentages of loss from a full crop, even in the best humid regions, it will become clear that irrigation is not only an advantage, but a necessity to the scientific farmer. In Union county the danger of drouth is much increased by reason of its location well within the arid region. The prospective immigrant will do well therefore to secure a water right with his land. It will pay for itself within the first year, and has the added advantage of seating the farmer firmly on his homestead. There is no emigration from an irrigated country. The flow of population is always inward.

Railroads.

There are 83.30 miles of the Union Pacific railroad from Denver to Fort Worth in the county, and it is an outlet of great importance.

Public Schools.

The people of the county take great interest in the public school system, and the buildings now in use and under construction at Clayton, Folsom, Miera and Baca, and at other points, compare favorable with those of any other county, and represent the progressive character of the people.



CAMPING
OUT

RAPID
FALLS

WATERFALL
TO
MOUNTAIN

WATERFALL
TO
MOUNTAIN



Coal and Stone Lands.

Development is in its elementary stages. Good indications of coal are found in the northern part, and valuable stone for building purposes is to be had wherever required.

Of course in a new country of such sparse population little can be said as to the actual advancement of the country. There is one thing, however, that can be said of these people, and that is they are possessed of absolute and indomitable pluck and energy. Vast and difficult problems of reclamation confront them, but they are of the same stock and race that have conquered three thousand miles of wilderness. According to the history of surrounding communities success is possible, and there is not the slightest doubt that these people will wrest success from difficulty. The immigrant who wishes to cast his lot with this community will find congenial surroundings, and all the advantages supposed to accrue to the pioneer; while at the same time he will be much better off than in many other sections, where railroad communication with populous centers is denied him.

MORA COUNTY.

This county is south of Colfax, and between Taos and Union. The surface consists of a gently rising plain from 5,000 to 7,000 feet above sea level. When the latter altitude is reached the



plain swells rapidly into precipitous mountains 10,000 to 12,000 feet high. The immediate assumption is, that a region so elevated, is not adapted to general farming.

This, however, is erroneous. Forage, cereal, vegetable and fruit crops all flourish. The high altitude is affected by the southern latitude and the combined effect is an equable and mild climate all the year round.

The topography of the country is marked by a series or rather ramification of valleys. In the western half of the county these are all tributary to the Mora river. The eastern half is crossed from north to south by the main stream of the Canadian. It flows, however, in a deeply eroded channel, and it is doubtful if its waters can be carried out in the surrounding prairie except at great expense. This part of the county is therefore better fitted for grazing than for agriculture.

The Mora and its Valleys.

The western half of the county is a beautiful farming country. On the west it is protected from high winds by the Las Vegas and Santa Fé mountains, two branches of the main range of the Rockies. On the east tower the Turkey mountain, a detached range that circles the valley until the Agua Fria mountains are reached on the north. Within the main valley, protected not

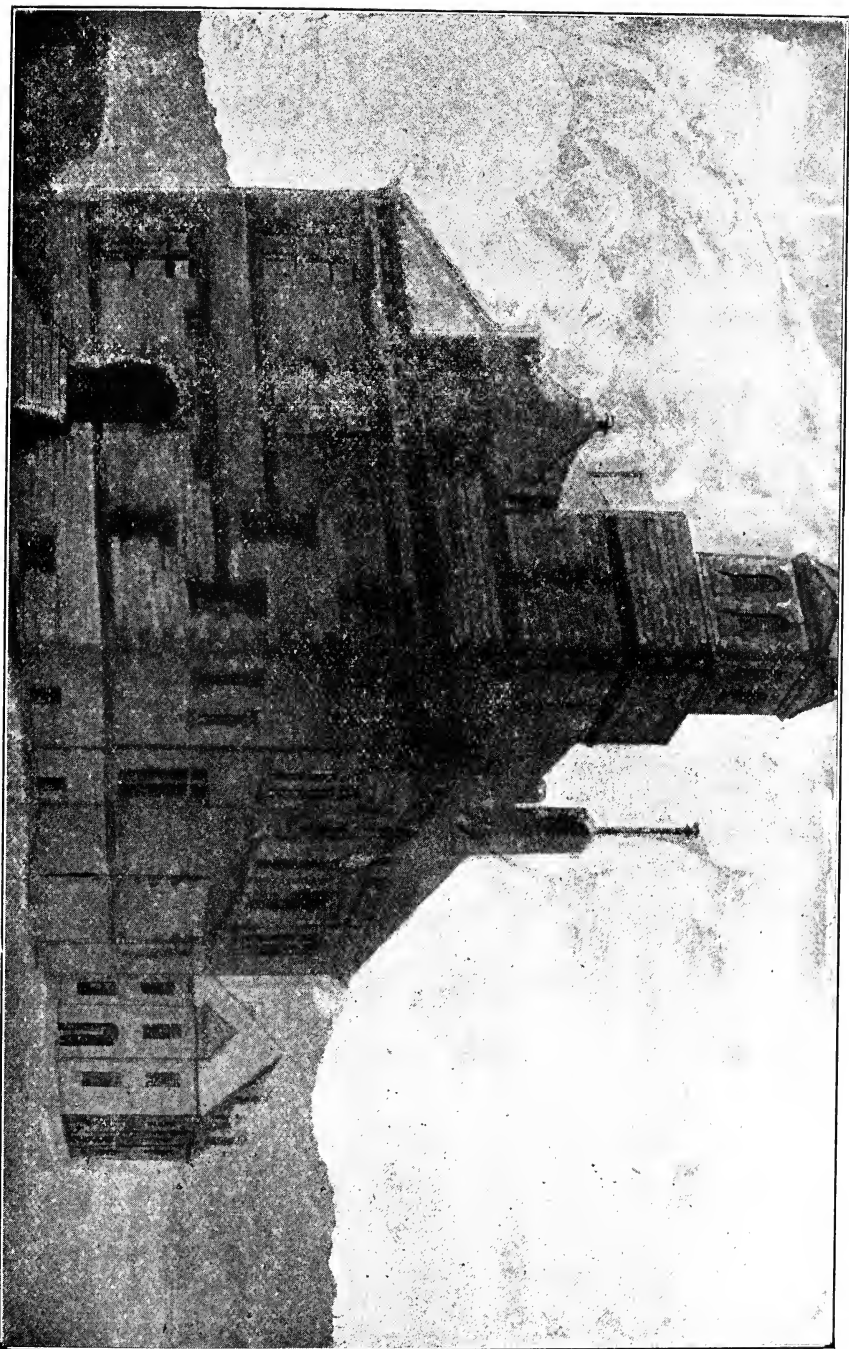
only from the blizzards of the Texas prairies, but also from western storms, flows the Mora. It takes up in its course, the Coyote, Cebolla, La Jara and Sapello. Every one of which flows through a fertile valley. This country lies in long, regular undulations, every broad ridge or divide forming a plateau valley of considerable extent. In these again are natural depressions fit for reservoirs, and which need but slight work in the way of embankments. They may be utilized not only for the purposes of irrigation, but for storing water out on the cattle ranges. Another advantage is that during flood periods all these depressions along the stream beds may be filled. The capacity will range from 5,000 to 20,000 acre feet. During the periods of low water these stores may be slowly returned to the stream bed, or into main canals, and distributed on the agricultural land through the regular irrigation ditches.

It has been noted before that all natural water courses are by the law of New Mexico public acequias or irrigation canals. It is necessary therefore for the people to agree as to the management and use of such water. For instance a large land owner desires to impound water for private use. He does it at his own expense. He cannot, however, use the stream bed, which in this country is usually practicable, to convey this water to his ditch without general consent; nor has a small or large portion of the community any better rights than the individual. He can, however, submit a proposition of improvement to the irrigators; and with approval or consent of all thereto, in writing, his rights would become vested and secure. This plan would permit the reclamation of large areas. The spirit of the New Mexican law, however, is that irrigation should be pursued by communities; and if this method of improvement of the local supply were taken up by the communities resident on different stream courses, the question would be less complicated and the advantage more general.

Wherever surplus water is stored and used in private ditches the right to it is absolute; and the person so doing has a free right of way over public lands for his canals, and over private

lands on the payment of reasonable compensation to the owner. Taking both these provisions together much may be done in Mora to improve her irrigation facilities, and so far as the storing of this water for use out on the range is concerned, there is no difficulty. The more progressive people of Mora are already considering this proposition of table land storage. Said one gentleman of Watrous to the agent of this Bureau: "I would be very pleased if between my place and the town of Mora there were twenty or thirty large reservoirs. These would be filled in the spring floods. In the late summer, it would be returned to the river, and we could not only have our canals bank full, but we could so enlarge them as to cover every acre of land between here and Mora. The seepage alone from these reservoirs would vastly improve our farms. Take my place for instance, I begin irrigating at the upper end, and before a week is over, the water is oozing into the river nearly two miles lower down the stream. In fact, the crown of a road twelve inches above the surrounding fields will be wetted up by capillary attraction."

It is of course to be pre-supposed that such a soil would make a poor reservoir; but such is not the fact as the flood waters are filled with a silicious silt, which quickly puddles the bottom and makes it almost as tight as a pot. This allows only the minimum amount of seepage. The other problem in reservoir building is evaporation. Owing to the elevation, this cuts little or no figure during ten months of the year; but during the early spring, and the brisk March winds, evaporation is quite a factor. The little waves offer sharply defined crests to the winds, and little films of moisture are clipped off every one. During this season the reservoirs will lose from a foot to eighteen inches from the upper surface, but as this is the time of greatest flood in the feeders, it really amounts to little. From this source alone it may be estimated that 250,000 acres of this county may be irrigated for crops or pasturage.





Irrigated Range.

The formation of these reservoirs will also cut an important figure as affording cheap pasturage. The table lands of Mora are thickly covered with black grama and blue joint grass. It is said that the latter is gradually prevailing over its neighbor and covering the plains exclusively. This is a matter of small moment, however, as either furnishes an exceptionally fine hay, If regularly, but scantily irrigated, that is, if about six or eight inches of water is poured over the land in addition to the rainfall, these grasses thicken in their growth and turn the land into heavy, rich meadows. Under such cheap, but artificial pasturage, instead of its requiring twenty acres for the support of a steer or other animal, not more than three and sometimes one acre will suffice.

This irrigated pasture has a double advantage. During the good grass, the stock may be permitted to range at large; as soon as this wild grass fails, they may be rounded up, driven within the fence of such a pasture, allowed to accumulate the last possible pound of beef, and then sold at the best market rates. Cattle ranches under such management will lose that wildness that has made the cow boy such a grotesque figure in Eastern and English literature; it will transform the ranch house into a humanized home, surrounded with a garden and the conveniences of life, from whence the manager or owner can superintend his lowing herds, keep his family with him and enjoy life. This picture of pastoral life will soon be realized in many parts of New Mexico, and especially in Mora.

While investigating the resources of this county, the agent of this Bureau saw on one ranch splendid fields of alfalfa that had been sowed a year ago on a heavy stand of timothy, and on the raw prairie sod. The seeding was heavy, nearly forty pounds to the acre having been used. After drilling in, nothing was done except to irrigate the land. The alfalfa sprung up, choked out the prior growth, and when inspected was ready for a second cutting. This shows how easily the ranges could be transformed into ideal pastures.

The Watrous Valley.

The valley immediately around Watrous, on the Atchison, Topeka & Santa Fé railway, is typical of this county and of all northern New Mexico. It is watered by the Sapello and Mora, from each of which the farmers have taken out small ditches, and brought over 4,000 acres under high cultivation. To see these lands in full bloom and beauty is a wonderful sight. The streams are banked with cottonwood, elder, wild plum and cherry trees; the fields spread with orchards, gardens and lovely homes. Here a house peeps from its sheltering grove; there the precise lines of an orchard break the landscape; at hand an alfalfa field, topped with its pretty flowers, waves green and purple, loading the air with delicious perfume. The Santa Fé and Las Vegas ranges on the west, on the east the Agua Fria and Turkey mountains close in the view. Owing to the high light the scene changes with every passing cloud.

The La Cueva Valley.

The most important valley is La Cueva, situated just outside the Cañoncito of the Mora, and watered by the Cebolla and Coyote. It lies in a perfect amphitheatre of hills, and these are overtopped with mountains. The floor of the valley is a smooth plain, over 50,000 acres in extent. Considerable work is being done here by the La Cueva Ranch and Cattle company, who own 29,000 acres of this valley. The management have 4,000 acres now under cultivation, and have run out their ditches so as to cover 10,000 or 12,000 acres more. At the head of the valley there are two large reservoirs, the largest being one of the principal lakes in the Territory outside of the Pecos valley. At present the survey shows that it covers 640 acres, and that six feet of water can be drawn off it. The feedway is still fifteen feet above the surface of the water, and raising the height of the embankment so as to confine this extra amount of water, it is estimated that 14,400 acre feet will be impounded. Besides this there are two other small reservoirs. The present works of this company assure the reclamation of 16,000 acres of land;

and besides this there are known opportunities to reclaim 30,000 acres.

The Prospects.

The prospects of this valley are superb. The climate is better than that of Greeley, Colorado. Greeley annually makes \$2,000,000 profit from its potato crop alone. Here the conditions are much more favorable for this cultivation than at Greeley. There is one point, however, that must be remembered, and that is that potatoes should not be irrigated, while the plant is in flower and the "apples" forming. If water is applied at this stage, the irrigator may be assured of a splendid crop of stalks, but very small potatoes, and few to the hill. While the potatoes are in flower no water should be given them, even if the plants seem to suffer. This lesson was learned at Greeley during years of drouth. The New Mexican irrigators should profit by it. Another thing, this region is a natural alfalfa and wheat country. An alfalfa field makes the best potato ground known. If the three crops named are alternated so as to run alfalfa three years, wheat one and potatoes two years on the same ground, an average profit of \$50 per acre annually may be secured. This is the experience at Greeley, where 25,000 acres are cultivated under one ditch. In La Cueva valley this same result may be secured on a large scale. The whole 50,000 acres of this valley may be laid down to the crops named, interspersed with garden patches and small orchards. These, however, should be protected by quick growing hedges. Cabbage, celery and onions would also yield well here. At Coyote, a little settlement near La Cueva, berries grow profusely, and there is no doubt but that they would flourish throughout this county.

The Mora Valley.

Up the Cañoncito, six miles from La Cueva, the Mora valley proper is revealed. Mora, the county seat, is a quaint town, containing a very handsome courthouse and other fine buildings. Several large stores are located here. The valley for fifteen miles is a band of green threaded with silver. In places the

mountains run down to meet the stream in picturesque abruptness, in others they recede leaving wide plains. The valley proper is from three-fourths to one mile wide, and contains about 6,000 cultivated acres.

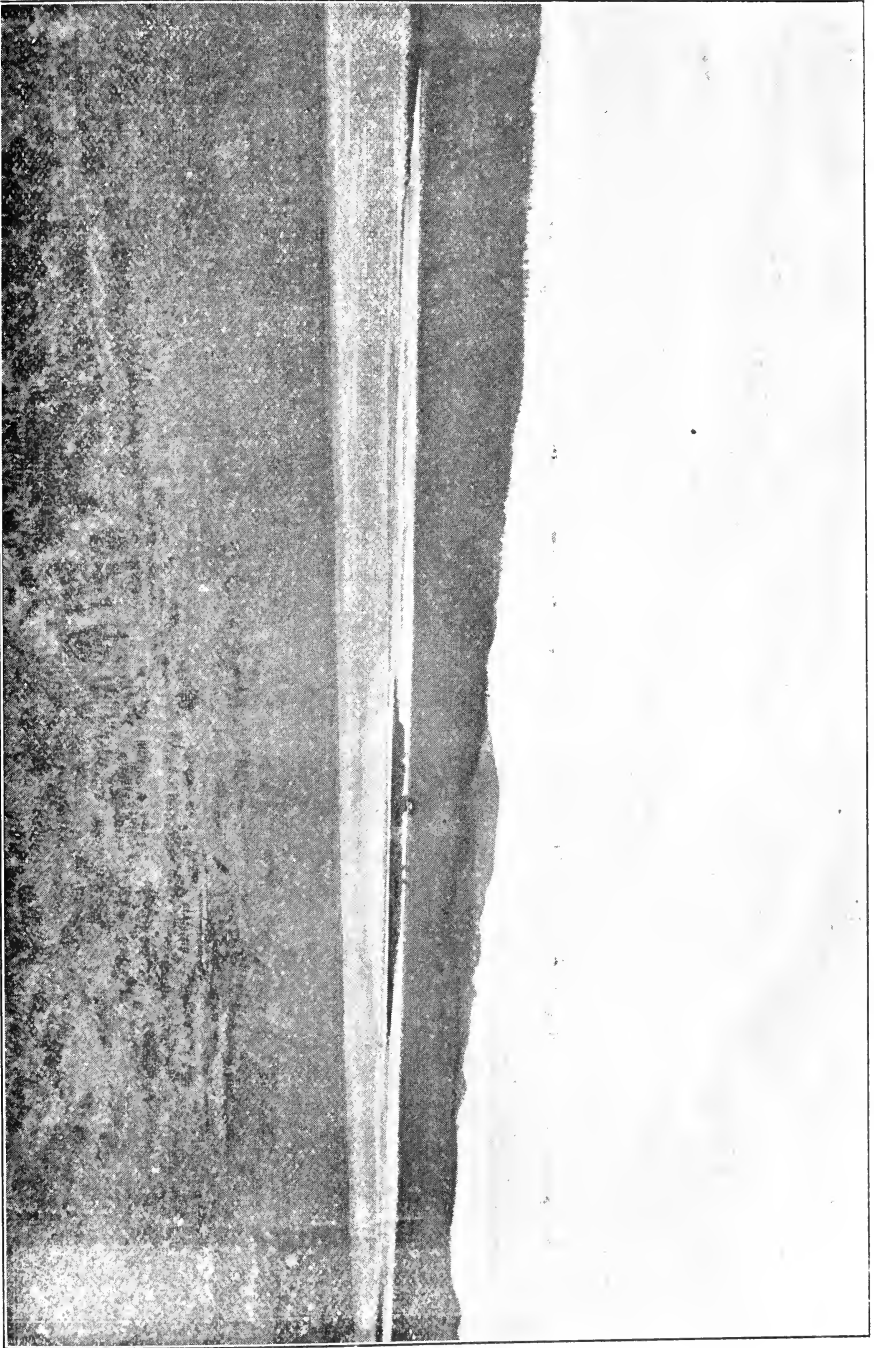
Intermediate Valleys.

From Mora back to Watrous is a panorama of beauty, which if possessed in an Eastern State would be world renowned. Those who are unaccustomed to the far West can hardly be persuaded that the climate is arid. From one divide to the other the grama and blue joint grasses wave a foot high, the babble of water is heard in all the streams; but the tenderfoot should not undertake dry farming. The moisture that will mature grama grass is not sufficient for tame hay, alfalfa or farm crops. The almost pearl gray horizon, and the deep azure of the dome of heaven lend beauty to the landscape, but they are signs that never escape the experienced eye. They mean aridity and constancy of sunshine that is valuable to the irrigator, but death to Eastern methods of farming. The water that purls in the streams comes from snow banks in the mountains, not from rain.

The Eastern idea is that irrigation is a good substitute for rain. The Western man thinks rain a poor substitute for irrigation. The rain belt farmer relies on chance. The irrigator knows what he is doing. Therein lies the difference.

Down the Valley.

Going from Mora down the river there are small ranches along it and its tributary streams until the Tipton ranch is reached, which belongs to the heirs of the late Enoch Tipton. It contains about 600 acres cultivated to fruit and general crops; then comes Walter Lynden, with seventy-five acres; and proceeding further down the valley passing small ranches until Shoemaker, eight miles from Watrous, is reached. Here the valley widens out and is called Cherry Valley, and there are a number of extensive ranches. The principal of which are those of Capt. W. B. Brunton, Thomas Lester, L. C. Fort, Frank Carpenter, Judge Carson and others, aggregating about 1,200 acres in actual cul-



La Cueva Reservoir, Mora County.

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tivation. Commencing again and following up the Mora for five miles we come to the Loma Parda, where several hundred more acres are cultivated. Webbers old place, now owned by Mr. Bierbaum, is seven miles up the river. Thence up the stream are the Golondrina and Buena Vista Valleys, well cultivated.

Accurate inquiry reveals the fact that there are over 20,000 acres cultivated annually in the county. The official figures of the census put it much lower, but it is probable, the enumerator in taking account of the irrigated and cultivated land got so mixed up in varas and acres that he could not tell what he knew about it. The statistics and estimates given above are about right.

Cattle and Sheep.

Mora county is a splendid sheep and cattle country. According to the tax returns there are 2,412 horses and mules, 29,270 cattle and 115,151 sheep in the county. The aggregate value of which is placed at \$416,991.50. These figures, however, as usual with tax returns, are much below the actual facts. There are at least twice the number of horses and mules, 250,000 sheep, a proportionately greater number of cattle. The values should also be proportionately increased. There are also a goodly number of goats, swine and burros.

Within this county is situated old Fort Union, now abandoned as a military garrison. Its name is associated with much that is thrilling in New Mexican history.

There is no doubt but what Mora county in its entirety is destined to be a great agricultural and stock country. Its land is richer than Greeley, Colorado, it is free from alkali, and will raise crops abundantly. Reservoir sites on the mesas, such as the one at La Cueva are frequent, and in these can be stored, without danger, water to irrigate many small tracts, which in the aggregate will amount to thousands of acres. This will greatly enrich not only the farmers but the county.

Artesian Water.

Artesian water may be developed at many places. At La Cueva, within a very few yards of the Coyote, are several springs

that show true artesian characteristics. There is little doubt but that strong flowing wells could be struck without difficulty. This, however, is a matter of development, and need not be described among the great resources of this county.

Price of Land.

Good agricultural land may be purchased in this county from \$15 to \$30 per acre. Cultivated farms from \$30 to \$75 per acre, these figures will include water rights.

SAN MIGUEL

AND

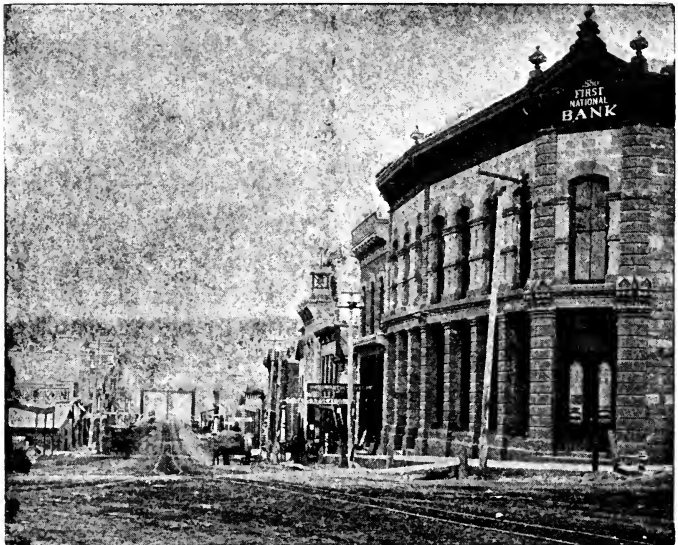
GUADALUPE COUNTIES.

San Miguel county, before Guadalupe and a portion of Union were segregated from it, was the largest county in the Territory. Its material interests and its physical conformation are so intimately associated with Guadalupe county that they are treated together. Combined they have an area of 7,247,160 acres, of which 4,122,000 acres belong to San Miguel and 3,125,160 to Guadalupe county.

These counties lie in the Canadian and Pecos valleys. The Canadian is the principal stream in San Miguel and the Pecos in Guadalupe. In the southeastern part of this area begins the great Llano Estacado. The eastern portion is part of the Great Plains which stretch from the British line to the Gulf of Mexico. Toward the west the country rises rapidly from about 4,500 feet on the line to over 12,000 on the mountain summits at or near the western boundary. The northern boundary of this tract is about the line of the 36th degree of latitude and extends south to 34 degrees 30 minutes. It is bounded on the north by Mora and Union county, on the south by Bernalillo and Chaves counties, on the east by Union county and Texas, and on the west by Santa Fé county. In a word it extends from the Panhandle of Texas to the main range of the Rockies, and also includes part of the Llano Estacado.

Besides the Canadian and Pecos, the Gallinas, Sapello, Tecolote and their tributaries water considerable area of this territory. These are fed with waters from the constantly snow capped mountains. These streams all have their sources in the same

mountains and nearly in the same locality. The precipitation of moisture on the eastern slope of the mountains by rain and snow is considerable. This fact is highly advantageous to all kinds of vegetation. The timber is particularly extensive and of large growth. Forests of yellow pine extend from the summits of the mountains down to the foot hills, which afford an almost inexhaustible quantity of timber for lumber and building purposes. In addition to the yellow pine, suitable for lumber, there are great forests of piñon and cedar, the former affording

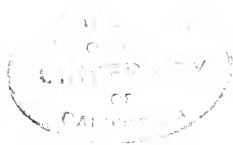


Street Scene in Las Vegas.

the best of fire wood, and the latter used for telegraph poles and other purposes for which cedar is fit. The timber interest of these counties is an important resource, and as the largest portion of the best forests are on government land, it will be available to actual settlers and eventually a source of great revenue.

Stock Raising.

Another resource of these counties is that of cattle and sheep raising. New Mexico is extensively and favorably known respecting this interest. These two counties are as favored as any





Phot. by Geo. G. G. G.

City Hall, Las Vegas.

other section in the Territory in this business. The eastern portion of the counties, extending to the Texas Panhandle, is pre-eminently a stock raising country. The pasturage is the native grama grass, which stands dry weather as no other grass does, and although of short growth is extremely nutritious; and, remarkable as it is, this grass possesses the quality the year through. The cattle come off the pastures in the spring as fat as in the fall. This fact is in marked contrast with other grazing localities. Texas even does not possess such grazing advantages. There the grass dies after frost and has but little nutriment left. "Northers" are but little felt, perhaps for the reason that the force of the winds is broken by the spurs of the Rocky mountains extending along the northeastern border of the Territory, and known as the Raton range. That which adds to the success of stock raising in this county is the fact that the grazing localities are well watered. The Canadian and Pecos rivers with their tributaries, supplemented by numerous lakes and springs upon the high prairies, supply water for immense ranges. The climate is mild and the altitude is such, being about 4,000 feet above the level of the sea, that a more desirable locality cannot be found for the farmer and stock raiser.

Sheep raising has been a very prominent industry of these counties, particularly with the native population. Cattle raising has become one of the principal industries of the eastern portion of both counties, and very successful efforts are being made to improve the herds by the introduction of thoroughbred bulls from the East, principally Durhams with some Herefords. Wilson Waddingham, the well known capitalist and land owner, has a ranch on the Canadian thirty-six miles in length by thirty in breadth, and covering nearly 800,000 acres. The ranch is heavily stocked with improved herds, and is one of the finest properties in the West. Many large ranches, owned by individuals and companies, are located along the Canadian and on the tributaries, north and south of it. The Pecos river, flowing through the southwestern portion of the counties, is a favorite ranching section. Ranchmen secure title to a water front, and run their

cattle on the well grassed plains and mesa lands extending back from the river. That portion of the counties afford pre-eminently good winter ranges, and no provision whatever need be made to feed cattle during the winter months. The ranges, possessing permanent water, are now generally taken up. Still there are many places, where wells could be sunk, and the water be either pumped up with wind-mills or artesian water found, and mag-



Court House, Las Vegas.

nificent ranges yet be secured many miles distant from any other ranch. On the vast plateaux that overspread the country surface, water is rarely found. Much is being done now by constructing reservoirs to catch the water occasioned by the annual rainfall. In the mountain portion of the county in the west, but little attention has yet been given to the stock business. Here splendid summer ranges can yet be located, particularly in the valleys of the higher altitudes. But it would be necessary for a ranchman there to provide hay to carry his stock through occasional heavy snows, to which the lower plains are not subject. This could

easily be done by means of alfalfa meadows made on bottom lands adjacent to streams. Alfalfa grows luxuriantly at any altitude below the timber line, and can be cut from two to four times a year, making a forage, when well cured, upon which cattle thrive and fatten, and upon which even hogs can be raised. The mountain districts offer the best opportunities for men of small means to grow herds of choice dairy cattle. All dairy products meet with ready sale at high prices, owing to the diversified industries of the Territory, and the numerous mining districts and commercial towns.

Agriculture.

For agricultural purposes San Miguel and Guadalupe counties possess as great advantages as any other portion of the Territory. The land subject to irrigation along the streams of the valleys is much greater than a casual observer would suppose at first sight. The soil is almost invariably rich, and anything like intelligent farming, produces abundant crops of corn, wheat, oats, barley, buckwheat, rye, alfalfa and all deciduous and small fruits. There are fine openings in this section for dairy produce and fruit farms. In fact, almost any industry pursued in the States promises to be remunerative if properly managed.

Mineral Resources.

The minerals found in this section are similar to those found in many other portions of the Territory, and constitute, mainly, gold, silver, copper, coal and iron. The mineral wealth of the counties is already an assured fact, and by judicious investment and management, within a comparatively short time, the yield from precious metals will be large. The mountains are almost wholly unexplored, but so far as prospecting has gone, the results have been surprisingly flattering.

Gold and silver bearing veins have been discovered in the Tecolote mountains, twelve miles from Las Vegas. The ore carries silver and gold principally, and although generally pronounced low grade, with occasional exceptions, is abundant and

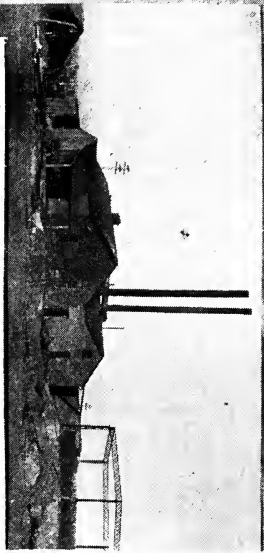
easily accessible. A large vein of copper ore, having some silver and gold, has been traced for many miles. These discoveries are just west of the Tecolote river. Still further west, however, in the mountains along the Pecos river important developments of copper have been made. The facts are, that the mountains are mineral bearing throughout, and all that is required is a thorough investigation to demonstrate beyond a doubt the great value of the deposits. Good indications of mineral exist above and near the Las Vegas Hot Springs, Tecolote creek, Sapello, and various other points. Float native copper has not only been found in the mountains, but likewise down the Pecos as far as Santa Rosa, and also in the vicinity of Fort Bascom. So far as the mineral in San Miguel and Guadalupe counties is concerned it is a virgin field, known to exist, but little prospected. Coal has been found in various places in these counties, and of good quality, especially on the Pecos river. The mica industry promises to be of considerable importance. The value of good mica mines is too frequently underrated or not understood. Good mica is always a merchantable commodity. In fact, the demand is always greater than the supply. There are very few localities, indeed, where marketable mica is found. New Hampshire and North Carolina furnish about all the mica that is sold in our markets and not shipped from abroad. Mica is worth from fifty cents to \$8 per pound, the price between these sums depending upon its clearness, toughness and size. Some of the mica now being taken from the mines in this county compares favorable with the best mica of any locality.

Las Vegas is the county seat of San Miguel county, and Puerto de Luna the county seat of Guadalupe county. The combined assessed wealth of the two counties is nearly \$8,000,000, of which over \$6,000,000 belong to San Miguel.

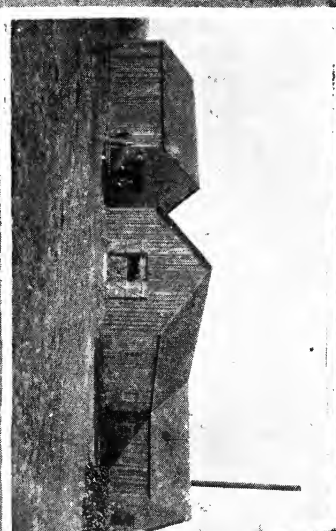
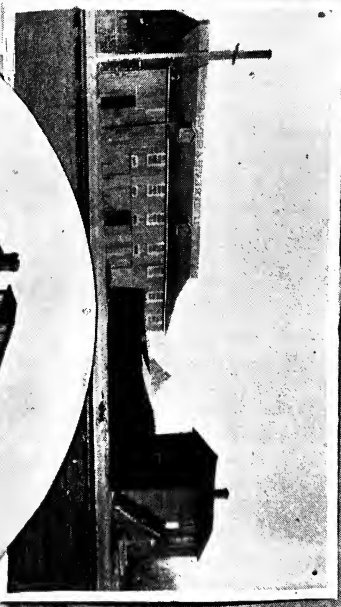
Las Vegas.

Las Vegas is the county seat and one of the thriving towns of the Territory. It has over 8,000 inhabitants. It is composed of two towns properly, lying on each side of the Gallinas river. The new town has been built since the advent of the railroad,

Gas Works & Electric Light Plant



PLANKING MILL



WOOL GROWERS PLANT

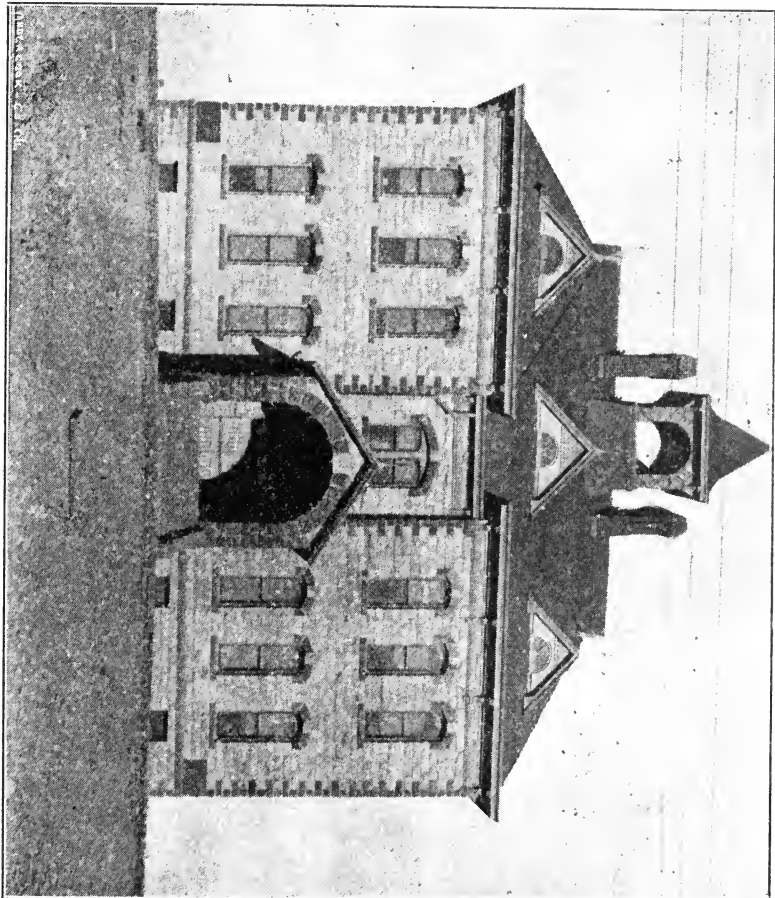


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and is characterized by that push and energy that has built up the West. The streets are wide and clean, the buildings commodious and well designed. The principal streets are lined with modern business houses, and around the depot are some very



High School, Las Vegas.

large warehouses. Las Vegas is the end of a division on the Santa Fé route, and a very important commercial point. An extensive and rich country is directly tributary to its markets, and the energy of its merchants pushes its trade into other territories. The climate has over and over been described as very

fine. A short branch line connects the city with the famous Hot Springs. The many praises the climatic advantages of this resort have received are known the world over. Situated as it is at an elevation of about 6,000 feet, there are no hot nor cold days. In summer the heat is cooled by the mountain winds, and in winter the constant sunshine raises the daylight temperature to a bracing tonic air.

A great deal of the wool raised in the Territory and a large proportion of the hides pass through Las Vegas. Another thing, the soil and altitude of the northern tier of counties seems excellently adapted for the culture of the sugar beets. According to the analysis of the Agricultural Department, the highest averages and percentages of purity, solids and sugar have been attained from the beets grown in this neighborhood. The establishment of a branch of the Agricultural Experiment Station at this place is a very important step in the development of this and other agricultural industries, as it will carefully examine into the details of the culture, and formulate the general rules of this new industry. Even with the present water supply a factory erected at Las Vegas could command the largest supply of sugar beets. The whole of northern New Mexico stands prominent in its adaptation to sugar making, and a factory situated at Las Vegas could command the trade.

The school system of Las Vegas is an exceedingly well conducted one; public and private schools are many, and its educational facilities will compare favorably with those of towns, double its size in the States.

The Insane Asylum.

At Las Vegas is erected one of the best constructed and regulated state institutions of its kind. It is the Territorial Insane Asylum, managed by a board of regents appointed by the governor. It is amply supported by the Territory, and has a capacity for 105 patients, and the counties throughout the Territory have the right to commit a number of patients to this institution in proportion to the number of their population. The average num-

ber of inmates of this institution since its completion early during 1893 has been about sixty, and it speaks well for the location and treatment that several of the mildly afflicted patients have been discharged as cured even during this short time. There is probable no better site for such an institution in the United States. Altitude and latitude combine to make it an ideal place for encouraging the healthy growth of animal faculties. The desire of the poet, "a healthy mind in a sound body" will be realized at least so far as the latter part of the wish is concerned, and when the body is healthy, the physician can more easily minister to the diseased mind.

Puerto de Luna.

This town is the county seat of Guadalupe county, contains about 1,000 inhabitants; there is a \$20,000 court house in the town, some good schools and several large stores. It is the center of a good trade with the surrounding cattle and sheep ranches, and of a fine farming country; fruits do very well in the vicinity of this town, and at Santa Rosa and Eden are several fine orchards. Hon. Celso Baca owns one of the best and most productive orchards in the vicinity; he and several other orchardists send fruits, specially apples, to Las Vegas, about eighty miles off, and still make a profit after the long haul. The town is situate on the Pecos river, and there is good system of ditches around it. With railroad connection this town bids fair to become an important trade center and a prosperous community. Its climate is excellent, and many thousands of acres of fine land in its vicinity, and for many miles up and down the Pecos river, could be brought under cultivation by a scientifically constructed system of ditches, dams and reservoirs. To the east and west of the town stretch many miles of the finest of grazing country. A survey of the Denver & El Paso Independent railroad passes right near this town.

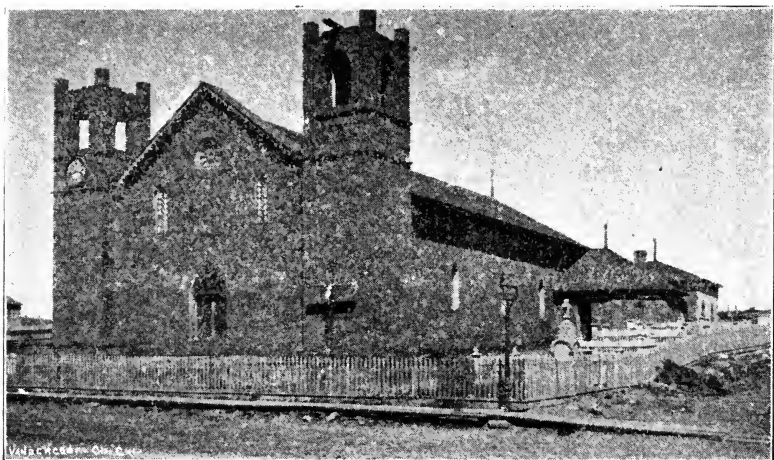
Railroads.

The main line of the Atchison, Topeka & Santa Fé railroad passes through western San Miguel county, from a point a few

miles north of Las Vegas to one near the town of Glorieta, in Santa Fé county; there is also a branch line from Las Vegas to the famous Hot Springs, six miles from that town. The road goes through a most picturesque section, through mountain passes, over broad plains with high mesas and grand mountains on either side, through heavy timber and some fine agricultural country.

The Upper Pecos.

The Pecos timber reservation comprises 702 square miles, covering a portion of western San Miguel, southern Taos and



Church in Las Vegas.

northeastern Santa Fé counties. The region is rugged and mountainous, and here innumerable small streams have their origin, and, flowing southward, form the source of the Rio Pecos, which cuts the reservation about midway between Las Vegas and Santa Fé. Here for twenty miles north of Glorieta mountains nestles one of the most beautiful and attractive upland valleys in all the Rocky mountains. Fine farms with an abundance of water to irrigate them string out along the river's edge of the streams, and crawl up under the sheltered sides of the valley, and along the tributary streams, Willow creek, Rio de la Baca, the Chaperito and Windsor creek are also to be found thrifty farms and

small ranches. Oats, potatoes, barley and timothy are chiefly grown, and the ranch houses and homes for live stock raising, whose flocks and herds are numerous, abound. As a live stock country the locality is specially adapted to the raising of horses. The snow seldom lays longer than forty-eight hours on the great mountain sides sloping toward the sun, and horsemen assert that in grazing upon these precipitous pastures the colts are compelled to occupy a position that expands and develops their lungs to an abundant degree. A Texas horseman who has had experience in this locality suggests that the fast horse of the future will be produced in the dry air of the Upper Pecos.

But it is as a pleasure and health resort that this locality has become famous. The scenic effects are grand. The country is wild and broken and much game abounds, including bear and deer, while the streams are literally alive with mountain trout running as high as five pounds in weight. From a health-seeker's standpoint this is one of the most delightful spots in the summer and fall that one could wish for, and annually hundreds of people from the southern part of the Territory and from Texas and other points go into camp along this beautiful valley, and enjoy and regain vigor and strength thereby while hunting or fishing along the Pecos river.

Splendid pine forests cover the mountains and mesas, and the timber industry is an important one. Copper and silver bearing leads have also been discovered hereabouts. It is to this locality that the world to-day owes the fact of cheap aluminum. At the village of Hamilton, twenty-five miles north of Glorieta, is a group of copper mines owned by the Cowles Bros., formerly of Cleveland, Ohio, now the widely known aluminum producers of Lockport, New York. These young men came to Santa Fé in search of health some ten years ago, and they soon found both health and wealth. Becoming interested in these mines they set about seeking a proper process for reducing the ore in such a manner as to save both the silver and copper, the ore being somewhat refractory.

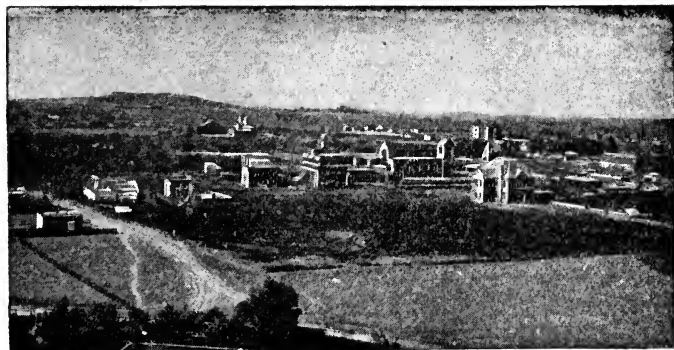
Accordingly they made numerous experiments, and, among other things, shipped to the Brush Electric Works at Cleveland

a carload of ore which was tested by the electric process. On this test it was developed that a certain clay which was abundant along with this ore could be utilized for the production of aluminum, and the Cowles Bros. were long in discussing at Lockport clay of a similar nature, hence their great addition to the find of both science and industry.



SANTA FE COUNTY.

Santa Fé is the central county of the Territory, and is traversed from east to west by the main line of railroad in the Territory, the Atchison, Topeka & Santa Fé railroad. The commerce of New Mexico with the rest of the United States began from the county seat, Santa Fé, which is also the capital of the Territory. The county is bounded on the north by the 36th degree of latitude, and extends south a distance of seventy-two miles or somewhat below the 35th degree. It is thirty miles wide, and has a total area of 1,498,600 acres, of which, according to the figures



Santa Fe.

of the surveyor general, 975,000 are irrigable, arable or fit for pasture. The surface of the country is beautifully diversified. Mountains, valleys and mesa plains break the contours. On the eastern boundary the main range of the Rockies protect the plains from violent winds, while on the west the Jemez and Valle mountains perform the same office. It comprises most of that area selected by the Spaniards as most adaptable to the purposes of colonization. Here after careful investigation the first European settlement was made at Santa Fé in 1605. The general altitude,

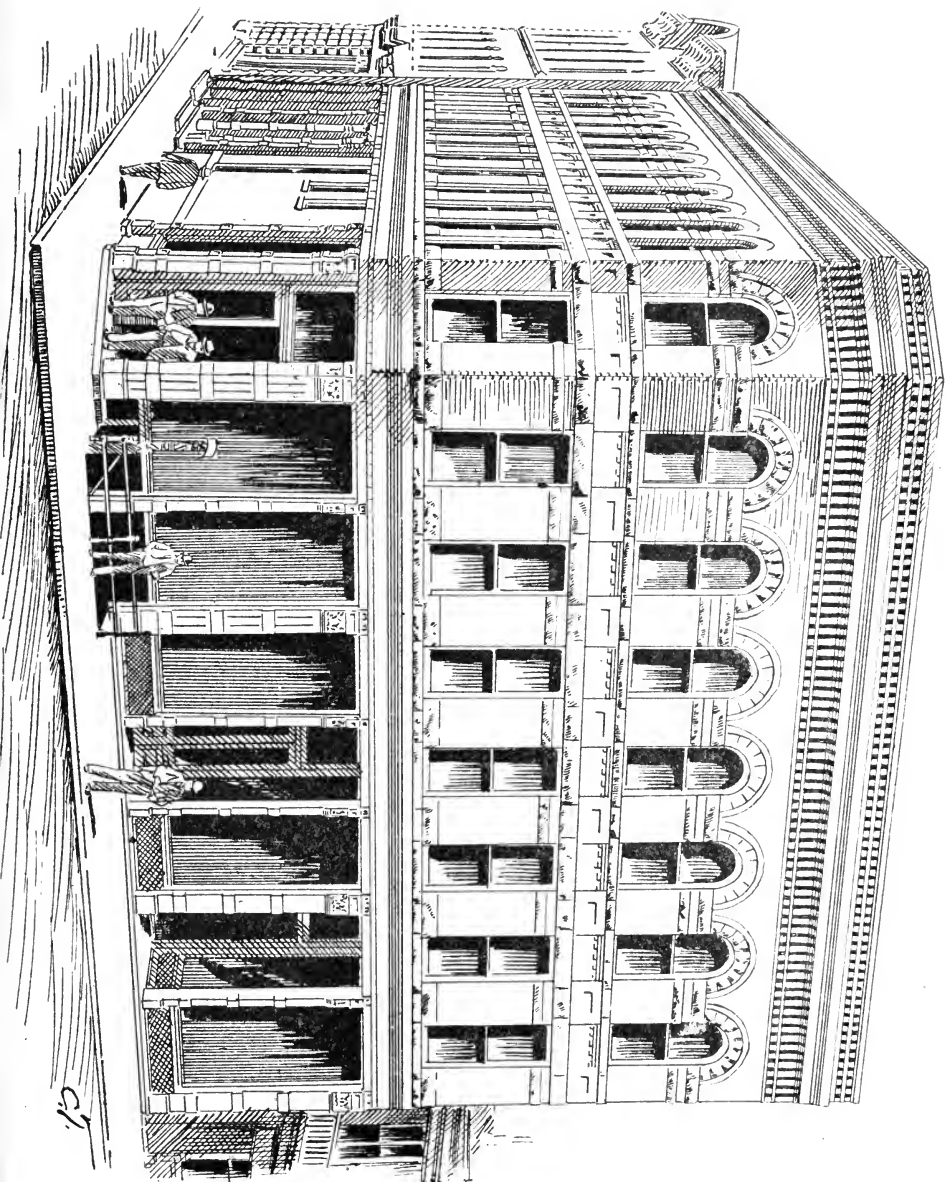
varying from 5,500 feet in the south to 7,000 feet at the city of Santa Fé, the fertility of the soil, reminding the colonists of their homes under the Sierras of Spain, the bracing air, the blue sky and the running streams, all combined to fix the residence of these hardy wanderers. The first permanent colony founded by them was named the City of the Holy Faith of Saint Francis, in memory of that Santa Fé in old Spain, where Columbus received the order to discover a new world, and from which he set out for Palos.

The county may be divided into irrigable lands occurring everywhere that water is found; pastoral lands, covering all the valley and table lands, and mineral land in all the mountainous parts, but especially in the southern portion.

To meet the demands of commerce growing out of all these industries, there is sufficient railroad accommodation. The Santa Fé railway crosses the Territory from east to west at about the center. From Lamy, a station on the main line, a branch of this road extends to Santa Fé; over which traffic is so arranged that only small freight has to be trans-shipped. From Santa Fé north the Santa Fé Southern connects with the main line of the Denver & Rio Grande railroad at Española. It will therefore be seen that this county and the capital have direct communication with the four corners of the country at large. There are two routes to the Pacific coast; two to Denver and direct communication over one of the greatest trans-continental lines with the East and South.

Irrigation.

The extent of tillage is not very considerable on account of the inconstant water in the streams of this county. With the exception that its altitude is greatly higher, this county greatly resembles Southern California in topography. The streams rise on the sides of abrupt mountains, pour precipitously into the comparatively level plains and exhaust themselves. Many of them give a constant flow during the year; but the least amount of water occurs at just the season when it is most needed. In the late summer, and early autumn water is needed very much



27

to mature the crop, and no matter how great a volume of water was available during the spring, only so much of the crop can be ripened as is irrigated during the entire season. For this reason, just as in Southern California, storage reservoirs are needed to cultivate the possible area of irrigation. The possibilities of reclamation in Santa Fé county are very great. It is estimated that the amount of rain (from three to four inches) that fell on the water shed of the Rio Santa Fé, a small stream, during thirty-two hours of September 27 and 28, 1893, was sufficient to irrigate for one year 11,200 acres of land. The total yearly precipitation of rain and snow, allowing for evaporation and seepage is enough to irrigate between 20,000 and 25,000 acres of land. This is only from one source—the Rio Santa Fé. The Nambe carries four times as much water as the Santa Fé, and by careful conservation of its flow could irrigate a much larger area. Besides these the waters of the Tesuque, Galisteo and various arroyos could be stored and delivered as needed on the Santa Fé plains, a solid body of land of 92,000 acres. This can all be irrigated at somewhat less than the usual expense.

At present there are 19,540 acres irrigated annually, and there are 18,440 acres settled in addition to this for the purpose of dry farming. There is no doubt but that this latter area under a good system of ditches and reservoirs could be made much more productive than it is now. In the immediate cañons and stream beds of the various creeks there are 13,940 acres that could be reclaimed in addition to the amounts now actually cultivated. The inducements to capital to develop irrigation works in this county are very great. An area of 557,880 acres is included in Mexican and Spanish land grants, the titles of which could be cheaply purchased and the land improved. In brief it may be said of Santa Fé county that it affords 425,000 acres of the best grazing land, partially covered with timber, and about 500,000 acres of arable land, 200,000 acres of which can be irrigated. This will not all be from one source, possibly one 50,000 acre tract lying under the Nambe will be by far the largest. The suggestions concerning colonies elsewhere in this book are

all highly applicable to Santa Fé. The soil is just as rich and productive, and for some little time to come the opportunities to plant a colony will be exceptional. Parties consisting of say 100 families could now have a pick and choice of several beautiful 5,000 acre tracts, that they could put under water at a nominal outlay if they determined to do the work themselves, or very cheaply if the water is contracted for with local irrigation companies. It would be invidious to mention special tracts, but the Bureau of Immigration will give personal attention to the planting of such colonies either in Santa Fé or any other county.

Available Water.

The Santa Fé creek, at the cañon, has a flow during February, March and April of each year of eighty acre feet per day. This is sufficient to supply 100 days of irrigation. This flow comes from the spring rains in the mountains. The flow from the melted snow and the summer rains of July and August is very heavy. During these two months the normal rainfall observed at Santa Fé is 2.48 inches. Allowing as is shown by observation that this normal for these two months is greater close into the mountains and in the cañons, it may be conservatively estimated that six inches of rain falls during the same period on the drainage of the Santa Fé above the mouth of the cañon. This area is about fifty square miles. Assuming that 33 per cent of this precipitation is lost by evaporation and seepage, and we have during these two months alone an available 10,720 acre feet of water, or sufficient for that amount of land. The remaining seven months of the year are yet to be accounted for; and it will therefore be seen that storage of the waters of the Santa Fé creek will supply 20,000 acres of land. The observed summer rainfall at the cañon mouth is: July, 2.83 inches, August, 2.64 inches and September, 2.68 inches. Anyone who will make the necessary calculations will see at once how conservative is the above estimate of possible reclamation.

The Nambe creek runs about four times the water of the Santa Fé, and will consequently irrigate 60,000 acres, and the storage basins on its course are very numerous.

The Tesuque has an aggregate flow about the same as the Santa Fé; and the Galisteo runs about half the volume of the Santa Fé.

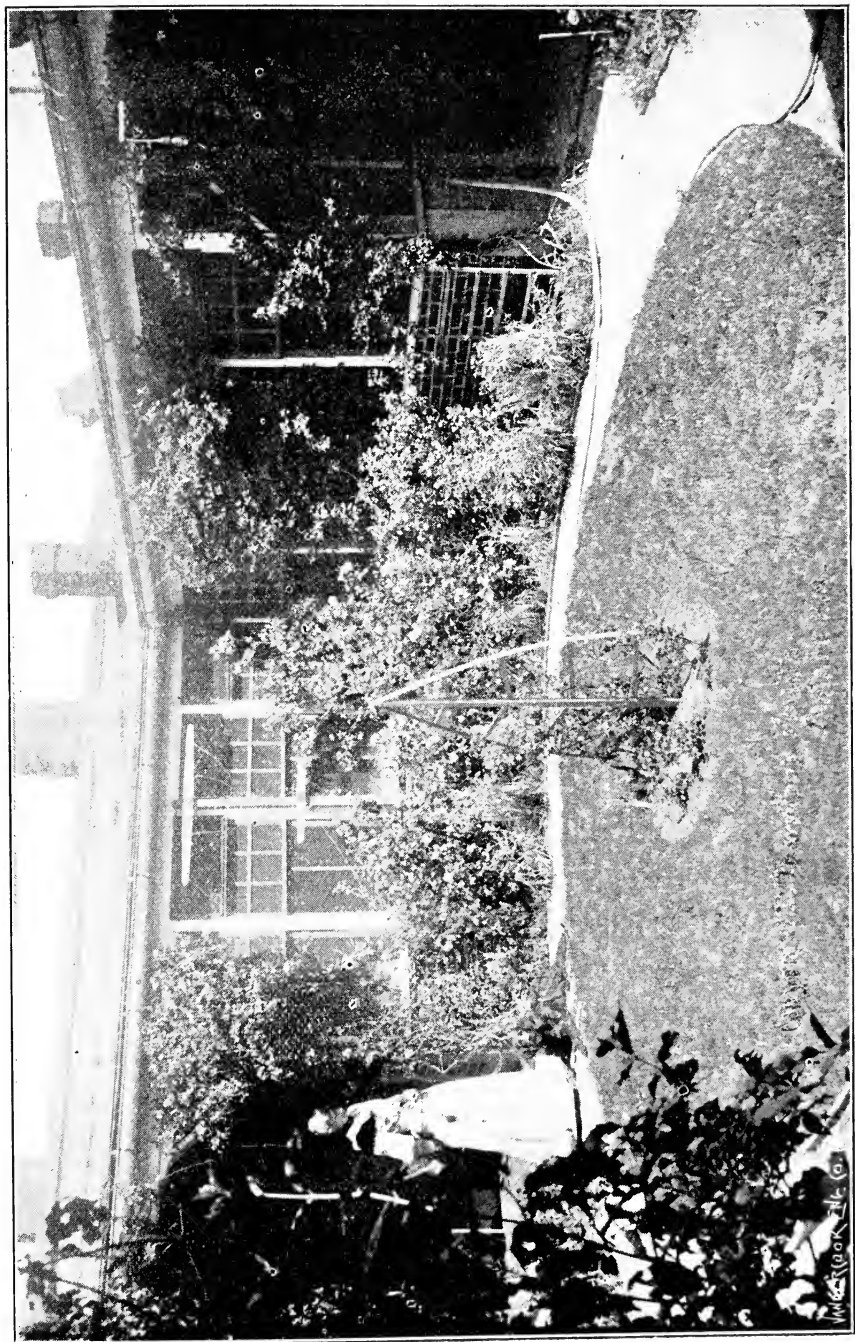
From these sources alone therefore 110,000 acres may be irrigated. This reclamation may be accomplished without the aid of the Rio Grande, which at the Embudo cañon has a strong and constant flow. The difference in altitude between this point and the Santa Fé plains is 200 feet. The problem of irrigation from an engineer's standpoint is easy; the only thing lacking is capital. These plains are completely sheltered by mountain ranges. The soil is porous and fertile, the air dry, and the elevation just suited for a perfect sanitarium. The return on capital invested to make small fruit farms fertile would be large and certain. There is no reason why an invalid should pay large hospital charges to regain his health, when by a small outlay he can secure healthful employment, and a good living off a ten acre fruit farm. The annual returns from the properly conducted places around Santa Fé would stagger the Eastern man. Ten acres laid down to berries, peaches, pears, plums, apples and other deciduous fruits should pay from \$300 to \$400 per acre. This will be comprehended if the reader will estimate the yields of fruit in his neighborhood at the prices quoted in the list given in the article on New Mexico.

Public Land.

In this connection it may also be mentioned that there are over 500,000 acres of public land available for settlement in this county, much of which is adaptable to irrigation. Celery and asparagus grown around Santa Fé have a wide reputation, and the new settler can make profits equal to fruit from their culture. At the same time they are almost impossible to hurt by irrigation, and two of the very best crops a novice in the art could plant.

Prices of Land.

Good locations may be found on the public lands. The government price of desert land is \$1.25 per acre payable twenty-five



Placita, Gov. Thornton's Residence, Santa Fe.

Wm. H. (Oak) & Co.

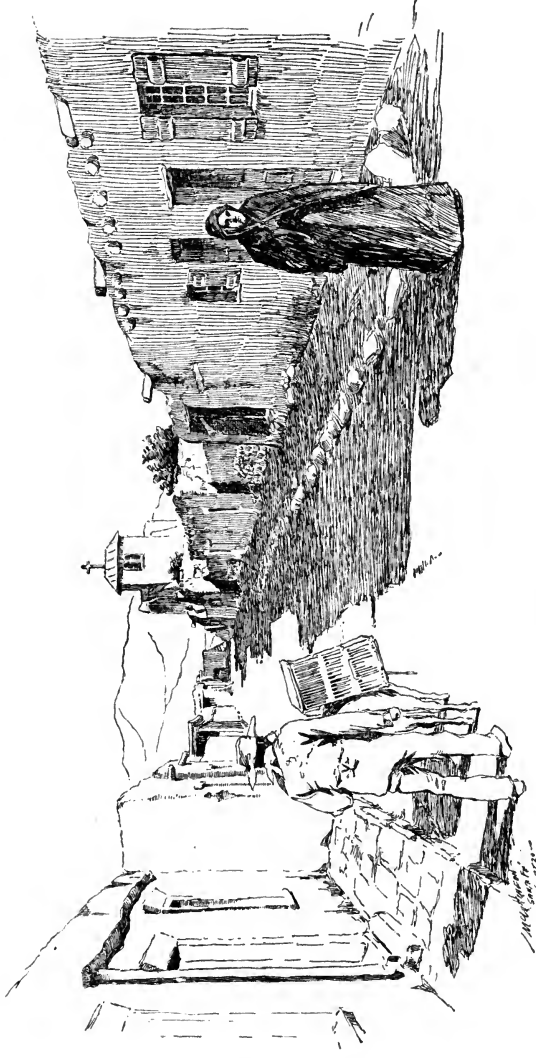


cents per acre down and the balance when reclamation is proved or at the end of three years. The individual settler may locate 320 acres, and it will pay to reclaim such places by means of wind-mills. Cultivated land runs all the way from \$20 to \$100 per acre. There are many improved places that are held at from \$300 to \$500 per acre. This shows the surety of a farm investment in this locality. No one need fear a depreciation of property. The settler need not fear that a good profit cannot be made from the cultivation of cereals and the staple crops. Alfalfa and wheat are steady payers in all the valleys.

Mining.

Mineral wealth is found all over the county, but especially in the southern part. The Old and New Placers are famous sources of wealth. From these beds the early Spaniards extracted several millions of gold by the crudest methods. They took the snows in the cañons and of the blizzards and melted it by means of heated rocks, and with the scanty supplies of water thus obtained washed out the precious metal. Modern science has, however, improved on this operation. At San Pedro and at Kelley's deep bore wells have been sunk and Knowles and Dean pumps attached. These wells furnish an unlimited supply of water for washing the dirt. At Golden another scheme has been started, but as the well was sunk in a deep intrusion of shale, no sufficient amount of water was found to warrant the company beginning operations. The well borers, however, say if the drill was put down 1,000 feet instead of 430, the present depth, a sufficient volume of water could be found to answer all purposes. The lode mines are not behind the placers. The Ortiz mountains and the dividing range between the Pecos and Rio Grande basins are filled with ore. The Territory ranks fifth in the Union in point of precious mineral production; but when the coal mines are brought to their best output it will take a much higher place.

The coal measures around Cerrillos are alone capable of supplying the West for several generations to come. Experts who have examined these mines report to the owners that the supply



San Miguel Street, Santa Fe.

seems inexhaustible; in fact, "that the next five generations of men will not see a perceptible decrease in the quantity." In matter of variety no coal field shows a greater range. Here are soft, free coking veins and non-coking bituminous, also semi-anthracite, anthracite. Natural beds of coke are found in some places, and besides this bituminous and anthracite veins are found in alternate strata in the same mines. This phenomenon puzzles all the geologists, but it is probably a corollary of the natural coke beds, and caused by the heat of the porphyric dykes that intrude into the general formation. The certainty is that southern Santa Fé county will not take second place with the famous coal fields of Pennsylvania, West Virginia, Tennessee or Illinois. The territory in which the fuel is found is compact, and the different varieties are contiguous. Indeed, one trunk line of railroad could serve all the mines. To accommodate the demands a \$30,000 coal crusher has been erected during the summer.

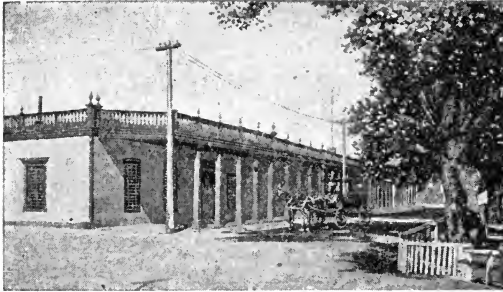
Not alone in precious and industrial minerals is Santa Fé county pre-eminent, but in the production of precious stones it has high standing among the experts of the world. At Turquesa, northwest from Cerrillos, are found the best turquoise beds now known. In lustre and permanent sky blue color the gems from these mines surpass those of Persia. Tiffany Brothers' expert has pronounced these stones the purest and best mined in the world. Garnets nearly as fine as rubies are commonly found.

The mining propositions are not only various but profitable. Gold and silver lodes from a foot to thirty-five feet broad are open; placers run from twenty-five cents to \$2.50 per cubic yard; and the coal veins are from five to ten feet thick. Metallic and magnetic iron are found in paying quantities.

Santa Fe.

The county seat and territorial capital is the historic city of Santa Fé. It was founded in 1605, and is the oldest capital on American soil. Founded as it was before Plymouth or Jamestown, it abounds in points of historic interest, and is surrounded

with edifices of vast archaeological importance. The mountains embrace it with loving arms, and it is perfectly sheltered from wind and storm. Here is located the famous "Palace," the only building in America known by that proud title. For two and a

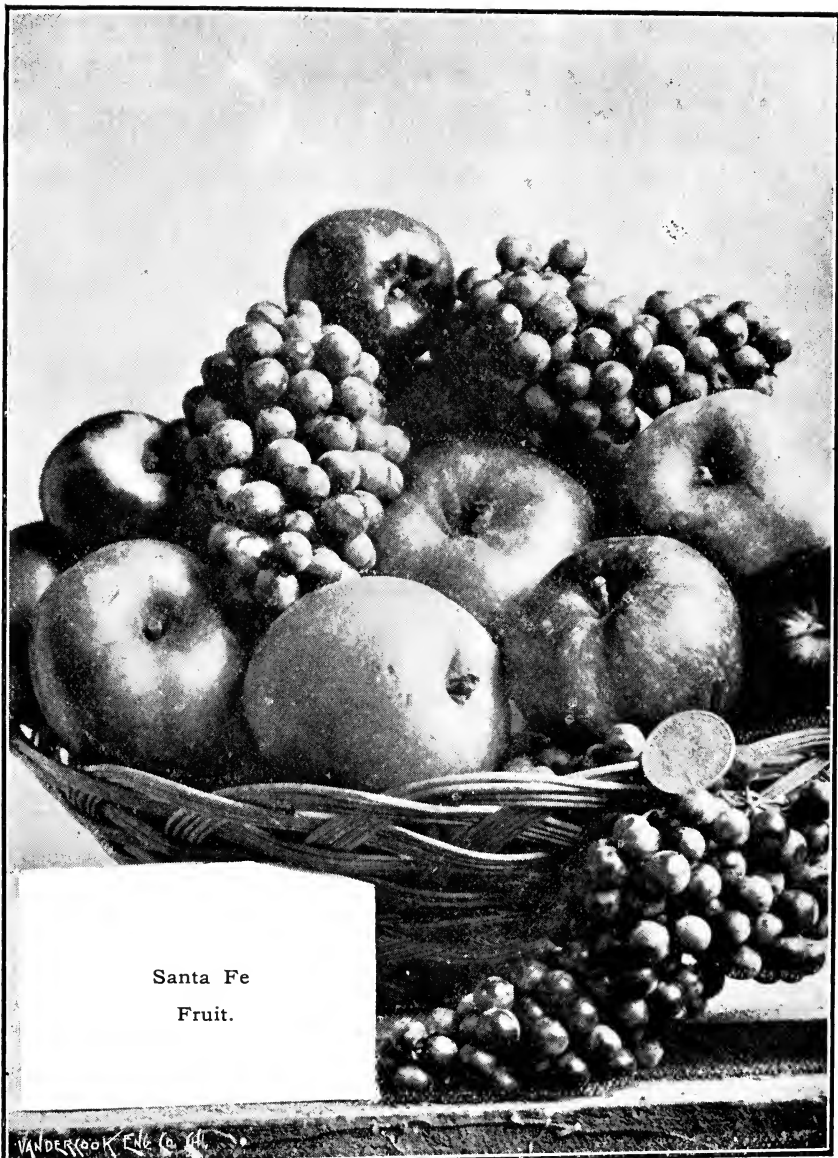


The Palace.

quarter centuries this building was the official home of the Spanish and the governors of the Republic of Mexico. Since the American occupation it has been the abode of the territorial government.

Besides many tragedies and scenes of thrilling interest, it boasts the fame of being the birthplace of some of Lew Wallace's best works.

The San Miguel church, built in 1630, and the oldest European house standing in the United States, built in 1606, are among its quaint features. The town is surrounded by majestic mountains cut with cañons of surpassing beauty. The Aztec pueblos of Nambé, Tesuque and San Ildefonso are still peopled with the children of the primal race; and Monument Rock and Aztec Springs vie with them in interest and beauty of scenery. The military post of Fort Marcy is located in this city, also a federal building erected in renaissance Gothic style. The cathedral is built of stone, and is a beautiful structure. The Christian Brothers' College, the Academy of the Sisters of Loretto, the public high schools, are well built and well attended seats of education. The Presbyterian, Methodist and Episcopal churches are well designed buildings and have large congregations. The St. Vincent sanitarium and hospital are among the best regulated institutions in the country. No contagious or infectious disease is allowed to enter the precincts of the sanitarium, but it is conducted solely for the benefit of the weakly and invalid. The best care of the Sisters is lavished on the inmates.



Santa Fe
Fruit.

VANDERKOP EN CO. N.Y.

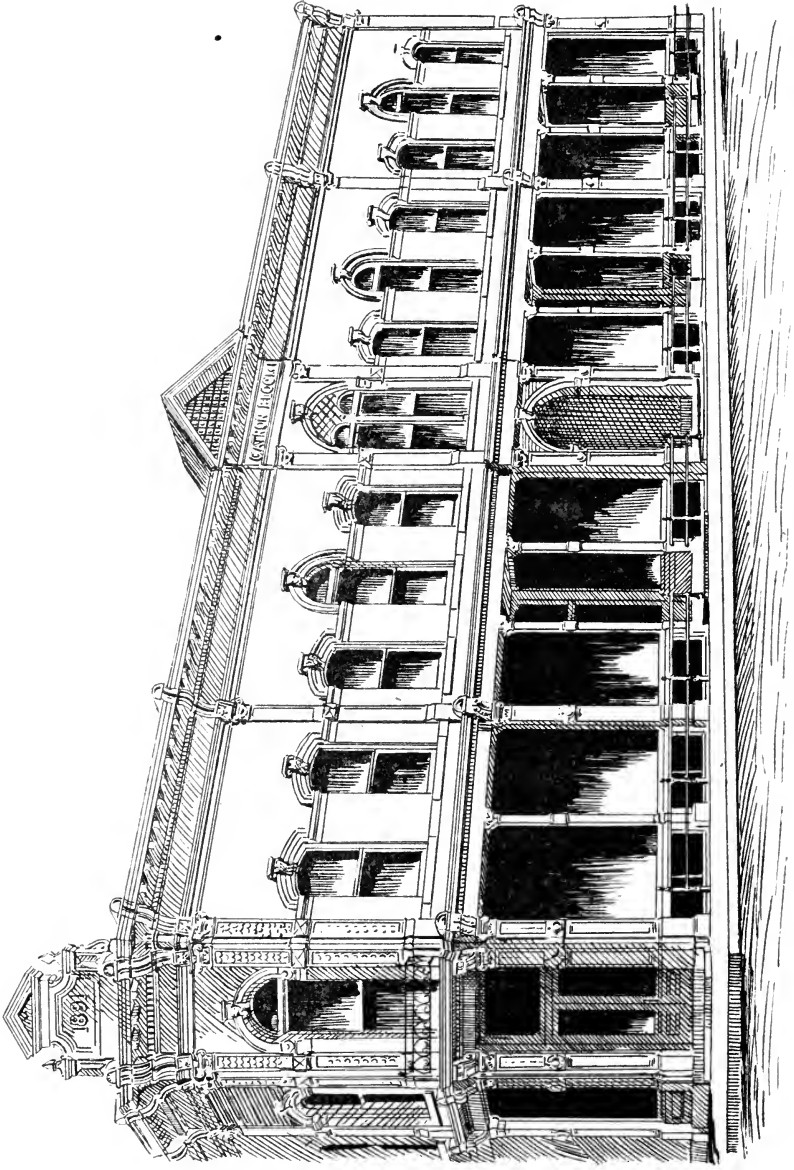


Santa Fé, as the territorial capital, is the headquarters of all the federal and territorial officials. The legislature, the supreme court and all territorial boards meet here. Besides the schools mentioned the city contains a public high school, the Methodist mission school and the Presbyterian select and mission schools, and the Ramona, St. Catherine and Government Indian schools.

Owing to various causes the commerce of this city is so great and steady that the two railroads entering regard the tracks immediately tributary thereto as the best paying sections on their lines.

The Santa Fe Water Works.

It is not alone in schools, churches and public buildings that Santa Fé rivals her neighbors; she is progressing materially in the matter of irrigation. During the past two years there has been built at the mouth of the Santa Fé cañon one of the best reservoirs in the world. Dr. Danter, of the American Health Resort Association, says: "It is worth traveling miles to taste this pure water that comes down from a cut in the mountains." The dam is thrown across the cañon so as to impound the greatest possible amount of water at this point. It is of clay with three cores of cement, which are also protected on each side with a sort of armor of triple pile sheathing. The dam is of puddled clay 350 feet thick at the base and 120 feet high in the deepest part of the cañon. It is built on bed rock, and the cores are keyed into the same. The old town reservoir and dam farther up the cañon is utilized as a settling basin; and from above this dam a four by six foot tunnel is taken under the reservoir, and delivers all roiled or muddy water below the spillway. This spillway is a notable feature. It is at the southern end of the dam and ten feet below its crest. The surface is such that the water shoals for a considerable distance above. It is built in the shape of a semicircle drawn around a chord of 600 feet. The outward face is built so as to resemble as nearly as possible half of a great funnel. No matter therefore how violent the flood may be, the



A Business Block, Santa Fe.

waste water is gently poured over the lip of the spillway and gradually debouched into a canal. At present this water is returned to the river, but the plan is to take it by a seven mile canal southwest to the Arroyo Hondo, a natural storage basin, where it will be used to irrigate 15,000 acres of beautiful, level mesa. The water for use is delivered through a water tower on the inside face of the dam, so constructed that water can be drawn off at any level. It is then sent outside the dam in pipes, delivered to an aerating fountain, and thrown sixty feet into the air. Thence it comes to the city supply pipes. Water in the fire hydrants is under 144 pounds pressure to the inch.

This dam up to date has cost over \$260,000, but it is only the initial project of a vast scheme of reclamation. In addition to the Arroyo Hondo works, mentioned above, the same company propose to store the Nambé waters and irrigate 50,000 acres.

Preliminary surveys have been made on both these projects, and the active and actual work will be well under way by the opening of spring, but not sufficiently advanced to deliver water for irrigation.

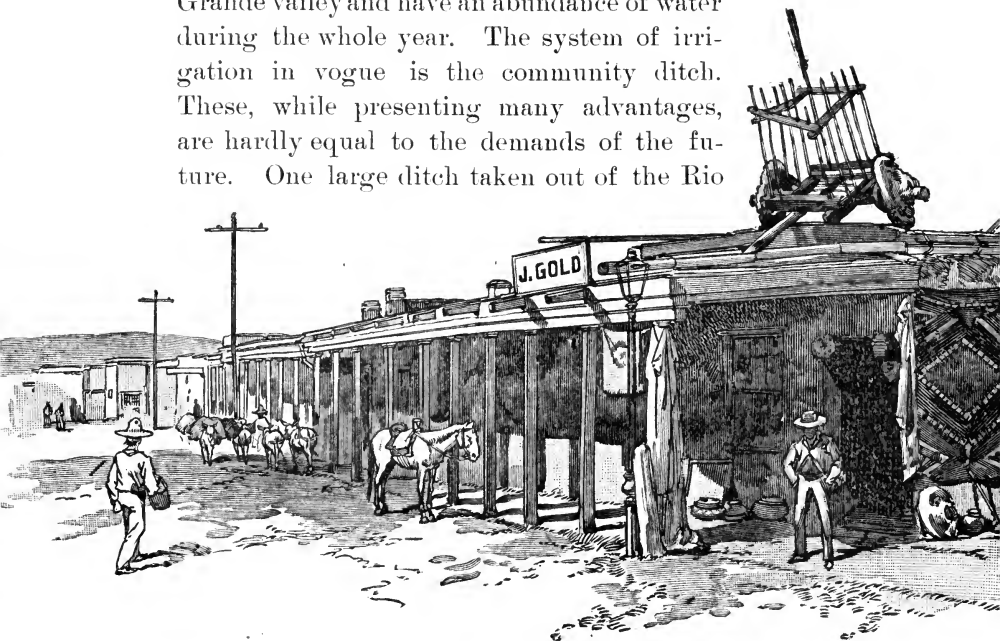
Cerrillos.

This town is known by the soubriquet of Little Pittsburg, which amply sets forth its characteristics. It is on the line of the Santa Fé route, and is the principal market for all southern mining interests of the county. The Cerrillos mining district is famous as a silver producer. Besides this it is the depot for the coal mines before described. This camp has had its ups and downs, but is a flourishing place now. Besides coal and precious metals it is surrounded by iron ores and limestone quarries. Pétroleum has been discovered. A handsome school house has been erected; and the town generally is on the high road of success.

Northern Santa Fe County.

Just as the southern part of the county is famous for and favored in its vast mineral resources, so is the northern half of the county in its agricultural development. Beginning at the

towns of Española and San Ildefonso, about thirty miles north of Santa Fé, is a series of beautiful valleys. The Española, Santa Cruz, Chama and Pojoaque valleys support a population of about 4,000 people, who are mostly engaged in the raising of fruit and cereals. In Chimayo, Quemado and Las Truchas valleys the land is principally devoted to wheat, yielding at the rate of 35 bushels per acre. These valleys are all subdivisions of the Rio Grande valley and have an abundance of water during the whole year. The system of irrigation in vogue is the community ditch. These, while presenting many advantages, are hardly equal to the demands of the future. One large ditch taken out of the Rio



San Francisco Street, Santa Fe.

Grande at Embudo, or White Rock cañon, would serve many times more land than is now cultivated. The Rio Grande in this section is a constant stream, and at no period of the year is it low enough to warrant apprehension that if all the land were irrigated there would be a dearth of water.

Some of the advantages of this section may be briefly summarized. First, the Denver & Rio Grande railroad, and its extension to Santa Fé, known as the Santa Fé Southern, runs a daily train each way. This road passes directly through the

farming or orchard land, and a trip over it shows a continuous succession of small, highly cultivated farms. As an instance of what can be done, one man at Española owns six acres planted to a growing orchard that will come into bearing next year. He claims that by cultivating the ground between the tree rows he has netted every year \$200 per acre. This is only one instance. At Española one store does a business of \$100,000 per year. At Santa Cruz there is a well equipped steam flour mill.

During 1893, when the Denver & Rio Grande officials were studying the reduction of expense on their road it was found that the best paying piece of track on the whole system was this through the Rio Grande valley in Santa Fé county. The great amount of vegetables, wheat, flour, fruit and honey that is exported from this section is of more importance than the traffic of the best ore or farming region on any part of the road.

Lands in this section with water right, but unimproved, sell for \$5 to \$25 per acre. Improved they range from \$25 to \$500. During the last three years about 100 American families have settled in this region.

Conclusion.

In conclusion it may be said that Santa Fé is progressing. Her resources are manifold, her people are branching out in various enterprises. Irrigation is receiving the very closest attention. Mining is developing very rapidly. In a word, the county is rapidly taking a front rank.



Scene in Albuquerque.

BERNALILLO COUNTY.

Bernalillo county is one of the largest and richest counties in New Mexico. It is the first county in point of population, and has an area of 5,024,136 acres, with nearly one 1,000,000 acres subject to irrigation, and about 3,000,000 acres fit for pasture. Only 12,500 acres are now actually irrigated and cultivated, leaving nearly 99 per cent of the available irrigable land of the county still open for settlement.

The county is of irregular shape, being about seventy-five miles from north to south at its widest point and having an extreme breadth from east to west of about 200 miles.

Rivers.

The principal streams of the county are the Rio Grande, Rio Puerco and the Rio Jemez. The Rio Grande traverses the county from north to south for a distance of about sixty miles. Broad alluvial bottoms skirt this stream on either side. The principal seat of population is located in this valley; and it is noted for the quality as well as the quantity of its fruits, grains and vegetables.

Grapes.

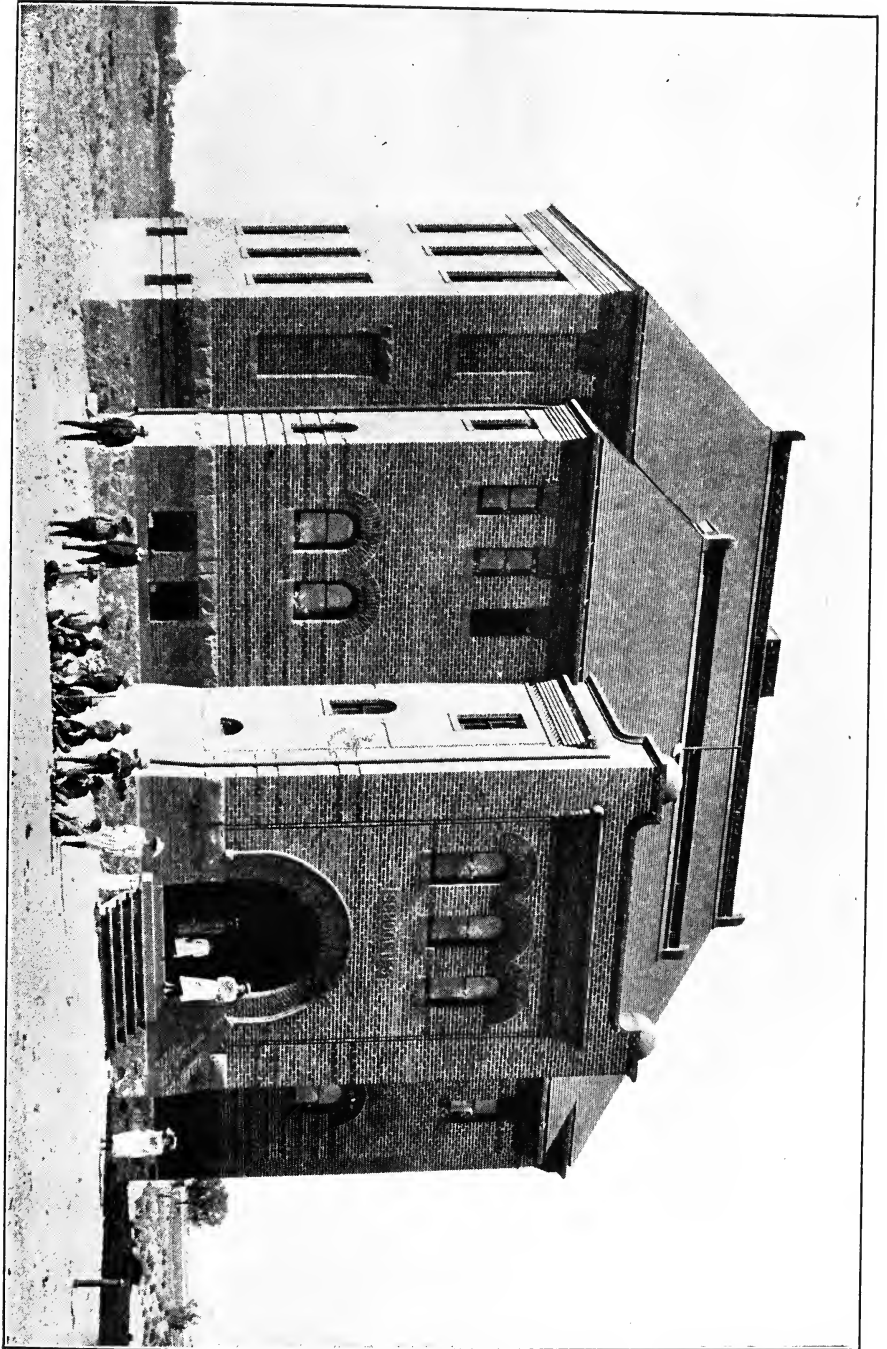
This valley is especially adapted to grape culture, and this fruit now successfully competes in every market to which it has been introduced with the choicest product of the California vineyards.

The grape most generally cultivated is that known as the "Mission" variety, supposed to have been introduced by the Franciscan friars and cultivated in the valley for the past two centuries. Some small vineyards of the "Muscatel" are also found, but generally as a table grape, coming into market a short time before the other.

The vineyards are almost always started from cuttings, planted from six to ten feet apart each way, though some growers prefer to trench the cuttings and root them for planting the first or second year after in the places where they are to remain. The Mexican method of culture does not require staking or trellising, and the first three years are directed more particularly to give strength to the main trunk. The vine is closely trimmed each year, all superfluous wood cut away and only the trunk and a few short branches left, so that a well cared for plant of a few years growth resembles a dwarf tree. It is necessary in setting out the cuttings to pack the soil closely about them, to turn the water onto the plant from the irrigating ditch as soon as possible and, when sufficiently dry, repack the dirt. There is nothing more to do the first season than to irrigate the vineyards at certain intervals and keep the ground free from weeds until November, when the vines are covered with earth to protect them from the cold until spring. The time for uncovering varies among the different growers from the middle of February until the first of April. They are then allowed to stand from ten days to a month and then trimmed. But few grapes will be produced until the third season, but the labor of the cultivator is needed every year in stirring the soil, removing suckers, trimming, covering and uncovering.

Deciduous Fruits.

Much attention is now being given to larger fruits, and, though it has only been about twelve years since the improved varieties of American fruits were first introduced, fine orchards are flourishing in every settlement. These are yielding large returns and doing much to establish and maintain the reputation which New Mexico is so rapidly acquiring as one of the finest and most successful fruit growing districts on the American continent. The fruits of the temperate zone, without exception, find a kindly home in the Rio Grande valley. Apples however will thrive better on the uplands than in the low bottom lands. In the high mountain valleys this fruit can be

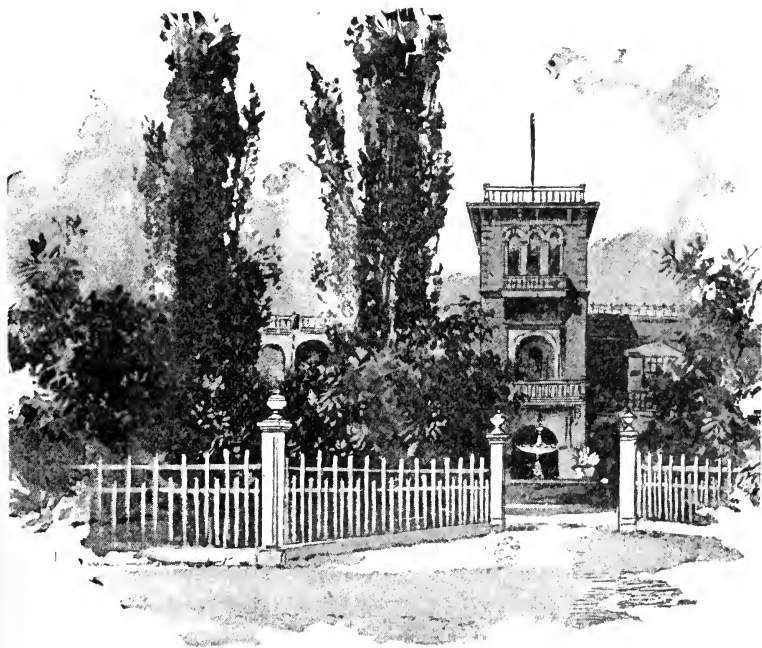




raised without irrigation on account of the always abundant rain, and the heavy snows of winter seem to improve the quality and flavor of the apple, especially the late varieties. Peaches, plums, cherries and apricots thrive better in the valleys.

Grain and Hay.

Wheat raised in this county compares favorably with the best in the United States for weight and quality. Corn, oats,



An Albuquerque Residence.

barley and rye do equally as well. These crops do well on uplands or bottom lands; but it must always be remembered that it does not pay to raise grain at \$20 or \$25 per acre profit, when fruit pays from \$150 to \$700 per acre.

Alfalfa.

This crop thrives all over the county. In some few places it grows without irrigation; but in the valleys where water is

abundant four cuttings of about $1\frac{1}{2}$ tons to the cutting per acre are harvested. This crop is worth from \$10 to \$15 per ton, according to the date of sale, and therefore is a good paying crop. If fed to stock and sold in the shape of fatted beef \$100 per acre, net, can easily be realized.

The Rio Puerco Valley.

The Rio Puerco is a large tributary of the Rio Grande. It traverses the county from north to south, on its course receives numerous tributaries, and embraces a body of rich irrigable land sufficient in area to support a population much greater than the number now resident in the entire county. A tract in this valley embracing 50,000 acres of agricultural land was recently purchased by an eastern syndicate, and the land is to be divided into small tracts and parceled out as homes to several colonies of settlers from the eastern states and from Europe. The plans of this company have been partially executed; and engineers are now outlining a system of new ditches which will carry water to every part of the tract. The soil and climate of this valley are essentially the same as the soil and climate of the Rio Grande.

Coal.

Great coal beds of excellent bituminous quality are found in the Puerco valley. It is so easily mined and handled that it pays to team it with oxen to Albuquerque and sell it as low as \$4 per ton. These coal measures extend throughout the entire area of the valley, and in the northern part in the vicinity of Nacimiento and Copper City the veins are of unusual thickness. At one point in the vicinity named a vein has been opened which shows twenty-five feet of clear coal without a particle of "bone" or slate, and with a solid roof.

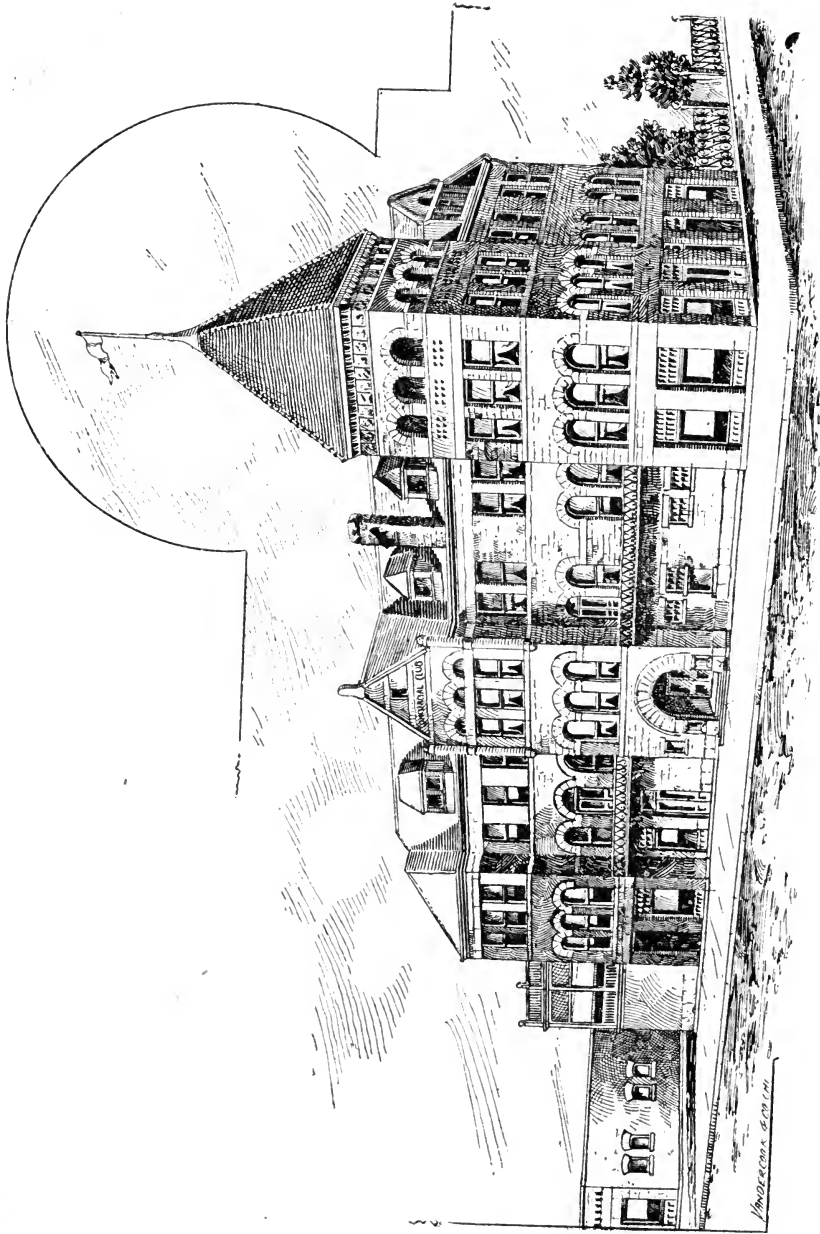
From the Rio Puerco to the line of the Territory all the land in Bernalillo county as far as it has been prospected is found to be underlaid with coal in veins sufficiently thick to pay for mining. This however is lying useless for want of capital to provide for its transportation to market.

The Gallup Mines.

The only point at which coal mining has been systematically pursued is Gallup, a point on the Atlantic & Pacific, 160 miles east of Albuquerque, and the second town in importance in the county. Here is mined all the coal used by the Atlantic and Pacific Railway between Albuquerque and San Francisco, together with large quantities of domestic fuel shipped to Albuquerque and various points in southern California. The regular output of these mines is now about 1,000 tons per day. During the year 1892 the actual shipments amounted to 247,000 tons. During the first eight months of 1893 254,410 tons were mined. Therefore the output for 1893 will be somewhere in the neighborhood of 380,000 tons. The product may be increased almost indefinitely as the market demands. This coal is now sold in Albuquerque at \$6 per ton. A reduction in this price will however be compelled by reason of the competition of coal that will be brought by rail from the Rio Puerco mines as soon as rail communication with that section will be had. At present an abundance of wood fuel is obtained in the mountains and is delivered to consumers at \$5 per cord.

Albuquerque.

This city is the county seat of Bernalillo and claims to be the largest city in New Mexico. At present it is asserted that the population is 10,000 persons. It formerly consisted of two towns, known as "old" and "new" Albuquerque; but the growth of the last two years has drawn the limits of the two steadily nearer to each other till they have grown together and constitute one city, though each still maintains its individuality and its characteristic features. The old town preserves its quaint and curious Mexican air, with its low and flat roofed adobe houses, its narrow and crooked streets, and the quiet and leisurely manner of its people; while the new town is marked by all the rush and bustle of the most progressive and busy American city. It has broad and imposing streets, good sidewalks, street cars, water works, electric lights, gas works,



Commercial Club, Albuquerque.

churches, daily newspapers, splendidly built and equipped public schools, and lodges of all the leading secret societies, while its buildings are all of modern style, and many of them making no small pretensions to architectural beauty. Many of the business houses are large and substantial structures of stone and brick in combination with iron and glass, which would do no discredit in size or style to any town in the United States. The volume of trade would be a revelation to the merchant doing business in a town of 10,000 people in the East. This will be understood when it is stated that Albuquerque is the trade center and distribution point of 194,000 square miles of territory. The new England States combined have an area of 68,000 square miles. Parts of this great area will never support a dense population; but there are vast areas again where ten acres of land are enough for a family of five persons, or 320 inhabitants to the square mile of farming land. The growth of Albuquerque has afforded a very reliable gauge of the territorial growth. Beginning with the advent of the railroads, which may properly be accepted as the beginning of American immigration into this section, the growth of the town has been steady and reliable. The progress of each year shows a steady increase in the character as well as the number of improvements.

Inducements to Settlers.

The resources of Bernalillo county are numerous. As a place for the investment of capital this county has two undeveloped resources that will certainly return good interest on the principal. These are irrigation works and mining. Improved property near Albuquerque brings an annual return of 10 per cent over taxes and improvements.

Manufactures.

A dozen different lines here afford opportunities for the profitable investment of capital in the mechanic arts. Albuquerque is situated at the junction of the Santa Fé and Atlantic and Pacific railways. On the west then will be New Mexico and

Arizona; to the south Old Mexico will take almost everything that can be manufactured; southeast is the great and growing Pecos country. Albuquerque sits at the junction of this commerce. Wool, iron, coal, hides, fruit, are handled here in large quantities. Take wool alone, the territorial clip is over 12,000,000 pounds. Arizona produces nearly as much more, and western Texas is also a large wool grower. A large proportion of this wool is purchased here.

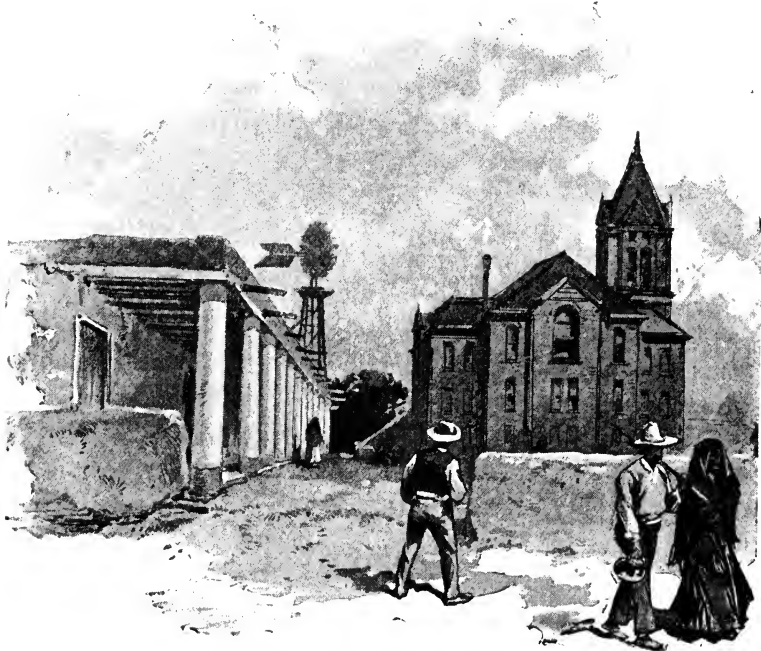
Albuquerque is peculiarly situated for advantageous smelting and refining. Gold, silver and copper ores should be reduced to the fine metal at this point. Iron should be manufactured into finished implements. The various other industrial metals could be and should be worked up and disposed of from this point. In a word, Albuquerque's railroad connection, her altitude and the contiguous coal supplies should make her a considerable manufacturing point.

Leather.

Hides constitute one of the chief exports of the Territory. Growing wild on the mesas and plains of New Mexico are thousands upon thousands of tons of caña-agria, a plant carrying $33\frac{1}{3}$ per cent of tannic acid. It is three times as good as oak bark for preparing leather. At present it is being shipped to Europe at a cost of nearly \$100 per ton. A tannery located at Albuquerque could handle all the hides of central New Mexico. Freight would be saved on the raw hide, on the caña-agria, and again on the leather or its products. Let it be considered that at present all these products, coming and going, pay freight on about 5,000 miles of railroad transportation. All this the manufacturer can practically save for himself, his workmen and the consumer, and pocket a good percentage because of his thrift and foresight. Another point is that all the "unskilled" labor required about a tannery or any other manufacturing establishment can be had here cheaper than in the States. Therefore no reason exists, except ignorance on the part of capital, why all this unnecessary freight and labor should be expended on sup-

plying the world with the finished products of New Mexico resources.

At present wool is shipped "in the grease," leather in the raw hide, metal in the ore; in fact all New Mexico's resources pay



Street in Old Albuquerque.

excessive freight to the East, and then pay another heavy toll when they return in the shape of a manufactured article.

Bernalillo.

About eighteen miles north of Albuquerque, on the Santa Fé Route, is situated the pretty town of Bernalillo. It contains about 1,000 people, and in the adjacent farming country there are probably 2,000 more people. This is one of the gardens of the world, one of those spots where a man can pitch his tent and say, "Here I rest." The blooming fields and orchards, the climate, the Rio Grande, the convenience of the town, combine to make it an important point. Wine making, wheat raising and

fruit culture are the representative industries; but outside the cultivable valley there is a wide stretch of country fit for pasture upon which the farmers keep considerable herds and flocks. This is one of the richest places in the Territory.

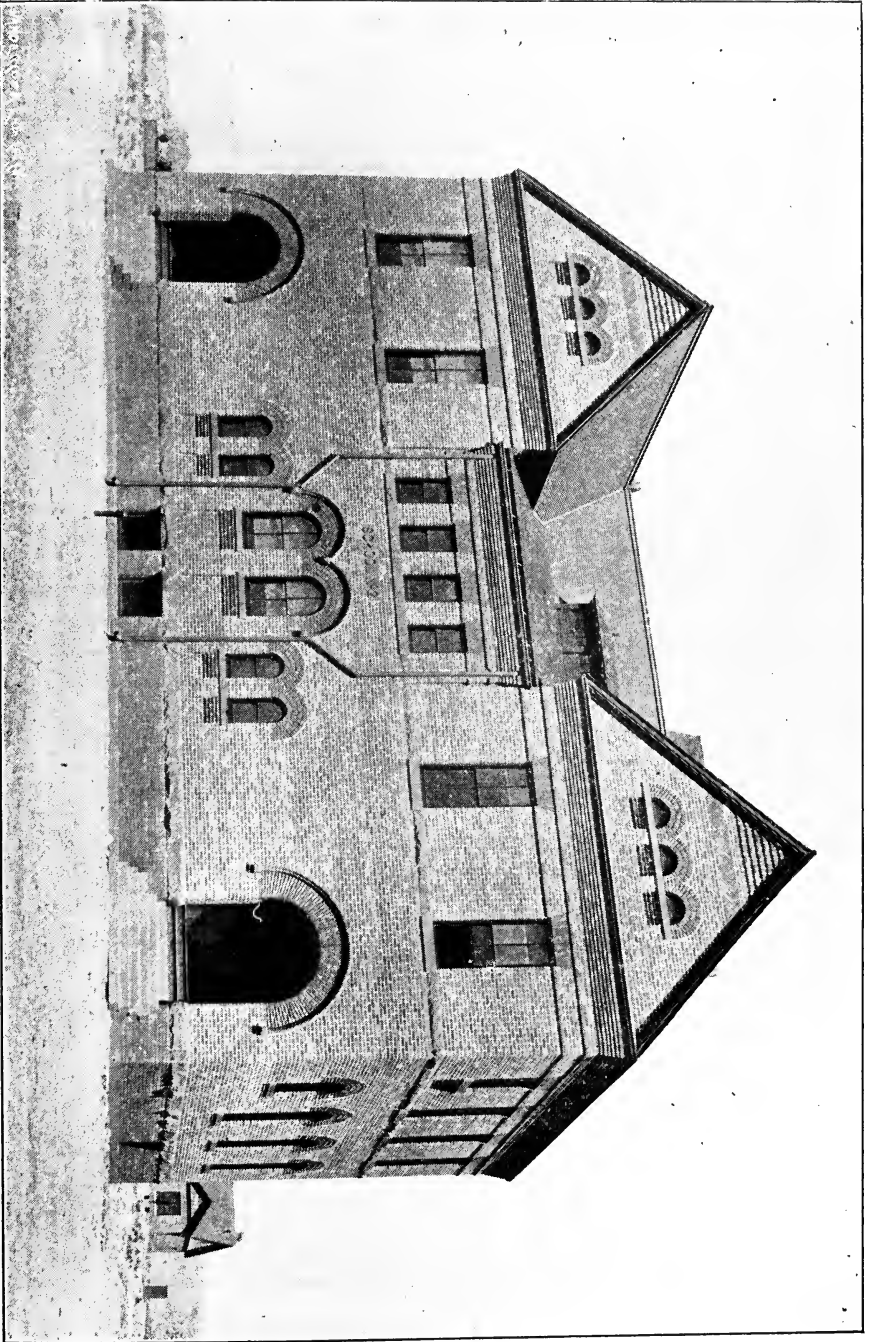
Agriculture.

In agriculture this county is one of the foremost in New Mexico. With irrigation the thrifty, attentive farmer becomes his own providence and is relieved from the dangers of loss by drought or flood. He is no longer a hap-hazard creature of chance but has the same surety of return for his labor as the manufacturer. In this way the stability and prosperity of both are enhanced as they are mutual customers. In an irrigated country the population is denser over the cultivated area. This is another advantage. What has been said concerning special crops will give the farmer a general idea of the farming resources of this county; and it will suffice to say here that every grain, vegetable and fruit of the temperate zone flourishes in the deep loamy soil, and the most tender varieties will not be menaced by the action of the climate.

Climate.

The great extent of Bernalillo county affords a diversified climate. In the Rio Grande and Puerco valleys the weather is very mild; the summers are long, with genially warm days and cool nights, and the winters never approach that severity common in the humid region. The air is dry, the elevation about 5,000 feet, and the latitude sufficiently south to make a very favorable combination. The average rainfall is about thirteen inches, over one-half of which falls during the summer months.

On the plateaux and mesas, east and west, the general altitude is about 7,000 feet and the general temperature correspondingly lower. Indeed, taking Albuquerque as a center, the health seeker can choose the exact temperature for comfort. It may be warm in the city, but within half a day's horseback or foot journey it will be bracingly cool. The person is hard to suit who finds fault with such conditions.

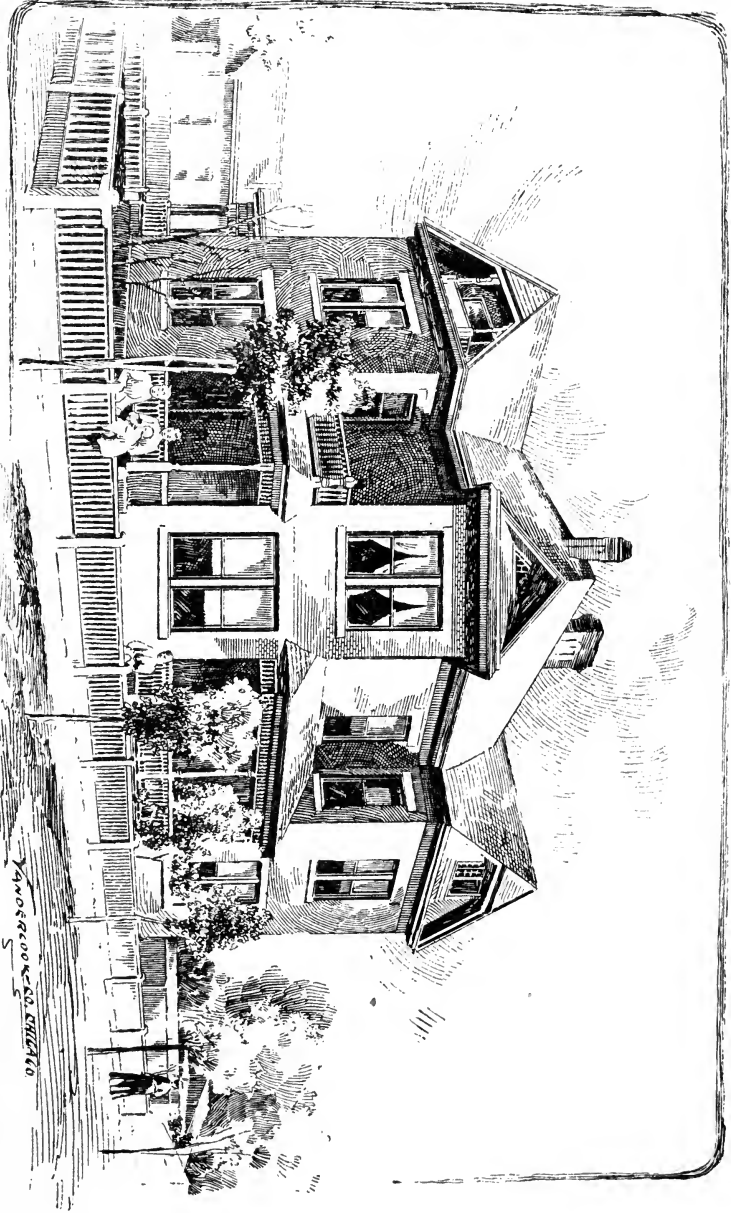


Public School, Albuquerque.



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A Home in Albuquerque.



YANORADO K. CO. CHICAGO

These plateaux and plains afford the very best grazing. They are covered with grama grass, and large areas of them could be irrigated by modern high line ditches. The summers in these regions are shorter and cooler than in the valleys. The rains are more frequent, and the aggregate snowfall of the winter averages about as in southern Illinois or northern Kentucky. These lands however are very fertile and suited to the cultivation of the potato, apple, and cereal crops.

Climate, as before stated, is only a matter of choice. The immigrant can choose the warm valleys or the cool plateaux. Another thing is, that a cyclone or a blizzard is unknown. The climate is a paradise for invalids. Everything said concerning climate in the general article on New Mexico is applicable to this county.



VALENCIA COUNTY.

The county of Valencia is one of the oldest as well as the largest counties in the Territory. It has a population of 13,876 persons, is 236 miles from east to west and sixty-two miles from north to south. The total area is 5,621,760 acres, and of this 3,000,000 acres are fit for pasturage in their natural state, and about 800,000 acres are possibly irrigable from all sources. At present there are about 19,000 acres cultivated in this county, a small proportion of which is tilled without irrigation. The cultivated land is divided about as follows: In the valley of the Rio Grande 10,000 acres, all irrigated; in the eight precincts west of that country 6,000 acres; and in the northern part of the county 3,000 acres.



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Crops.

The principal crops are wheat, barley, corn, beans, chile or peppers, alfalfa and fruits. Peaches and grapes are the best fruits in the lower valleys and apples on the uplands. The greatest spread of fruit is in the neighborhoods of Belen and Los Lunas. These crops all yield phenomenally, and in some parts of the county it is claimed that the largest harvests known in the world are obtained.

Largest Crops Known.

The following statistics are from the notes and observations

of the Bureau of Immigration; the vouchers for any of these facts are of a character that passes all criticism.

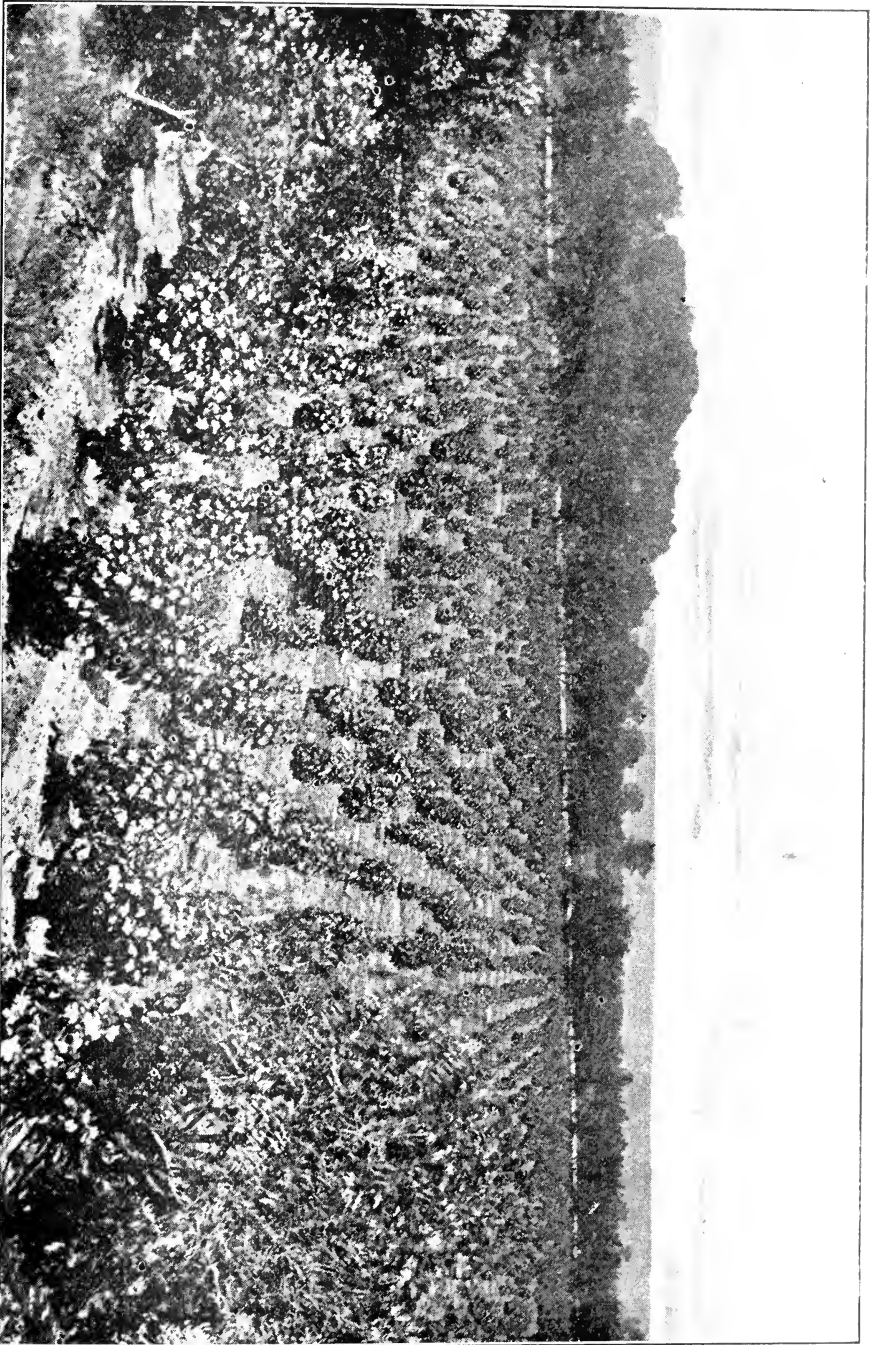
At Cebolleta, on the south side of the San Mateo mountains, one almud of corn, about 1-5 of a bushel, yields a harvest of 100 fanegas, —a fanega is $2\frac{1}{2}$ bushels—a return of 250 bushels of corn from a sowing of 1-5 of a bushel of grain.

Wheat yields proportionately. On one ranch, in the neighborhood of San Mateo, from one fanega, or $2\frac{1}{2}$ bushels, of seed wheat 80 fanegas, or 200 bushels, have been harvested. As sown here, this would be at the rate of about 50 bushels per acre. All other crops give proportionate returns. Harvests, even less than the average of the neighborhood, are from 10 to 20 per cent better than the rest of the world. The oats that took the second World's Fair prize for quality were raised near Belen, in this county, and the same town took the first prize for wheat.

Potatoes.

The whole of Valencia county seems to be the natural home of the tuber. White or Irish potatoes grow wild in great abundance. They vary from $1\frac{1}{2}$ to 3 inches in size. As found they are of a somewhat irregular appearance, with a pink skin and a white, crispy heart. The children, even of well-to-do people, eat them raw and say that the flavor is extremely good, having a peculiar sweet taste. They grow in a rich sandy loam of unknown depth. An actual occurrence will illustrate the character of this soil. At Cerro Colorado, a stage station, on the Puerco river, a well was sunk. At a depth of 43 feet from the surface ruins of houses, with ashes in the fire places and ordinary house litter, were found. Pieces of coal were also discovered, indicating that these aborigines used this fuel.

There is no doubt that, if these wild potatoes were properly cultivated and developed according to modern methods, a new and valuable variety might be propagated. They have all the good qualities of the cultivated tubers except size, are indigenous to the soil and climate, and would need very little water. That it would pay to give them attention is a foregone conclu-



Vineyard, Valencia County.



sion; and it is also as true that the modern cultivated potato would pay handsome profits. At Greeley, Colo., it is not unfrequent for potato raisers to make \$100 per acre gross; and \$50 per acre is an ordinary net profit.

Fruits.

All of the Rio Grande and Puerco valleys is especially adapted to fruits. In these two valleys there are fully 100,000 acres of bottom lands, easily irrigable and splendidly fitted to these crops. The general elevation above sea level is about 5,000 feet. Peaches and grapes are the staple crops, and there are now single farms that yield tens of thousands of pounds of the Mission grape. At present the majority of this product is utilized to make wine and brandy. Among connoisseurs, the wine and brandy of Valencia county have already a high reputation. Only the very finest fruit is used to distill brandy, and the wine is made of pure juice and without artificial sweetening. To satisfy those who prefer a very sweet wine, the vintners take the residue of the grapes after the wine is made, press it and boil the juice down to a thick sirup. This is added to the wine as a sweetener. The Mission grape is almost as sugary as a raisin, and its wine really needs no added sugar. Most people prefer it a little dried out. The vintners of this section keep their wine casked and bottled for five years before selling it. There are splendid opportunities in this section for the investment of capital in wine and brandy making. The reputation of the region is already established and a good business could be done from the very start.

Lumber.

There are about 400,000 acres of excellent timber in this county. Great stretches of pine forest are found in the western part, especially in the Zuñi mountains, on the Zuñi plateau and east of the Zuñi reservation. The timbered area stretches from northwest to southeast; and although these forests have furnished all the ties used on the Atlantic and Pacific road, they may be still described as virgin. This is all timber of

sufficient size for lumber. On the uplands and mesas cedar and piñon grow in sufficient abundance to furnish fuel for a number of years. All the higher mountain regions are covered with dense forests of pine, spruce and fir, intermingled in favorable locations with oak and aspen. At no point are the edges of the forest belts more than six or eight miles from the railroad. The San Mateo mountain forests are virgin. In fact the whole of the western half of the county is covered with heavy timber.

Live Stock.

The principal business of Valencia county is cattle, sheep and horse raising. Not counting the Indian stock, which is quite numerous, there are 400,000 sheep, 100,000 cattle and over 5,000 horses and mares in the county. These find nutritious and abundant pasture on the wide mesas and plateaux. The Manzano valley especially will always remain a favored cattle country. Springs abound, and while there are no rivers or streams of sufficient importance to make a considerable area of this land valuable for irrigation, still by a judicious development of the ground or phreatic waters this whole valley, of more than 1,000,000 acres, can be made to yield a good revenue as a cattle country. Water can be developed almost anywhere. The western part of the county is no less valuable in this respect. The cañon streams and the springs on the mesas furnish an ample supply of water. In this region farm irrigation and stock raising can be pursued together. The stock may be allowed to range at will during the spring, summer and fall seasons on the best grass, then brought in and fed alfalfa for a short time before shipping, so that the animals may be sent to market in the prime condition. Upon a systematized ranch this is easily possible in Valencia county, and the beef raiser will find his profits not only materially increased but assured from one year to the other.

Minerals.

A few miles west of the Rio Grande the coal measures begin, and extend almost in a continuous body to the western bound-

ary, including an area 100 miles long by 50 miles wide. Coal crops out on all the higher mesas. These measures are a continuation of the San Juan and Bernalillo county beds. These fields have been very little prospected, but when development begins there is little doubt that more than 1,000,000 acres of choice coal lands will be added to the New Mexican coal beds.

Salt.

Salt is found in the Manzano valley and in the Zuñi mountains. In the first location the mines are equal to the Michigan or Danish deposits. The lakes of brine in this valley are well known. If properly worked the salt deposits of the Manzano valley would add greatly to the commerce of the southwest.

Precious Metals.

Gold and copper mines are being worked to some extent in the Zuñi mountains. In the Manzano range gold is found and some mines are open. At Abo Pass in the Manzano silver and copper are found. Hell's cañon, in the same range, has some excellent gold properties. These mines were discovered about two years ago and if some capital were invested here it would pay handsomely.

Gypsum.

Gypsum is found near El Rito adjoining the Atlantic and Pacific railroad. This deposit is very pure, lies in regular strata, and is exposed in a bluff of between 80 and 100 feet high. This is extremely valuable as a fertilizer.

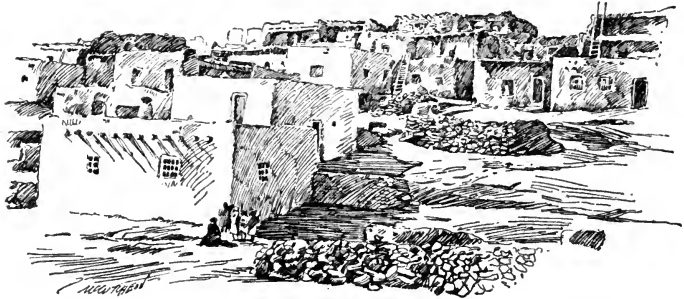
Building Stone.

In the western part of the county, along the line of the Atlantic & Pacific, are extensive deposits of building stone, with sandstone and granite. These have been tried and used in the construction of several of the largest buildings in the principal towns of the Territory and are found to be handsome, durable and just fitted for the purpose. With the growth of the larger towns in the Territory and the erection of large business blocks

and municipal buildings these deposits will prove valuable for the county and for the railroad named.

Colonization Prospects.

Up to date the magnificent opportunities for the location of colonies on a prosperous basis have been neglected. At La Cebolla the Mormons have planted a small settlement of 100 persons. They have dammed up a small cañon so as to store water for about 500 acres, of which they have now 200 acres under cultivation. So productive is the soil that this small area—only two acres per capita—supports them in more than



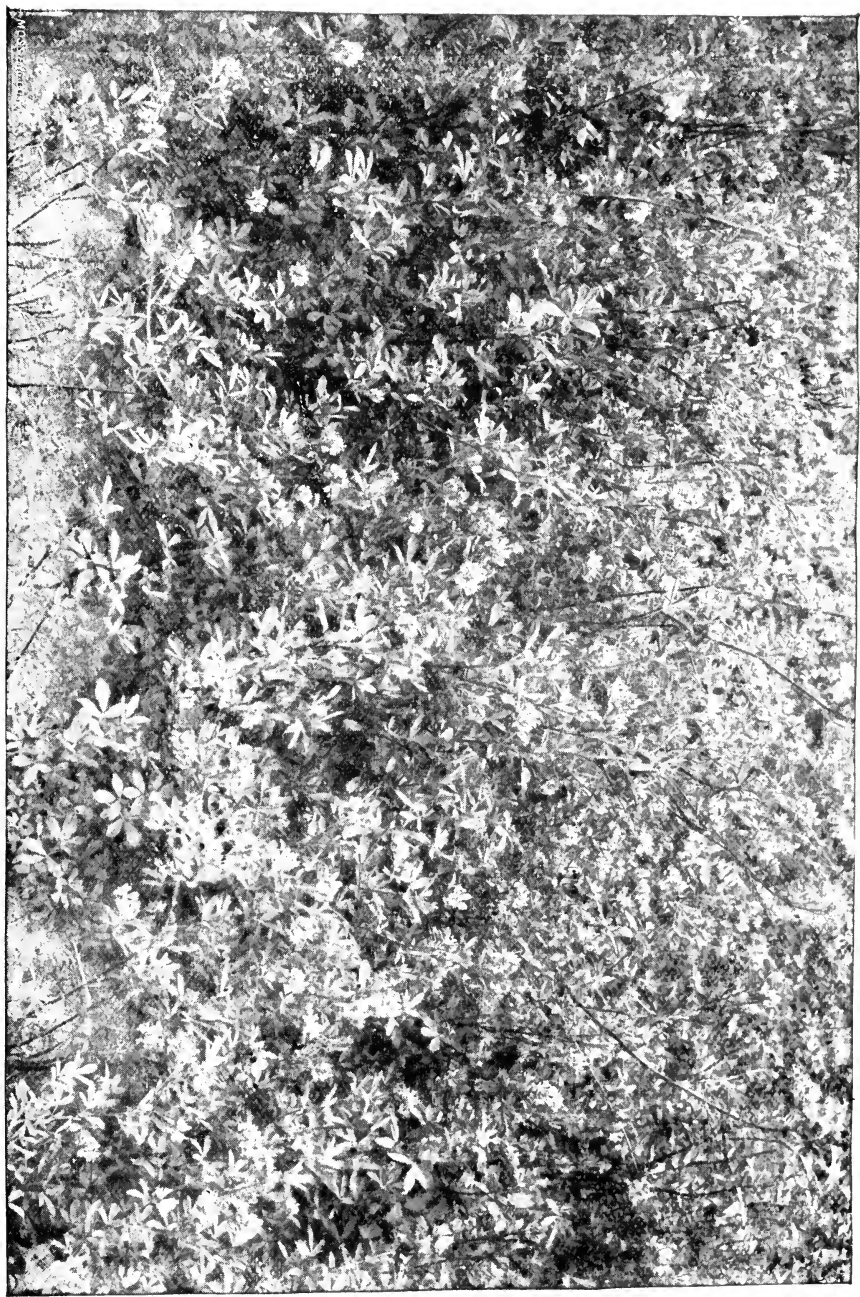
An Indian Pueblo.

ordinary comfort. It must be remembered, however, that this, like all Mormon farming, is conducted on a highly intensive system of cultivation. The Mormon achievements in farming are everywhere lessons of successful thrift. Alfalfa, sorghum, grain and fruits are their staple crops.

A Big Scheme.

Opposite Los Lunas is a tract of good land. The valley runs back to the mountains eighteen miles on a gradual slope. This embayment is about ten miles across. Into this area numerous cañon streams from the Manzano mountains empty, while on the west sweeps the Rio Grande. A corporation could reclaim nearly the whole of this area. As yet all this is open land. Another scheme would be for a colony of 300 or 350 families to locate here, taking up under the land

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laws a sufficient tract to satisfy their wants. A community of thrifty farmers once located here would be sure of success, and, though there is an ample supply for the irrigation of the whole, they would have a prior right to water in any abnormally dry season. This is one of the best opportunities in New Mexico.

San Mateo.

In the San Mateo country 25,000 acres may be cultivated. The following permanent streams empty into this valley: The Rito Colorado, San Mateo, San Lucas and El Dao. Around San Mateo there are nearly 1,000,000 acres of arable land, and the estimate of 25,000 acres as possibly reclaimable is very conservative. On the northern slopes of the San Mateo mountains fruit, except apples, cannot be successfully cultivated, but as a grain and root country it is unsurpassed.

El Rito.

The El Rito or Cebolleta valley contains about 500,000 acres of land, a considerable percentage of which is reclaimable. In this valley the big harvests before mentioned are the general average.

Evidence of an Ancient Civilization.

Every township in the western half of the county contains ruins of ancient villages and pueblos, all of them of considerable extent. It is impossible to travel six miles in any direction without running upon some of these ruins; near San Mateo a buried village, 200 acres in extent, was lately discovered. That a dense population once inhabited this vast section is true. They were not of the same race as the nomadic Indians, but a people who were seated on the soil. The only tradition of them among the Pueblos is: "They were children of Montezuma. When he and his successors were hard pressed by the Spaniards, they were called south to the succor of the City of Mexico. They responded unanimously, and none of them ever returned." Their homes alone tell of their once flourishing existence. There is no geological trace of any greater supply of water than is

now known, and to have raised crops sufficient for their support resort must have been had to underflow supplies, as in India.

Towns.

The principal towns are Belen and Los Lunas. The latter is the county seat. Both are located on the main line of the Santa Fé route, and have a considerable trade with the surrounding country. The big cattle and sheep ranches outfit from these points. Along the line of the Atlantic & Pacific railway there are several villages and towns of importance, the chief of which is El Rito.

The Rio Grande valley, in the neighborhoods of Los Lunas and Belen, is one of the best fruit and grain countries in the world. Any section that raises the best wheat in the wide world is necessarily fertile. It is no exaggeration to say that



Street in Los Lunas.

these lands are richer than the valley of the Nile. The conditions, so far as hardy crops are concerned, are identical. Of course tropical fruits cannot be raised, but the crops to which the English speaking peoples are accustomed grow in greater luxuriance than in any other region.

Fort Wingate.

The military post of Ft. Wingate as situated is three miles south of Wingate station on the Atlantic & Pacific railroad. It is garrisoned by a headquarters, band, seven troops of cav-

alry and one company of infantry. The fort is located south of the Navajo reservation and was so located for the purpose of watching the Navajo Indians and affording assistance to their agent should it become necessary. From the indications Ft. Wingate is one of the permanent posts in the United States and will be a military garrison for many years to come. It answers the purpose for which it was built admirably and has been found to be a great benefit both to the military branch of the government and the surrounding country.

Conclusion.

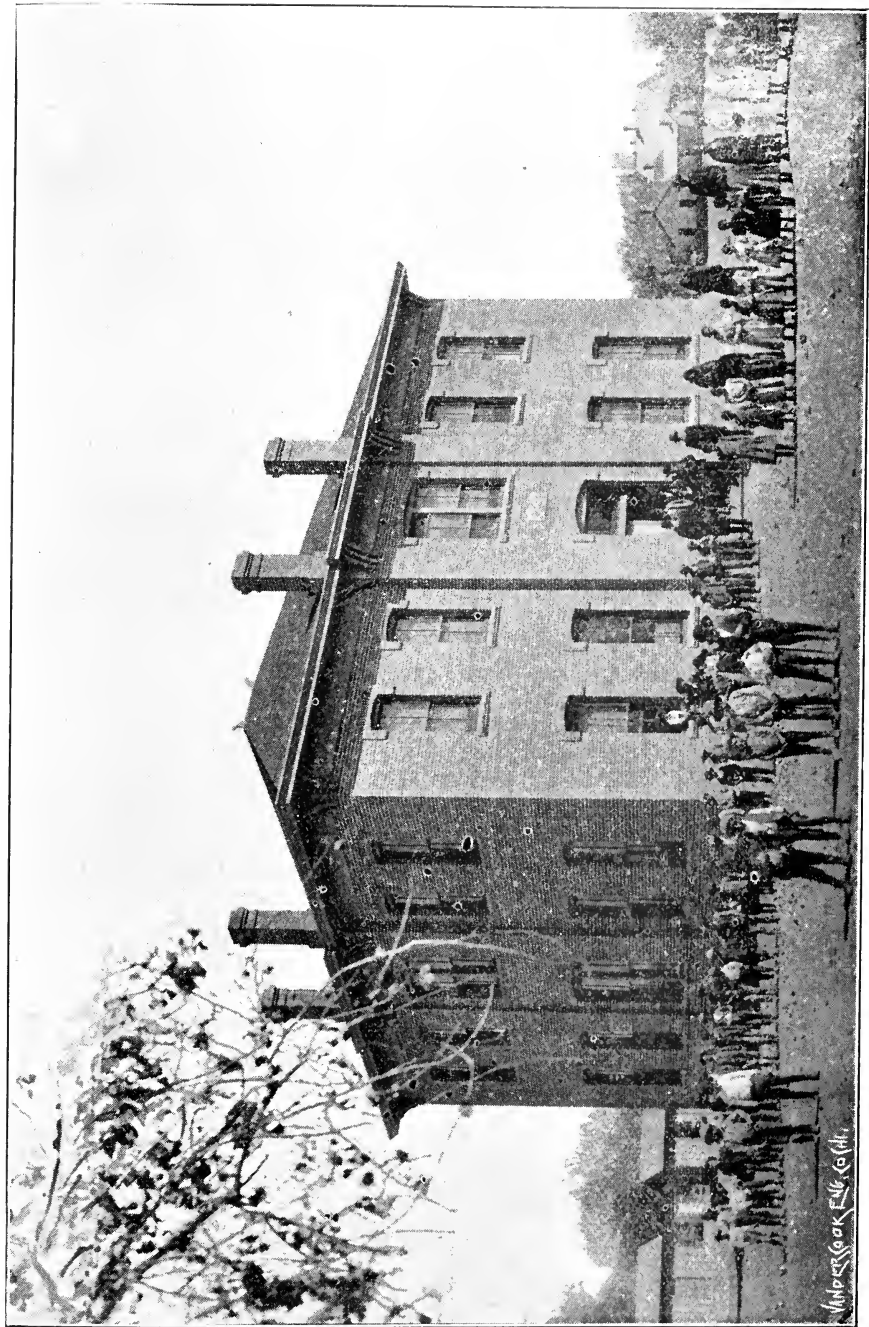
Probably no equal area of the world possesses such manifold resources and is so little known. This county may be made the seat of a population equally dense and far more comfortably surrounded than in many sections of Europe. Important mineral ores, wide stretching coal measures, fertile irrigable valleys are known. Fortune awaits the men who will develop them. This Bureau will take pleasure in giving further information to colonies or individuals concerning these vast latent resources.

SOCORRO COUNTY.

Socorro county is the largest municipality in New Mexico. It extends from about the center of the Territory to the Arizona line, having a width of 164 miles east and west, and its greatest length is ninety-four miles. Its area is about 13,968 square miles, or 8,939,520 acres, of which about 2,700,000 acres are mountainous and the balance fit for agriculture or pasture. In order that the reader may realize the truth of this bald statement, it may be said that this great county is about thirteen times the size of either Rhode Island or Delaware; it is three times larger than Connecticut, nearly half as big as the great state of Maine, while Maryland, Vermont, New Hampshire, Massachusetts and New Jersey are only babies in comparison, it being once and a quarter greater than any of them. Such is the empire to which the Bureau of Immigration invites attention, with the purpose of portraying briefly a few of its many advantages and resources.

Physical Features.

The Rio Grande crosses this county almost on the line of the principal meridian of New Mexico. The valley is bounded on the west by the Socorro, Magdalena and San Mateo mountains, whose average elevation is about 9,000 feet, with a peak culmination of over 10,000 feet. On the west the Sierra Oscura, part of the frontal range of the Rockies, walls in the valley. The first named ranges are very precipitous on their eastward faces, and their rocks are granitic or eruptive in character. The eastern mountains are of sedimentary formation and consequently very absorptive of moisture. This is evidenced by the number of springs that break out in the eastern part of the valley. Whether or not artesian water may be obtained within



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Public School, Socorro.



this wide valley is a mooted question; but it is certain that with very small expense ground water may be developed in wells and springs far in excess of the needs of pasturage. Besides this, outside of the area irrigable from the waters of the Rio Grande, small farms may be created by the development of the earth or phreatic waters, whose produce of grain, grass, roots and fruit will be more than sufficient for the support of the men engaged in stock raising.

The bottom lands of this great valley are from 4,000 to nearly 5,000 feet above sea level, and the trough of the Rio Grande in this county is very wide. Thence west and across the Magdalena range stretch the San Agustin plains, into which the Black Range, Datil, Mogollon and Piñon mountains intrude their rugged fronts. Beyond which again, and flanking the great Cooney district, rise the snowy San Francisco mountains. Between the Black Range and the Mogollons is a great timber belt whose forests continue to the summits of the bounding mountains; and within this area runs the continental divide. These, roughly, are the great physical features of this interesting region. The minutia and details of its formation are too numerous to be even glanced at in this paper. The most varied geological conditions present themselves. Wide alluvial plains rise into mountains whose breasts swell with the precious metals, and all formations from the Archæan rocks to the coal beds of the Tertiary period are exposed.

Population.

The population of this county according to the last census is 9,595 persons. Practically, however, this only includes the inhabitants of the valley of the Rio Grande, as little or no account was taken of the outlying ranchers and stockmen. The people generally are progressive and thrifty and of good moral habits. The population of this county will in all probability figure up more than 12,000 at this writing.

The School of Mines,

a territorial institution, created by act of the Legislature of

1889, is located at Socorro, the county seat. It is supported by a tax of 1-5 of a mill on all the taxable property of the Territory, and is organized as a high grade school of technology, geology, mining and engineering—in fact to fit its graduates as first-class mining engineers and experts. Tuition in this institution is absolutely free. Its president, Prof. Floyd Davis, says: “It will in no sense be allowed to degenerate into a shop in which to teach the mere art of assaying. The requirements that will be demanded of the teachers are that they be practicable men, endowed with energy and with a high grade of intellectual and scientific acquirements: not so conservative as to be hampered by the traditions of scholastic education, but rather they shall be imbued with the exactions of modern progress and with ambition that will only be contented by signal achievements accomplished through their efforts.” The work of the able Prof. Davis is efficiently seconded by Prof. Theodore S. Delay, his assistant. A school organized on such broad lines and with such comprehensive opportunities for progress is worthy of explicit notice.

Its work is conducted under a board of trustees, of which the governor of the Territory and the superintendent of public education are ex-officio members. Candidates for admission must be well qualified for the work of the school and have a preliminary training in the collateral branches of learning such as to enable them to avail themselves of the full advantages of the school.

The building and equipment of the school are of the best. The building is T shaped, 135 feet long by 32 feet deep, with a central assay wing 54 feet long by 32 feet wide. It is constructed of gray trachyte, in broken ashlar, trimmed with red sandstone. The basement is entirely floored with cement and is divided into furnace, store, coal and wash rooms, an assay preparation department, a metallurgical laboratory and water closets. On the main floor are the president's office, library, reception room, private laboratory, qualitative and quantitative laboratories, balance, evaporation and stock rooms and the laboratories for fire

and wet assaying. The second story contains a lecture room with a capacity for seventy students, and a preparation room. The third story is occupied by a museum, a well lighted micro-spectroscopic room and storage closets. The building is plumbed for water and gas, and supplied with the former in all parts under high pressure. The complete structure cost \$42,940.53, and when the entire apparatus necessary for its work is in it will cost at least \$15,000 more. Convenient working desks, twenty-two crucible and two large Denver muffle furnaces, a large roasting furnace, scales, balances and generators, together with an ample and carefully selected supply of chemicals and re-agents, complete the present equipment of the school.

Agriculture.

The farms of this county are principally found in the Rio Grande valley, beginning at Sabinal, about thirty miles north of Socorro, and then stretching down to the beautiful fields of San Marcial, near the southern boundary. All this section is easily irrigated, and much more land than is now cultivated might easily be reclaimed. On the ninety miles of the course of the Rio Grande in this county there are over 150,000 acres of land easy to reclaim in the first bottoms. On the mesas and bench lands there are 100,000 acres more. This is all of inexhaustible fertility, and capable of supporting at the very lowest estimate 15,000 families of farmers alone. From La Joya, "the jewel" of the Rio Grande, to the Sierra county line will one day flourish magnificent farms and orchards. There are now probably 60,000 acres under ditch in this tract, and there are cultivated somewhere between 20,000 and 30,000. While the American people are clamoring for almost worthless lands in other sections, it is marvelous that the great advantages of this valley are overlooked. Organized effort on the part of colonies of from twenty to 100 families would assure them happy homes and a sure competence in this valley.

The land in Socorro county at various places has been examined by experts, analyzed and tested. Generally it is non-

alkaline, friable and loamy. The mild climate allows the cultivation of a wide range of products and the proximity of mining camps insures high prices. Sugar-beets, caña-agria, alfalfa and small fruits will be the staples of this county. They grow in great profusion.

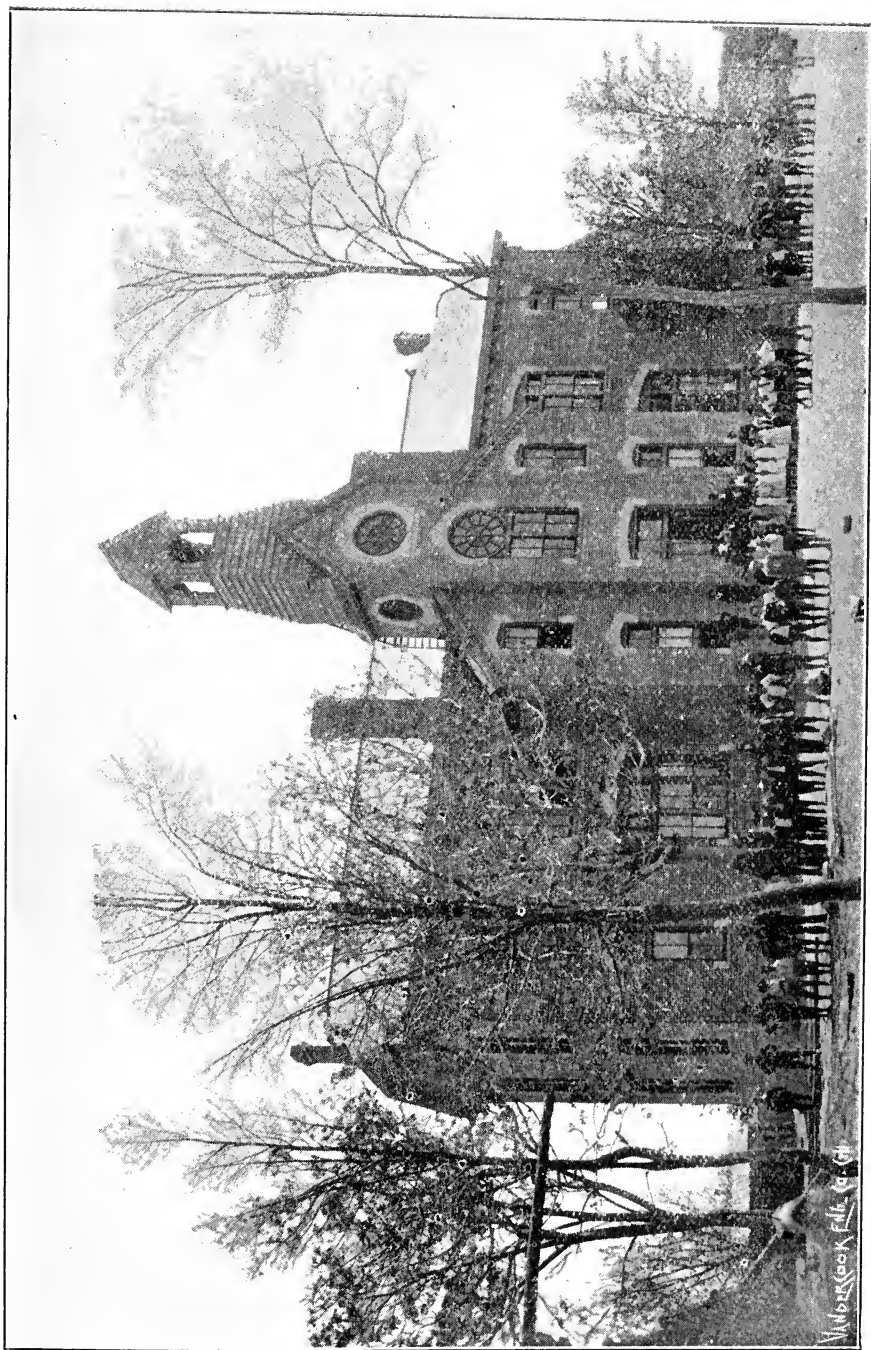
In the western part of the county, near the Arizona line, are found the ever-flowing waters of the Tularosa and San Francisco, with their multitude of affluents. Another large body of good land with ample water is to be found here. The probability is that the Santa Fé route will at no distant day fill the gap between its Magdalena branch in New Mexico and its Prescott & Phoenix extension in Arizona. Then will be opened to commerce one of the richest mineral, grazing and irrigable regions in the world.

The agricultural exports from Socorro county are fruits, principally peaches and grapes, grain and alfalfa.

Returning to the Rio Grande, there is one feature of its agriculture that demands attention. The level stretches of its low bottom lands are peculiarly susceptible to the influences of sub-irrigation, of which there is one notable example in the orchard of Mr. A. D. Coon. The roots of the trees of this plantation are so near the level of the underflow of the Rio Grande that it has never been necessary to irrigate them even in the driest years. This fact will be of inestimable advantage when irrigation is undertaken on a large scale in this valley.

Cattle.

The cattle interests of Socorro county are very large. The animals do not seem to suffer as much during bad seasons as in other places. The mild, open winters permit them to use up all their food for the making of flesh and not for the creation of heat. This is an advantage of great importance. In the north cattle are subject to long spells of great cold, blizzards, etc. This is unknown in New Mexico and especially in Socorro county. There are now upwards of 250,000 cattle, and immense



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herds of sheep on the ranges. It is almost impossible to estimate them accurately.

Mining.

There are known to be fifty-two mining districts in this county. Some contain several camps and make large outputs; in others only development work has been prosecuted. The minerals range from salt to gold, and include carbonates, sulphates, sulphides, phosphates, magnesia, calcium, alum, fire-clays, coal, aluminum and other valuable deposits. The principal districts are the Socorro, Magdalena, Kelley, Ladrones, Water Cañon, Mogollon, Datil, Cooney, Limitar and Oscura mountains. According to development the richest are the Kelley and Mogollon districts. In the latter there are about 400 men working on all the claims. Gold and silver are the mainstays, while lead and copper are the principal by-products.

Kelley.

The great camp of Kelley, situated four miles southeast of Magdalena, the present terminus of a branch of the Santa Fé route, is embraced in the Magdalena mountains and sheltered from the winds in almost every direction. It is 7,500 feet above sea level and enjoys a most genial climate. There is not a day in the rolling year when work must shut down on account of inclement weather. The principal mines are the Kelley, Graphic, Imperial, Mary Lode, Ambrosia, Grand Tower, Ida Hill and Miriam. There are about 100 miners now at work in this camp, but the number is far below the full complement.

The Kelley or Graphic could alone supply work for this number. At present the Kelley mine is under lock and key and visitors are not allowed in it.

The writer visited the Graphic and explored all its resources. There are over two miles of tramway in this mine and more than four miles of galleries. Since the recent sale of this property to an eastern syndicate for \$150,000 the principal work of the present company has been in the way of development, although a good output of ore is made daily. The product of

this mine is silver and lead and the ore is graded so as to run 30 per cent of lead and from three to four ounces of silver. The ore varies in character. Some of it runs in sand carbonates, some in galena, and more again in iron. The work on this mine since last June shows how profitable eastern investments in New Mexico mines may be made under proper management.

The view from this camp is beautiful. It is embraced in a mountain basin. In the immediate foreground is the beautiful Magdalena peak, rearing aloft the graven face of the penitent woman. Beyond appear rolling vistas of the San Agustin plains; in the immediate valley lies Magdalena, surrounded by a beautiful grazing country. From the summits of the peaks the country on all sides is visible for over 100 miles. This locality offers superior advantages as a sanitarium.

Magdalena.

This town is a general outfitting point for numerous cattle companies, dozens of mines, and besides is a rich mineral district itself, producing carbonate ores easy of reduction, while brick and fire clay, hematite and limestone abound. It is situated twenty-three miles northwest of Socorro, on a branch railroad, and in a beautiful valley between the Socorro and Magdalena ranges. It drives a busy trade with all the surrounding country. Nine miles northwest of Magdalena there are a number of rich mining claims in the Gallinas mountains, to which access is had by a good road free from heavy grades. Among the mines there are the Atahualpa and the Midland. Considerable work has been done in these mines, and in both there is ore in sight which only requires to be taken out and shipped. Returns from the Rio Grande smelter, at Socorro, on a car load of this ore shipped for treatment are as follows: Lead, per cent per ton, 24.20; silver, ounces per ton, 24.60; gold, ounces per ton, 5.35; the net value of the ore, deducting freight and cost of treatment, being \$133.84. Assays of a vein

of galena uncovered in the Midland give 47.9 per cent lead and 11 ounces of silver to the ton.

Experts who have examined the gold ore from these claims declare it to be free milling ore. Stamp mills are being erected in the vicinity and it is thought that a mill test of these ores will give good results and enable a large saving to be made in their treatment.

Socorro.

The county seat, Socorro, enjoys some unrivaled advantages. It is a town of about 3,000 to 4,000 inhabitants, and is situated on the principal meridian of New Mexico, which is the datum point for all public surveys. The town contains a public school costing \$25,000, a fine court house, the school of mines previously described, numerous business houses, a brewery and ice plant, a good flouring mill and a fire-clay works. The Rio Grande smelter, at present working over 200 men, is within the town limits. These works in good times employ about 400 operatives and are amongst the most important smelters in the country. Immediately across the Rio Grande are immense measures of coal extending from fifteen to twenty miles. The city is almost in the center of the Territory, conveniently situated for all trade purposes. Its climate is mild and equable; its altitude is about 4,300 feet; it is exceedingly well sheltered from winds. Its water supply is excellent and plentiful, and is partly obtained from large springs about two and one-half miles from the city. The town is in the center of a rich mineral, grazing and agricultural district and has a magnificent future before it.

San Marcial

is one of the prettiest towns on the Santa Fé route. It is situated on the Armendaris grant. Preparations are now being made to reclaim 82,000 acres of land in this immediate vicinity, and also to develop the mineral and pastoral resources of this valuable grant. San Marcial will be the center of all these operations, which are now proceeding on a basis of an invest-

ment of over \$4,000,000. The town has good schools and hotels, a very good newspaper, *The Bee*, and is the end of a division of the Atchison, Topeka & Santa Fé railroad, and round-houses and repair shops are located here. This town has excellent trade from the surrounding country and the rich mining districts of the Black Range. It contains about 1,000 inhabitants and is growing constantly.



LINCOLN COUNTY.

Lincoln county, situated in the southeastern section of the Territory, is part of the drainage area of the Pecos river. It is bounded on the north by Guadalupe and Valencia counties, west by Socorro and Doña Ana, east by Chaves and Eddy counties, and on the south by the State of Texas. Until 1889, when by act of the Legislature Chaves and Eddy were separated from it, it was the largest county in the Territory. It is 156 miles long and from fifty to seventy miles wide, with a total area of 8,495 miles. The average elevation is from 4,000 to 5,000 feet above sea level and its mountains rise 9,000 or 10,000 feet high. The Sierra Blanca, Capitan, Nogal, Jicarilla and Sacramento mountains are well forested. In general aspect this county consists of wide grass covered plains, and on the western border this formation is broken into "mal pais," or bad lands, by reason of the intrusion of a wide lava flow.

Mountains and Minerals.

The topography of the western portion of the county is extremely broken. Eruptive rocks of various characters extrude from the sedimentary formations. The mineral deposits are numerous and extensive. Beds of crystallized gypsum are found. Large measures of coal, similar to that found on the Raton plateau, are known and worked to some extent for fuel for local use. Valuable and rich mines of gold, copper and lead are found in all the mountainous regions, but especially around White Oaks, Nogal and the Capitan mountains. In the well watered and timbered Sacramento mountains argentiferous copper is found. Gold is found in the Carrizo, Jicarilla, Capitan and Sierra Blanca mountains. During the last two years, within a radius of twenty miles of White Oaks mining has received quite an

impetus. In the fall of 1892 a rich strike was made in the North Homestake, a new body of gold ore being struck at the 1,000 foot level. This runs very high in gold and is considerably richer than in the upper workings. Indeed it has been the general experience of miners in this section that the deeper the shafts the better the ore. The Old Abe mine has recently made considerable improvement in its mill by reason of finding a good well in White Oaks cañon. A daily supply of 80,000 gallons has been secured. This allows ample water for its twenty stamp mill and for all purposes around the mine. This water is piped from a reservoir a distance of 5,400 feet. The Vera Cruz is another good mine. It has a fifteen stamp mill and is working steadily on fine gold ore. The shaft of the South Homestake was burned out about a year ago. A new one was at once put in. The owners did not expect to strike any ore until they reached the level of their old workings. At the 200 foot level, however, a new body of \$10 ore was struck and the company is now stopping this out. The hills everywhere in this section seem to be filled with metal. The Jicarilla mountains are also showing many good prospects and some good mines.

Water.

The central parts of the county are well watered by running streams, the principal of which is the Rio Hondo, a deep, swift stream draining the Sierra Blanca and Capitan mountains. Besides this are the Feliz or Felix, Ruidoso, Bonito, Eagle, Upper and Lower Peñasco and Nogal creeks. In the northern portions springs break out on the wide plateaux and afford water for stock. The native grasses flourish abundantly on these plains fed by the slight rains. It is very difficult to estimate the amount of land that might be irrigated from the various sources. Another question is, how far will it be profitable to store water by means of dams built in the stream beds. There are many thousands of acres of arable land in the county, but according to present knowledge it cannot be

said that there is water in sight to reclaim more than 100,000 acres.

Pasturage and Stock.

At present it would seem that the proper method by which to approach the reclamation problem in Lincoln county is by means of small colonies. A sufficient area of irrigable land should be taken in some of the many river and creek bottoms. The contiguous range should then be improved by the systematic development of its springs and water holes. In this way stock and agriculture could go hand in hand, and the development of the garden and orchard would be simultaneous with better methods of stock raising. It may be said right here that no matter how rich or resourceful a section of country may be, the individual irrigator can do little. Either co-operation or co-ordination must prepare the way for success. The united efforts of a colony always tell in the line of economy, the concentration of ordered forces by a corporation makes for rapid development in its widest degree. This region is particularly tempting to the colonist. Stock men estimate that the profit on cattle in this county is fifty cents monthly per head from the time they are calved, and that the profit on sheep is 50 per cent. This is on stock raised by the "open range" methods. In the plan suggested above for colonies the range would become a stock farm. It is not meant that the farmers should own their land or stock in common but only that they should co-operate for the common good in the development of water.

Circumstances are so favorable to stock raising in Lincoln county that prudent managers think 2 per cent is a very liberal estimate of loss from all causes while the cattle or sheep are on the range. Both sheep and cattle men have shown wisdom by importing to their ranges the very best and purest blood to cross with the native breeds. The flocks and herds are now splendidly graded, of fine form and size, and are vigorous and healthy. The bountiful and lasting pasture, the excellent climate, where snow scarcely ever covers the grass, combine to make this country an ideal stock region.

Agriculture.

Of course all agriculture in Lincoln county is conducted by irrigation, and the people enjoy all the advantages of that style of farming. Until recently agriculture was very primitive, though the yields were always phenomenally large. The old and laborious methods of the past have given place to modern science. The best agricultural implements have been employed and to-day the country is dotted with thrifty farms. All the valleys should be covered with them. Grapes and currants grow wild in this county and when cultivated mature in the utmost abundance. All the vegetables thrive. Cabbage, lettuce, celery, turnips, parsnips, carrots, radishes, peas, tomatoes, pumpkins, squashes, onions, melons, okra and cucumbers have been planted and all have yielded larger crops than the farmers ever thought could be raised. The size of all is astonishing and the quality perfection. Beans are a staple crop. The average yield is 900 to 1,500 pounds per acre. They are sure in their results and command from 4 to 6 cents per pound. Alfalfa is also notable in its yields. From four to five cuttings are made every year and the crop will average from five to eight tons. There is another thing that should be remembered, and that is that some of the best agricultural and grazing lands in Lincoln county still belong to the public domain. Good locations are plentiful, and there are great chances here for the men who are willing to grow up with the country.

Timber.

The plains, plateaux and valleys, indeed all the level country is generally without timber, but the mountain areas are heavily forested. This supply is so extensive that taken as a whole it may be said to equal that of any other section of the Territory. It extends in a somewhat broken line from the northeast to the southwest a distance of 156 miles. The wood consists of piñon, pine, juniper, ash, cottonwood, oak, etc., and affords excellent building material. In the Capitan mountains



Irrigated Egyptian Corn, Pecos Valley.



there is a large saw-mill capable of supplying the present demand for lumber.

The county has several good and thriving towns, which, although off the railroads, are considered among the best in the Territory.

Lincoln.

The county seat is Lincoln, situated in the central portion of the county and connected by daily stages with Carthage and San Antonio on the Atchison, Topeka & Santa Fé railroad and also with Lava on the same road. The water supply is good and pure. It is principally obtained from the Rio Bonito and from wells. The surrounding country is principally devoted to stock raising and mining, and the trade of the town is with the ranch men and adjacent miners. The climate is so mild that business is prosecuted all the year through. Some attention is being devoted to agriculture and there are a number of good farms near the town. The adjacent mountains are covered with pine, cedar, piñon and walnut.

White Oaks.

The town of White Oaks in all probability will shortly have a good railroad connection through the Pecos Valley railroad. As it stands now it is eighty miles distant from the Atchison, Topeka & Santa Fé road. It is surrounded by good gold mines and mills and is altogether a thriving town. The mountains are filled with coal and precious mineral. It enjoys an equable climate, good water, and the plains are grassy and afford good pasture.

Nogal.

In the central part of the county is the town of Nogal, or Black Walnut, so called from the great number of these trees which grow in the neighborhood. It is located in a beautiful mountain park, watered by streams and springs, and is altogether a delightful place. Its principal trade is in mining and ranch supplies.

Other Towns.

Bonito, Ruidoso, Walkers, Weed, Upper and Lower Peñasco, Ft. Stanton, Las Tablas, Puertecito, Tecolote Wells and Red Cloud are the remaining towns and settlements.

Fort Stanton.

The military post of Fort Stanton is located in a beautiful valley seven miles from Lincoln, the county seat. It is now garrisoned by two companies of infantry. It is about forty miles north of the Mescalero Apache Indian Agency and was originally established forty years ago to keep the Mescalero Apaches in check. These latter are now entirely peaceable and peacefully inclined. The post has ample quarters for officers and men for two companies of infantry and two troops of cavalry. Between it and White Oaks some very extensive and good coal veins have been discovered and prospected, but the want of rail communication has retarded development. Supplies for Ft. Stanton are hauled by teams from San Antonio or Lava station on the Atchison, Topeka & Santa Fé railroad.

Mescalero Reservation.

In the southwestern part of the county is situated the Mescalero Apache reservation. This country is a paradise. It is well grassed, watered and full of game. These Indians are making great progress in farming and the industrial arts, and many of their children are attending the several Indian schools of the Territory. The reservation contains 575,000 acres, and there are about 600 Indians.

SIERRA COUNTY.

The beautiful county of Sierra enjoys the enviable distinction in the West of being out of debt and maintaining its warrants at par. The population is between 4,000 and 5,000 people. It is situated in the south central part of New Mexico, is partly bounded on the west, north and east by Socorro county. Grant and Doña Ana counties complete its boundaries on the west and south. For forty-eight miles the principal meridian of New Mexico forms its eastern boundary, whence it stretches in a gentle slope to the summits of the Black Range, a distance of about sixty miles. Its average length and breadth are fifty-four miles, and it comprises 2,376 square miles. This is a small county for New Mexico, but its diversified contour of plain, valley and mountain makes it one of the most promising and beautiful in the Territory. It was created in 1883. The Santa Fé route runs through its eastern portion and skirts its southern boundary. From Nutt station a branch of this great railroad penetrates to Lake Valley. It lies principally on the Rio Grande water-shed, which river passes through the entire length of the county, taking up in its course a maze of streams and creeks. A few streams at the western limits flow toward the Gila.

The Principal Mining Districts

are the Black Range, Apache, Cuchillo Negro, Kingston, Hermosa, Animas, Hillsborough, the North and South Perchas and Lake Valley. The progress of these camps since the county was created has been very great. At times there have been backsets, but the wonderfully rich strikes constantly occurring have stimulated energy and capital and recovery has always been rapid.

Physical Features.

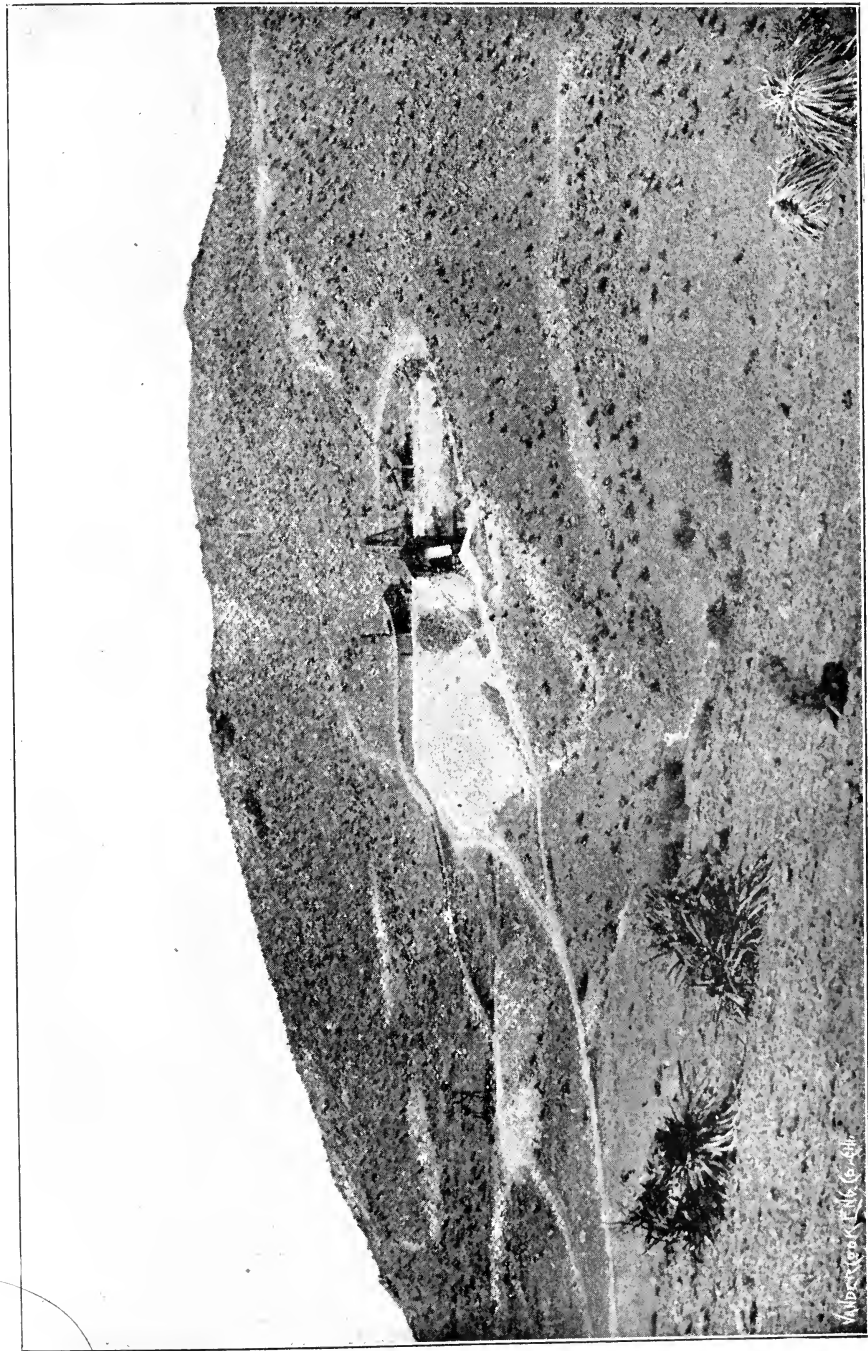
The general altitude above sea level of the valleys is between 4,000 and 5,000 feet. Three mountain ranges run parallel with the Rio Grande. On the west tower the forest crowned summits of the Black Range and on the east the San Cristobal and Caballo mountains. Primitive rocks of the granitic series compose the central and higher portions of the ranges, and overlapping this formation are strata of quartzite, porphyry, limestone and shale. In the contacts, faults and fissures occur the mineral deposits. The valleys are wide and fertile, seamed by torrential streams, and it is possible to reclaim 50,000 acres. All the mountains are heavily forested, and in the Black Range there are several saw-mills that supply the county with lumber.

Climate.

The weather all the year round is very mild. In winter the thermometer rarely falls to 20 degrees below freezing and never touches zero. Consequently mining operations are prosecuted continuously, and agriculture has no disadvantages. Blizzards and snow-slides are unknown.

Kingston.

This town is the center of a phenomenally rich silver country. Probably the best known of its mines are the Brush Heap and the Illinois. The latter, owned by the Illinois Mining Company and managed with great success, has yielded good returns, and there is hardly a doubt but that if the white metal were at or near par further prospecting would yield great wealth. As to the Brush Heap, it is still a better mine than most of those boasted by other communities. In this district are also the Gypsy, Lady Franklin group, the Kangaroo, United States, Calamity, Kingston, Etna, Virginian, Templar, and Blackie. In this last a great deal of ore was found on the surface in nuggets. Recently the Brush Heap mine has been the only steady shipper, averaging about twelve tons a week, which run about 200 ounces of pure silver. The Calamity occasionally makes a shipment of good ore, but as a general thing the late terrible



Gold Mine, Sierra County.

Albrecht & Co. 1891



depression of silver has caused these mines to shut down. The Iron King is also an important mine as it furnishes the manganese used by the Kingston Ore Reduction Company and other smelters as a flux. The character of the mines will be better understood when it is considered that out of one chamber in the Comstock \$350,000 of almost pure silver were taken. It was gutted in three months. The ore belt stretches from the Trujillo to the North Percha, and no one able to devote intelligent labor to mining need fear for results in the beautiful camp of Kingston. The town itself is well situated, has a public water service, churches and schools, two good hotels, and a pushing, go ahead population of about 1,000 persons. The magnificent specimens of native silver in the miner's cabin at the World's Fair will bear out this testimony to the richness of that region. Native silver is prevalent. Only one other instance need be mentioned. In the chloro-bromide ores, like those of Tierra Blanca, assays of \$6,000 to the ton have been made.

Kingston is reached via Hillsborough, the county seat, by Mathewson & Orchard's stage line from Lake Valley. The road is good and the ride delightful.

This camp is situated in the valley of the Rio Percha and was discovered in 1878. Within a few years thereafter \$6,000,000 were realized from the surface riches alone. Since this period of rapid development the work has become more systematic, and nearly every mine named above has yielded from \$20,000 to \$1,500,000. The ores are native, brittle, sulphide, chloride and chloro-bromide, and are found in connection with quartz, iron, copper, zinc, galena and talc. Binoxide of manganese prevails throughout the district.

Hillsborough.

The pretty town of Hillsborough is the county seat and the center of the gold mining district. It has one of the handsomest court houses in the West, good schools and good hotels. It was founded in 1878. The success and prosperity of this town and its great reputation as a gold camp were

only obtained after years of persistent effort. For the first ten years of its existence the discouragement was only cheered by flitting gleams of success. The ore veins are found on either side of the intrusive porphyry dykes that cross the country, radiating from Animas Peak. This feature insures their permanence to any depth possible to be attained by human science, as these eruptive dykes must of necessity extend through the crust of the earth to the Plutonic rocks. The principal mines of this character now operating are the Snake, Opportunity, Bonanza, Richmond, the Copper King group, El Oro, Wicks, Garfield, Homestake-Trippe, Happy Jack, Golden Era, Chance, Printer Boy, Bull of the Woods, Morton, the Champion group, Smuggler and Ross. The first four named are great mines. The El Oro, Wicks, Garfield and Homestake have produced from \$18,000 to \$100,000 each. The others mentioned are also good payers.

Next year the output of this camp will be about 60,000 tons, or at the present value of its ores about \$1,200,000. This will be nearly as much as the lodes have paid prior to 1893, when the value of the total output footed up about \$1,500,000.

For instance, for the week ending December 14, 1893, the total output was as follows:

	Tons.
Standard Gold Mining & Milling Company--	
Snake Mine.....	80
Opportunity Mine.....	225
Good Hope-Bonanza Mining & Milling Company--	
Bonanza Mine.....	105
Percha.....	95
From the Eighty-five and other mines.....	130
Total.....	635
Total output since January 1, 1893.....	25,701

CHARACTER OF THE ORES.

The metal carrier in this district is quartz, impregnated with copper and iron pyrites, and containing precious metals in the proportion of one ounce of gold to five ounces of silver. Surface ores, to a depth of 150 to 300 feet, are much oxidized

and are free milling. The gold values vary from \$6 to \$175 per ton. Ore is also found in solid pyrites.

The pamphlet lately issued by the World's Fair committee of this county says:

"There are a great many claims upon which little work has been done, but which make a good surface showing and warrant the expenditure of some capital to prove their value. They can be purchased at low rates, and may prove great investments. One of the big mines of this district was thus purchased for about \$2,500, and with an expenditure of \$4,000 was placed upon a paying basis. It would now take about \$250,000 to buy that same property. Yet, at the surface, there was nothing to especially indicate its great value. Like the other veins, its course is straight with the accompanying porphyry dyke, and its croppings of ore in average value were low. Such opportunities are here to be found in considerable number. Fortune favors the brave, and more especially in mining matters."

SMELTERS AND MILLS.

There are four reduction works located here, and a new eighty ton furnace is being put in by the Standard Smelting Company, which will increase the annual output from this camp to the figures given heretofore. The present product of all the Hillsborough mines is about ninety tons a day. The reduction and smelting works are known as the Hopewell, the Richmond, the Bonanza and the Standard.

Perhaps the most notable feature in the Hillsborough gold mines is the unbroken continuity of the ore veins. In the Opportunity mine a drift 1,600 feet in length was carried without a break in its average of about one foot thickness of pay ore. Thirty-two hundred feet of drifts in the Bonanza mine show the same conditions, always some ore to go on. Several thousand feet of workings in the Snake and in the Richmond mines still further attest this valuable feature. The ore varies in thickness, of course, but there is always some for the miner to follow, and once having ore you have it always.

LEAD CARBONATES.

Along the bases of the porphyry hills in which the gold

mines are located is a quartzite dyke in which crystallized lead, sulphate of lead and lead carbonates are found. Much work is being done and good results are expected. Manganese, iron ores and some flint deposits rich in gold are also found.

MARBLE.

North of the lode district and near the Animas river are found extensive beds of white, black and variegated marble. These quarries contain some of the purest marble known.

A BIG PROJECT.

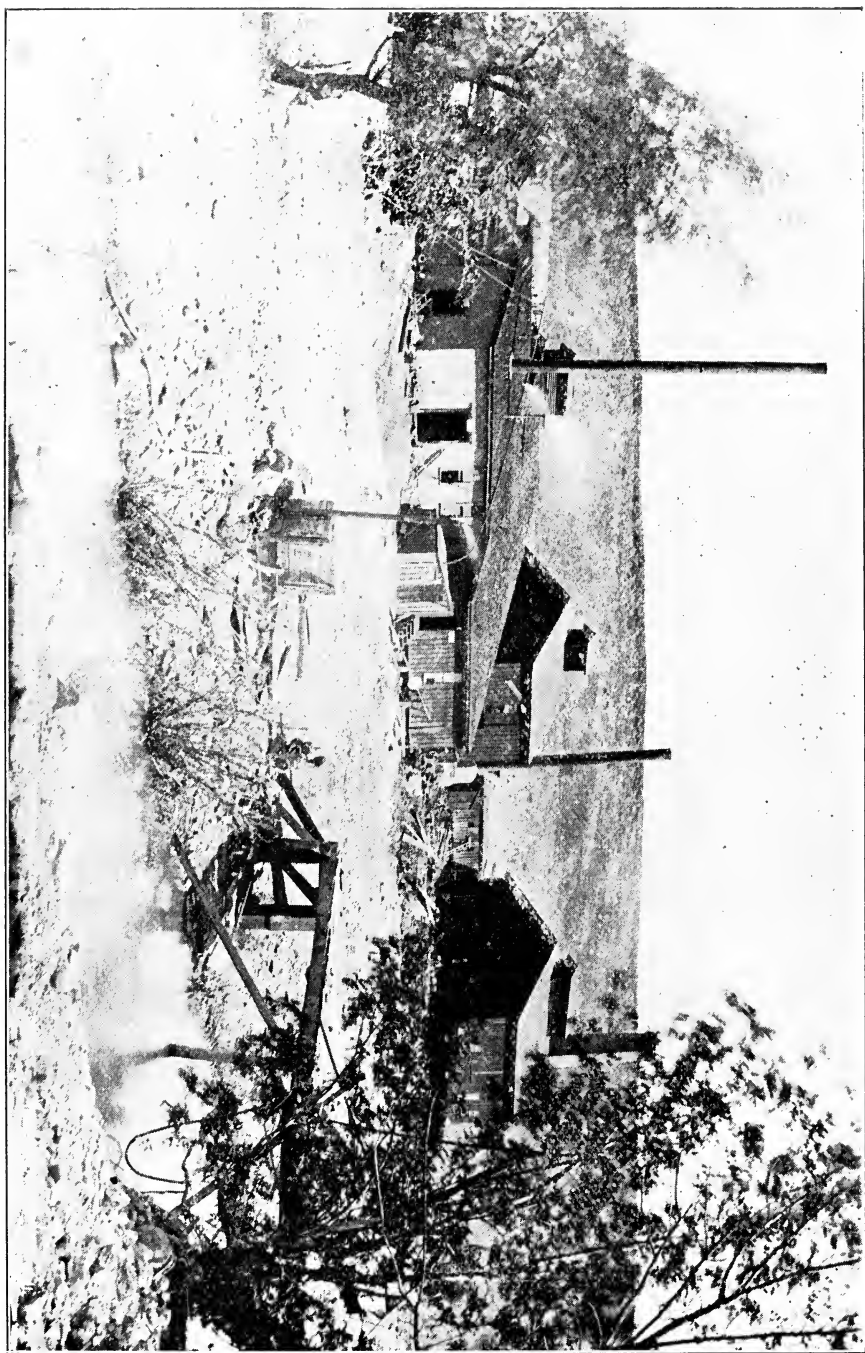
In the center of the porphyric dykes before mentioned rises Animas Peak. A company is now engaged in rapidly tunneling through the base of this mountain so as to cut the many leads that radiate from it. It is a big undertaking, but about 1,000 feet of the work is now done and the investors are satisfied with the showing thus far made.

PLACER BEDS.

To the west of the lode district lie some phenomenally rich placers. Up to date some of the richest dirt has been teamed and packed to the Rio Percha and washed out, and men have made wages fanning out the gold from the dry dirt. A company is now engaged in laying a pipe line from the Animas river to these placers. Already about \$800,000 have been taken out of this ground, and as soon as the pipe line is completed the output will run up into the hundred thousands per year.

Lake Valley.

Of all the romances of mining Lake Valley furnishes the best story. Here abounds the highest grade silver ore. In the early days, when Victoria, Loco and Nana made this valley unhealthy, two miners struck a gold prospect. They sold it for \$100,000 to a Philadelphia syndicate, and two days after the lead ran into the Bridal Chamber, the working of which yielded over \$3,000,000. The expense was so trifling that one man offered the owners \$200,000 for the privilege of entering the mine and taking the metal that he could knock down single



Standard Smelter, Hillsborough.

handed with his pick in one day. This was an era of wild speculation, from which Lake Valley suffered a natural reaction; but the riches of the camp seem only touched as yet. Eight million dollars have been taken from its mines but there is still rich ore. It lies in blanket form and quickly runs into pockets and chambers.

Chloride

lies in the northwestern part of the county. It has both gold and silver bearing fissure veins in granite and syenite. There are two groups of mines tributary to this place. The camp opened in 1880, and has paid well. However, to make big money it is necessary to go deep down. The principal mines are the Silver Monument, Comet, Independent, Black Prince, Black Hawk, Cashier, Small Hopes and Oural in the upper or bornite group, and in the lower are the St. Cloud, U. S. Treasury and Grey Eagle. The ore yields well to the process of lixiviation.

Grafton

lies north of Chloride and there are about twenty-five or thirty miners at work there. It is on the road to Magdalena. The miners are all reported satisfied and the silver is easily mined. When this is said truthfully the prosperity of a camp is assured.

Hermosa

is a thriving camp between Hillsborough and Chloride, and nineteen miles south of the latter. The principal group of mines is the Pelican, carrying silver and lead. These ores are always valuable. Before the fall of silver there were about 109 miners at work in this camp and all doing well. The mines are worked a good deal on the lease system, and the miners have the benefit of all big strikes.

Other Resources.

Besides the precious metals there are immense marble quarries, and on the Armendaris grant great beds of coal, specimens of which were recently analyzed by the U. S. chemists

and pronounced of excellent quality. The Santa Fé route runs through these beds, which are easily worked.

Cattle.

"In the good old days," as the cow men say, thousands upon thousands of stock roamed the Sierra ranges. It is said the grass was breast high, but the range was tremendously overstocked and the grass is now no more than enough to feed the diminished herds. The principal companies are the Rio Animas and the Sierra Land & Cattle Company.

Agriculture.

The same conditions, however, that made cattle profitable prevail to afford the farmer a sure and handsome return for his labor. There are about 4,000 acres under crop, and these are but an earnest of what will be. Fifty thousand acres could be easily cultivated and watered from the numerous streams and the great flow of the Rio Grande. There is an immediate market for the produce in the mines.

Two schemes to reclaim large tracts are under way, and the farmer who desires to better his condition will be repaid if he examines the land, the market and facilities offered, and which now are open to his grasp. With all the advantages enumerated, Sierra county has a genial and salubrious climate, is situated at a moderate elevation, and asthma and kindred diseases are unknown. Sierra county is a place to settle and to live in; but above all it offers opportunities for comfort, and even wealth, to the intelligent, energetic immigrant.

To give some idea of the prices realized on farm products it is only necessary to mention that alfalfa sells for \$20 to \$25 per ton the year round. Vegetables, fruits and dairy products are in constant demand. Small colonies, from a dozen to fifty families, equipped with a capital of about \$1,000 each, could make excellent locations in this county. The demand for agricultural products is growing and the prices will not diminish for some years to come.

Transportation Facilities.

The Atchison, Topeka & Santa Fé railroad passes through Sierra county, like the Rio Grande, from north to south. Its distributing points are at Lake Valley for the south, and at Engle for the east, whence well equipped stage and freight lines penetrate to the different towns and villages of the county. The Santa Fé directory has done much to develop the resources and aid in the growth of this section by granting low rates of transportation on ores to the great smelting points of Colorado, and to Kansas City, Socorro, N. M., and El Paso, Tex. For the 740 miles from Lake Valley to Pueblo and Denver the rate is but \$5.80 per ton. Some important branches and extensions are contemplated to penetrate to the most remote mining camps of this region, and it is the aim of the directory to foster and sustain, to the extent of its power, the rapid growth of the mining industry. An immediate improvement is the extension of the Lake Valley branch to Hillsborough, the county seat, which will bring the road within twelve miles of the most distant mines in the southern half of the county.

GRANT COUNTY.

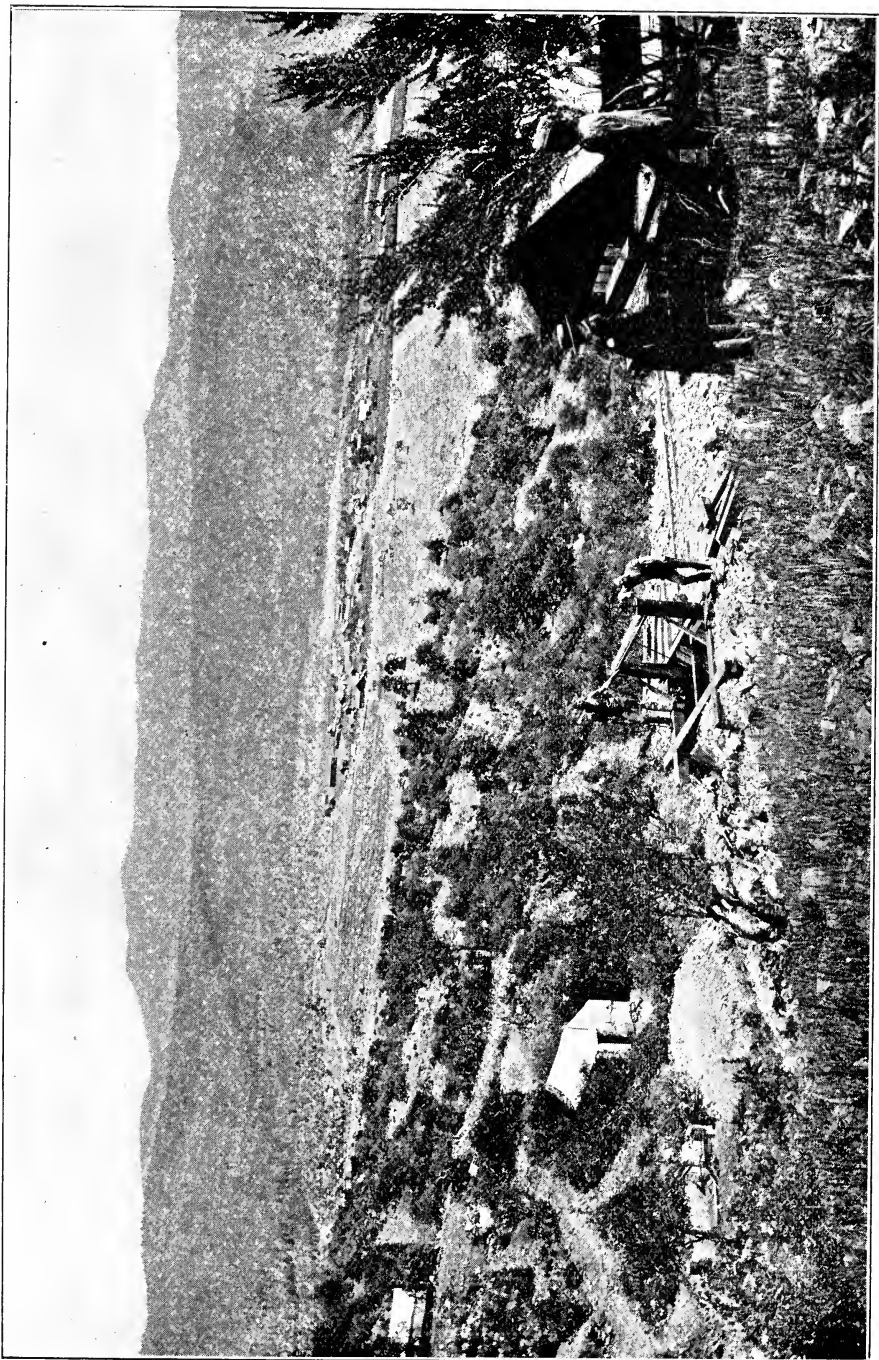
The county of Grant, named for the great soldier, is 23 years old, occupies the southwest corner of New Mexico, and has an area of 9,234 square miles. It is 114 miles long by 81 miles wide. It is bounded on the west by Arizona, on the south by Old Mexico, on the east by Doña Ana and Sierra counties and on the north by Socorro. About 3,500,000 acres are available for pasture land and there are possibly 100,000 acres that can be reclaimed and irrigated by water in sight.

Physical Features.

The general appearance and contour of Grant county is anomalous. The great divide comes down near its western line, trending southwest. It divides the county into two very unequal portions, the larger of which, or Mimbres basin, has no ocean drainage, but its waters flow, sometimes in great, all-devouring floods, at others in unnoticed seepage, toward Palomas lake, the sink of this great region. The Gila drains the northwest of the county into the Gulf of California.

The Gila.

This river rises in Socorro county, and carries off the Pacific drainage of the San Francisco, the Mogollons, the Datil and Black mountain ranges. Owing to the influence of the moist winds that constantly pass over it from the western ocean it has generally been supposed that farming might be conducted without irrigation. On the Sapello, Copper, Duck, Mogollon creeks, and the Gila meadows and plateaus, there are numerous small tracts where crops have been matured for a period of fifteen years without any artificial application of water. The long series of dry years has however dissipated this idea to a great



Pinos Altos Mining Camp.



extent. Crops for the past three years have, to say the least, been precarious, the great underflow alone offering sustenance to vegetation. During this dry period a large increase of irrigation on the Gila by means of small farm ditches has taken place. This region, however, offers to the capitalist tempting possibilities of gain. It is in the midst of one of the greatest mining centers of the world. Every hillside is pregnant with rich ore; the market for farm produce is immediate, and high prices are realized. With a comprehensive system of works about 30,000 or 40,000 acres could be reclaimed, and the farmers could realize from deciduous fruits returns that would rival those from the orange groves of California. Apples, pears, berries and such fruits here reach perfection. The country is free from insect pests, and the intelligent farmer with well watered land has nothing to fear from drought or frost.

The Mimbres.

The Mimbres rises in the mountains of the same name, taking its head waters within a mile or so of some of the principal feeders of the Gila, but on the gulf side of the mountains. During its upper course it takes up the waters of many large springs and small water courses, and supplies water for over 100 farms ranging from 200 to about ten acres in extent. These furnish the majority of the vegetable food of Silver City and the surrounding mining camps. They are thrifty, well kept plantations, and their owners enjoy a certain prosperity. The water is taken out of the river on the community system by small ditches and distributed pro rata to each cluster of farms. Owing to the peculiar situation of the valley it is doubtful if this plan could be much improved by a comprehensive ditch system. The apples and hardy fruits, together with fine vegetables, raised in the upper valley of the Mimbres are of a very superior quality. In the aggregate there are about 5,000 acres cultivated and the prices are very good; 5 cents per pound is the ruling price of apples, and small fruits sell even higher. Potatoes and general garden vegetables are on a scale about

the same as apples. These products are sold in the surrounding mining camps.

The Singularity of the Mimbres Basin.

Below the mountains the Mimbres takes the form of what is usually termed a "lost river." About thirty miles north of Deming it debouches onto a plateau of the Sierra Madre, a large plain of deep alluvial soil. Little or no water is in sight except in the flood seasons; but it may always be had at moderate depths below the surface. For sixty miles south of the Mexican line, and for a similar distance east and west, the same condition prevails. The rivers rise in the mountains, drain a considerable water-shed and then disappear into the earth. The importance of this underflow may be judged by the numerous lakes which appear in Old Mexico just south of the line. Palomas lake is the principal. It is about five or six miles long, three-quarters to two miles wide and fed by hundreds of springs. Some of these are so strong that their disturbance of the water can be plainly seen on the surface of the lake.

This important source of supply is being exploited by two large companies. One project is to sink a bed rock dam across the Mimbres cañon, effectually stopping the underflow of the river at that point, and then to take the water raised to the surface out by gravity ditches on about 20,000 acres of as good land as exists. This project is well under way. It has been examined by the best engineers and pronounced feasible. Next season will probably see it completed. The other is by underflow ditches to obtain the water of the Mimbres and also that of the Burro mountains, which will then be carried by canals to the neighborhood of Deming and placed on ten acre tracts. This scheme also appropriates a large percentage of the surface flow of the Mimbres. Both are extremely practicable propositions. The water is there and can be got by the methods proposed. This will place an aggregate of 40,000 acres under ditch in this valley.

Cattle.

At a conservative estimate there are 200,000 head of cattle in Grant county. The most favorable conditions prevail for stock raising. The county presents the appearance of a great inland sea that had been drained after the cretaceous period. The plains lie flat, with only the gentle undulations caused by wave action. Dotted here and there over the surface are clusters of mountains from 1,000 to 2,000 feet above the general level. The broad plains are covered with black and white grama grass, and the showers ordinarily induced by the mountain clusters serve to keep these herbs in nutritive condition. Of the dozens of valleys where good range is found, the Animas, Valley de las Playas, the Florida plains, the Gila plains, the Sapello, Upper Mimbres, Mule, Mogollon and Duck creek are the principal. Careful and conservative stockmen estimate that about 200,000 cattle and numerous flocks of sheep still range in Grant county. When the disastrous droughts of the past few years are considered this fact speaks volumes for Grant county. When other stockmen are complaining that out of herds of tens of thousands only a few hundred can be found, Grant county still marshals mighty hosts at the annual round-ups.

Except in the rare periods of long continued drought it is almost impossible to overstock the Grant county range, and this fact, taken in connection with the policy of many of the big rangers to sell their stock as young and in good condition as possible, has operated favorably on Grant county's cattle interests. During 1893 there was not only enough grass for the herds, but thousands of tons of grama grass hay were cut. This county for the four years previous to 1893 was a large importer of hay; now they are exporting it in large quantities. This hay grows wild on the public domain, and only costs the labor of cutting. It is now worth about \$19 per ton, with a prospect of higher prices during the winter.

Mining.

In mineral resources Grant county has wealth of gold, silver,

lead, copper, opals, marbles and building stone. The following statistics will show that notwithstanding the dull times mining is still vigorously practiced.

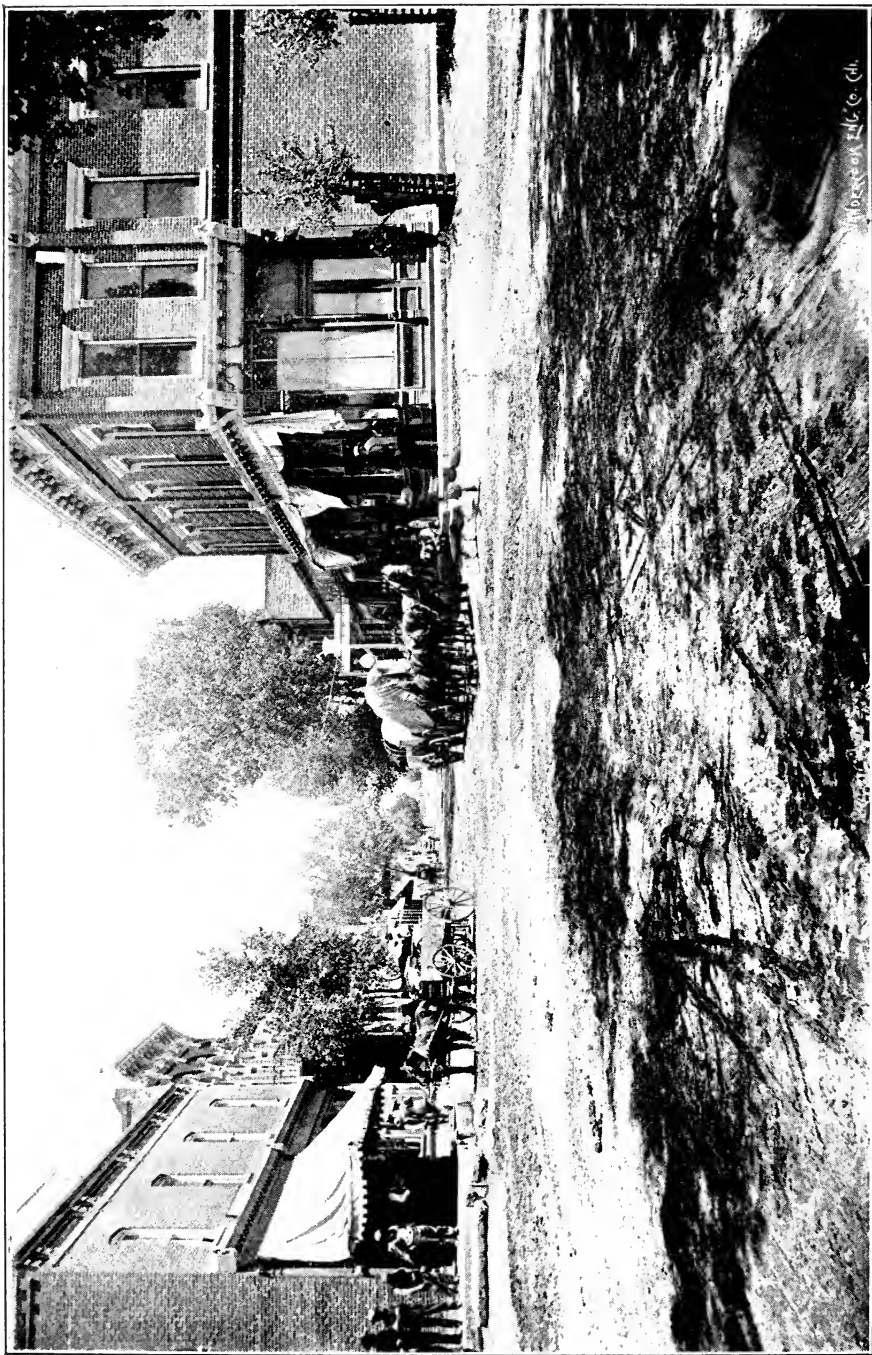
In the gold and silver camps of Lordsburg, Pyramid and Shakespeare seventy-five miners are at work; Victorio, a silver camp, has twenty-five; Central City, a gold producer, works 200; Pinos Altos, gold, 100; Cook's Peak, the greatest lead camp in the southwest and also a good silver producer, employs 100 men; Hadley, silver, fifty; The Floridas, silver, ten; Tres Hermanas, silver, ten; Oak Grove, silver, ten; Georgetown, low grade silver, 130; Hachitas, high grade silver, twenty-five men.

At some of the camps some difficulty has been found this year to get water for the mills, but taken as a whole the mines of the county may be considered in a good condition. Of course the low price of silver is a drawback, but this county has not felt the full severity of the hard times.

This county annually produces over \$1,000,000 of gold and about \$800,000 worth of silver.

The first camps opened in Grant county were at Pinos Altos and Central City. At the two there are over 600 lodes located, all of which have produced some good ores. These are gold camps. When silver, during the year 1893, was depressed and the mines producing it shut down, it was at once supposed that a serious blow had been struck at the general prosperity. The miners, however, immediately pushed work on their gold leads, and the output of Grant county, which is now almost entirely gold, or silver and lead, has increased to nearly double. The gold ores from this district are very similar to those of Central City, Colorado. On the surface they consist of the same iron-stained quartz, containing free gold. At a lower depth the ore is composed of sulphurets of iron and copper with auriferous galena and zincblende deeper still. Nor is gold the only paying ore. Near Pinos Altos one mine shows a streak of native silver that runs \$25,000 per ton. Since the introduction of large capital even the rebellious ores of the lower levels are yielding their riches. Good concentrators and stamp mills have been





Library of A.L.C. Co. (Ch.)

A Street Scene in Silver City.

introduced at nearly every mine, and the surety and success of mining in this region has long been an allowed fact. The silver mines that have shut down on account of low prices have turned loose a large body of energetic miners who are devoting their attention to the placers and gold ledges of the county. The climate is so mild that work is continued every day of the year. The country is about 6,500 feet above sea level, under a warm southern sun, free from disease, and not subject to those sudden changes from warm to cold that are so fatal in the mines north of New Mexico. The western half of the county is one vast stretch of gold lodes and placers intermixed with high grade silver veins.

Silver City.

The county seat is Silver City, situated at the foot of Pinos Altos, in the beautiful Chihuahua valley. All the northern half of the county and parts of Socorro county and Arizona are directly tributary to it, and it outfits dozens of surrounding camps. It lies at the end of a branch line of the Santa Fé road, and enjoys the advantages accruing to every large supply depot. Its banks, court house, hospital, stores, public schools, hotels and other buildings of a public and semi-public character would do credit to an eastern county seat. Since the opening of the Santa Rita copper mines in 1800 it has been a town site, but the energy of the last decade has done more for its advancement than all the previous years. Situated as it is, surrounded by mills and concentrators, almost in the very center of the mining region, its stability and prosperity are assured. Large business blocks are built or projected, and during the year 1893 about twenty-five business houses and handsome residences were built within the city limits. It has a number of civic and social organizations. Its water-works, lying about two miles from town, assure the city not only of a good and pure supply of water, but, as there is a normal pressure in the fire hydrants of 144 pounds to the inch, immunity from the ravages of that dangerous element is certain. The water is pumped to a high reservoir by powerful machinery. It is taken from a tunnel

which drifts across bed rock the full width of the valley. Under anything like ordinary conditions the supply is more than ample. Building material is very cheap as the surrounding mountains furnish lumber and stone of the best character.

This method of developing a water supply is worthy of a complete and technical description. Space however does not permit this. The water is stopped on the bed rock by sub-drains. The location is in a wide swale or shallow valley leading down from the Pinos Altos towards Silver City. No water whatever runs on the surface. This under-drainage is an important factor in the economic development of the arid west. Silver City is a notable example. Not only has she an ample supply for domestic and sanitary purposes of a large city, not dependent on chance showers, but through her pumping system she is relieved as much as possible from danger of fires.

The court house, the Sisters' hospital, the fine blocks that line the business streets, the churches, the commodious and comfortable hotels, of which there are four, give the city a metropolitan air. The salubrious climate makes good the local claims as a sanitarium. Situated at about 6,000 feet elevation, at about (35 degrees 15 seconds) north latitude, protected by encircling mountains, all the conditions are perfect for the preservation of health or the restoration of the invalid to sound physical existence. The springs are early and winters mild, while the summers are never torrid. The latitude is the same as that of the northern coast of the Gulf of Mexico, but the heat is tempered by an elevation of more than a mile above the sea. The air is dry and ozonated, and the influence of the pine forests is felt like balsam in every breath. The invalid who settles here will find his interest in life reviving. He will mix with a brainy, cultured populace, and in a short time will find himself discussing business. He will find ground cheap and material plentiful to build a home, to which purpose the universal hospitality of the people will impel him, and in a short time he will feel himself a useful member of a growing and thriving community. Silver City has a wonderfully bright future.

Deming.

At the junction of the Atchison, Topeka & Santa Fé and the Southern Pacific railways is situated the enterprising and thriving town of Deming. It is a natural railroad center and point of transshipment for the great and growing traffic of Southern California, Arizona and southwestern New Mexico. The importance of Deming as a railroad town can hardly be overestimated. The great Mormon railroad is projected from this point. As proposed it will run south via Columbus, on the boundary line, thence to Guerrero and then to Chihuahua, a distance of 510 miles. A branch of this road has also been surveyed across the Sierra Madre mountains to Sonora, on the Gulf of California. The total mileage of this road, according to the provisions of the Mexican cession will be 1,292 miles, and it will open to commerce one of the richest sections of country on the American hemisphere. At Ascencion, Diaz, Pacheco, Las Palomas, Colonia Juarez and Dublan the Mormons have already established colonies aggregating over 12,000 English speaking people. Their nearest trade center and market is Deming. The country tributary to it is therefore of much commercial value, as the business back and forth with these people is very large. This, however, is only one factor in the growth of Grant county. In a suit between the railroads the plateau on which Deming stands was characterized as only fit for the home of the broad-horned steer, horned toads and rattlesnakes. The people have, however, introduced a great number of wind-mills, by which the vast underflow of water is raised to the surface and put on the land. Dozens of gardens surround the town. These are rapidly developing into a comprehensive system of irrigation. Two enterprises are now under way, and the town itself has constructed a reservoir of 45,000,000 gallons capacity. Its supply is pumped from an immense well.

Caña-agria.

As before mentioned caña-agria carries a larger percentage of tannic acid than any plant known. At Deming extracting

works, complete in every detail, have been built. Three tons of the root are reduced to one ton of extract. The present investment amounts to \$100,000, and the works cover nearly two acres of ground. This extract makes the most pliable and best leather known. It is shipped to all the principal tanneries of the world, and the owners are constantly overcrowded with orders.

Lordsburg

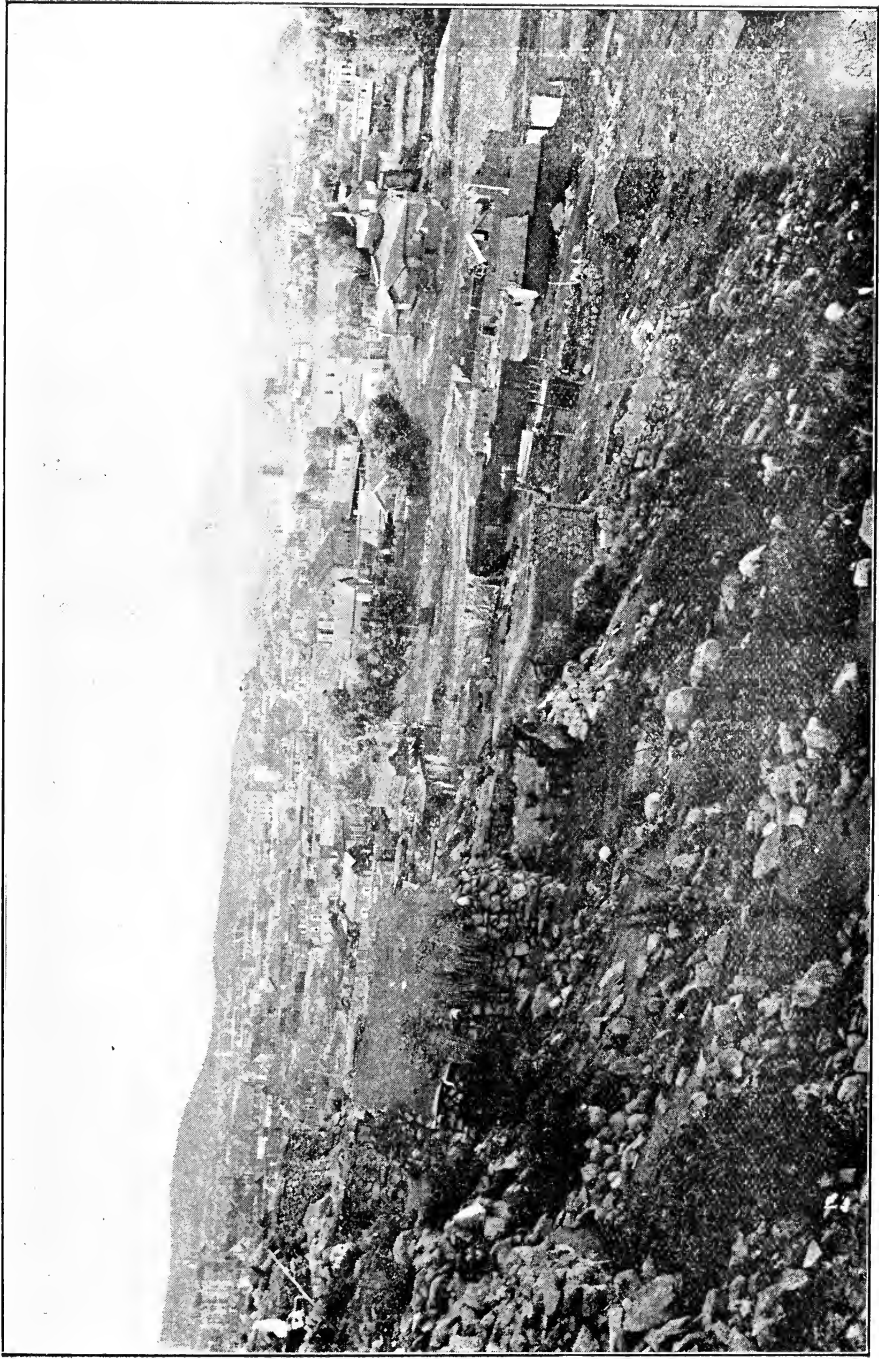
is the center of the southwestern third of Grant county, and is a thriving little town. It is a gold camp and is at present very prosperous. The surrounding stockmen in former years developed their cattle ready for the Eastern market. Of late they have taken to breeding and selling one and two year old stock, which enables them to keep a larger number on the range, and has brought Lordsburg into much prominence as a cattle center.

Georgetown.

This town is on the Mimbres, about twenty miles from its source. It is the center of several hundred good mining claims of low grade silver. At present there are 130 men at work, principally on leases. Only the pay streaks are, however, being worked, as it is not profitable to mine the low grade ore. A clean-up is, however, made of this selected ore about once a month, and a shipment running from one to five or six carloads sent off. The ore shipped is worth from \$12,000 to \$15,000 per month, and all the men in the camp are making good wages. There are immense bodies of silver and lead ores here, and the town is bound to be a thriving point. There are several large stores here now, and the business with the surrounding country for miles is large.

Fort Bayard.

This is one of the important military posts of the United States. It is located seven miles from Silver City, and is garrisoned by four companies of cavalry and two of infantry. It is also headquarters of the 24th infantry and has a fine band. It was located and built early in the '70s to prevent the raids of



Silver City.



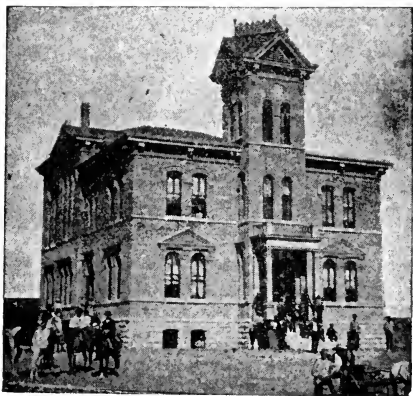
the San Carlos Apaches into New Mexico and of the Hot Springs Apaches into Arizona, and also to prevent the excursions of Indians from the United States into Mexico. It has served its purpose well, and also has protected the rich mining districts of Pinos Altos and Central City from ravage. Before the erection of this post many miners lost their lives in these regions, and it was almost impossible for a prospector to escape an engagement with some hostile Indian. Since its building all this has changed and quiet and security reign.

Evidences of an Ancient Civilization

are everywhere visible in Grant county. The inference is plain that it once supported a large and thriving population. Ruins abound everywhere, and in some cases the evidences of crude mine workings are to be seen. The time is not far distant when this county under better and more stable times will advance to a front rank. The advantages so briefly sketched in the above are already inviting capital. Large investments have in some instances been made; and it may be said generally of Grant county that any one desirous of bettering his condition—be it what it may—who is willing to work hard, can succeed in this thrifty and beautiful region.

DONA ANA COUNTY.

Doña Ana county is situated on the Mexican boundary of the United States, between Grant county on the west and Eddy on the east. On the north it is bounded by Sierra, Socorro and Lincoln counties. It contains 8,280 square miles, and



Agricultural College.

includes a country almost unrivaled in variety and richness. It is provided with about 200 miles of railroad communication in the shape of a triangle formed by the Santa Fé route and the Southern Pacific railway. They start from El Paso on the southern boundary. The former runs north to Rincon and then branches southwestwardly to Deming, in Grant county. The Southern Pacific also reaches Deming, forming the base of the triangle. The county is unique in enjoying such extended railroad facilities.

Physical Features.

This county lies almost wholly in the basin of the Rio Grande, which flows through it in a southwestwardly direction, carrying water enough if properly developed and used to make a world renowned granary and vineland. Stretching around it and beginning at the Floridas, at its mid-western boundary, are the Good sight, Santa Magdalena, Sierra Caballo, Sacramento, Jarrilla, Hueco and Franklin ranges of mountains, while the Sierra Oscura, San Andres and Organ mountains pass through

its center in a grand and beautiful series of peaks. The southwestern corner of this county is included in the sink of the Mimbres. Here springs abound and water is everywhere attainable at very slight depths. The mineral richness of this portion of the county is also very great and there is little doubt that the near future will witness a rapid and permanent development of agriculture and mining matters along the boundary line of Doña Ana and Grant counties. Possessing, as this section undoubtedly does, water, mineral and land, this is a certainty. From the eastern base of the San Andres mountains stretch vast deposits of gypsum which will shortly become extremely valuable as a road building material. Hon. C. B. Eddy has already attained considerable success with this material at the town named for him, and experts in the East pronounce it the best road maker known.

The Mesilla Valley.

The greatest and best known region is, however, that portion of the Rio Grande valley known as the Mesilla valley. On the east it is bounded by the Organ mountains; on the west stretches a great llano or high table land, which breaks down from the Magdalena mountains and seems to flow thence southward along the Rio Grande.

Las Cruces

is the commercial center of this valley and the county seat. In itself it is a quaint collection of houses coming down from the old Mexican regime. In the early days its richness attracted immigration from the four corners of the earth, and its fame had reached to the oldest Caucasian cities, inviting the bold and brilliant to come and found wealthy families. The era that succeeded the war, during which the great transcontinental roads were building, drew off from it the tide of immigration. It is one of the countries to be rediscovered. A man goes there, views the lights and shades ever changing on the Organ mountains, sees the wide alfalfa fields, glowing and luscious orchards, grain fields and vineyards, and is impressed with the beauty of

the scene. He passes a field to-day and sees it closely clipped of its verdure. He returns in a week or so and sees the same a billowy mass of alfalfa. Four and five cuttings of this fragrant and profitable crop are garnered during every season. Grapes are indigenous to this soil. Apples, peaches, plums, nectarines and apricots flourish in luxuriance. The figures and statistics hereafter given will furnish an idea of the prosperity of the farmer of this valley.

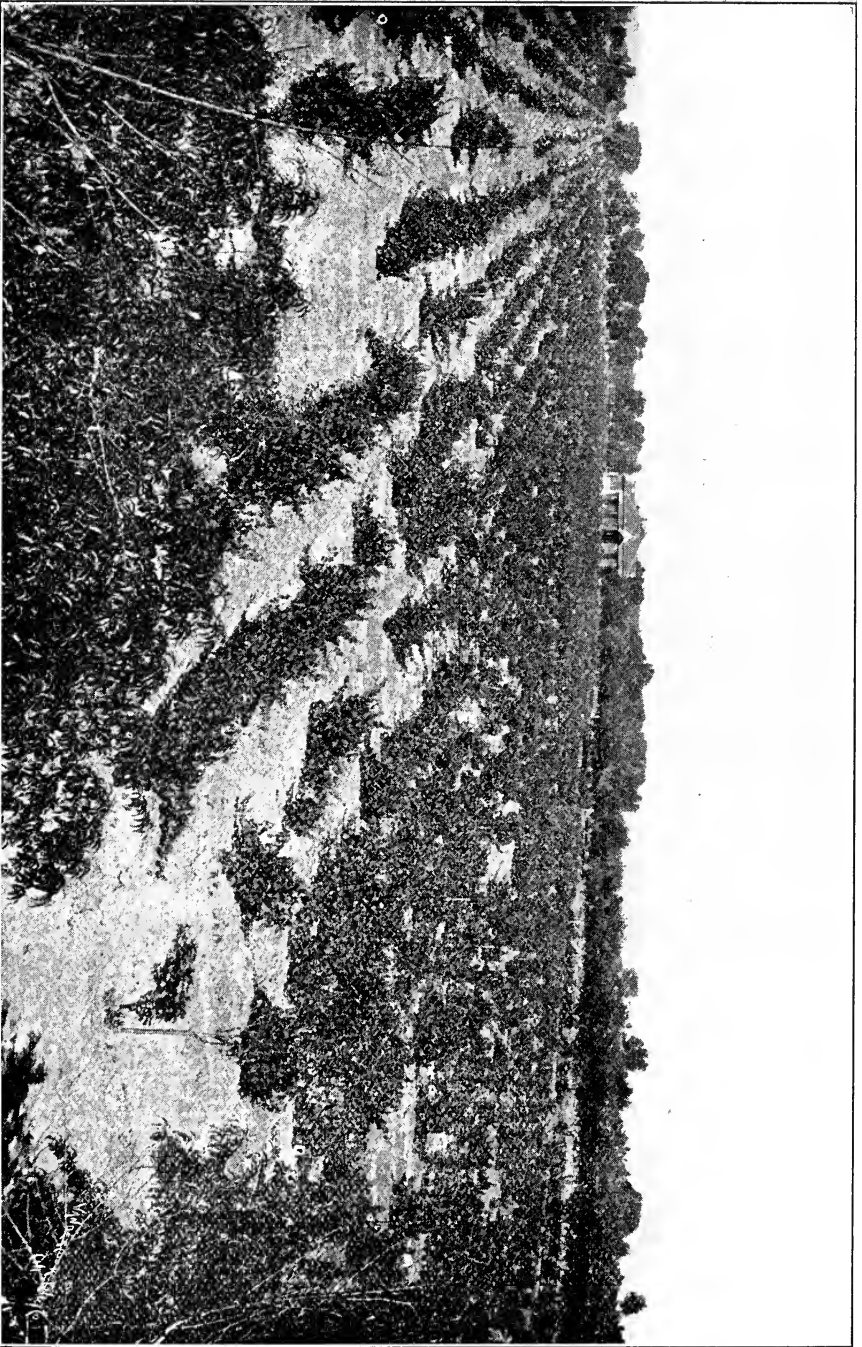
Cattle.

The plains furnish a large crop of grama grass each year and large herds of beef cattle fatten upon it. If the range is not overstocked the cattle men can winter their beeves without loss, and the bottoms, where the nutritious grasses that must have water grow, will fatten them for market. Thousands of dollars are annually made from this industry. The more progressive stockmen raise or lease large alfalfa fields on which they give their cattle a final feed before sending them to market. This, however, is not necessary as a rule. The showers, which are not infrequent during the summer months, keep the ranges in good condition and it is only during a series of dry years that tame grass is at all necessary to bring stock into condition.

Agriculture and Horticulture.

The agricultural crops of Doña Ana, and especially of the Mesilla valley, are alfalfa, fruits and the cereals. In the gardens and vineyards the finest fruits of the temperate zone reach perfection. Many eastern farmers hesitate about settling in the West because of its arid character, which necessitates irrigation. The cost of this artificial application of water is small, averaging not over \$3 per acre yearly for water right and labor. A competent authority puts the cost of labor at less than \$1 per acre for six irrigations. This, however, applies to field crops. Orchards and vineyards require more care and consequently more expense.

Taking alfalfa as a standard it will require an expense of about \$13 to break, seed and lay out an acre, while it will take about \$15 per acre to pay for irrigating, cutting, taxes, water right,



Vineyard, Mesilla Valley.



hauling to depot and commission on sale. On the other hand, alfalfa is a paying crop. Four to five cuttings are made per year, and each cutting averages from about one to three tons per acre. On June 3 of this year, at the Alameda ranch, near Las Cruces, the writer viewed a perfect jungle of alfalfa. It stood almost up to a man's hips, and laced and interlaced into such a tangle that no one could make the passage of the field of nearly 100 acres without as much difficulty as would be found in traversing the same amount of lightly drifted snow. In the early part of the season the average price of this product is \$10 per ton, delivered baled on the cars. It may, however, be said that few farmers sell their alfalfa at this price. The annual average will run about \$12 or a little over per ton, the reason being that within a radius of 150 miles, in the mines and on the ranges, this hay is worth \$20 to \$22 per ton. An acre of good alfalfa land in the Mesilla valley should not produce less than five tons, and with good seeding, watering and care the average should be nearer ten tons. At the latter figure this would be a gross return of \$120 per acre annually. This is not a general thing, but there are fields that produce to this amount, and any farmer of the East, who will devote the same energy it requires to cultivate his eastern farm, will equal this figure. Alfalfa in the Mesilla valley and in fact in all Doña Ana county is a sure and profitable crop, but it must be carefully watched. Intelligence is what tells in its culture.

Crop Values.

A recent report of the Agricultural Department, executive document No. 41, part 1, 52d Congress, 1st session, page 219, speaking of this county says:

"Alfalfa will bring \$80 to the acre. Wheat and corn are low in average, wheat \$20 to the acre; corn will bring \$36. Grapes at 2 cents a pound will net \$200 an acre. An acre of 700 vines, averaging twenty pounds to the vine, will at 2 cents a pound pay \$280. The finest varieties, such as the Muscat and Tokay, will average per year \$300 per acre. They have brought \$600 per acre. * * * Alfalfa, June 30, 1890, was worth \$15 per ton in the cured bale."

Grape Culture.

Two years ago the Secretary of the Bureau of Immigration predicted that "the Mesilla valley, in southern New Mexico, is destined to become the fruit garden of the continent." Since then his judgment has been endorsed by Monsieur Pierre Viala, professor of vine growing at the national school of vine growing, France, who was in the United States studying viniculture. He says: "It really makes me homesick to see these vineyards. It is a splendid soil for the purpose. It could hardly be better. * * * With such a climate and soil, this valley (the Mesilla) can have few rivals in grape culture." This, is praise indeed. To mature a vineyard such as these, described by competent authority to be unrivaled, requires but three years; and once in full bearing they may be rented to commission merchants at from \$80 to \$120 an acre per annum. This, however, is a bad practice and should be discouraged. The rental is spent away from the place of production and does the county no good. Besides, the leases are short and the merchant controlling them often forces the vines too much. It is a reprehensible practice, and its only virtue is to show the value of a Mesilla valley vineyard as an investment. All varieties of the grape seem to be indigenous to this valley and county. Judge G. W. Woods, of Las Cruces, who came to this valley about six years ago from Ithaca, N. Y., says: "In May, 1889, I placed cuttings of the Gros Coleman grape on my place, which I had brought from the Isle of Jersey, as an experiment. In the summer of 1891 these cuttings produced sixty pounds of grapes to the vine, some of them measuring $3\frac{3}{4}$ inches in circumference. The average weight to the bunch was $1\frac{1}{2}$ pounds." This variety of grapes has been widely planted from cuttings furnished by Judge Woods, and all report their excellent qualities. It shows that the grape is indigenous to the Mesilla valley.

Other Fruits.

The various other hardy fruits also reach perfection in Doña Ana county. Peaches, pears, plums, apricots, quinces, prunes

and, above all except peaches, apples flourish. Major W. H. H. Llewellyn has a beautiful ranch of thirteen acres, including almost all these fruits. Hon. Martin Lohman, the present sheriff, has another large ranch, while dozens of others, among whom may be mentioned Messrs. Spatcier, Schaublin, Bull, and Mrs. Casad, have fine places. These orchards are thriving, the vineyards pay big profits and the whole is in a prosperous condition. The purpose is to strictly confine these statements to facts. Therefore only one will be cited, and that, although startling, is absolutely incontestible. Judge G. W. Woods has a most beautiful, well tended orchard. It is set out in apples and peaches alternately, seventy trees of each to the acre. Last year his full bearing peaches yielded \$10 per tree or \$700 to the acre. This does not include the apples, which yielded in proportion.

“Go thou and do likewise,” might be said, but few would give the labor and intelligence to the business that Judge Woods does. Early in the spring he goes over his trees and strips them of all superfluous fruit. In this way his trees are not broken down, nor is the quality of the ripened specimens deteriorated. Each peach and apple is perfect and his product sells from 1 to 2½ cents per pound higher than the best California fruit.

Watermelons grow well. One field here yearly supplies the Albuquerque fair with them, and the owner says he can raise any melon as well if not better than the eastern farmers. He says “the Doña Ana melons are equal to any except the prize specimens that horticulturists manufacture by splitting the stem of a big melon, then inserting a long yarn and feeding it with fresh, rich milk.”

Bee Culture

is a source of profit in connection with all the above. The wide stretching alfalfa fields yield a peculiar variety of honey that is exceptional as a remedy in consumption and all throat and lung diseases. A hive will yield fifty pounds of honey per year, worth 12 to 15 cents per pound. An acre of ground with 150

trees will accommodate twice that number of hives. The reader can make his own calculations of profit from this source. Bee culture is practical on every ranch in Doña Ana county.

Mining

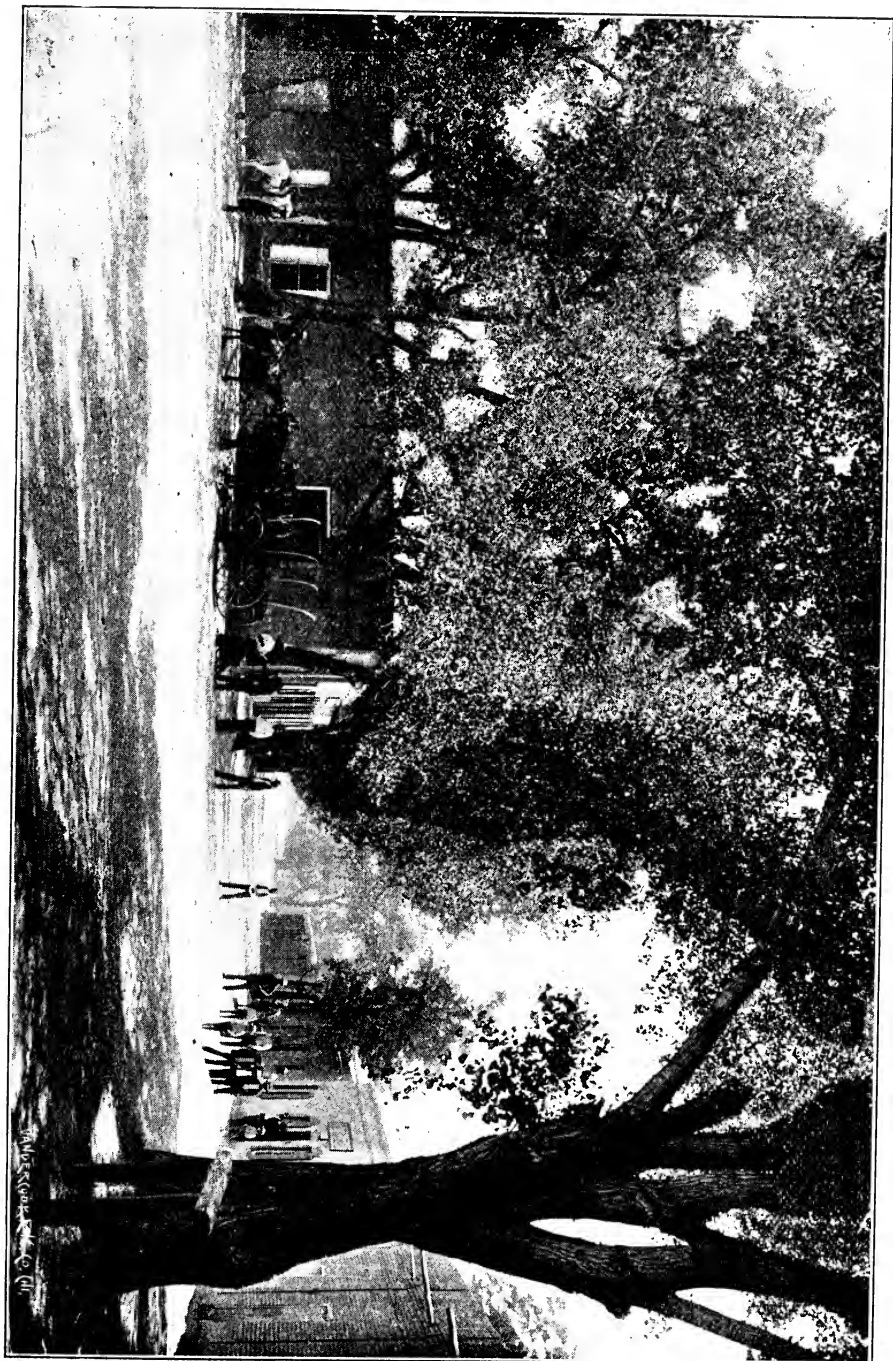
is an important industry. The Bennett-Stephenson puts out such a rich silver ore that it is running even at the present low price of silver. A mill capable of turning out half a ton of concentrates per hour is working up this ore prior to shipment to the smelter at Socorro. The Modoc is also a good shipper. Of late the mines of the Organ mountains have become such an important factor in the wealth of Doña Ana that a company has erected a large concentrator at the depot in Las Cruces, where most of this ore will receive its initial treatment. It is well and solidly constructed.

Towns and Cities.

All the way along the Santa Fé from Rincon to El Paso the eye is gladdened with the verdure and life of pretty little towns, the most important of which are Rincon, Doña Ana, Mesilla and Las Cruces. The first is an important railroad center, with good future prospects.

Las Cruces

is the county seat: has good schools, a fine court house, churches, a splendid academy conducted by the Sisters of Loretto, and contains the Territorial Agricultural College. This institution is a model of its kind. It has taken up the culture of caña-agria, and two plats, one watered and the other not, are devoted to the study of the peculiarities of this plant. It is also, by example, introducing the very latest methods among the surrounding farmers. It teaches in its classes the English and classic courses, besides such branches of agriculture and science as will be fundamentally useful. The chemistry of plants, botany and entomology receive much attention. The writer, in a recent investigation, saw some beautiful specimens and drawings made from the microscope. All the work possible about the place is done



Street Scene in the Town of Mesilla.



by the students themselves, and there is inculcated a practical tendency; the board of regents is now in correspondence with the Secretary of War for the purpose of having a military instructor detailed. The school will then be placed under military discipline. Prof. Hiram Hadley is head of this model institution of practical training.

HOTELS.

Notwithstanding the delightful climate of Doña Ana, and its altitude, about 3,600 feet, calculated to benefit the sick or well, not much could be said of it as a temporary resort until lately. Mr. J. K. Livingston has, however, recently erected a model home hotel one mile from the depot at Las Cruces. It is bowered in trees, surrounded by a small but beautiful ranch, and commands a splendid view of the Organ mountains. Within its hospitable shade no one need fear dust, storm or wind. The wide stretching fields shield it from the sand storms, while the roses that surround it might appropriately demand that it be called Rose Lodge. The owner has deemed the name of Alameda best. This splendidly conducted ranch hotel combines all the beauties and conveniences of farm and hotel life. The choicest and earliest fruits, cream, butter and vegetables are always on the table.

Tularosa

is a pretty, well laid out town southwest of the Mescalero Apache reservation, and is situated at the mouth of the cañon of the river of the same name. It is growing in importance and is destined for a great future. The fruit industry of this section is coming more into prominence. The peaches and grapes are especially fine. A great deal of good wine is also made here. Mining and stock raising are also profitable businesses.

Chamberino, Amoles, Colorado, Doña Ana, Earlham, La Mesa and San Miguel are all important settlements in the Mesilla valley. In fact the whole of this valley is dotted with beautiful towns and villages.

Gypsum.

The White Sands, which occur in the northeastern part of the county, in the large plain east of the Oscura, west of the Sacramento mountains, are a very peculiar formation, deriving their name from their snow-white appearance, really being a vast deposit of gypsum in pulverized form, in many places absolutely pure. The hills, which are about twenty-five miles north from Shedd's Ranch and eighteen south from Tularosa, occupy a section about thirty miles long from north to south and from one-half to five and six miles in width. The deposit forms hills twenty to fifty feet high which move like the dunes on the sea shore, under the wind. It is a most valuable material for the manufacturing of plaster of Paris as well as for fertilizing purposes for the wheat fields of the East, and, when the railroad from El Paso to White Oaks is built, fortunes will be made out of handling it in a short time. Strange to say, there is a good, pure-water spring at the southeastern end of these hills, while every other water running from the hills, after rains, is so saturated with gypsum that it is entirely unfit for any use. No particle of any kind of humus (soil) is on these hills.

Wine Making.

Doña Ana is rapidly acquiring a reputation for its vintage. The vineyards yield from 1,300 to 1,500 gallons of wine per acre. The basis in the best wineries is to estimate that 15 pounds of grapes will yield one gallon of wine and one pint of the finest brandy. No addition of any kind is made to the natural juices of the grape, and the purchaser can be assured of an absolutely pure article. It is very fine in flavor. All that is necessary to make these vineyards rival the famous wines of France and Germany is age. A five year old wine from this section is unrivaled for body and flavor.

The Rio Grande Land Company,

of which Mr. W. T. Cliver, of Las Cruces, is manager, offers splendid opportunities for investment or home building. About 6,000 acres are for sale at Mesilla Park and other locations

around Las Cruces in plats from ten acres up. Ten acres are enough for any man to begin on and the land sells at from \$20 to \$50 per acre. The reader of these pages can do no better than to write to Mr. Cliver for information. The settler in Doña Ana county will find a salubrious climate and a beautiful and prosperous home. The future opportunities for development are so great that it is fully anticipated that the population will more than double in the next five years.

This company, a sub-corporation of the great and progressive Atchison, Topeka & Santa Fé railroad, deserves the utmost praise, not only for its energy displayed and good works built, but for the spirit of fairness that has animated its actions. It has published some of the best literature on the subject of irrigation in New Mexico and has not confined its praise solely to its own lands but has given due commendation to every enterprise in the Territory. This certainly is a unique means of advertising and was only prompted by the fact that this company has some of the best land in New Mexico and knows that it cannot suffer by comparison with any other irrigated farms.

THE PECOS VALLEY.

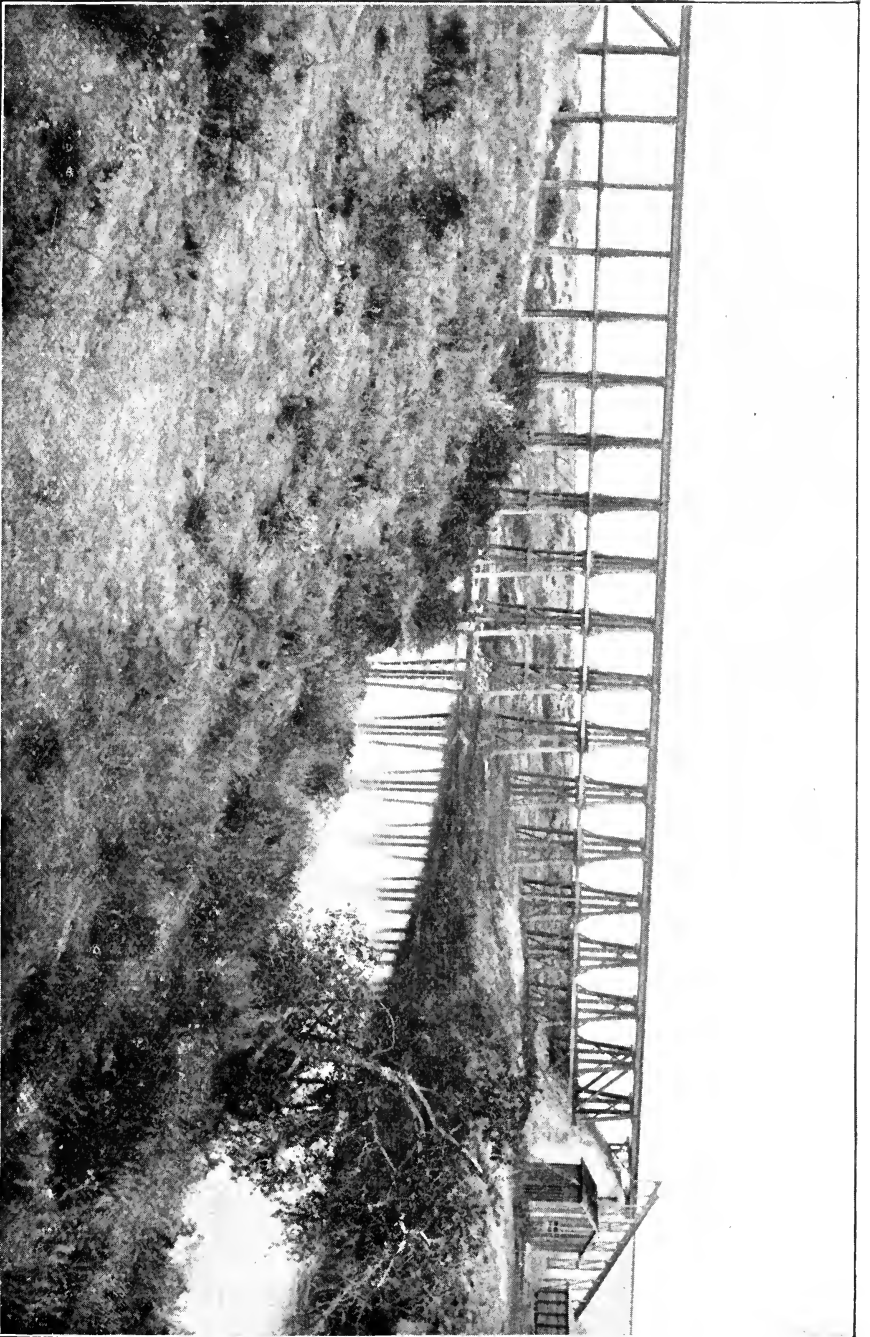
The Development and Prospects of Eddy and Chaves Counties.

The material interests of Eddy and Chaves counties are so interwoven that it is almost impossible to consider them separately. They represent the development, not of civic divisions, but of a region. Therefore they have been combined under one head.

Physical Aspects.

The valley is an immense trough, deeply eroded by the Pecos river, between the Llano Estacado, or Staked Plain, on the east and the central ranges of New Mexico. It runs parallel with the Rio Grande valley throughout its course. The dividing range at the Santa Fé mountains towers to a height of over 12,000 feet. Here the Pecos has its head, flowing eastwardly and taking through a net-work of creeks the great rain and snow fall of this high area. It pursues its course almost up to the wall of the Staked Plain, and from its drainage the river as it turns south takes up another dozen or so small tributaries. Below its most northern spur the Llano Estacado is dry, and the river receives no further moisture from that source. On the west, however, the eastern drainage of the inter-Rio Grande-Pecos divide augments its volume with the waters of a great many streams. It drains an area of over 30,000 square miles. In length the valley is over 350 miles, while it varies in width from twenty to fifty miles.

Geologically its soil is part of the immense area known as the Red Beds, which in eastern New Mexico, Indian Territory



Flume on the Pecos River.

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and western Texas cover an area of more than 100,000 square miles.

Prof. Robert T. Hill, reporting on this region to the U. S. Agricultural Department, says:

“To one accustomed to the green clad landscape of the East or its sombre colored formations the vast landscapes and brilliant colors of the Red Beds are striking, especially if seen in some bold cliff for scores of miles. Glaring vermilion or deep brown chocolate sometimes prevails, varied only here and there by a snow-white bed of gypsum. * * * Along the eastern escarpment of the Llano Estacado there are beautiful bluffs of these vermilion beds with an occasional butte or mesa.”

The Beginning.

Ten years ago this was a practically unknown country. The early Spanish-Mexican settlers had explored it but little, and there are no land grants within its area to impede modern progress with their unsettled titles. Cabeza de Baca, the earliest Caucasian explorer, describes the Pecos as “a great river coming from the north,” and little more was known of it up to the time named, except as is to be gleaned from military reports, and that little is buried in much extrinsic matter.

In 1888, the *New Mexican*, published at Santa Fé, commissioned Mr. Charles W. Greene to examine the resources of what is now the counties of Chaves and Eddy as special correspondent. He found the country occupied by vast herds of cattle owned by the Eddy Bros., the Chisums, Leas, Poe, Milne, Halls and others. Mr. C. B. Eddy had long seen the surprising excellence of this country as an agricultural region, and had even then begun to take out water in a series of ditches on the Laguna Vista. Mr. Eddy and Mr. Greene both understood the methods and necessities of an irrigated country. An organization was at once begun. Mr. Greene left journalism to promote the gigantic undertaking. A company consisting of C. B. Eddy, C. W. Greene and half a dozen Chicago capitalists was first organized, and a good deal of the preliminary work was done by this organization.

Later on, through the efforts of Mr. C. B. Eddy, there came a reorganization and Mr. J. J. Hagerman, the Colorado Springs capitalist and builder of the Colorado Midland railroad, became interested.

The large capital under his influence and command has been poured out and the result is that by an expenditure of \$3,000,000 this vast empire with its water rights and latent wealth has been developed into a world renowned agricultural region, to which are flocking colonists from every nation.

The Bureau of Immigration has always fostered the advancement and growth of this section and now seeks to describe what was, is and will be the Great Pecos Valley.

Progress of this Stupendous Work.

The counties of Eddy and Chaves no longer belong to the has-beens, but are among the most pushing and vigorous communities in the southwest. The Pecos Irrigation & Improvement Company, with its kindred corporations, found what is now Eddy and Chaves counties five years ago merely a promising wilderness. The native grasses, through which over 300,000 cattle roamed, were the only signs of its wonderful fertility; but there was the water flowing to waste, and engineers could accomplish the rest.

Up to date the completed improvements consist of 1,200 miles of irrigating canals and main ditches, 200,000 acres of land reclaimed and under ditch, 50,000 acres settled by intelligent farmers, 20,000 acres actually cultivated.

One hundred miles of railroad have been built and are in operation; also 175 miles of telegraph.

Two counties, Chaves and Eddy, have been created, containing between 9,000 and 10,000 thrifty, energetic and live people.

The foundation of the town of Eddy, with 2,500 inhabitants, newspapers, schools and churches; the rapid development of Roswell to a town of 1,200 people; the foundation of half a dozen smaller towns, with well selected and laid out sites;

the construction of a railroad 100 miles long, and which is projected and building to a junction with the Santa Fé railroad, all of which will run through the heart of a developed country; the planting of hundreds of thousands of shade trees; the knitting together of the community by 175 miles of telegraph and 100 miles of telephone lines, are efforts of corporate management done with wise prevision to further the comfort of actual settlers and induce the immigration of others.

The farmers and settlers themselves have not been backward. Hundreds of beautiful farm homesteads have been erected. With the use of telegraph and telephone the isolation of farm life has disappeared. Farmers' clubs and social organizations are general.

Two hundred and fifty thousand fruit trees were planted in 1892. Over 300,000 were set out during 1893. The fact that nursery men say that the Pecos valley is one of their best and most reliable markets is a significant encomium for a new community.

Two hundred and fifty thousand dollars have been expended in three private improvements in the suburbs of the town of Eddy alone. As much more has been laid out on large model farms. Eight million feet of lumber have been consumed in house building. On January 1, 1894, there were \$200,000 worth of improved live stock in the valley. There are three model stud farms.

The above condensed facts are purposely stated out of the regular order to enforce the reader's attention. They represent the salient features of a marvelous development in which men of brains and capital have fixed their faith. They also represent important reasons and inducements for energetic young men starting out in life to cast their lots with a community of go-ahead people.

The System of Irrigation.

In order that the development above outlined may be understood, the reader's attention is requested to the consideration of the local system of irrigation. It is the largest on the conti-

neut and in its plan one of the most perfect in the world. The irrigable area of this great valley begins a short distance above Roswell. It stretches thence south to below the Texas line a distance of about 170 miles. Low limestone ridges flank the Pecos throughout this part of its course. Sometimes they stretch away for a distance of forty miles, leaving wide level mesas, easily commanded by water. At other points they converge and crowd the streams in narrow gorges, 50, 80 or 100 feet high. Behind the gorges usually lie ideal sites for reservoirs. Under one general plan four great systems of canals and reservoirs have been laid out. They command the entire irrigable area of the valley just described.

The Northern Canal.

Beginning on the Rio Hondo, about five miles east of Roswell, the northern canal takes its water. This system commands the country down to Seven Rivers. The canal is thirty feet wide on bottom, six feet deep, and has a gentle fall of one foot per mile. It is over thirty-five miles long and now waters 60,000 acres. It will be so extended as to cover 100,000 acres more. At the intake of the canal the water is raised fifteen feet by means of a heavy timber dam well founded on closely driven piles. It will carry a maximum amount of 561 feet per second, or ample water for 100,000 acres. The natural flow is sufficient in the growing months to irrigate the land served with water, but in order that no dearth shall be suffered in times of exceeding drought, a reservoir is now being constructed at a favorable point to feed this canal. Its dam is 2,850 feet long, thirty-five feet high, slopes three and one-half to one on the face and two to one on back, and the reservoir has a capacity of over 2,000,000,000 cubic feet. All the waste water will therefore be stored, and the area served by the canal will be amply supplied with water.

The Southern Canal.

The next system in order is known as the southern canal, which starts from a reservoir six miles above Eddy. It is forty-

five feet wide on bottom, with a side slope of one and a half to one, carries seven feet of water, and has a maximum discharge of 1,320 cubic feet per second. Three and two-tenths miles from its head it divides into two branches, the southern of which crosses the Pecos by means of a terre-plein or dyke, 2,600 feet long and sixteen feet high, and a splendid flume. It also crosses the Black river by another flume, 1,040 feet long and sixteen feet high, carrying five feet of water. It is now constructed for forty miles. The other canal, known as the east side canal, has a total length of nineteen and three-tenths miles.

The Immense Reservoirs.

The reservoirs from which this canal will be fed with water are splendid examples of wise location and good construction. Water is taken from reservoir No. 2, as it is known, through a gate cut out of live rock. The storage is 1,000,000,000 cubic feet of water, and submerges 1,032 acres of land. This is again supplemented by the largest single storage basin on the continent. Its dimensions, capacity and description, according to the engineers' figures, are as follows:

NO. 1—SEVEN RIVERS, N. M.

	Feet.
Length of dam.....	1,686
Greatest width at base.....	306
Crown of rock dam.....	74
Crown of earth dam.....	6
Greatest height.....	52
Rock dam, back slope.....	1½ to 1
Rock dam, front slope.....	1½ to 1
Earth face, slope.....	3½ to 1
Capacity, cubic feet.....	6,000,000,000
Submerged area, acres.....	8,100

This reservoir will turn its water as needed into the Pecos river to be taken up and distributed from reservoir No. 2 by the southern system just described. The whole system will serve when completed 200,000 acres.

Intermediately between these will be another reservoir, known as No. 3, formed in a basin similar to the Seven Rivers reservoir, which will store 3,500,000,000 cubic feet. The construction of its dam will be similar to that at Seven Rivers. In fact

the general features of that dam are common to all others. Mr. Louis D. Blauvelt is the engineer in charge.

The southern system as projected and described, when fully complete, will have 10,300,000,000 cubic feet of stored water to serve its needs. This storage alone is more than sufficient to irrigate 200,000 acres.

The Hagerman System.

The third system of canals, known as the Hagerman system, is on the east side of the Pecos and has its dam head about fifteen miles below Eddy. It has a reservoir on its course a mile and a half long by one-half mile wide with an average depth of twenty-five feet. This canal is twenty feet wide and ten miles long. It will be extended to a total of twenty-five miles.

The Highland canal, or the fourth system, is projected to be built south of the territorial line and water land in Texas. It will have the same cross section dimensions as the Hondo canal; will carry the same amount of water, 561 cubic feet per second. Its length will be forty-two miles.

The Supply of Stored Waters.

A summary of the above information will show that there have been constructed up to date:

	Miles.
Total length main canals.....	121
Necessary main laterals.....	273
Farm or sub-laterals.....	900
Total	1,294
	Cubic feet.
Capacity of completed reservoirs.....	7,000,000,000
Capacity of projected reservoirs.....	6,000,000,000
Total storage.....	13,000,000,000

Sources of Supply.

A peculiarity of the Pecos will be somewhat understood by a brief review of its sources of supply. Besides carrying off the surface drainage of its immense basin, it is a spring fed river. Its subterranean waters are an extremely important factor

in the economy of the irrigation of the Pecos valley. Only a few of its numerous tributaries carry water in sight into its channel. Among the most important are the Rio Hondo, Spring, Peñasco and Black rivers. At the foot of the dam six miles above Eddy the river bed is dry. Within fifty yards, however, large springs burst out on the banks and within the river bed, and within a space of 200 yards the river is running a wide, good stream of water. At Eddy, six miles down, the United States Agricultural Department caused this spring water to be measured. There was no water passing the dam, yet the flow "measured over 300 cubic feet of water per second that had come into the river below the dam from springs in the bottom and along its sides" (see page 14, part 2, Senate executive document No. 41, 1st session, 52d Congress). When unimpeded by dams the perennial flow of spring water in the Pecos at Eddy is 1,000 cubic feet per second; or sufficient, according to the duty of water estimated at Greeley, Colorado, to irrigate 160,000 acres of land. The local ratio is, however, much higher, and would range over 200,000 acres.

The examination made by the United States Agricultural Department, the report of which is above quoted, was conducted by Col. Edwin S. Nettleton, under Col. Richard J. Hinton, special agent. Liberty is taken to use much of the matter gathered therein.

The Mountains Furnish Water.

The ranges in which the principal tributary streams rise are timber covered, even the Guadalupe range. Below the Santa Fé range the Sierra Blanca range rises above timber line, and is covered with snow from November until June. The Capitan and Sacramento ranges are about 9,000 feet and the Guadalupe 7,000 in altitude. The waters from these ranges sink soon after entering the valley. Evidences are plentiful of a lost river flowing through a valley lying between these mountains and the San Andres range. At present there is no running water in this valley, but a good deal flows into it and rises in springs.

It also supplies the Lanoria mesa near El Paso with its water. On the Pecos side the water reappears at various points, breaking into the river through fissures in the conglomerate and limestone rocks that underlie the whole valley. Under this again is a bed of gravel and boulders imbedded in a sand and limestone mortar. In this at contact with the limestone the springs are found. These strata generally dip toward the river and their upturned angles offer good opportunities for conducting subterranean water to it.

Take Black river, a large tributary to the Pecos, which flows from the southern end of Guadalupe range. It is nothing but a storm channel, but four large springs discharge into it. Blue spring, the largest, has a discharge of seventeen cubic feet per second. The other three aggregate over fifteen feet. This water and the further large amount that seeps in unnoticed is nothing but the drainage of the Guadalupe reappearing.

Near Roswell again are four large springs that form the North and South Spring rivers. These burst up on the open prairie and pour their waters into the Hondo just above the proposed dam site. The North Spring river has a measured volume of 105 cubic feet per second. It is the same with the North and South Berendas.

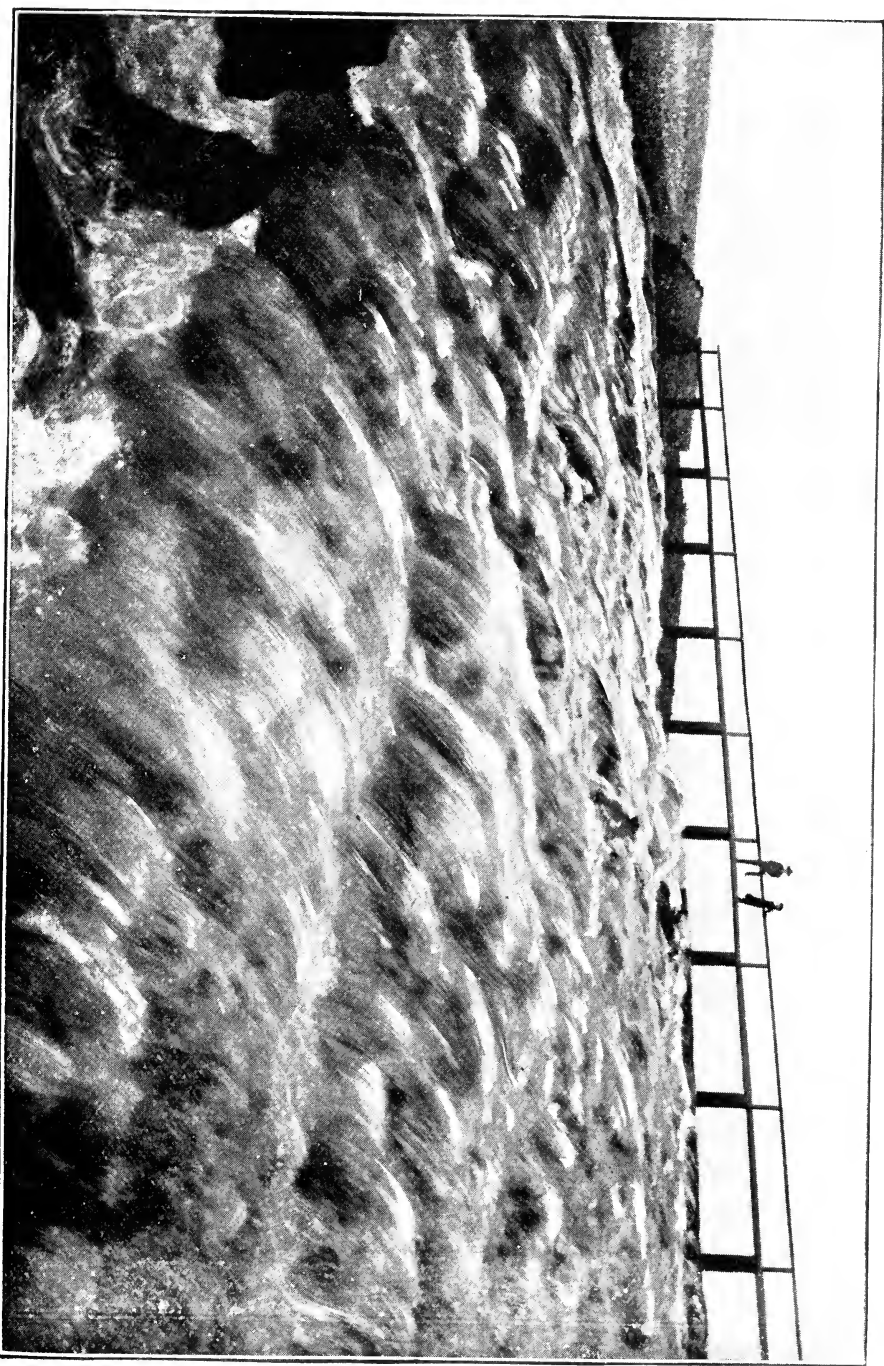
Besides these springs named there are hundreds of others. Within three miles of Eddy there is one that runs 20,000,000 gallons of water daily. Large bodies of still water are also found; deep, almost bottomless pits, called China holes, filled with water, also abound. These often stand out alone on the otherwise dry prairie.

It is the ingenious and systematic saving and distributing of this water that has given the Pecos Irrigation & Improvement Company command of so large an amount of land.

General Water Resources.

The water resources may be summed up as follows:

Average annual rainfall $12\frac{1}{2}$ inches. Even if all this fell in the growing and ripening months it would not be sufficient to



Waste Way of the Reservoir Near Eddy.



mature ordinary crops; therefore the other sources must of necessity be considered. They are:

Average flow of surface water in the Pecos, 500 cubic feet per second.

Average known flow from springs throughout the irrigable portion of the Pecos valley, over 1,200 cubic feet per second.

This is a total of 1,700 cubic feet per second, or enough to irrigate 340,000 acres of land without storage.

At this point the writer wishes to say responsibly that no other region in the United States, with the possible exception of the Tuolumne and Stanislaus valleys of central California, and San Juan county, New Mexico, can show equal water resources. With the storage, noted above, of 13,000,000,000 cubic feet there is nothing at all approaching it in this country, and only the gigantic systems along the Ganges and Nile surpass the works of the Pecos Irrigation & Improvement Company for economy, capacity or skillful engineering. Relatively speaking, things are equal. The writer knows whereof he speaks, having personally examined all of the large irrigation works and systems of the country.

It may be said further that this does not include all the sources of water supply proper to the Pecos valley. In order to do so a discussion of too technical a character to fit the present writing would have to be entered on. Sufficient has been shown, however, to bear out the claims made.

The Character and Ingredients of the Water.

The next question to be considered is the character of this water supply and its adaptability to agriculture. Malicious persons have steadily asserted that crops could not be successfully and continuously grown in Eddy and Chaves counties because of the predomination of alkali in the Pecos water.

It would be sufficient answer to these statements to cite the progress and development up to date. However, as above reports, made and asserted as of absolute knowledge by interested

persons, are liable to do harm, a fuller discussion of this subject follows:

In the first place the writer knows alkali when he sees it, and he has seen more in almost every irrigating region in the West than on the Pecos.

There is more alkali on a section of land around Greeley, Colorado, than in the whole irrigable area of the Pecos.

A better authority, however, speaking on this subject, says officially to the United States Agricultural Department, after special examination, as follows:

“The escarpment of the Llano Estacado in Texas and New Mexico affords superb displays of these brilliantly colored strata, often alternating with bands of pure white, saccharoidal gypsum.

“The beds of gypsum occur over a great area and its quantity is inexhaustible. * * * It is present in Kansas, New Mexico (the Pecos valley), Oklahoma and Texas in great abundance, and is the most important economic feature in the whole Red Beds region, in that its presence is the basis of the fertility of the Red Beds, and it is readily soluble in water and usually accompanied by it. The water is so often strongly impregnated that the term ‘gyp water’ is common throughout the region. Until recently unappreciated, it is rapidly becoming an economic feature. * * * In eastern Mexico (the Pecos valley) it is often soft like pulverulent flour and is known as ‘yeso.’ This yeso is often mistaken for the injurious ‘alkali,’ when in fact it is the fertility of the soil. Miles and miles of this yeso can be seen in the Pecos valley.” See page 130, part 3, executive document 41, 1st session, 52d Congress, report of R. T. Hill.

The above is the official opinion of one of the foremost geologists of the world, and the one best acquainted with the region of which he speaks. It has been adopted and endorsed by the United States Department of Agriculture and published as above in their official reports.

Col. Richard J. Hinton, late special irrigation agent of the United States Department of Agriculture, the foremost expert on the economic phases of irrigation, and who has frequently examined the Pecos valley, holds the same view, and has often expressed it officially and individually.

Analysis of the Pecos Water.

A chemical analysis of a gallon of Pecos water showed: Chloride of calcium and sodium 69.23 grains; sulphate of soda (glauber salts) and sulphate of magnesium (epsom salt) 36.62 grains; carbonate of lime 39 grains; sulphate of lime 30 grains.

This was made by the eminent chemist, Prof. Precht. He goes on to say:

“This analysis is also of great interest from an agricultural standpoint, since a careful computation shows that on every acre of land irrigated with Pecos river water over two tons of solids are deposited in each year, and these are the same class of phosphates and carbonates that many eastern farmers annually buy and spread on their land at a great cost of money and labor. It will likewise be seen that these waters must be of great value for stock, as well as human beings, since they possess the elements that are so essential for the making up of bone, blood and muscular tissues.”

The chemical elements that most generally enter into the composition of plants are chlorine, iron, lime, magnesia, potash and some compound of nitrogen. The last is probably the most important element. This, however, is in largest degree absorbed from the air. At least such is the dictum of Herve Magnus and Charpentier di Cosigni, the foremost French agricultural chemists. It will be seen that the Pecos water furnishes in large degree all the essential salts, but that the analysis shows an absolute absence of alkali.

Prof. Louis Hilgard, of Berkely University, also endorses the Pecos soil and water as exceptionally adaptable to irrigation and raising crops thereby.

The above are a few of the many opinions that could be cited on this subject. They are of the highest authority, and their weight should overburden the malicious slanders that are current in some quarters. Surely these gentlemen know their business and what is necessary to plant life.

There is only one thing further to be said. It is a well known fact that gypsum, or as it is sometimes called “land plaster,” is a universal antidote for alkali. How then could it

exist on land one of whose principal elements is the fertilizing gypsum?

A Delightful Climate.

The climate of the Pecos valley is unsurpassed in winter, and in summer the pure, dry, ozone burdened air tempers the heat.

The general altitude ranges from 3,000 to 4,000 feet. At Eddy, in the center of the valley, it is 3,250 feet. This height, combined with the bracing air from the surrounding mountain ranges, makes the valley a peculiarly good sanitarium. The thermometer rarely falls below 15 above zero in winter and although it rises to 100 degrees in summer it is not damp heat and therefore perfectly tolerable and not oppressive.

Last year the coldest weather in the Pecos valley was 23 degrees above zero. During the winter before last, on January 19, 1892, the lowest degree of cold registered was 7 above zero. At that date a terrible blizzard raged over the country and the cold throughout northern New Mexico was from 10 to 20 degrees below zero and in Colorado it was from 40 to 50 degrees below. Last year hardy native vegetables were on the Eddy and Roswell markets during each month of the year. With this genial climate and rich soil it is not after all so wonderful that Eddy and Chaves counties have shown such marked development. Under these genial influences trees and fruits attain a beauty and fragrance unsurpassed and almost unknown elsewhere, and their flavor is such as can only be imparted on a good gypsum soil under a warm, brilliant sunshine.

The saccharine elements are best brought out under these influences. It is for this reason that the sugar beets raised in this valley show an average of 75.9 per cent of purity; and this under the rigid official analysis of Prof. Wiley, chemist of the United States Agricultural Department (see bulletin No. 36, United States Department of Agriculture, 1892, page 19). All fruits do proportionately well. Six year old apple trees at Roswell yield 1,600 to 1,800 pounds of fruit each year; pears three to four bushels; plums four to six bushels; peaches 400 to 600 pounds. On the Hagerman farm, near Eddy, three almond trees



A Four Year Old Irrigated Apple Tree, Pecos Valley.



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bore and matured over 100 pounds of nuts per tree. Add to this the fact that the Pecos water is equal to the famous springs of Kissingen and Epsom, that all stomachic troubles are corrected and relieved by this water, and there is no other climate in the United States offering equal advantages.

There are, however, two crops in which the Pecos valley offers exceptional advantages to the farmer. They are sugar beets and caña-agria. Their culture is simple, and, although somewhat new to the general American farmer, presents opportunities of profit that quickly command attention when brought to notice.

Caña-agria.

Caña-agria is a species of sour dock that grows wild even on the dryest mesas or table lands. On the high tongue of land at the junction of the Pecos and Black rivers the writer has seen tons of it dessicating in the dry air. No water except the scanty rainfall could reach it. It contains so large a percentage of tannic acid that three tons dried will yield one ton of extract. This is a much higher average than the best oak bark is capable of yielding. There are about 500 acres of this root now in cultivation around Eddy. There is probably no better avenue to profit for a new farmer than raising caña-agria. With ten acres of an eighty acre tract devoted to its culture he could pay all expenses of the remainder and have a good income besides. There is, however, no reason why he should not devote himself entirely to caña-agria planting. One large European firm of tanners has planted 320 acres of this new found help to it near Eddy.

Sugar Beets.

Sugar beets were first introduced to notice in this country by Prof. Wiley, before mentioned. One farmer near Eddy raised beets of 81.3 per cent of purity. These were not forced or overfed plants but the average of his crop. Another of the same place has raised sixty-three tons of this sugar maker to the acre. The cultivation of this product is new here, but when it is con-

sidered that the territorial average is 19.4 per cent of actual sugar to the total weight of the beet, it will be seen what can be done in the Pecos country. Experiment will develop that two tons of sugar can be raised to the acre.

Sugar beets weighing over sixty ounces have been raised. The best weight, however, is from twenty to twenty-five ounces. This is for the reason that the beet only has a limited amount of territory from which to draw its saccharine qualities; after it goes above the weight recommended the gain is only in pulp. An acre of twenty ounce beets will yield more sugar than an acre of the large pulpy ones. The former will go as high as 25 per cent of sugar solids. The latter will seldom reach over 12 or 14. The farmer proposing this culture should bear this in mind.

A beet sugar factory will shortly be erected at Eddy. The company has made all arrangements and the work will go ahead.

Irrigation the Best Method of Cultivation.

Eastern farmers sometimes refuse to come west because of the curious ideas they entertain concerning irrigation. They assert they would sooner stay in a country "where God does the irrigation." If they paused to think, they would soon conclude that nothing could be more absurd. Japan, China, Russia and English Asia, Africa, Italy, Austria, France, Spain, and a large part of Germany gain their food from irrigated farms. It is the method of proper production of cereal food.

Three-fifths of the lands in the United States must of necessity be irrigated to raise crops. Irrigation is natural and historic. The great olden cities drew their supplies from irrigated fields; and the Aztecs once irrigated the western country and brought it to a high degree of fertility.

Prof. W. O. Atwater says: "Not the natural fertility of the soil but its rational culture is what brings the largest, the surest, the most enduring harvests."

Let us examine irrigation in the light of this dictum.

Warmth, light and soil, although essential, are not sufficient

to raise crops. Water is the most essential. Water is the medium through which the plant nourishes itself. No manufacturer would allow the prime necessity of his business to depend on chance. Why then should the farmer allow his product to depend on timely showers or devastating drought? Water at small cost can be controlled absolutely, and fed to growing crops, not fortuitously, but at the exact moment when needed. Another advantage of the irrigated farm is the wide range of culture it allows. On the eastern farm the owner is practically restricted to those crops that suit his rainfall. For some very valuable plants that his soil would raise it is too much, for others it is too little. This is not so with the irrigator. He makes his climate. He puts his crops in the ground and depends on them as certainly as the factory owner on his product. He can control his water absolutely. He is sure of sunshine. He knows the constituents of his soil. What more can be demanded? The irrigator is not a hapless farmer; he is a manufacturer of food. This, because he goes about his work in a rational manner.

There is another way to consider irrigation. It is an insurance of the crop. No eastern farmer would hesitate to pay \$1 or \$1.50 annually per acre to any company that would insure him the value of his crop.

Water Rights in the Pecos Valley.

A perpetual water right is sold by the Pecos Irrigation & Improvement Company at \$10 an acre, or \$400 for a forty acre tract, payable in ten annual installments of \$1 each per acre, with interest at 6 per cent on the deferred payments. This water right must also be considered part of the cost of the land. Without water the soil is useless. Hence, if land and water cost \$35 an acre, and that land will produce larger and better crops than an eastern farm, why should any one hesitate about coming to the Pecos valley?

The additional annual cost for service of water is \$1.25 per acre.

A water right is enough water to cover an acre of land twelve inches deep and consists of 42,560 cubic feet per annum. It is amply sufficient to mature all crops. This amount of water is sometimes called an acre foot.

Irrigation as a Fertilizer.

There is also another point to be considered. It is very seldom, and only for special plants or experiments, that the irrigator is bothered with the use of fertilizers or manures on his land. The water does all that for him. As said before, the Pecos water used in the amount above mentioned annually deposits two tons of the finest fertilizers on each acre of land. This alone would cost an eastern farmer more dollars than his crop generally returns. Fertilizers deposited in this warmer climate also do the most good. They sink right to the spot needed, are taken up in the best form to nourish the plants and make the largest growth. The irrigated farm, therefore, instead of growing poorer is constantly growing better, richer, and more mellow. This aspect alone should be sufficient with the intelligent farmer to decide against the obsolete methods of dry farming and adopt the scientific and certain ways of the irrigator.

A Great Sanitarium.

The climate of Eddy is one of the finest. Wm. Thornton Parker, M. D., member of the Massachusetts Medical Society, Boston Gynæcological Society, etc., in a letter to the *Philadelphia Times and Register*, says:

“When we search our libraries, and the columns of medical journals of this and other countries, we find that the health resorts of real value are not numerous; but in spite of the fact that the American climate is, generally speaking, a severe one for invalids, we have this great western health section as a winter resort for pulmonary invalids, unsurpassed in any quarter of the globe.

“I desire, in this connection, to call special attention to the Pecos valley of New Mexico as a resort for pulmonary diseases.

“Some few years ago this part of New Mexico was known as a region of desert land, in a remote portion of the Territory,





inhabited by desperadoes, and too dangerous for investigation, except by large and well armed bodies of soldiers or by hardy frontiersmen.

“To-day all this is changed. The desperadoes have long since been driven out, a beautiful town (Eddy) has been built, the land is being reclaimed by a superb system of irrigation, and the desert has been replaced by orchards, vineyards and rich fields of nearly every kind of farm produce. Over \$3,000,000 have been spent by men of wide experience, sound judgment and rare business ability. An extensive settlement of sturdy farmers has come forward to improve the land and open up one of the most beautiful valleys in the Territory, if not in the whole West.

“Eddy county is that portion of the Pecos valley which I wish particularly to mention. It is in the extreme southeastern portion of New Mexico, but it is of such recent organization and growth that it does not appear on any map published prior to 1891. It embraces within its boundaries mountains, hills, plains, valleys and meadows, streams, rivulets, springs, and the swift flowing Pecos river. It includes a great variety of trees, shrubbery and wild flowers that beautify its surface, a grand climate and a soil capable of producing the most luxuriant grains, grasses, vegetables and fruits.

“With an experience on the frontier covering many years, from Minnesota to New Mexico, I have never seen or heard of a new town so handsomely and substantially built, so beautiful and so orderly as Eddy, the county seat. No saloons are allowed in Eddy, a clause in all deeds prohibiting the sale of liquor on the premises.

“With regard to the prerequisites in the climate cure, moderate elevation, dryness of atmosphere, abundance of sunlight, gentleness of climate, all these are found in profusion and perfection in and about Eddy. The average temperature is 63 degrees. The atmosphere is light, dry, highly rarified and absolutely pure. Its tonic and remarkably agreeable character is readily realized by every one who breathes it; the grand influence of the invigorating mountain currents, fresh from the noble Guadalupe, is recognized at once. For 325 days of the year the rays of the sun are unobstructed—the summer days are warm and the nights are cool and refreshing. In fact, this section combines every climatic requisite of altitude, equable

temperature, absence of malaria, and abundance of ozone and electricity.

“We have, then, in this beautiful Pecos valley, a section whose history is so remarkable and whose climatic advantages are so grand and so genial that northern and eastern physicians may safely send their patients here, not only for the one genuine cure for consumption—the climate cure—but for the cure of all throat troubles, catarrh, rheumatism, etc.”

Endorsements.

Among others who speak highly of the Pecos valley are ex-Gov. L. Bradford Prince, Gov. W. T. Thornton and the late Jay Gould. Ex-Gov. Prince is an enthusiast. He says officially:

TERRITORY OF NEW MEXICO, }
EXECUTIVE OFFICE, }
SANTA FE, N. M., July 22, 1891. }

To Whom it May Concern:

From recent personal observation as well as from full information, both official and otherwise, I am able to speak in the most favorable manner of the Pecos valley as a field for immigration. The valley itself presents exceptional advantages in this regard, on account of the fertility of the soil, the peculiar excellence of the climate, and its never-failing supply of water, augmented by living springs, which make it impossible to injure the country below by using all the water above. The companies who control the property and its development are composed of gentlemen of high standing, large resources and extraordinary energy, who are anxious in every way to make the settlement of the valley a success, and add to the prosperity and happiness of the individuals who locate there. The titles are all direct from the United States, as no Spanish or Mexican land grants exist in that part of New Mexico, and are therefore perfect and undisputed.

L. BRADFORD PRINCE,
Governor of New Mexico.

WHAT JAY GOULD SAID.

The Pecos also enjoys the advantage of being the only locality to which the late Jay Gould lent the weight of his endorsement. His letter speaks for itself, and while it has been published before its reproduction is not amiss here:

“After passing through the Pecos valley from the crossing of the Texas & Pacific railroad to Eddy I am impressed with the wonderful richness of the soil; with its peculiar adaptation to irrigation, and with an ample supply of water. It will not be long before it becomes one of the richest valleys of the United States. What I was particularly interested in is the effect of the dry, pure air on bronchial troubles. Speaking from personal experience, there is no better region than this for persons thus suffering. The effect is immediate and improvement rapid.”

(Signed) JAY GOULD.

COL. NETTLETON'S OPINION.

Col. Edwin S. Nettleton, who constructed the first large irrigation ditch in the United States, at Greeley, and has had the widest experience in irrigation, in an official report to the Secretary of Agriculture says:

“Owing to the finest climate, permitting the raising of nearly all of the products that can be grown in a semi-tropical climate, including the fruits (excepting the citrus), and the large area and constant water supply, the Pecos valley will be the largest and one of the richest, if not the richest, and best cultivated valleys in New Mexico. The irrigable lands are being rapidly taken up and occupied by English speaking people, a large percentage of whom are from the northern and eastern States.” Page 18, part 2, Irrigation and Cultivation of the Soil Thereby, Senate executive document 41, 1st session 52d Congress.

In a recent interview published in the *Santa Fé New Mexican*, Governor W. T. Thornton says:

“I spent six days at Roswell and three at Eddy, and I saw more evidences of thrift, progress and prosperity in the Pecos valley than I have seen in all my travels, either in New Mexico or the rest of the Union. I never saw thriftier trees and trees so full of fruit. This was quite a surprise, as it has always been claimed, for some cause or other, that fruit trees would not grow in the Pecos valley. The vineyards are also in splendid condition.”

The Shortest Inter-ocean Railroad.

For the first decade of its existence Roswell, then the only town of any importance in this section, used to make the quaint

boast that it was further from a railroad than any town of its size in the United States. Even up to the last days of 1889 it enjoyed this distinction, if distinction it was, being reached by a stage line 177 miles long, from Pecos City, Texas. Just as soon, however, as the ditches began to carry water to the fertile fields the management began to lay plans for the building of a railroad.

Since January, 1891, the first division of this road, ninety-seven miles long, from Pecos City, Texas, to Eddy, New Mexico, has been in active operation. Its business has trebled since its opening, both in passenger and freight traffic.

The building of this road has been a great boon to Eddy, but the wise controllers and promoters of the reclamation of the lower Pecos valley do not stop short of completion. The valley above Eddy is just as rich as below. It is therefore the purpose to push the building of this road north to a junction with the great Santa Fé route, taking en route Roswell and other towns. The management are wisely reticent about their ultimate plans. Where they have actually determined to tap the Santa Fé has not been revealed, but it is a certainty that the extension will be commenced in the immediate future. Surveying parties have laid out the line as far as Roswell, to which point, a distance of eighty miles, it will go with only three tangents. This shows the comparatively level nature of the country.

Assuming only that it will reach the Santa Fé route somewhere in central New Mexico, a glance at the map shows quite a startling railroad proposition. The Pecos Valley railroad is of standard gauge. The Santa Fé road in Texas, within 150 miles east, at San Angelo, has also a standard gauge. The building of this small stretch of railroad would give the Santa Fé and Pecos Valley roads the shortest inter-ocean railway in the United States. With a line from the deep water harbors of Galveston and Velasco, through Texas, New Mexico, Arizona and California, this combination would become the most formidable competitor for inter-continental traffic in the country.

How to Get a Farm.

The following statistics will be interesting to those who intend to locate in Eddy. The cost of a water right has heretofore been given. Land is worth from \$25 to \$35 per acre. Taking it at the lower cost a forty acre tract would cost the farmer about as follows:

Land, at \$25 per acre.....	\$1,000 00
Grubbing, at, say, \$2 per acre.....	80 00
One mile of fence, four wires.....	120 00
Plowing, at \$3 per acre.....	120 00
Alfalfa seed for 30 acres, 20 lbs. to the acre, at 12½c (present price).....	75 00
Corn or cane seed for 10 acres, 60 lbs. to the acre, at 2c.....	12 00
Harrowing 40 acres, at 25c.....	10 00
Ditching 40 acres, at 25c.....	10 00
Harvesting	60 00
Total.....	\$1,487 00

In addition to this there would be an annual water rental of \$1.25 per acre.

The above figures were furnished by an actual farmer in the Pecos valley. He also furnished the following, which gives an idea of the first year's return:

First cutting alfalfa, ¼ ton to acre, 30 acres, 7½ tons at \$15	\$ 112 50
Second cutting, 1 ton per acre, 30 tons at \$15.....	450 00
Ten acres cane or corn, 4 tons to the acre, at \$12.....	480 00
Total.....	\$1,042 50

The second year's possible returns he put at \$3,375 for alfalfa and \$480 for corn or cane.

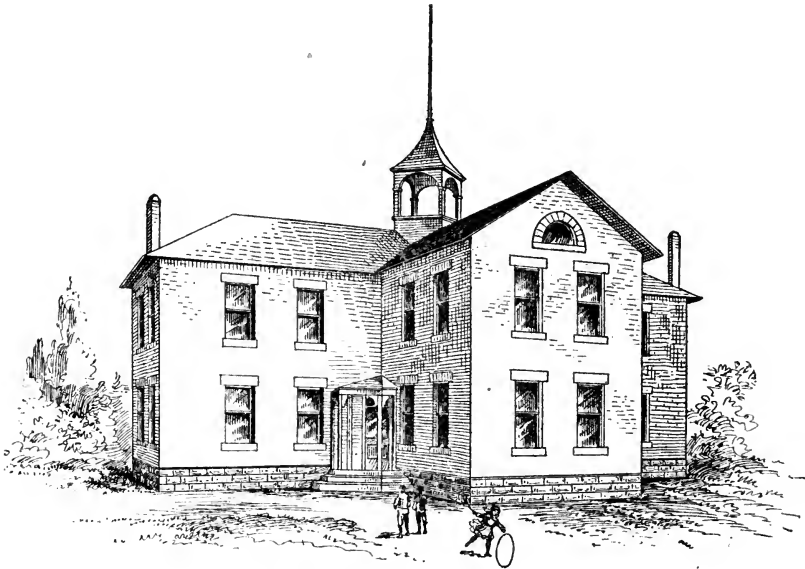
The above is a low estimate of two staple crops. If fruit raising is attempted of course there will be no return for about three years, but the ultimate profit will be much larger.

A Costly but Profitable Investment.

The Hagerman ranch has cost over \$100,000 to put in shape. The question now arises was all this done merely to provide a beautiful home. Certainly not. Mr. Hagerman as surely expects a good return on his outlay as any farmer in the valley. His eighty acres of alfalfa will yield him \$60 gross per acre, or \$4,800. His fruit, 130 acres now planted, will average \$200

per acre, a gross income of \$26,000. Allowing for expensive and improved methods that it costs \$5,000 or \$10,000 per year to keep up the ranch, it will easily be seen that Mr. Hagerman's lovely home will annually yield him a handsome income. Or to take a lower and very reasonable estimate of \$140 gross return per acre annually, and from 640 acres, when fully improved, he will receive each year \$89,600.

Viewed merely in the light of an investment this is a far more than handsome return. If such a proposition was laid be-



Public School Building, Eddy.

fore any good business man he would pronounce it a good thing. Ample data will be given the reader later to show that the above is very much underestimated. If the comparatively poor man will adapt these figures to his own case, and know that they are backed by one of the soundest financiers of the age, he can hardly hesitate in admitting the value of irrigation. Land a great deal better for all practical purposes than the Hagerman farm can be had in the Pecos valley for from \$25 to \$35 per acre.

The view from this beautiful ranch is magnificent. To the east stretches the parapet of the Llano Estacado; in the west the rolling tops of the Guadalupe mountains break the azure sky line; at one's feet almost lies Eddy and its bustling life, with the Pecos river backed up like a lake for three miles; to the south stretches the great valley, the houses of Malaga and Vaud tell of life and activity; three miles away the mile square vineyard of Chas. W. Greene glows in the sun like an emerald on the breast of the mesa; while a hundred homesteads dot the brown expanse with tiny specks of green. Three years ago there was not a house between Eddy and Malaga, twenty miles away. The scene was grand, but wild and bleak. To-day how changed. Life, comfort and happiness announce themselves in hundreds of verdurous spots, and it is realized more strongly how this magnificent wilderness, 150 miles in length, is assuming a delightful and civilized appearance.

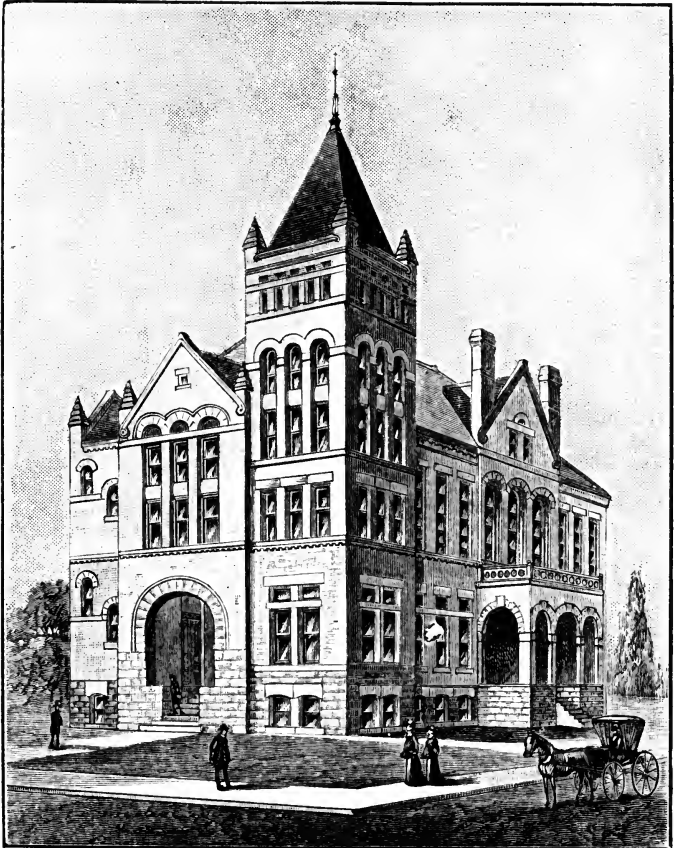
Wool Growing.

One of the great factors of this prosperity is the adaptability of the Pecos valley to wool growing. All day long heavy freight wagons in the clipping season are hauling the fine fleeces to the depot. More than 500,000 pounds of wool were shipped last year. The ranges for sheep are good, and the non-irrigable land affords good winter grass. These places will always be sufficiently removed from the farm settlements to make wool and mutton raising a profitable investment.

The C. W. Greene Properties.

The Pecos Irrigated Farms Company is organized with a capital of \$250,000. It owns three sections, known as the lower farms, on the Pecos south of Malaga. They are all under ditch and are intended to be sold in lots of forty acres. On each plat twenty acres are planted to alfalfa, ten acres to fruit trees, and the remaining ten acres are merely cleared so that the purchaser may devote them to any culture he desires, or the company will plant them according to orders. This land, improved as it is, sells for the reasonable price of \$60 per acre, or \$2,400 for a forty

acre tract. The payments run over four years, and are in equal installments of \$600 each. This proposition is one of the most advantageous to the purchaser of any ever made in the West.



Eddy County Court House.

The farms are in perfect condition for growing profitable crops at the moment the farmer takes them.

On the Felix river, twenty-two miles from Roswell and adjacent to the railroad, are 3,000 acres laid out in the same way as the lower farms.

These properties are among the best in the Pecos valley. All

of them lie in selected locations. The parks near Eddy are very beautiful.

Eddy.

The county seat of Eddy county is the well built and regulated town of Eddy. It is situated on a rolling mesa, and contains some of the best business blocks and most costly and handsome private residences.

Scattered around are handsome churches, erected by the Episcopalians, Baptists and Methodists, and smaller ones by other religious organizations; to which has been added during the past three months a large Catholic church.

Two large, commodious schools are conveniently located, while another of brick, iron and stone, two stories high, heated and ventilated according to the latest modern science, has been erected at a cost of \$10,000. When the townsite company laid out the town the first business attended to was the location and building of school houses.

The court house is a model county building. It is of brick, and cost \$30,000. The design is so appropriate and elegant and the workmanship so thorough that it would be always estimated as worth \$50,000.

Eddy contains sixty-eight miles of graded streets; 130 miles of irrigating ditches, so that every lot has water for irrigation; ninety-four miles of shade trees planted by the city alone; a dozen large general stores, business establishments and public markets such as are usual in a thrifty modern city.

Roswell.

Chaves county is no less important than Eddy as a factor in the Pecos valley. All general descriptions heretofore apply equally to both. Roswell is the county seat of Chaves, and is surrounded by a much older settlement and more picturesque country than Eddy. It was settled in 1875 and it is a prosperous, pretty and very interesting town. It has many orchards and the fruit raised there is fine, luscious and plentiful. It is steadily increasing in population and growing in prosperity and

importance. It is connected with the city of Eddy by a telephone and telegraph line ninety miles in length. Ancient cottonwoods and extensive orchards lend a settled look to it. One great advantage it has over the lower country is that artesian water in light flows can be had comparatively easily. The following gentlemen have wells that have been carefully measured:

Jaffa & Prager:—Depth, 207 feet; $1\frac{1}{2}$ inch pipe; flow, $2\frac{1}{2}$ gallons per minute.

Main Street:—Depth, 165 feet; $1\frac{1}{2}$ inch pipe; flow, very slow.

S. Truxton:—Depth, 156 feet; $1\frac{1}{2}$ inch pipe; flow, $3\frac{3}{4}$ gallons per minute.

J. C. Lea:—Depth, 165 feet; 3 inch pipe; flow, not definitely taken.

Cosgrove:—Depth, 185 feet; $1\frac{1}{2}$ inch pipe; flow, $\frac{1}{2}$ gallon per second.

The town is well supplied with hotels, school houses, a fine court house, well laid out streets, and the general conveniences of a city. At the Pecos valley fair, held at Roswell every year, the display of fruit is wonderful. Nearly every person has seen a picture of the great alfalfa palace which was part of the exhibit of 1892. Fruit, alfalfa, and vegetables are the staples. Roswell is also a great wool depot, receiving the fleeces of Lincoln and Chaves counties.

Other Towns.

Otis, Vaud, Hagerman and Malaga are thriving new settlements, all founded since 1891, but all in a flourishing condition.

A Sign of Progress.

There is a proverb in the Sahara, "put a stick in the ground and water it and you can have a tree." That is just the case in the Pecos valley. Take cottonwood stakes twelve feet long, stick them in the warm soil and water them and they grow into large trees. The planted shade trees of Eddy and surrounding little towns if stretched in a single line would shade a road from Chicago to St. Louis and thence almost to Cincinnati. All this has been done since 1890.

Live Stock.

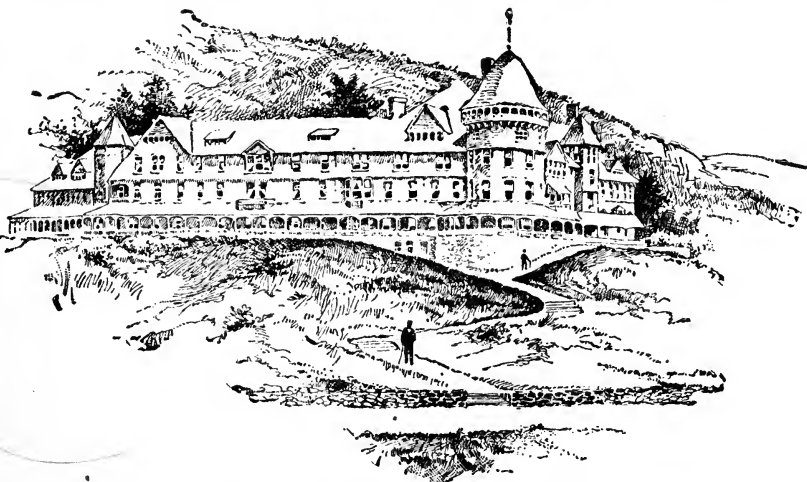
The Pecos valley is rapidly gaining fame as an excellent breeding place for live stock. In Chaves county there are now about 3,000 horses, 100,000 cattle and 60,000 or 70,000 sheep. In Eddy there are about 7,000 horses, 75,000 to 100,000 cattle and about 30,000 sheep. The assessors' returns will be found under the head "property," and while not so large as the figures here given, these are yet well within the bounds of reason, if allowance is made for the usual omissions of the assessment rolls. The eastern part of these counties contains splendid range, but the effort here is to own well bred live stock. The demands of the farm are no longer satisfied with range ponies, nor the dairy or market with semi-wild cows or range beef. In nothing else is the progress of the valley better shown than in the improvement of the number and quality of its live stock.

CLIMATE.

Modern literature, and especially American, is full of descriptions of foreign climates. The changes are rung on Lake Como, the Riviera, Southern France and a half a dozen other places in tiresome iteration. The United States boasts climatic advantages superior to any of them. Take New Mexico for instance. It lies on the southern slope of the continental divide, in the region of perpetual sunshine. Its air is dry and pure and the average elevation of its valleys above sea level is one mile. Fogs of the kind that make hazy weather are unknown. The average number of cheery, sunny days is about 290, while of the balance there is hardly one, certainly not more than half a dozen, when the sun is absolutely invisible. Altitude, sunshine and latitude so balance one another that almost every day is "elixir to the breath and velvet to the cheek." During the past twenty years observance of the weather, in the city of Santa Fé, the thermometer only registered 90 degrees or above eight times. At an altitude of from 5,000 to 7,000 feet, the winter season should be long; but, lying as New Mexico does between the 37th and 32nd parallels of latitude, the cold of winter is minimized, while the heat of summer is reduced. It must not be supposed that New Mexico is within the frostless belt. On the contrary, the winters are of a healthy cold. It may be better understood if it is explained that New Mexico enjoys the summer climate of Minnesota or Wisconsin, the winter climate of Tennessee or North Carolina, and the spring of southern Illinois or Ohio. But there is one advantage that belongs to none of these places. The dry air minimizes the effect of both heat and cold. In summer warm underwear is comfortable, indeed very desirable; in winter there is no need of weighty

wraps. Some light woolen fabric is sufficient as an outer protection and the body clothing may be whatever is most fancied.

So much as concerns physical comfort; but there is rarer pleasure yet. The air of New Mexico comes in with the winds from the widest Pacific. As it scales the terraced western slopes of the great divide it is gradually dried out, and on reaching here is crisp, rarefied, and a poor conductor of heat. On the other hand, it is filled with ozone and all the elements most favorable to excite the bodily functions necessary to produce



Montezuma Hotel, Las Vegas Hot Springs.

animal heat. Its rarefaction is so great that distance is practically annihilated. Mountains and hills twenty and thirty miles off seem not more than three or four and stand revealed from base to summit in all their beauty of brown, gray, ochre, and crimson. The lights are high and the shadows dense, while at points through the lower hills are opened vistas of monarch peaks more than 100 miles distant. Here and there a tiny cloud dapples these shouldering giants and again they blaze out in naked beauty. There is scarcely a hamlet in New Mexico that does not afford these beautiful views.

To put this phenomenon of long vision of beautiful objects in a practical light let us consider it according to eastern ideas of

distance. Suppose that a splendid mountain range encircled Philadelphia; if the eastern people enjoyed New Mexico's pure air the peaks would be visible to the New Yorker. The Boston man could look off towards Albany, N. Y., and feast on the glories of a mountain sunset. The summits of the Adirondacks could be seen from Poughkeepsie. The sheen of a mountain peak at Milwaukee would be visible at Chicago, with all the enchantment of distance.

The causes that operate to fill our air with a velvety elixir are the same that make the country arid. There is, however, a vast difference between an arid and a desert region. The desert is so because it has no water; the arid region is so for want of rain in the valleys. Owing to a peculiar arrangement of towering mountains the rains and snows descend on their crests to a depth of 90 or 100 inches. The valleys have a rainfall of only thirteen or fourteen inches. This is only enough to lay the dust; but from the bosoms of the mountains pour constant streams of living water, filled with a silt and sediment as rich as that from the Nubian mountains that fertilizes the valley of the Nile, and this taken out upon the arable land renders our fields perennially fertile. Of course without irrigation the arid fields are sere and brown with burnt vegetation, or gray with sand; but saturate them with the mountain waters and they bloom with green and gold. The Atlantic States have an average precipitation of fifty inches per annum. How often even with this do crops fail either through drought or flood. Relying on nature the ripening months are often too dry, and again too wet, to make a good crop. In the so-called deserts of New Mexico this is never the case.

The old saying that "praise from a rival is praise indeed," is true now as ever. Hence the following is quoted from the editorial columns of the *Denver Republican*:

"New Mexico is one of the richest parts of the national domain, but there are many people who do not appreciate this. They think it is a barren and desolate region; and what is especially to be noted is the fact that this erroneous opinion is held

by some of the inhabitants of Colorado. Men of Colorado who find fault with people in the East for thinking that Colorado is a desert are guilty of the same offense when it comes to a consideration of New Mexico. In New Mexico, as in Colorado, irrigation is necessary for agriculture, but wherever irrigation is practicable the soil produces bountifully. In some respects the climate is better than that of Colorado. The winters are milder."

That the climate of New Mexico is the mildest and most equable on earth may be doubted by outsiders, but every resident firmly believes it. However, it is best to permit the reader to form his own opinion on the record taken from the data gathered by the weather service during a period of twenty years, at Santa Fé, so far the only data available. According to these figures, the normal temperature, reckoned according to Fahrenheit's scale, for each month in the year is as follows: January, 27.08; February, 32.06; March, 39.06; April, 46.04; May, 53.08; June, 65.00; July, 68.07; August, 66.05; September, 60.01; October, 50.00; November, 37.02; December, 30.09 (see last annual report of the weather service bureau).

Taking the year, then, and considering it by monthly normals only the mean annual temperature would be 48.32 degrees above zero. Below are given the actual figures for each year, and the reader can form his own opinion of the departures from an absolutely equable temperature:

Year.	Annual mean.	Year.	Annual mean.	Year.	Annual mean.	Year.	Annual mean.	Year.	Annual mean.
1872	47.9	1876	47.5	1880	45.0	1886	47.6	1890	50.4
1873	48.5	1877	47.6	1881	49.7	1887	49.0	1891	47.3
1874	48.0	1878	47.5	1882	48.3	1888	48.4	1892	49.1
1875	47.5	1879	50.2	1885	47.7	1889	49.8	1893	49.5

1883 and 1884 lacking.

The two years noted as lacking are when changes in the staff of observers or omissions rendered an actually accurate record impossible. The results of the partial returns are therefore not given.

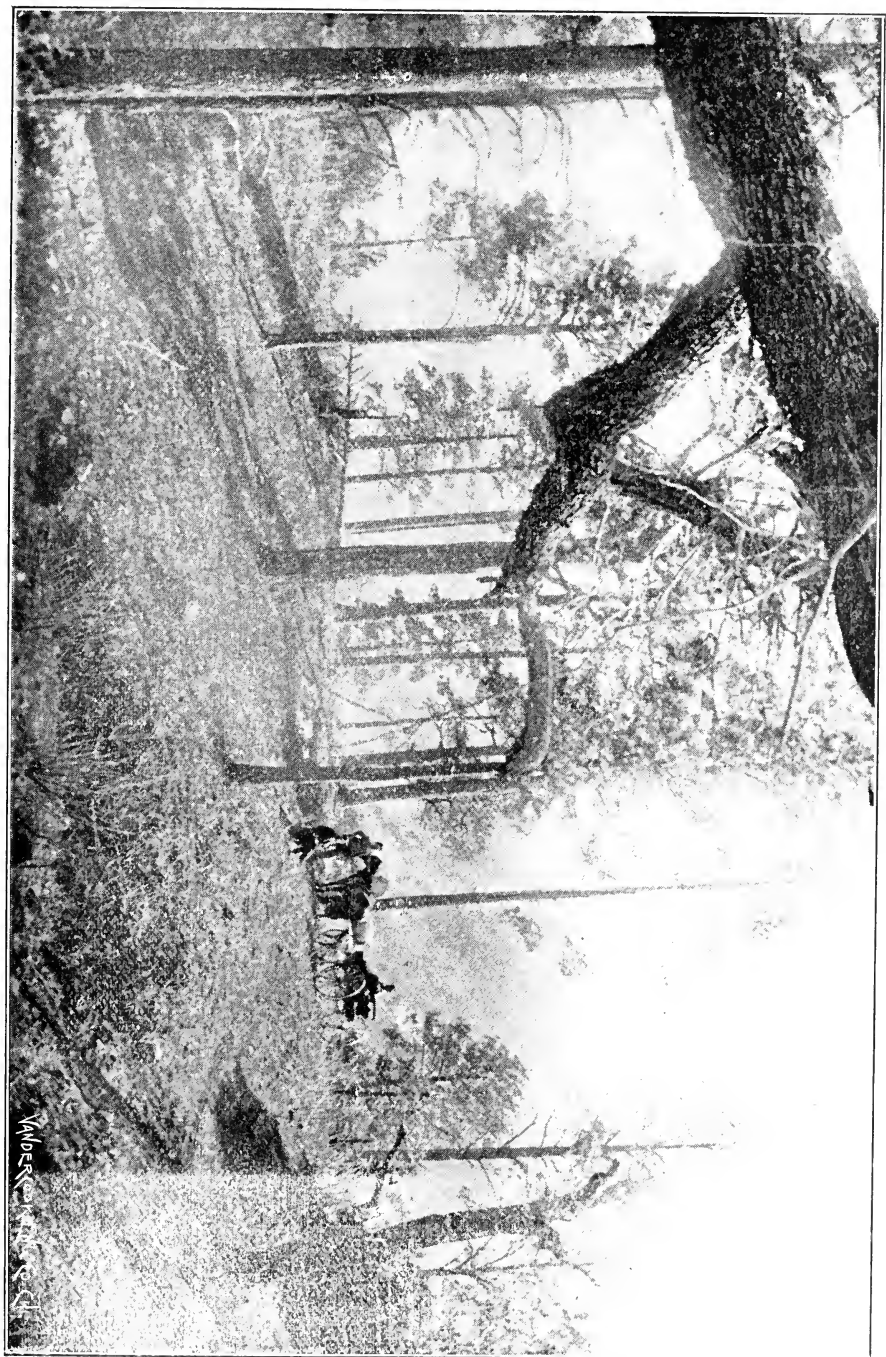
The study of "means" and averages is very deceptive. It is only by giving in connection therewith other figures and data

that an intelligent idea can be gathered. During the twenty years observations quoted the thermometer reached 90 degrees in the shade only seven times. The hottest day recorded at Santa Fé, the main office, is 97 degrees. Only fifteen times did the cold touch zero throughout this period. These figures may be considered as general to the Territory; but the necessary changes and amendments will suggest themselves to the reader according to altitude and latitude. Of course the mean range of the summer months will be higher at Las Cruces, Eddy, Deming or Silver City, where the normal for the month of July will probably be 70 or 72 degrees; but the temperature of January, the coldest month, will be correspondingly increased. The figures quoted will very fairly apply to Las Vegas, Albuquerque, Raton and many other sections of the Territory.

Herewith is given the record in inches and fractions of the normal rain and snow fall of each month for the valley areas: January, 0.58; February, 0.77; March, 0.65; April, 0.35; May, 0.90; June, 0.95; July, 2.74; August, 2.59; September, 1.50; October, 1.00; November, 0.89; December, 0.83.

The reader will note that the precipitation is greater in the months of summer; that in fact it is almost in direct ratio to the amount of caloric in the air. For this reason, among others, the summer heat of the sun is tempered, while its full effect is felt in winter. It will also be noted by a reference to the leading article of this book that 290 sunny days may be expected each year throughout New Mexico. Of the balance not more than thirty days will be what are technically termed "cloudy," that is that the sun is invisible for eight-tenths of the time. The forty-five remaining days will be such as show a broken sunshine record. The automatic indicator at Santa Fé has never registered a single day, winter or summer, when the sun was totally invisible.

The winter temperature of New Mexico is delightful. Actual experience is the only appropriate test of its salubrity. However, to give some idea of the temperate weather, take January, the coldest month, with a temperature of 27 degrees: there



Top of the Divide, Black Range.

Yalderwood

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will hardly be a single day when it will freeze during daylight. The air and ground are dry and free from frost, therefore shortly after sunrise the temperature begins to rise, and from early breakfast time until dark the weather is mild enough for delicate persons to enjoy out-door life.

Comparing the humidity of New Mexico with the world at large, we find, according to the U. S. weather bureau, that 76 per cent of moisture in the air is general for the Atlantic coast, while at Jacksonville, Fla., it is 86; Chicago has 71 per cent, and San Francisco 70 per cent of vapor or humidity in the atmosphere. New Mexico has only 36 per cent of relative humidity.

This will be better comprehended by saying that the rainfall of New York is 52.30 inches per annum; Cincinnati, 47.70; Aiken, South Carolina, 45.3; interior New York State, 41.24; Milwaukee, 30.09; and so on; while New Mexico generally has only between 13 and 14 inches of snow or rain; and besides this the soil is a deep, sandy loam into which the rain sinks, so that an hour or so after an ordinary shower the surface is dry and fit for the tread of the most delicate pedestrian.

Take the foregoing facts and then consider that at an altitude of 4,000 to 7,000 feet the lungs are exercising as in a special gymnasium, not alone during the day but at night and all the time. The air being light and incapable of a high degree of saturation, breathing is easy and healthful. Culled from the many medical opinions on New Mexico the following are quoted:

Dr. Clinton Wagner, service surgeon of the New York Metropolitan Throat Hospital, says:

“The effect of dry rarefied air is to increase the appetite; assimilation is improved, the number and depth of respirations (breathings) are increased, the chest gains in expansive power; more moisture is exhaled than in humid atmospheres, the effect of which is in time to check secretion from the diseased tissues. The cheeks fill out, the complexion becomes of a ruddy brown, the strength increases, the spirits revive, and the invalid becomes impressed with the idea that he will recover.”

Speaking of the immunity of New Mexico from consumption, ex-Surgeon General W. A. Hammond, U. S. A., says:

“New Mexico is by far the most favorable residence in the United States for those predisposed or affected with phthisis (consumption). In a service of three years in New Mexico, during which period I served at eight different stations, I saw but three cases of phthisis, and these were in persons recently arrived from elsewhere.”

Prof. Jaccoud, an eminent French physician, writing on the “Curability and Treatment of Pulmonary Phthisis,” and speaking of New Mexico in particular, says:

“Mountainous climates have in reality a double effect; firstly a general one, by which the constitution is restored to a healthy condition; secondly a local one, by which the rapidity of respiration is increased to a maximum degree, while the lung is protected from the effects of congestion or hyperæmia. The climate of such altitudes produces a tonic effect, while it has a mechanical influence upon the lungs due to atmospheric pressure.”

As stated before, New Mexico is a vast table land, averaging 5,000 feet above sea level. Doctors consider that disease germs are fewer, and the general conditions of animal life more favorable at an elevation of 4,000 to 7,500 feet than at any other altitude. Another great requisite of a good climate is a dry, non-malarious air. Prof. Joseph P. Ross, addressing the Chicago Medical Society, says:

“Study of the gulf coast and Florida leads to the conclusion that the climate is a failure for the treatment of consumption. Patients go there, the air is balmy, and they say ‘what a beautiful air!’ They do not cough so much, but they sit around, for there is nothing to cause them to take exercise. There is something lacking in the air. It does not brace one up. The atmosphere is warm and moist, and very depressing, while malaria abounds.”

Such is not the case here. While the movements of the winds are gentle, only between five and seven miles an hour, they come laden with ozone from the mountains, and the air is free from impurity. The hottest days of summer are pleasant on account of this balmy breeze.

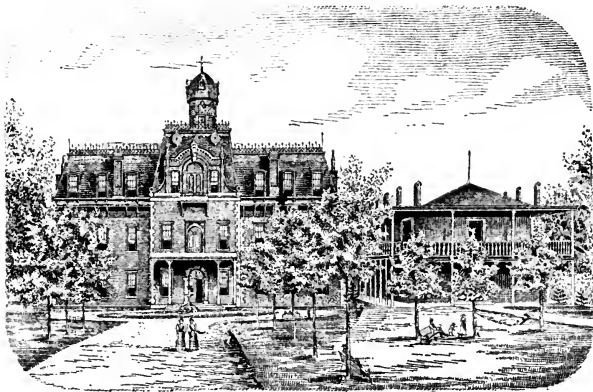
This question of the average velocity of the winds is an important one for invalids. Searching, boisterous gales are very trying to delicate health. The figures given above—between five and seven miles per hour—are taken from the records of the U. S. weather service, and the reader may easily satisfy himself of their exactness. Such things as blizzards, cyclones and hurricanes are unknown in the valleys of New Mexico. The reason is that the mountain ramparts that surround them break the force of violent storms; and the airs that percolate into the valleys from the constant continental winds are mild and gentle. They kiss the cheek of the invalid until its roses bloom again.

The foregoing shows the advantages of New Mexico as a world's sanitarium. In the native dialects there is no word to indicate consumption. Were it not for the annual influx of consumptives the disease would be to-day unknown. As it is the death rate from the terrible scourge is only three in 1,000 deaths, or 3-1000 per cent. By an examination of the records of the United States census, it will be seen that the mortality from pulmonary disease averages $33\frac{1}{3}$ per cent, while in Maine 50 per cent of all the deaths between the ages of 20 and 40 years are from consumption. The general average in New England is 25 per cent, Minnesota 14 per cent and the Southern States from 5 to 6.

A committee of the medical societies of France decided years ago that New Mexico was the freest part of the habitable world from consumption. Besides this it presents a wide range of altitude. Santa Fé is 7,000 feet high, or more than a mile and one-quarter above the sea. Las Vegas, in about the same latitude, and Silver City, 3 degrees or over 207 miles further south, are about 6,000 feet high. Albuquerque, somewhat between the two in latitude, is 5,000 feet. Las Cruces and Eddy, are the centers of lovely valleys, and about 3,400 feet above sea level. Then there is Deming, about 3,600 feet high, where the air is as pure and free from moisture as the Desert of Sahara. There is not a town in New Mexico from Raton, on the north, to Colum-

bus, on the Mexican border, in the sink of the Mimbres, where consumption may not be cured or the invalid regain strength.

Dr. Dennison, of Denver, Colorado, has called attention to the fact that "if we reckon the surface of the human body at 16 square feet—the average proportion—we see that at an altitude of 6,000 feet the body of a man is relieved of the enormous weight of 7,000 pounds, or at 7,000 feet more than 8,000 pounds." Prof. Lieberkuhn reckons the area of respiratory sur-



St. Vincent Sanitarium, Santa Fe.

face in both lungs of a man to be 1,400 square inches. The enormous relief of pressure on the weak lungs of a consumptive is therefore easily seen. The

effect thereof is to quicken and enlarge respiration. The lungs are very elastic; the pressure of the blood within them remains the same, and the first effect of a removal from the damp, heavy level of the sea shore to this altitude is a healthy expansion of the lungs. Again, in order to procure the necessary amount of oxygen in this thin air, more of it must be inhaled. The first effect therefore noticed is a more rapid breathing, but in a few months this subsides into a natural, deep inhalation. The chest has increased in girth, from two to five inches usually, and of course the lungs attain greater size. In from three to five months the consumptive, not too far gone in disease, should be on the sure road to permanent recovery. It should also be noted that the spring months in New Mexico are among the driest of the year, and the consumptive need not fear this trying season as he does elsewhere. Colorado would have equally as good a

climate as New Mexico were it not for the greater amount of moisture that pervades its atmosphere. The relative humidity of April, May and June, the worst months on weak lungs, is 35.2 per cent for the first month and 30.3 and 30.5 for the others, respectively.

There is one other feature of the climate to be mentioned, and that is the absence of rank vegetation. This makes New Mexico, in its general expanse, a splendid sanitarium for hay fever as well as consumption.

The inquirer will naturally ask, where shall I locate in New Mexico. If he be an invalid he should consult his physician, and through his advice select the altitude and latitude most suitable to him. He is offered a range of five degrees of latitude, and any elevation he may desire down to about 3,000 feet. If the immigrant is merely seeking this climate as a preventative anywhere will do. He should read the balance of this book and decide on the location best suited to his business. Every quarter will benefit his health. If, however, he desires local treatment in the way of baths or mineral waters a wide range of selection is open to him.

EDUCATION.

The amount of aid and the facilities to obtain a good education free of charge afforded by the State are always good criteria of public character and progress in any community. New Mexico's system of public schools is one of the best in the country and is very liberally supported by appropriations from various sources. A resume of the school law will therefore be of interest.

The executive machinery consists of a superintendent of public instruction and a territorial board of education made up of the following membership: the governor, the superintendent of public instruction, the president of St. Michael's College, Santa Fé, the president of the University, at Albuquerque, and the president of the Agricultural College, Las Cruces, who meet semi-annually, and at such other times as may be necessary. This board prescribes the kind and authorship of school books to be used. The superintendent is obliged to visit each county once each year for the purpose of holding a teachers institute, which shall continue for at least two days. During these visits he shall also carefully examine into and direct all matters connected with public education. The superintendent is also charged with other ministerial duties in the way of reports, etc. The law also provides for county superintendents, who shall have local powers. Each county is divided into school districts, under charge of directors. These schools are supported by a territorial tax of 3 mills on the dollar of all taxable property, a poll tax of \$1 on each voter, the proceeds of licenses, together with the proceeds of certain fines. The statistics hereafter presented will show how ample these funds are for the support of the public schools. It will be noted that considerably more than a quarter of a million was available for the public schools.

As is to be seen this was considerably in excess of the actual needs of the schools. Under the present appropriation and apportionment of funds it is easily possible to give every child who wishes to attend from eight to ten months schooling. The physical difficulty of long distances between the scholars and the school is the main factor in reducing the school year in some localities.

The studies in every school are the same: reading and spelling, writing, grammar, geography, arithmetic and algebra, history, physiology and hygiene. This curriculum is wide enough to fit any boy or girl for the duties of life. The text books are all non-sectarian, in the English language, with the exception of a primer in English and Spanish, and are those prescribed by the territorial board of education.

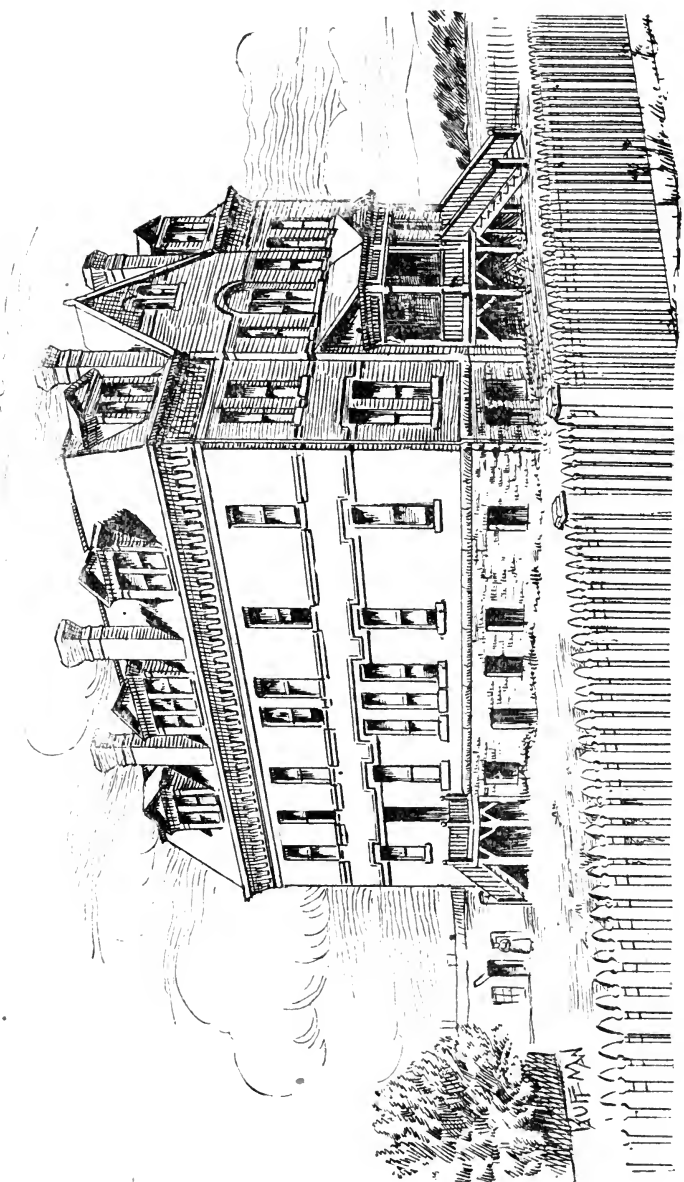
Free education is also afforded by the Territory in the higher branches of knowledge, at the University, at Albuquerque; the School of Mines, at Socorro; the Agricultural College, at Las Cruces, and two normal schools, one at Silver City, and one at Las Vegas.

Normal Institutes.

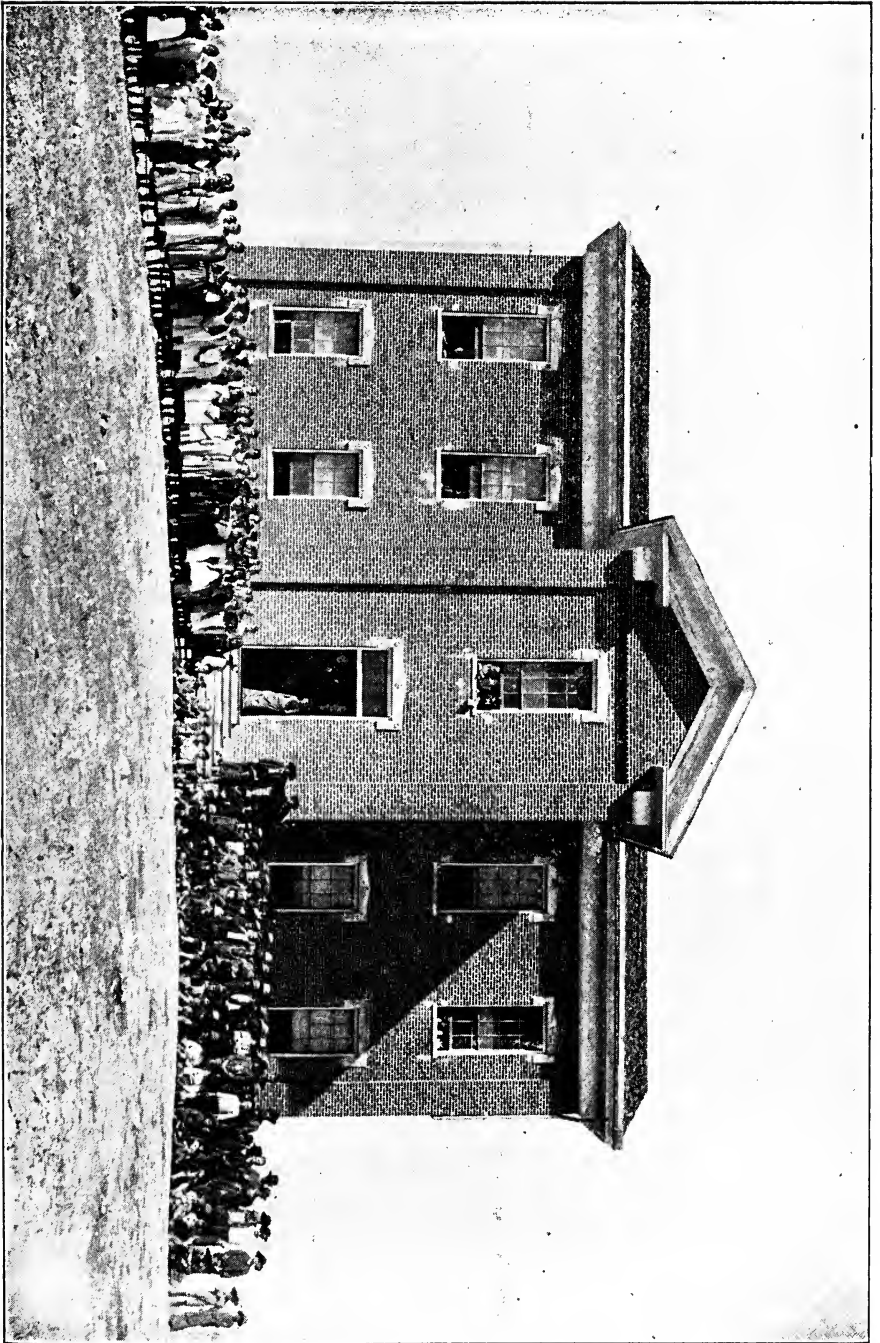
The superintendent of public education during the last legislature secured the enactment of a law providing for the holding of five teachers normal institutes during vacation of each year, for the purpose of improving the education and the methods of the teachers themselves. The branches which receive most attention at these institutes are methods of teaching, the laws of the Territory pertaining to education, and the general science of the teacher's profession. The sessions shall not be less than eight weeks and tuition shall be free. The success of these institutes last year was wonderful.

The Military Institute.

To further stimulate learning the Territory has provided for a free military institute, at Roswell. Academic studies are followed here under strict military discipline. Prof. J. E. Edgington directs the school, assisted by a competent staff. The gov-



Presbyterian Mission School, Santa Fe.





error has applied for the detail of a U. S. army officer to this school and it is expected the order will presently be made.

Private Schools.

The public schools are ably seconded in their good work by private and secular institutions. The Methodists and Presbyterians have a number of well attended schools.

The following are the schools carried on by the Presbyterian Board of Home Missions:

CLASS 1.—Day schools for Mexican children.

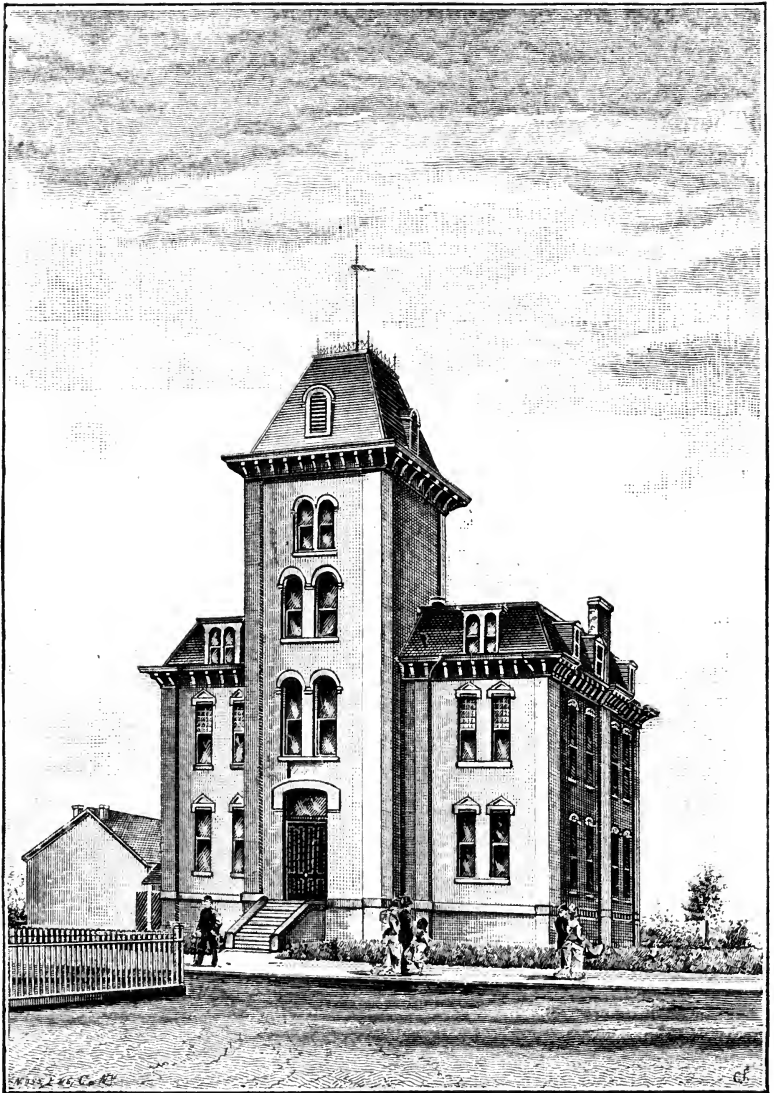
Name of school.	Teach-ers.	Pupils.	Estab-lished.	Value of prop-erty.
Las Cruces.....	2	60	1878	\$1,000
Pajarito.....	1	50	1884	1,800
Corrales.....	1	30	1878	1,800
Jenfez Hot Springs.....	1	24	1881	2,000
Santa Fé.....	1	60	1867	1,000
Capulin.....	1	25	1887	2,000
Chaperito.....	1	30	1889	1,000
Raton.....	2	50	1887	1,100
Glorieta.....	1	20	1881	200
Buena Vista.....	1	30	1888	300
Rociada.....	1	20	1887	275
Ocate.....	2	35	1881	1,000
El Rito.....	1	30	1883	1,000
Agua del Lobo.....	1	20	1889	250
Prado de Taos.....	2	60	1883	300
Fernandez de Taos.....	2	65	1873	2,000
Ranchos de Taos.....	2	60	1881	2,000
Arroyo Seco.....	1	15	1889	250
Peñasco.....	1	25	1887	250
Embudo.....	1	30	1887	250
Peña Blanca.....	1	40	1891	100
Los Valles.....	1	30	1891	500

CLASS 2.—Boarding schools for Mexican children.

Name of school.	Teach-ers.	Pupils.	Estab-lished.	Value of prop-erty.
Santa Fé.....	6	75	1883	\$20,000
Las Vegas.....	5	70	1881	19,000

CLASS 3.—Day schools for Indian children.

Name of school.	Teach-ers.	Pupils.	Estab-lished.	Value of prop-erty.
Isleta.....	2	25	1882	\$275
Zuñi.....	2	30	1887	1,600
Laguna.....	2	45	1876	500
Jemez.....	2	35	1877	2,000



High School at Santa Fe.

The following are the Methodist mission schools and the average number of pupils in attendance:

Tiptonville	45	||	Peralta	35
La Joya	25		Socorro	20
Escondida	25		El Ranchito	25
Cerro	28		Albuquerque College	00
Albuquerque girls' schools	20		Old Albuquerque	30
Las Vegas	35	||	Dulce	23

The Southern Methodists continue to carry on the seminary at Las Vegas with good success. This institution had the misfortune of a visitation by fire, but it has kept on its course with unabated energy.

The following institutions are under the charge of Catholics:

Under Sisters of Charity.—Albuquerque: St. Vincent Academy, 130 girls; parochial school, 150 pupils; San Miguel: select school, 40 pupils; public school, 175 pupils; Santa Fé: orphan asylum, 62 pupils. The Sisters of Charity also conduct a sanitarium as well as a hospital at Santa Fé, the latter containing at the present time about 40 charity patients. There are about 40 Sisters of Charity teaching in the Territory. They came from Cincinnati to Santa Fé in 1866; to Albuquerque in 1880 and to San Miguel in 1882.

Under Sisters of Mercy.—Mesilla: select and parochial schools for boys and girls, under charge of 7 sisters.

At Los Alamos, San Miguel county: parochial schools with 75 pupils, and a public school of 50 pupils, under the charge of 3 sisters.

At Silver City, Grant county: an academy and parochial school for boys and girls, under the charge of 6 sisters; no return has been made of the number of pupils attending their schools. These sisters also conduct a hospital at Silver City.

At Santa Fé: Academy of Our Lady of Light, established January 1, 1853; number of pupils enrolled in boarding and select day school during the session 1892-93, 70; parochial school, free, 298.

At Fernandez de Taos, Taos county: St. Joseph's Convent, established in October, 1863; the number of boarders and day scholars, 105.

At Mora, Mora county: Annunciation Convent, established in 1864; the number of select day scholars, 50.

At Las Vegas, San Miguel county: Academy of the Immaculate Conception, established in 1869; the number of boarders and select day scholars, 60; number enrolled in parochial school, 100.

At Las Cruces: Visitation Academy, established in 1869; the number of boarders and day scholars, 155.

At Bernalillo, Bernalillo county: Convent of Our Lady of the Sacred Heart, established in 1875, an Indian boarding school for girls; the number of Indian pupils, 70.

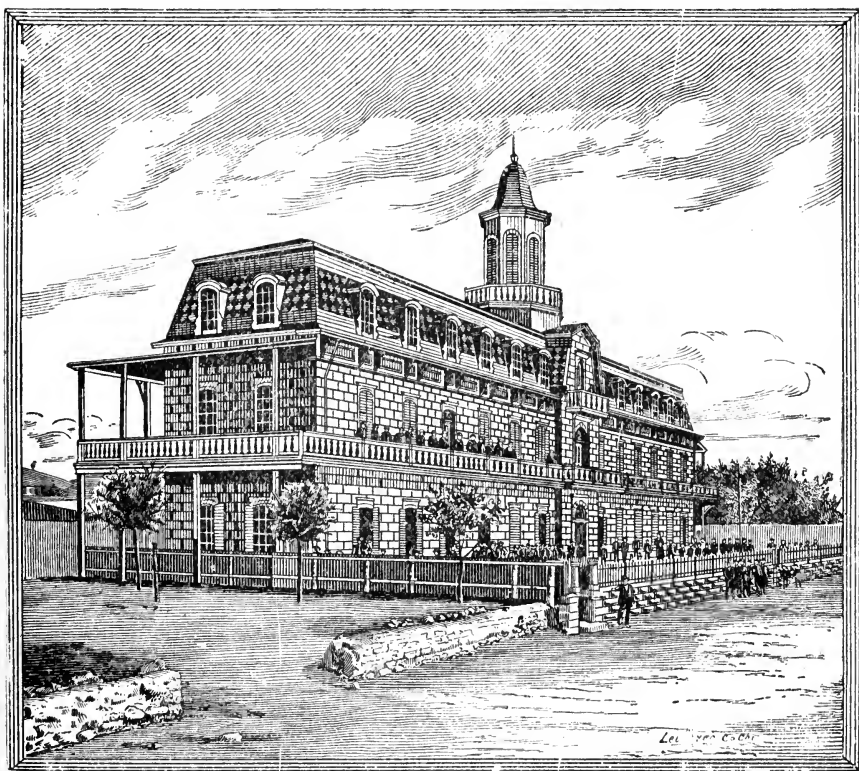
At Socorro, Socorro county: Convent of Our Lady of Mount Carmel, established in 1875; the number of boarders and select day pupils, girls, 40; free school, girls and boys, 181.

Under Christian Brothers.—The Christian Brothers have conducted St. Michael's College at Santa Fé since 1859. The average yearly attendance has been 150 boys. Some of the pupils come from Colorado, Arizona, Texas and Old Mexico, but the majority are from our own Territory. There are six departments in the college, under the tutorship of as many teachers. Besides these there are three specialists employed in giving lessons in extra branches, such as music, telegraphy, typewriting, stenography, etc. The president of the college is a member of the territorial board of education. The college is empowered to confer degrees, besides teachers' certificates to recipients of degrees.

This institution is unendowed and does not receive any share of the public funds. It has a mineral cabinet containing many valuable specimens of the minerals found in the Territory, a complete chemical laboratory and assay department, besides a museum containing rare relics of Indian and Mexican civilization and other valuable curiosities. The cathedral parochial school is under the direction of St. Michael's College and has an attendance of 175 pupils, who are taught by two lay teachers. It is supported by the clergy with money collected from the parishioners. A similar school exists in the parish of Guada-

lupe, in this city (Santa Fé), which has an average attendance of 60 pupils, boys and girls, and, like that of the cathedral, has been supported by the contributions of the people.

Besides these schools in Santa Fé, the Christian Brothers conduct a parochial school in Las Vegas, having an average attendance of 120 boys, under the direction of two brothers; a

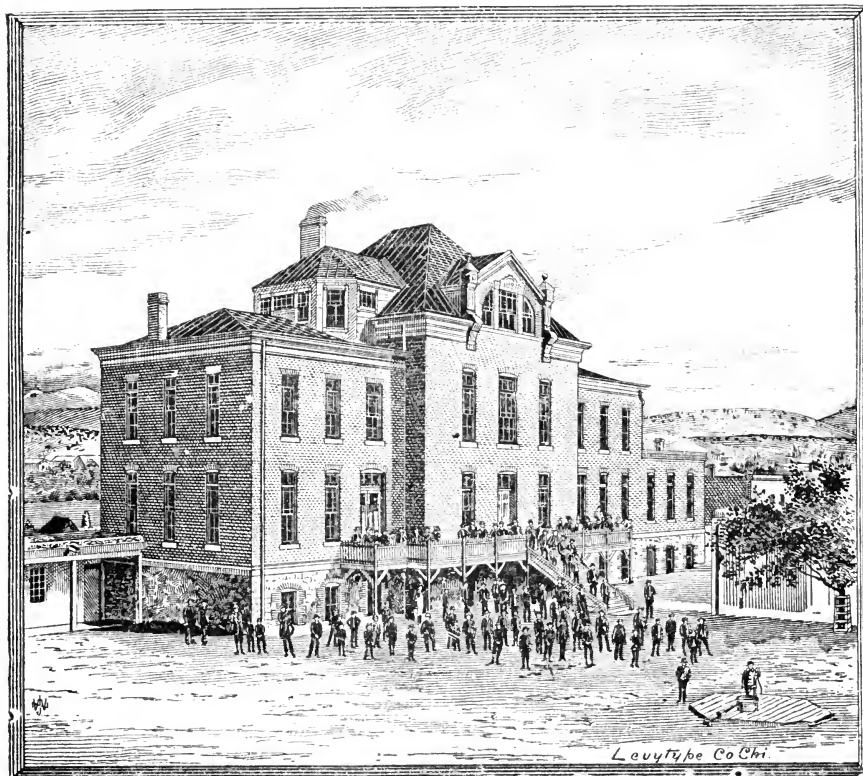


St. Michael's College, Santa Fe; established 1859.

county school in Bernalillo, with an attendance of 125 pupils and taught by two brothers.

Catholic Indian Schools.—Boarding school: St. Catherine's Indian school for boys, located at Santa Fé, N. M., established in 1886; the average attendance has been during the fiscal year 94 pupils. Day schools: Taos day school, located at Taos,

N. M.; average attendance, 30 pupils. San Juan day school, located at San Juan, N. M.; average attendance, 32 pupils. Jemez day school, located at Jemez, N. M.; average attendance, 35 pupils. Acoma day school, located at Acoma, N. M.; average attendance, 25 pupils. Laguna day school, located at Laguna, N. M.; average attendance, 28 pupils.



Class Building, St. Michael's College.

The government supports a large Indian school at Albuquerque, and another at Santa Fé. At the former 200 pupils are in attendance. The latter has been closed for some little time owing to some complications at the Indian office. The Ramona Indian school, at Santa Fé, with 60 pupils, also receives a small amount of government aid.

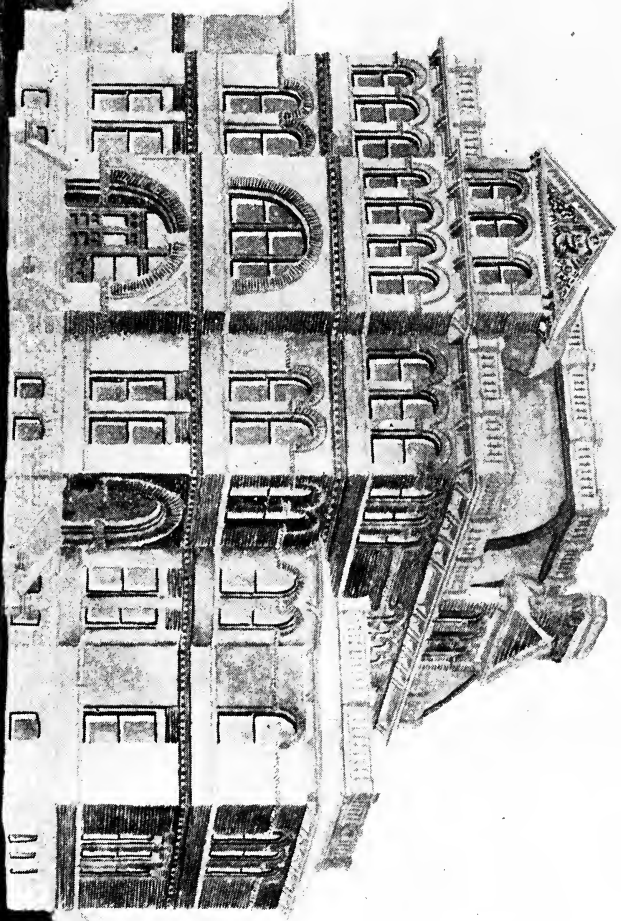
STATEMENT.—Condensed from reports of the county school superintendents for the year 1893.

County.	No. of districts.	Teachers			Enrollment			Average daily attendance.			No. of scholars between the ages of 5 and 20 years..			No. of schools
		Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	
Bernalillo.....	51	43	19	61	1,914	1,319	3,233	1,280	762	2,042	2,916	2,639	5,545	59
Chaves.....	4	3	5	8	103	100	203	61	59	120	252	290	452	7
Colfax.....	37	24	21	45	564	461	1,025	356	315	671	1,159	913	2,072	38
Dofia Ana.....	31	11	14	25	512	393	905	287	243	530	1,675	1,440	3,115	22
Eddy.....	12	9	8	17	273	332	605	205	276	481	468	450	898	11
Grant.....	36	15	30	45	844	648	1,492	521	411	932	1,533	1,212	2,745	46
Guadalupe.....	18	13	4	17	372	267	639	284	180	464	699	637	1,336	17
Lincoln.....	42	3	4	7	105	70	175	58	36	89	887	1,034	1,921	7
Mora.....	47	29	10	39	691	502	1,193	685	291	926	1,781	1,471	3,252	39
Rio Arriba.....	40	36	5	41	1,467	796	2,263	978	379	1,327	1,834	1,645	3,479	39
San Juan.....	23	13	20	33	301	191	492	201	147	348	482	318	800	19
San Miguel.....	91	62	25	87	2,261	1,417	3,678	1,581	971	2,502	3,582	2,896	6,478	87
Santa Fe.....	22	23	5	28	320	911	1,231	425	231	656	1,109	689	2,048	27
Sierra.....	15	8	6	14	367	280	646	181	151	332	560	510	1,070	13
Socorro.....	49	35	9	44	1,110	682	1,792	748	470	1,218	1,904	1,506	3,410	44
Taos.....	28	27	5	32	880	438	1,318	691	337	1,028	1,601	1,262	2,863	31
Valencia.....	37	15	2	17	587	323	910	315	137	452	1,028	746	1,774	14
	582	308	179	547	13,142	8,548	21,690	8,762	5,396	14,160	23,470	19,788	43,258	519

STATEMENT.—Condensed from reports of the county school superintendents for the year 1893.—Continued.

County	Average number of months taught.	Receipts.				Total	Expenditures.				On hand Oct. 1, 1893.
		Balance Dec. 1, 1892.	From county school fund.	Polltaxes, fines, etc.	Total		Teachers' wages.	Rent, fuel, etc.	School houses and grounds.		
Bernalillo.....	6½	\$6,025 71	\$15,374 50	\$15,925 90	\$40,326 11	\$10,823 48	\$2,304 05	\$200 00	\$26,998 58		
Chaves.....	5	6,322 18	6,322 18	18,503 94	6,589 53	1,922 50	435 89	2,869 29	1,351 85		
Colfax.....	6½	12,090 61	7,068 00	7,412 65	37,754 55	15,174 19	8,219 73	8,023 25	6,335 38		
Doña Ana.....	5	3,641 81	7,412 65	4,205 49	15,259 93	6,408 94	1,446 77	2,402 37	5,901 85		
Eddy.....	5½	11,000 07	17,802 53	9,615 41	28,892 50	4,936 25	797 26	9,279 65	13,879 54		
Grant.....	5½	.....	12,259 48	1,196 00	21,924 89	16,019 49	1,802 59	464 35	2,638 46	
Guadalupe.....	5	2,159 40	373 80	1,196 00	3,729 20	1,870 27	222 37	68 50	1,508 06		
Lincoln.....	4½	1,188 87	2,337 58	2,114 49	5,696 88	3,507 63	616 22	68 70	1,468 23		
Mora.....	6	3,121 20	1,653 87	2,221 31	6,996 38	4,085 50	460 08	.....	2,450 80	
Rio Arriba.....	6	4,153 10	6,267 76	1,562 18	11,983 04	3,536 90	1,093 58	21 40	7,332 16		
San Juan.....	6	989 41	2,167 70	498 09	3,653 20	1,340 26	826 62	523 64	949 17		
Sau Miguel.....	5½	4,593 27	8,204 30	15,349 88	28,117 45	14,069 25	231 54	6,448 03	663 54		
Santa Fé.....	5½	3,891 14	5,161 03	150 40	9,202 57	3,183 20	1,163 00	.....	4,856 37	
Sierra.....	6	2,619 43	3,637 68	4,777 90	11,035 01	6,987 00	1,351 77	1,148 43	1,547 81		
Socorro.....	6	8,829 86	7,112 50	14,839 48	30,781 84	11,824 75	5,818 63	5,851 74	7,298 77		
Taos.....	6	3,207 54	3,637 73	1,504 14	8,369 41	4,044 00	1,250 97	620 00	2,498 43		
Valencia.....	5½	2,643 54	2,100 00	718 15	5,461 69	2,226 08	267 55	.....	2,958 06	
	5½	73,432 25	108,962 29	93,322 74	275,747 58	111,241 29	28,328 73	42,989 35	92,019 21		

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INDIANS.

New Mexico has long been regarded as a sort of outlying province subjected to the periodical raids of hostile and savage Indians. This is erroneous. The aboriginal inhabitants of this big Territory are the Pueblo Indians, so called by the Spaniards because they dwelt in "fixed habitations" or permanent villages. They are noted for that docility and gentleness of character that demarks civilization from barbarism, and have always been distinguished from the nomadic Indians by their fixed homes, their permanent cultivation of the fields adjacent to their villages, and the civility that comes from an organized system of government. The Pueblo Indians from time immemorial have been the bitter enemies of the Apaches, the Utes and the Navajoes. War between the wandering tribes and the Pueblos has been constant. The reason is therefore plain why New Mexico has been so early ridded of warlike Indians. The Pueblos have all the art and cunning of the wandering Indian, and added thereto they possess the civilized obedience to authority that marks the difference between civilization and barbarism. The immigrant need not fear any hostile demonstrations from Indians in this Territory.

Appended are the statistics of the Pueblo and Jicarilla Apaches as set forth by the agent:

UNITED STATES INDIAN SERVICE, }
PUEBLO AND JICARILLA AGENCY, }
SANTA FÉ, N. M., Nov. 20, 1893. }

Col. Max. Frost, Santa Fé, N. M.

DEAR SIR:—In compliance with your request I append herewith the information you desire respecting the Pueblo and Jicarilla Indians.

The following is the list of Indian pueblos in New Mexico, with population of each:

Acoma, 504; Cochiti, 300; Isleta, 1,055; Jemez, 404; Laguna, 945; Nambe, 74; Picuris, 107; Pojoaque, 15; Santa Ana, 222; Sandia, 126; Santa Clara, 190; Santo Domingo, 793; San Felipe, 473; San Ildefonso, 101; San Juan, 351; Taos, 374; Tesuque, 83; Zia, 101; Zuñi, 1,463. Nineteen pueblos in all; total population, 7,681.

The following is a list of the schools in connection with the agency:

Government day schools, with average attendance for quarter ending June 30, 1893: Santa Clara, 12; Laguna, 13; Cochiti, 5; Zia, 31.

Presbyterian day schools, with average attendance as above: Isleta (school closed part of quarter), 3; Jemez, 22; Laguna, 15; Zuñi, 20.

Catholic day schools, with average attendance as above: Acoma, 20; Pahuate (Laguna), 21; Jemez, 29; San Juan, 29; Taos, 28; Santo Domingo, not in session. Boarding schools, with average attendance as above: St. Catherine's, Santa Fé, 78; Sisters of Loretto, Bernalillo, 91.

Ramona boarding school, Santa Fé, average attendance as above, 44.

The Jicarilla Apaches, whose reservation is at Dulce, Rio Arriba county, New Mexico, number 847. They are not self-supporting, but receive weekly rations and annuity goods. About 200 of these Indians who have been absent from the reservation for some time have recently returned. There are 256 children of school age, but there is no school.

Total population, Pueblos and Jicarillas, 8,528.

Respectfully,

JOHN L. BULLIS,

Capt. 24th Infy., Actg. Indian Agent.

The Mescalero Apaches occupy a reservation within the boundaries of Doña Ana and Lincoln counties. They are far removed from the influences of the predatory tribes, and have not given any trouble since the early '80s.

The Navajoes, long known as the "pets of the government," cut a very small figure in New Mexico. Their reservation occupies 15,000 square miles, of which only about 1,900 square miles are within New Mexico, and that small portion is confined

to the extreme northwestern corner. These Indians own 2,000,000 head of sheep, a couple of thousand head of cattle; the government is reclaiming their land by irrigation, and the settler need fear no incursion from them. They have recently been placed under the charge of an army officer, E. H. Plummer, 1st Lieutenant 10th infantry, and are perfectly amenable to authority.

It may be said in this connection that the government never took a wiser step than to remove the control of Indians from civil to military authority. It has worked wonders in New Mexico. The officers handle the Indians with a certain firmness that quickly begets docility, and the Indians themselves quickly see that they fare better.

LIVE STOCK.

The live stock interests of New Mexico have considerably shrunk in the past five years. This was the direct result of false corporate and individual economy. The speculators overstocked the ranges, the stockholders of the large cattle companies expected immediate and too large returns from the business, and thus destroyed its security. Notwithstanding this, however, all grades and classes of live stock are rapidly being established on a sound and prosperous basis. The good grass of the past year is enough to support the herds and flocks in good condition for at least two years more. Even if no rain were to fall during the next two years, from Colorado to Mexico the valleys and plains would be one waving mass of grama and other native grasses. A peculiar property of this grass is that it "cures" on the stalk and all over the snowless plains of New Mexico makes the most excellent fodder known. This grass really becomes hay while on the root, and does not fall down or lie on the ground. It affords pasture all the year.

Cattle.

The assessors' returns show that in 1892 there were 1,041,237 cattle in the Territory, of an assessed value of \$8,597,867. The same figures for 1893 are: cattle, 740,694; value, \$5,129,261.

The peculiar, open, sunny weather of New Mexico makes the best conditions for stock raising. The food that the animal eats is not used up in producing bodily heat, but goes to make flesh. It is estimated that under similar conditions of food scarcity a steer will live twice as long in New Mexico as in Wyoming or Montana, for the reason that, requiring less heat, less food will nourish him.

These facts are noted not because of their inducement to raise stock on the "open range," for the palmy days of the cowboy are over, but because they bear importantly on a new era of beef raising. Adjacent to every irrigable area is a great stretch of pasture land, which can be utilized in connection with the farms. Small, well selected herds of beef cattle could be turned loose on these ranges and allowed to mature, then they could be brought into the home inclosure and fattened for market. Ten acres on a well managed farm can be easily made to produce 40 to 50 tons of alfalfa hay. This fed to cattle before shipment will bring a return of \$100 per acre. By handling stock in this manner proportionate profits can be realized on a larger acreage.

Leather.

The growing importance and security of the live stock interest make the opportunity for a leather factory, indeed for several of them, very favorable. A peculiar plant known as caña-agria is indigenous to all New Mexico. It contains an average of 33 per cent of tannic acid and is cheaper than any other tanning agent known. By a combination of a tannery with a manufactory of leather goods, the whole trade of the southwest could be commanded. As things stand now the western raw hide is shipped to the Atlantic coast at a very heavy expense for freight. Then it returns to the West in the shape of leather and leather goods, paying a higher freight. There is no earthly use to pay freight for over 5,000 miles on this merchandise. Any business man can see that with the tanning for his leather obtained cheaper than anywhere else on earth, with his hides obtainable without freight cost, and the saving made all along the line, he would have a handicap in his favor that would enable him to laugh at trusts or any other eastern competition. Besides obtaining cheaper shoes, leather, etc., there are also many resultant advantages to New Mexico.

Sheep and Wool.

In 1892, according to the assessors' returns, there were

1,378,151 sheep in New Mexico, of a value of \$1,850,962. In 1893 there were 1,392,671 sheep, worth, according to assessment, \$1,665,069. It is safe to double both the number and the value of the sheep as returned by the assessors. The product of wool and mutton is therefore very large. It is safe to say that the average fleece in New Mexico is five pounds to the sheep; the wool clip in 1893 in this Territory was about 12,000,000 pounds.

During the past year, 1893, there were 650,000 sheep marketed from the Territory. This fact alone will give the reader a definite idea of the extent of this industry. The possibilities are simply immense. In Texas, New Mexico and Arizona the flocks amount to nearly 10,000,000 sheep. In New Mexico there is an abundance of clear soft water, just suitable for wool washing. The freight on the wool in the grease amounts to about 3 cents per pound from New Mexico to New York. If this wool were handled in New Mexico, and only the local clip were obtainable, without counting the wool of Texas and Arizona, a saving of \$360,000 per annum could be made on freight one way on the raw material. Just estimate now the return freight on the manufactured articles, and it will be seen that the capitalist or corporation that has the sense to grasp the possibilities that the pure water of New Mexico affords can command the textile trade of the southwest, perhaps of a great deal of the world. Labor is cheap. A direct route will soon be open to two deep water gulf ports. These even now can be reached by way of El Paso. With good wool, pure water, quick railroad connections and cheap labor, what is to prevent New Mexico from taking a leading position in this trade?

Horses and mules do better in New Mexico than any other place known. Even the tireless horses of the Sahara do not surpass them. The high altitude and the precipitous upland pastures develop the lungs. The tough, nutritious native grasses develop bone and muscle. It is no unfrequent thing for a man to ride or drive 100 miles per day. Good drivers find no difficulty in doing this. The air is so pure, the pasturage so good, that few diseases develop.

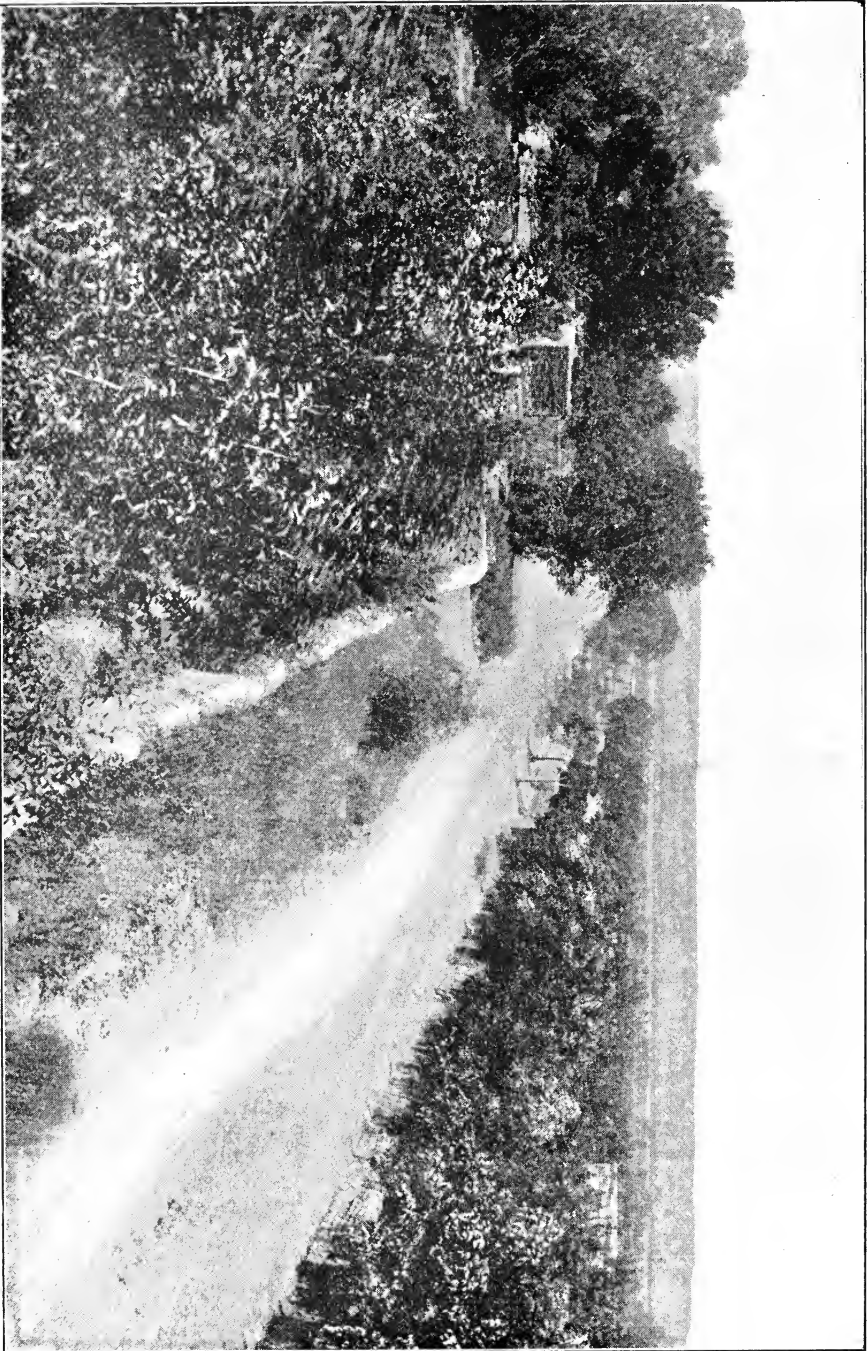
RAILROADS.

The romantic history of the American continent is nowhere more striking than in the development of its commercial arteries. The magical projection of the vast American system of railroads is something usually taken as a matter of course and of fact. Few ever pause to think what a tremendous task has been accomplished. Take the line of the Atchison, Topeka & Santa Fé railroad. It had its birth in the minds of a few Boston philanthropists whose purposes were patriotically bent toward the abolition of slavery. It grew, under great odds and at the cost of great sacrifice, until it covers about 10,000 miles of railway and is the greatest and most popular of western roads. It begins at Chicago, stretches thence southwardly through Illinois, Missouri and Kansas into New Mexico. From Raton to El Paso the distance is greater than from Washington, D. C., to Boston, Mass.; but this is not by any means the extent of the road in this Territory. At Raton a short line runs to the Blossburg coal mines, at Las Vegas another runs to the Hot Springs, and at Lamy Junction another side line branches out, running eighteen miles to Santa Fé. At Albuquerque the Atlantic and Pacific, which for all practical purposes is part of the Santa Fé's main system, runs westward to California, connecting direct with Los Angeles and San Francisco and all intermediate points. From Socorro to Magdalena, a distance of twenty-seven miles, is another road; from San Antonio to Carthage another; while from Rincon to Silver City, taking Deming en route, is a branch 101 miles long. From this latter branch, at Nutt station, runs another branch to Lake Valley, thirteen miles. The Santa Fé operates therefore 857.1 miles of standard gauge road in this Territory alone. From El Paso it

runs south again to the City of Mexico, a distance of 1,970 miles, and has also pushed another branch to Guaymas, on the Gulf of California.

A glance at the map will show that this gigantic construction was not forced by competition, but is the result of wise foresight and a general disposition to advance the prosperity of its territory. It has had the effect of civilizing a barbarous country and pacifying the most savage tribes of Indians. During the thirty odd years after the acquisition of this Territory from Mexico the United States expended more than \$200,000,000 in Indian wars against the Apaches and Navajoes. Since the completion of the present system of this road how changed is all this. There is not a turbulent tribe or a single renegade Indian within the confines of New Mexico. This for the reason that the railroad facilities made it impossible for the savages to commit depredations unpunished. The day when these terrible foes could sweep through the country unterrified by the power of the government is past. At the first inkling of disorder the savages would find themselves hemmed in by a cordon of troops impossible to break. All this the Atchison, Topeka & Santa Fé has accomplished in building its New Mexican lines, without a cent of government subsidy. It is true that the Atlantic and Pacific, a line now controlled by the Santa Fé, has a valuable land grant, but the main system of 683 miles is the result of private enterprise, and the management deserves full credit for its energy, perspicacity and public spirit.

Some of the advantages may be briefly stated as follows: Beginning at Raton, the Gate City, the Santa Fé route has the benefit of the splendid coal mines now open in that vicinity. It is also one of the best lumber and mineral regions known. To the west are placers and lodes of unexampled richness. Then it commands the commerce of the great Canadian valley, including the counties of Colfax, Mora, San Miguel and Guadalupe. South of this region it enters the Rio Grande valley at Glorieta, and thence south for 300 miles has undisputed command of this rich and fertile area. In this valley, on the main



The Road Between the Towns of Las Cruces and Mesilla.



line to El Paso, there are fifty-nine cities and stations, all pouring their commerce over the road. At Cerrillos are coal, silver and gold mines and several hundred coke ovens. At Santa Fé a large commercial and passenger traffic is secured. Albuquerque does as much business as almost any town in Kansas except Topeka, and the same may be said of Las Vegas, further north. From Albuquerque the road runs through a country rich as the valley of the Nile in agricultural products, underlaid with coal. From Socorro to Las Cruces, besides fruit, there are heavy shipments of ore and metals. The branch lines penetrate good mining, grazing and agricultural districts.

During 1892 the shipments of fruit by express from this region were 1,427,372 pounds. During the past year, 1893, the express shipments of fruit will exceed 1,500,000 pounds. The exact figures have not been tabulated at this writing. During the year 1893 7,200 cars, containing 216,000 cattle, were loaded and hauled out of New Mexico. During the same time 150,000 sheep were shipped by the Santa Fé railroad. Necessarily no account can be taken of the immense amount of freight handled in and out of the Territory to supply purely mercantile purposes, nor can the amount of ore and metal shipped be estimated at this date. Up to August 31, 1893, there had been mined in New Mexico and shipped over the Santa Fé 623,420 tons of coal. Since that date the mines have all been at work and it is safe to estimate the annual shipment at the same proportion, 960,130 tons. There is little doubt but that the actual figures will show that more than 1,000,000 tons of coal have been carried out of New Mexico over this one road; but taking the first figures given, at an average of twenty-five tons to the car load this would be 38,405 cars of coal originating in New Mexico and shipped over this road and its branches. This is business of which both the road and the Territory can be proud. President J. W. Reinhart and Vice-President D. B. Robinson can well be proud of the showing for their able, energetic and prudent management in this Territory. The Bureau of Immigration considers the Santa Fé the friend of New Mexico, and has never had to

palliate any of those extortionate methods that characterize the dealings of some other railroads in other States. It can assure the immigrant of good treatment and excellent service.

The Denver & Rio Grande and Santa Fe Southern.

President E. T. Jeffrey, of the Denver & Rio Grande, has pursued a policy similar to the Santa Fé management. Branching from Antonito, a few miles from the north central boundary of New Mexico, are two roads, one descending the valley of the Rio Grande to Española, thirty-eight miles north of Santa Fé, and the other running mostly within New Mexico to Durango, Colo. The Española branch is continued into Santa Fé by means of the Santa Fé Southern. The superintendent and general manager of this road is Mr. T. J. Helm, of Santa Fé. He has worked up a surprising business. During 1893, when all the railroads in the country were reducing the scope of their operations in order to curtail expenses, it was found by experiment that the business over the Santa Fé Southern and the Denver & Rio Grande branch from Antonito was of such a profitable character that no reduction of its operating expenses was permissible.

The Antonito-Española division as yet carries little or no ore; but it is expected that next year the business will be trebled through the output of the Taos county mines. These have lately been brought to prominent notice through the discoveries near the new town of Amizett, on the western side of the Rockies near the county seat, Fernandez de Taos. Just now two heavy daily trains, north and south, are run over this road for the purpose of transporting the wool, sheep, cattle and agricultural products of this region. The country is a series of good, cultivable valleys along the railroad, with lateral valleys of immense extent. The famous Chama placers and lodes, the Taos and Rio Arriba mica, tin and precious metal mines, indeed the wealth of north-western New Mexico is directly tributary to this railroad.

The Union Pacific.

The Union Pacific road crosses the northeast corner of the

Territory, on its route from Trinidad, Colo., to Fort Worth, Tex. It traverses the best sheep country now known. During 1893 190,000 sheep were shipped out of this portion of New Mexico, and a proportionate number of cattle.

The Pecos Valley.

The fierce competition between railroads and the growing necessity of quick tide-water communication with the inland give the Pecos Valley road a peculiar prominence in railroad economy. At present it runs from Pecos City, Tex., to Eddy, N. M., a distance of ninety-seven miles, and is now projected and building to Roswell, N. M., eighty miles further. The road is three years old, and its business has doubled each year of its existence. It is projected to join with the Santa Fé at some point between Bernal and Albuquerque. The peculiar feature about it is that by building it then southeastwardly to San Angelo, Tex., it will complete the shortest inter-ocean railroad in the world, except the line across the isthmus of Panama or the Nicaraguan ship railway, if that scheme is ever perfected. It will be nearly 2,000 miles shorter than the Canadian Pacific and run all the way through a productive country. It will shortly be completed and it will then be possible to carry freight from Pacific coast points to the Gulf of Mexico at Velasco or Galveston by the shortest possible route in the world. The importance of this road as a mercantile artery is equal to that of the Isthmian railroads or canals which have so long been the dreams of commerce. It will make the southwest independent of any of the great Atlantic centers, and is one of the most important steps in the development of the West.

Mr. J. J. Hagerman, builder of the Colorado Midland, is the projector of this road, and is pushing the scheme as rapidly as possible to completion; he is the president of it and Hon. C. B. Eddy, one of the brightest minds in the country, is vice-president.

The Southern Pacific.

This great road crosses New Mexico in its southern tier of counties from west to east, terminating at El Paso. It com-

mands a territory of peculiar richness in mineral, stock and agricultural resources. It requires, however, a considerable capital to develop them. For this reason but little of the great business of this road originates in New Mexico. The possibilities of the future are however promising.

The Arizona and New Mexico.

This road runs from Lordsburg, Grant county, N. M., to the noted copper smelters at Clifton, Arizona. It strikes the rich valley of the Gila, 134 miles northwest of Lordsburg, whence connections can be made by stage with many points in the northern part of Grant and the southwestern part of Socorro counties.

Railroad Prospects.

The great necessity now is a road to be built from central New Mexico into the San Juan country. This is the ideal field of irrigation, and is the richest coal country in the United States. It was thought during 1892 that such a road was assured but the stringency of money has caused its promotion to languish.

In the northeastern part of the Territory the Rock Island has a large force of engineers and surveyors in the field working on the line of a road into the Taos valley. The officers are very reticent about their ultimate plans and little more can now be done than herald the fact that the road is contemplated. It will probably run from Liberal, Kansas, via Maxwell City and Elizabethtown into the great Taos valley gardens and mines.

In the southern part of the Territory the officers of the Mormon church hold a concession from the Mexican government for a road from Deming into the northern and central States of the Mexican Republic. Over 1,200 miles of road-bed are contemplated south of the Mexican border, and within sixty miles of Deming there are over 12,000 Mormon colonists. The persistence and energy with which the Mormons pursue their purposes warrant the certain prediction that this road will be built. It will open a very rich country to commerce.

HOT SPRINGS.

The geologic processes are so recent in New Mexico that nearly every county in the Territory has its healing, hot or mineral springs. The purpose of this article is only to give a few facts concerning the most accessible resorts. Many important places are necessarily omitted because the average tourist would be unable to visit them.

In geographical order the first to be mentioned are

Folsom Hot Springs,

situated near Alps, a station on the Denver, Fort Worth & Texas railroad, fifty-nine miles south of Trinidad, on the summit of the Raton Range, close to the extinct volcano of Capulin, in Colfax county, near the northern boundary of the Territory. The altitude is about 6,500 feet, and the location is very beneficial for consumptives. They have fine medicinal properties and promise to become of prominence.

Las Vegas Hot Springs.

In practically the same latitude, but on the Atchison, Topeka & Santa Fé railroad, the main continental line of travel, in the beautiful valley of the Gallinas is a large group of hot springs. Every one of these springs has a peculiar medicinal property. Any one who drinks and bathes in these waters under proper direction cannot fail to be benefited. The sick are healed of their ailments, and the weary and jaded rejuvenated. The average temperature of the dozen or so springs is 140 degrees F., the altitude 6,726, and a general analysis of the waters shows them to contain to the gallon:

	Grains.
Carbonate of calcium.....	0.89
Carbonate of magnesium.....	0.15
Carbonate of sodium.....	8.38
Carbonate of potassium.....	0.28

Sulphate of sodium.....	3.45
Chloride of sodium.....	14.68
Silica.....	3.50
Alumina.....	0.10
Volatile and organic matter.....	0.32
Carbonate of lithium.....	Trace
Bromide of sodium.....	Trace
Total.....	31.65

In its chemical composition this water resembles, in many respects, the waters of the famous hot springs of Teplitz, in Austria, while in its two chief active constituents, the carbonate and sulphate of sodium, it may recall the somewhat analogous, though very much stronger, waters of Karlsbad, justifying, in a degree, the name often given it of "dilute Karlsbad water." This dilution, however, is more frequently a benefit than a disadvantage, for it permits a larger amount of the water to be taken, thus securing the valuable solvent and eliminating powers of the water itself, together with the remedial virtues of its mineral constituents.

These figures are taken from a report made by Dr. Walter S. Haines, of Rush Medical College, for the Santa Fé road.

Ojo Caliente Springs,

the property of the Hon. A. Joseph, are situated on Ojo Caliente creek, in the southwestern portion of Taos county, and easy of access from Caliente station, on the Denver & Rio Grande railroad, twelve miles distant.

The country surrounding these springs consists of hills with volcanic dikes and mesas, traversed by a very coarse-grained granite, the feldspar and quartz forming masses, and the muscovite (mica) large plates several inches thick. The springs are at an altitude of about 6,292 feet and have a temperature from 114 to 108 degrees F. The water contains in 100,000 parts:

Carbonate of sodium.....	196.95
Carbonate of calcium and magnesium.....	6.25
Sulphate of potassium.....	5.34
Sulphate of sodium.....	19.23
Chloride of sodium.....	39.78

A very good hotel, with ample bath accommodations, is kept by the owner.

Jemez Hot Springs

are in Benalillo county, in San Diego cañon, being a branch of the Jemez creek, which nine miles south connects with another branch running through Guadalupe cañon. To reach them one has to travel from Santa Fé by wagon road to Peña Blanca, twenty-seven miles distant west, crossing the Rio Grande there and thence keeping a western course through the foothills of the Valles mountains to Jemez pueblo, twenty-six miles; from there it is thirteen miles to the first group of springs, at Archuleta postoffice; or from Bernalillo, on the Atchison, Topeka & Santa Fé railroad, also by wagon road past Santa Ana and Zia (or Silla) pueblos to San Ysidro, and thence to Jemez pueblo, where this road and the former join, distant twenty-seven miles.

Both roads are sandy, but the latter specially so, running for about thirteen miles through Jemez cañon.

A much better road, running from Archuleta north and northeast through the mountains and ending at Española, has recently been constructed.

There are several groups of hot springs in San Diego cañon, but those at Archuleta, and two miles further north, are most frequented. At Archuleta are ample hotel accommodations. Many health seekers prefer the "upper group" and camp there. At both places the scenery is enchanting and the atmosphere dry and healthy.

The lower springs, at Archuleta postoffice, have an altitude of 6,620 feet above sea level. Limestone and sandstone of the carboniferous age form the sides of the cañon, 1,000 feet high, often changed from their original position by volcanic materials. There are here:

1. A geyser, with an opening of one square foot, a temperature of 168 degrees F., running about fifty gallons a minute, with escaping carbonic acid and deposits of white carbonate of lime.
2. A spring of 130 degrees F., with free carbonic acid and red brown deposits.

3. A spring 119 degrees F., with "alga" (cryptogamic water plants); a black sulphite of iron forms on them, a result of the action of sulphureted hydrogen upon carbonate of iron and oxide of iron in the alga. The sulphureted hydrogen is a product of the reduction of gypsum.

There are more springs with a temperature from 102 to 108 degrees F. The total salts in 100 parts of water amount to 0.2401 parts of sodium, lime and magnesia. The springs are especially beneficial to rheumatic diseases.

The upper group, two miles from Archuleta, in the same cañon, consists of forty-two springs. Their elevation is about 6,740 feet above sea level, and their temperature varies from 70 to 105 degrees F.

They flow from caves of carbonate of lime, some of which are twenty feet in height. Combined they form a dam or dike thirty feet high and 200 feet long. The springs contain .3726 parts solids in 100 parts of water, mostly chloride of sodium and sulphate and carbonate of soda, lime and magnesia. They greatly resemble the famous Marienbad.

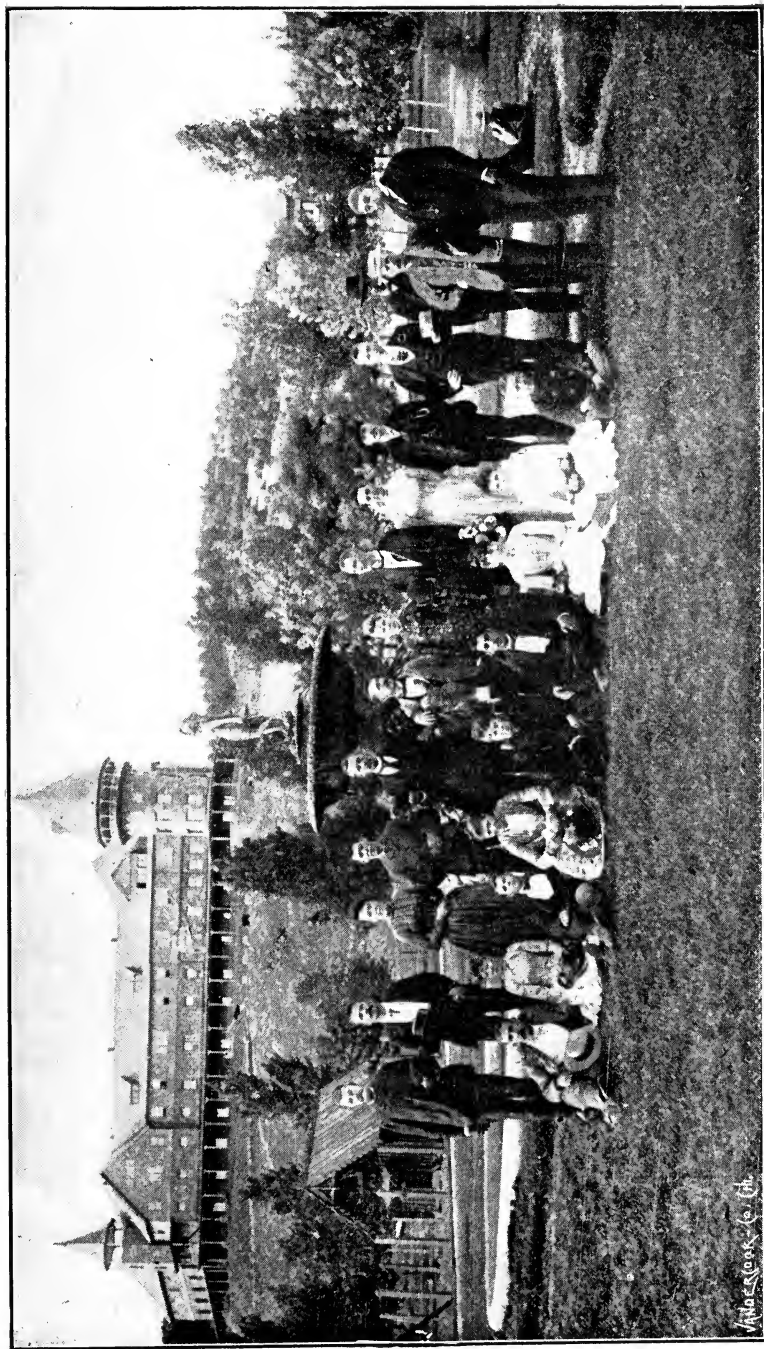
Besides the hot springs, north of the upper group are cold mineral springs. Half way between the two groups is an extensive ruined pueblo.

Cherryville Springs.

In Socorro county, at Cherryville, is the next occurrence of noted springs. These are found near the head of the cañada or falls of the Alamosa, whence Geronimo started out on his famous raid. They are accessible by stage from Engle, a station on the Atchison, Topeka & Santa Fé railroad. They are on the eastern slope of the Black Range. The temperature is 130 degrees F. and the altitude 6,540.

Gila Hot Springs.

In the southwestern part of Socorro county, on the west of the Gila, or Diamond creek, as it is called, is a group of springs, at 5,545 feet altitude, that are easily reached by wagon from Sil-



Montezuma Hotel, Las Vegas Hot Springs.

W. H. S. COOK & Co.



ver City. The temperature is 130, and they carry similar ingredients to the Jemez springs.

Apache Tajoe Springs.

Four miles from White Water, on the Atchison, Topeka & Santa Fé railroad, are also found some good springs, of 97 degrees F. They are in Grant county, thirty miles north of Deming.

Hudson's Springs.

Twenty-four miles north from Deming and within three miles of Hudson station, on the Santa Fé road, are several good springs. These springs are widely known and much frequented, both on account of their medicinal properties and the lovely climate and beautiful scenery.

The average temperature of the springs is 130 degrees F., and their altitude 5,782 feet above sea level. The main spring is in a mound of soda, lime and magnesia, in the center of which is a large depression containing the permanently boiling water, which has effected many cures of rheumatism, kidney and blood diseases. The water contains, in one gallon, the following solids:

	Grains.
Silica.....	1.552
Alumina and oxide of iron.....	0.530
Carbonate of lime.....	4.448
Carbonate of magnesia.....	2.624
Sulphate of soda and potassium.....	13.547
Chloride of soda.....	2.286
	24.987

Some other undeveloped springs are about three miles north of Hudson's Hot Springs.

It remains to be said that close to the western boundary of the Territory are several other locations of hot springs, of which one is about ten miles southwest of Zuñi and one in the valley of the San Francisco river, the latter with an altitude of 5,630 feet above sea level and an average temperature of 84 degrees F., largely used by the Indians and the people of the vicinity respectively.

Aztec Spring,

in the foot hills of the Santa Fé range, about three miles east of Santa Fé, is of cold water, but remarkable for its chemical constituents. These are:

Soda.....	0.538
Carbonate of calcium.....	1.538
Magnesium.....	0.605
Sulphate of calcium.....	0.050
Sodium.....	0.225
Chloride of sodium.....	0.193

Total solids in 1,000 parts of water.....3.813

as appears from an analysis made by Prof. Clark, of the Smithsonian Institute. The composition of the water renders it especially useful in diseases of the bladder.

STAPLE PRODUCTS.

Every State, every people have some product in the culture of which they stand preminent. New Mexico has many. At the World's Fair this Territory exhibited and took the prize for the best wheat in the wide world. Russia took first prize for oats and New Mexico second. New Mexican apples also surpassed all competitors. Now one thing must be remembered, the specimens which took these prizes were of course selected with great care by every exhibitor. Had there been a prize for general excellence of fruits and vegetables, New Mexico would have taken it beyond doubt; and this is said with a full appreciation of the fact that the New Mexico exhibit was not as large and as varied as it should have been.

The purpose of this paper is to notice a few products of great importance in New Mexico, but little known in the outside world.

Alfalfa.

The eastern farmer would consider \$10 and \$12 per ton for hay exorbitant, and at the utmost two tons a big crop per acre. Usually such a yield is only attainable on artificially fertilized ground. Take the length and breadth of New Mexico, and alfalfa will average five tons per acre and over \$12 per ton. This price of course is above the average of other States and Territories, but is a very conservative estimate of the territorial market, and it will continue as long as it pays to feed stock in this sunny climate, or to run its productive mines.

A keen observer of western life says "alfalfa is the saving clause in the constitution of the arid West." It is not only the best reclaimer of wild land but it is the best fertilizer known. It is a perennial species of clover, and in Europe is commonly

known as "lucerne." When first planted, and for about a month afterwards, it is a tender crop and may be drowned out or burned up very readily. Once, however, that it makes a "stand" it is almost impossible to kill it. The roots penetrate dozens of feet, and open the soil to the healthy influence of light and air. To break an alfalfa field for a new crop the ploughshare must sink as deeply as possible. The soil is then filled with a multitude of hollow roots, from whose decomposition as well as the large amount of air a high percentage of nitrogen is furnished to the succeeding crop.

Its culture is simple. After the seed has been once drilled into a thoroughly irrigated soil, the crop should be left alone until it is at least six or eight inches high. During this time the roots will sink as the moisture near the surface recedes. The next irrigation should be thorough, and as the upper soil has been rendered very friable by the plant itself the water will sink rapidly. In from two to four months after planting, according to climate, the hay will be ready for cutting, and the first season the cultivator can rely on about one ton per acre. Every succeeding season it should be cut from three to six times. As soon as the plant flowers out well it is ready for harvest and the reapers should start in.

To get a good stand thirty to thirty-five pounds of seed and about a bushel of oats should be sown on well ploughed and watered ground. The oats will spring up rapidly and shade the young and tender shoots. In the protection of this shade the plant will establish itself, and after the first cutting will choke out the oats. From that on the alfalfa will take care of itself; and will kill all weeds within its influence like poison. Alfalfa is a good crop for the novice in irrigation. There is little danger of his failure if he follows these hints and the general practice of his neighbors; besides, its product is as good as so much cash.

Potatoes.

The honor of being the home of that valuable plant the white or Irish potato has been claimed several times, and is a ques-

tion that persons with a reputation for exact statement do not care to answer. Whether or not New Mexico can claim this honor need not be discussed here. There are, however, a few well known facts that lead to the belief that the potato is a crop peculiarly adapted to the arid region. It loves a warm, mellow and rather dry soil. It conserves all the moisture attainable in its edible roots, and therefore it is apparent that if the soil is wet and soggy so will be the potatoes grown on it.

The modern size and flavor of the potato is the result of 300 years of careful selection and attention given by farmers to its growth. New Mexico has a natural wonder to some in its wild potatoes. In Valencia, Bernalillo and Socorro this tuber is found in great abundance in its wild state. The boys dig and eat it raw. They say it has a very crisp, rather sweet taste. The ideas that present themselves to a careful observer of this fact are rather startling. All the country in which these wild potatoes are found was once covered with an enormous population, the latest tradition concerning whom is that they went to the assistance of Montezuma's beleaguered capital and never returned. Therefore for nearly 400 years at least these roots have been growing wild in the midst of the arid region. The general average elevation of these plains is over 5,000 feet. The rainfall will not exceed thirteen or fourteen inches per annum. The roots will average nearly two inches long and nearly an inch thick. They are somewhat irregular in size and appearance. Now the inference from all this is that if the potato has subsisted by natural propagation for hundreds of years in an arid section there is certainly good reason to experiment with the cultivated tuber. These seedling, wild potatoes have preserved a splendid flavor; have a respectable size; they grow without attention or irrigation; then why should not their culture be encouraged.

The first potatoes successfully raised in the arid region matured at Greeley, Colorado. It is a peculiar fact, as any of the old Greeley colonists will tell, that the plentitude of the potato crop is in direct ratio to the scarcity of water. For instance,

during the years of great floods in the streams and ditches there are fewer tons of potatoes raised than during the years when everybody is afraid that the crops are ruined by drought. Some of the shrewder farmers there have grasped the lesson, irrigate scantily, and always have big crops of large potatoes.

As high as 900 bushels of potatoes per acre have been raised in this region. It was somewhat over this figure that took the American Agriculturist prize in 1890. As a matter of fact the yield will run between 250 and 300 bushels per acre. That it does not approach nearer the higher figure is because the farmers do not seed heavily enough. This is an important hint. Potatoes will run steadily, even in the worst times, at \$1.00 per cwt. or 60 cents a bushel. This will give a gross return of \$200 per acre. Deduct from this say \$50 per acre for expense and the farmer will have a very neat profit. These figures should be reached by every farmer if he pay attention to seeding, cultivating and irrigating. It is accomplished every year by every farmer who comprehends the plain principles of potato culture.

It is very hard to formulate rules for irrigating potatoes. There are really only two rules and these are constantly modified by experience. Potatoes should be irrigated scantily, and should not be irrigated at all while the flower is blooming and the apples forming. Seeding, on these deep, friable soils, should be heavy.

Another thing that has been learned by experience is that crops should be alternated to get the best results. Alfalfa should be run say three years, potatoes two and wheat one year on the same land. Some more profitable vegetable may be substituted for wheat at the option of the farmer. Alfalfa is the great regenerator of soils. Its deep roots ventilate and enrich the earth. Potatoes following alfalfa yield phenomenal crops.

Sugar Beets.

Sugar beets are generally classed among the exotic plants of Southern Europe. Recent inquiry, however, would lead to the

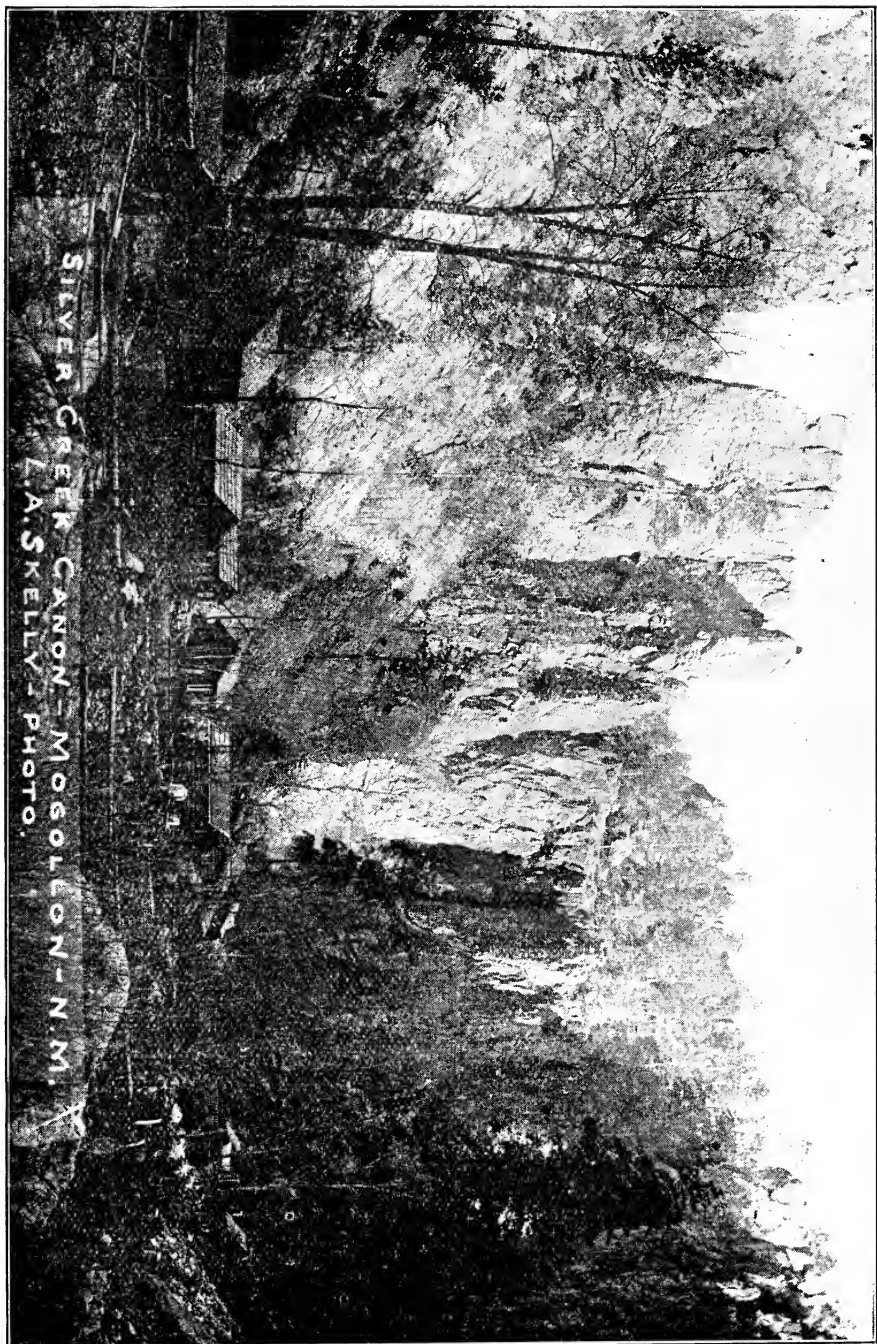
conclusion that this idea is erroneous in that it does not fully express the classification of this wonderful sugar maker. It should more properly be classed as an arid region plant. It thrives best with scanty irrigation, has a long tap root—one fourteen feet long was shown at the last Paris Exposition—and is a great air feeder.

There is only one rule by which to irrigate this plant. Do not force the bulbs to great size by plentiful watering. The ideal weight of the beet is between twenty and twenty-five ounces. A study of the table given later will show the reason of this. Big, pulpy beets do not make sugar. It is the hard, compact, slow growing bulb that stores in its veins the greatest amount of saccharine matter; and this for the reason that sunshine is the principal agent in making the sugary particles.

It sounds rather big to say that a farmer in this arid region can raise a ton of sugar per acre, and this with certainty and small expense. This, however, is only half of what can be done. Herewith is clipped from Bulletin No. 36, Division of Chemistry, U. S. Department of Agriculture, 1893, the tabulations of official tests and experiments made in New Mexico under the auspices of Dr. Harvey W. Wiley, chemist department and director of sugar experiment stations. The table is clipped verbatim et literatim from page 19 of the above cited bulletin.

NEW MEXICO.

Serial No.	Name of grower.	Postoffice.	County.	Time of harvesting.	Yield per acre.	Date received.	No. of beets.	Average weight.	Total solids.	Sugar in beets.	Purity.	Sugar yield per acre.
					Tons	1892.		Ounces.	Per cent.	Per cent.		Pounds
16838	H. B. Ashenfelter.....	Maxwell City.	Colfax.....	Sept. 27	8.276	Oct. 3	2	5	24.5	19.01	81.7	2,321
17042	do.....	do	do	Oct. 28	10.890	Nov. 3	2	11	32.6	19.30	80.9	3,409
17043	do.....	do	do	Oct. 28	6.098	Nov. 3	2	7	21.3	17.77	87.8	1,717
17087	do.....	do	do	Nov. 1	5.009	Nov. 7	2	9	19.5	15.43	83.3	1,162
17088	do.....	do	do	Nov. 1	7.187	Nov. 7	2	11	20.4	16.92	87.3	1,916
17107	do.....	do	do	Nov. 3	12.197	Nov. 9	2	20	19.6	16.02	86.0	3,035
17108	do.....	do	do	Nov. 3	8.276	Nov. 9	2	15	18.8	15.82	88.8	2,099
	Average.....				8.276			11	21.0	17.18	86.1	2,237
17177	Chas. W. Greene.....	Eddy.....	Lincoln.....			Nov. 19	4	21	15.0	10.37	72.3	
17178	E. S. Motten.....	do	do			Nov. 19	3	26	18.7	13.27	74.7	
17179	Geo. Blankenship.....	do	do			Nov. 19	3	36	16.9	12.32	76.1	
17180	G. O. Shields.....	do	do			Nov. 19	3	42	16.4	12.66	81.3	
	Average.....							31	16.8	12.11	75.9	
	Average of Territory.....				8.276			19	19.4	15.34	83.2	



SILVER CREEK CANYON - MOGOLLON - N. M.
L. A. SKELLY - PHOTO.

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In the first place, these figures show the highest average production, sugar percentage and purity of any place in the known world. France and Germany are satisfied with 8 to 10 per cent of sugar. In the northern section of the Territory, which is embraced in the first half of the table, there is an average of 17.18; in the southern part of 15.34. The reason that there is a falling off in the south is that the beets raised were too big. They were irrigated too much. It will be further observed that in the northern portion eleven ounce beets yielded 2,237 pounds of sugar to the acre; in another instance eleven ounce beets made 3,409 pounds of sugar per acre.

Fruit.

Fruit may be considered as the most profitable and best product of the Territory. The methods of culture and prices realized have been fully treated in the preceding chapters.

Caña-agria.

This new tanning agent has been considered in full in various parts of this book. The latest prices quoted in New York are \$50 per dried ton, or, as it takes three tons of green to make one dry, \$16.66 for the green root. The Agricultural College has lately demonstrated that this plant yields from four to five fold more under irrigation than when growing wild on dry land; and the artificial watering does not affect the tanning contents of the root. The culture is simple. Small roots are thrown at intervals of about six inches or a foot into an open plough furrow. This should be done in the fall. With the first spring rains the plant will sprout. Afterwards it is only necessary to irrigate slightly whenever the plant seems to suffer. In the fall following the planting it will be found that the small roots, not bigger than a man's little finger, have grown five to eight inches long and they are surrounded by half a dozen subsidiary roots. The plant is a true tuber and multiplies itself with the fecundity natural to that family. Caña-agria will easily yield twenty tons to the acre, and at the prices above quoted the farmer can see how profitable a crop it is.

PROPERTY.

The appended table will give a complete exhibit of the property of the Territory from a taxation or revenue stand-point. It is necessary, however, to point out that by acts of the 30th Legislature, 1892, railroads and irrigation ditches that are commenced or improved during six years from 1892 shall be exempt from all taxation for a similar period of six years. It will be remembered that in the earlier pages of this book it was shown that the average mortgage value of a farm in New Mexico was considerably over \$4,000. Consider that during the next year the titles to large areas of land, held under Spanish and Mexican grant titles, will be confirmed, and further that these are the very choicest lands on the continent. The situation then is just this: New Mexico has the largest, best and most compact areas of land in which to make corporate investments. No irrigation scheme can acquire sufficient land under the United States land laws to make their investment secure. Here, by purchasing the confirmed title of a large grant, a corporation can command and own sufficient land to make their investment a good one. Besides this the irrigation canals that carry the water, the railroads necessary to carry the new and growing commerce will be free of taxes. No such opportunities exist in other States. This is one of the things in which New Mexico excels. She is always glad not only to welcome investors, but to assist them in every way possible. Her tax laws, as will be seen from the foregoing, are very liberal; she is the only Territory in which large areas of land can be procured under private title; the average value of her farms is very high, and the spirit of her people very liberal and just. The foregoing pages deal with our mineral resources very fully.

TAXABLE PROPERTY.—Compiled from assessors' returns for the year 1893.

County.	Lands and town lots.	Houses and improvements.		Horses.		Mules.		Cattle.		Sheep.		Goats.		Swine.	
		No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Bernalillo.....	\$2,572,200	3,000	\$67,219	350	\$11,200	9,000	\$75,880	150,000	\$162,000	570	\$570	160	\$812		
Chaves.....	206,691	3,476	73,209	220	12,146	74,311	449,213	54,973	110,871	137	131	207	742		
Colfax.....	1,746,000	3,331,232	4,350	89,860	239	7,500	465,110	108,456	157,780	1,838	1,883	490	1,685		
Dona Ana.....	529,270	408,260	2,136	44,320	106	4,240	231,040	14,238	16,490	1,440	1,620	165	310		
Eddy.....	707,910	302,787	6,086	107,384	451	31,584	272,895	29,158	60,170	2,691	3,369	414	1,519		
Grant.....	292,827	603,640	7,630	169,043	316	10,285	822,565	21,652	31,102	9,124	9,295	629	1,946		
Guadalupe.....	698,100	53,783	2,453	46,636	127	3,136	203,937	128,290	163,420	1,740	1,805	71	194		
Linch.....	329,807	247,449	7,176	129,360	166	5,890	542,233	59,576	80,692	10,408	15,112	213	2,426		
Mora.....	700,000	73,019	2,300	55,000	150	4,000	250,000	100,000	100,000	4,000	4,000	200	1,000		
Rio Arriba.....	246,007	107,379	2,250	52,492	116	4,538	39,116	116,458	116,458	2,955	2,955	319	368		
Santa Fe.....	318,544	90,439	3,664	78,868	74	2,845	63,206	17,927	23,371	539	709	372	1,536		
Santa Fe.....	625,191	832,537	978	31,106	168	3,056	28,573	48,334	48,334	2,950	2,950	214	567		
San Miguel.....	947,243	801,341	5,524	127,639	395	11,014	841,839	217,471	271,559	9,704	10,880	413	1,303		
Sierra.....	181,339	270,935	3,156	56,880	159	6,591	115,784	6,230	7,358	6,971	10,243	153	450		
Socorro.....	535,571	351,382	3,167	100,755	331	9,291	549,680	76,693	74,693	5,004	5,004	636	940		
Taos.....	624,126	3,090	130	3,120	100	5,000	20,200	55,345	53,345	2,800	2,800	.....	1,300	
Valencia.....	591,467	102,883	3,031	49,957	260	6,841	159,170	187,900	188,426	1,302	1,119	177	408		
	12,086,383	7,087,625	61,534	1,285,492	3,718	143,161	5,129,261	1,392,671	1,665,069	64,218	74,495	5,933	17,506		

ERRATA.

Above, read: Taos county, Horses number, 1,500; value, \$31,200; making the total number of horses 62,884, total value of same \$1,313,572, and total value of taxable property \$41,304,638.

TAXABLE PROPERTY.—Compiled from assessors' returns for the year 1893.—Continued.

County.	Barros.		Carriages and wagons.	Personal and other property.	Totals.
	No.	Value.			
Bernalillo.....	250	\$2,815	\$34,257	\$2,164,070	\$6,372,277
Chaves.....	125	1,187	11,055	280,009	1,482,569
Colfax.....	156	900	16,550	1,007,108	3,434,620
Doña Ana.....	57	385	10,510	1,377,383	2,629,052
Eddy.....	40	455	16,064	515,537	2,020,594
Grant.....	128	1,100	18,570	1,192,930	3,153,303
Guadalupe.....	780	2,738	9,679	42,218	1,166,120
Lincoln.....	522	2,010	5,000	181,625	1,942,774
Mora.....	275	950	10,000	350,000	1,427,478
Rio Arriba.....	366	2,350	14,515	548,178	1,027,282
San Juan.....	81	429	11,862	45,649	643,521
Santa Fé.....	382	1,207	20,513	1,219,700	2,807,948
San Miguel.....	950	3,281	32,330	1,944,482	6,080,208
Sierra.....	104	780	13,273	732,199	1,380,086
Socorro.....	.....	1,132	32,838	1,596,129	3,258,775
Taos.....	216	525	10,900	301,460	1,029,826
Valencia.....	448	1,207	21,802	292,748	1,416,026
	4,889	24,201	290,327	13,681,505	41,275,559

HISTORICAL.

The honor of the first discovery or exploration of New Mexico is involved in doubt. Most historians assert that Alvar Nuñez Cabeza de Vaca, treasurer of the expedition of Pamphilo de Narvaez, sent in 1527 to conquer and colonize the mainland of Florida, was the first European who viewed its wide valleys and plains, saw and reported on its "fixed habitations" or pueblos, and the character of the aboriginal people. So eminent an authority as Prof. Ad. F. Bandelier, however, roundly asserts this to be untrue, and that Friar Marcus de Niza, a Franciscan monk, was the first white man who entered the Territory. The fact, however, remains that there is no more unique or romantic character in the annals of exploration than Cabeza de Vaca. His name is inseparably connected with the traditions of New Mexico, and a few words concerning his career will be timely and interesting.



A Wonderful Character.

Early in the Florida expedition dangers and difficulties multiplied around the little band. Narvaez was an arrogant, incompetent man. While proceeding along the Gulf coast in open boats, having selected the strongest rowers for himself, he coolly abandoned the others, saying the time had come when it was every man for himself. Cabeza de Vaca and his compatriots were wrecked. Some survived, among them the leader. They were thrown, almost naked, on the shore, captured by the Indians and reduced to slavery. Of this boat load he alone escaped

and gradually made his way westward from tribe to tribe, serving as a slave. During this journey he was reduced to the greatest extremities.

About midway on the Gulf coast, and somewhere in the neighborhood of the Mississippi, he met three of his comrades in arms. These were Alonzo de Castillo, Andres Dorantes and a negro named Estevancio or Stephen, who afterwards accompanied Friar Marcus on his explorations.

Shortly after this Cabeza de Vaca effected a cure of one of the Indians. His fame then spread abroad, and suppliants of his power multiplied so greatly that the three others were pressed into the service. Speaking of these experiences he quaintly says: "Although in being venturesome and bold in the performance of cures I greatly excelled, no one whom we treated but told us he felt well." He spent eight months with this tribe; and it is pathetic to read his account of his good luck when he could secure a hide to scrape for his masters. He scraped and dressed them very thin and ate the shavings of raw hide to satisfy his hunger.

After this period of eight months the prickly pear season came round. They got a little dog, which they killed and did eat to strengthen them for the journey. Then the four fugitives set out, subsisting on a handful or so of prickly pears per day. During this time he says: "I have already stated that throughout all this country we went naked, and as we were unaccustomed to being so, twice a year we cast our skins like serpents."

Their fame as healers had, however, preceded them, and the natives of the scattered villages came out in welcoming bands, bringing their sick and afflicted to the white men for succor. At one time De Vaca successfully extracted an old arrow head from near the heart of a chief. When the pilgrims came to a village the natives would place before them fine robes of skins and savage riches and ornaments—all their simple wealth—as propitiatory presents, but the Christians, in the name of their God, merely blessed and returned them. At times their progress was accompanied by three or four thousand Indians who had no

idea of permitting so much wealth to go to waste, and made a practice of pillaging every village. They pacified the pillaged by telling them it was the custom and that they should escort the white men on to the next town and, doing likewise, repay themselves by appropriating their goods. Thus did the red man learn to rob Peter to pay Paul. De Vaca says of the Indians: "These people are all great liars, particularly when it is to their interest."

After traversing several hundred leagues they finally arrived at "a great river coming from the north," which, from a study of the topography described and a close calculation of the itinerary, is supposed to be the Pecos. After another severe march, crossing high mountains and wide deserts, they came to "a great river breast high," supposed to be the Rio Grande. Proceeding up this stream, "habitations were first seen having the appearance and structure of houses." Immense herds of buffalo were also noted. The country was also reported as populous and productive.

Seven years from the date of Narvaez' expedition the wanderers fell in with a marauding band of Spaniards in Mexican territory, under command of Diego de Alcaraz. They had journeyed from Florida to Sonora, on the Gulf of California in Mexico, and, after a captivity and exile of eight years, they were forwarded to the City of Mexico, where Cabeza de Vaca made a report to the viceroy and was then sent on to Spain.

How he afterwards was commissioned as governor of Uruguay, returned and became a member of the council of the Indies, does not concern us; but it is of moment that for decades afterwards our Indians remembered the kindness and virtue of this man and received his compatriots kindly for his sake. That they were subsequently brought to somewhat another idea of his people does not reflect on him. Measuring Penn, Lord Baltimore, and the best of the early eastern settlers by his standard, the measure is not to their credit. He was not only kind and honest with the Indians, but he never sought to take advantage of their simplicity or ignorance. He practiced in their

entirety the kindly teachings of his faith, served his God and loved his neighbor as himself.

Friar Marcus.

Prof. Bandelier, however, says all the foregoing that relates to New Mexico "is devoid of foundation," and gives the credit of first discovery to Friar Marcus, who first visited the Zuñi pueblos in June, 1539. As a matter of fact, though, the guide and interpreter of this expedition was Estevancio, De Vaca's negro, who unquestionably made the great transcontinental journey.

Friar Marcus bore tidings to the natives from the Spanish emperor that they would not be enslaved and those maltreating them should be punished. He was instructed to "make them banish all fear and recognize God our Savior, who is in heaven, and the emperor placed on earth to govern." This expedition traveled up from the Gulf of California and entered New Mexico through Arizona. They left Sonora, where the famous Coronado was governor.

Friar Marcus, after entering New Mexico, sent the negro ahead as a herald, and arranged with him a novel set of signals. "If what was discovered," says the friar, "was but a mean thing he was to send me a white cross one handful long; if it were any great matter, two handfuls long; and if it were a country greater and better than New Spain, he should send me a great cross." Estevancio kept the natives busy carrying crosses taller than a man.

Estevancio had a pernicious habit of appropriating to himself such goods, chattels and women as he desired. Friar Marcus arrived at the great pueblo of Cibolo only in time to learn that the negro had just been killed for too freely appropriating the native women. His conduct had so enraged the natives that they refused the friar admittance to their town and he was feign to content himself with a thorough examination of it from a neighboring hill. Cibolo is the famous Zuñi pueblo.

Marcus then made formal proclamation of discovery and an-

nexation, not only of Cibolo, which he had not entered, but "also of the 'Seven Cities' and the Kingdom of Totontec, of Acus, and of Marata." These places he had only heard of. He also erected a great cross in memory and as a token of his proclamation. Then, as he expresses it, "possessed with more fear than victuals," he journeyed home and made a glowing report as to rich possessions filled with turquoise and gold, which influenced another expedition of more formidable character.

Coronado.

In 1540 Francisco Vasquez Coronado, guided by Friar Marcus, and followed by 250 men-at-arms, proceeded into New Mexico and occupied Cibolo or Zuñi. Thence, through reconnoitering parties, Coronado explored and annexed the Moqui country to the west and the Acoma and Tegua cities on the Rio Grande, near the site of Albuquerque. The inhabitants of Cibolo, anxious to be rid of their guests, filled their minds with visions of golden cities and a rich country farther on, and very complacently furnished them a guide in the person of an inland Indian. Listening to these tales, they departed in high spirits and followed the Indian league after league and month after month. Finally, as the country grew drearier and more barren, the Indian confessed that his purpose was to entice them so far and so break their strength and spirits that they would fall an easy prey to the Pueblos on their return. He was summarily hanged.

During this expedition Coronado arrived at Bernalillo, on the Rio Grande, in December, 1540, and then the Pecos and Galisteo basins were also annexed. In May, 1541, the whole force moved forward towards the mythical city of Quivira, in north-eastern Kansas or the contiguous portions of Missouri. This exploration was disappointing. Unlike the Pueblo or village Indians of New Mexico, the Quivirans lived in frail huts, while the pueblos were many stories high, well built and of good architecture.

Of these pueblo or communal houses Prof. Bandelier, the great archæologist, says:

“Ancient architecture in the Territory of New Mexico displays variations, but they are only in degree, not in kind. Nothing warrants the assumption that the people who reared the cliff dwellings, for instance, differed in culture from those who constructed the caves or the large pueblo houses. * * * * * On the whole, New Mexico is a most valuable yet hardly explored field of archæological studies. * * * * * The pueblos of New Mexico afford the last opportunity for studying a civilization at present unique in its kind, and which reveals many features important to the understanding of classical archæology even.”

These mighty and famous communal houses were built on some point of importance not only for defensive purposes but to overlook the country. They were constructed in the form of squares with inside courts or plazas, all the apartments having their entrances on the plaza, and the building itself is reared to a height of six or eight stories, made of well laid masonry. So good was their structure that many of them, although long abandoned, remain in good preservation until this day. Others that have been constantly inhabited are as good as when discovered.

When Coronado returned from Quivira he explored the country as far north as Taos, near the Colorado line, and in the spring of 1542 returned to his province of Sonora in Mexico, leaving behind him Andres Docampo, a Portugese soldier, and three priests. He failed to effect a settlement. When the royal soldiers shrunk from their task the soldiers of the cross took up the work. These three devoted priests were Friars Juan de Padilla, Juan de la Cruz and Luis Descolona. The first went back to Quivira, the second remained among the Teguas, and the last established himself at Pecos. The aged men of these peoples were hostile to priestly influence, and, although they enjoyed the confidence of the young people, they were all killed within a year.

In 1581 three other Franciscan friars, Francisco Lopez,

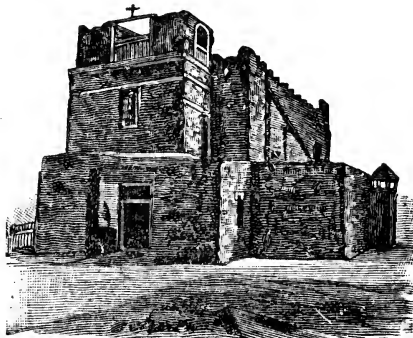
Juan de Santa Maria and Agustin Rodriguez, accompanied by eight soldiers, penetrated New Mexico to aid the three others supposed to be still working there. Alarmed at the reports concerning the first three priests, the soldiers deserted the priests, who pursued their expedition and were murdered shortly afterwards, one near the present town of San Pedro and the other two at the pueblo of Puaray, opposite the town of Bernalillo.

Other Expeditions.

In 1582 Antonio de Espejo, with fourteen men, explored the country from 103 degrees west, in Arizona, north to Galisteo, in Santa Fé county, and in 1585 the expedition of Bonilla and Jumana was destroyed absolutely by hostile Indians. Another in 1590, under Gaspar Castaño de Sosa, made a rapid march through the Rio Grande valley.

Oñate's Expedition and Settlement of Santa Fé.

In 1597, after many vexatious delays, Don Juan de Oñate entered New Mexico with 700 soldiers and 130 families for colonization. On September 7, 1598, he founded a town at Chamita, opposite the pueblo of San Juan in Santa Fé county, known as San Gabriel de los Españoles, which was abandoned in 1605 and the colony transferred to Santa Fé. The Pueblo Indians, with the exception of the Acomans, submitted peaceably. These latter made several attempts to entrap and kill Oñate but failed. After a struggle, in which the Spaniards displayed all the romantic bravery of the conquistadores, entrance was gained to the city over a terrible chasm by means of a beam thrown across it. After the Spanish victory these Indians became very peaceable.



San Miguel Church, Santa Fé—oldest church in the United States.

Oñate also penetrated to the towns of the Quivirans and made a treaty of peace and amity with them, and during the early history of Santa Fé a deputation of 800 Indians visited the town praying assistance against their enemies the Axtaos Indians.

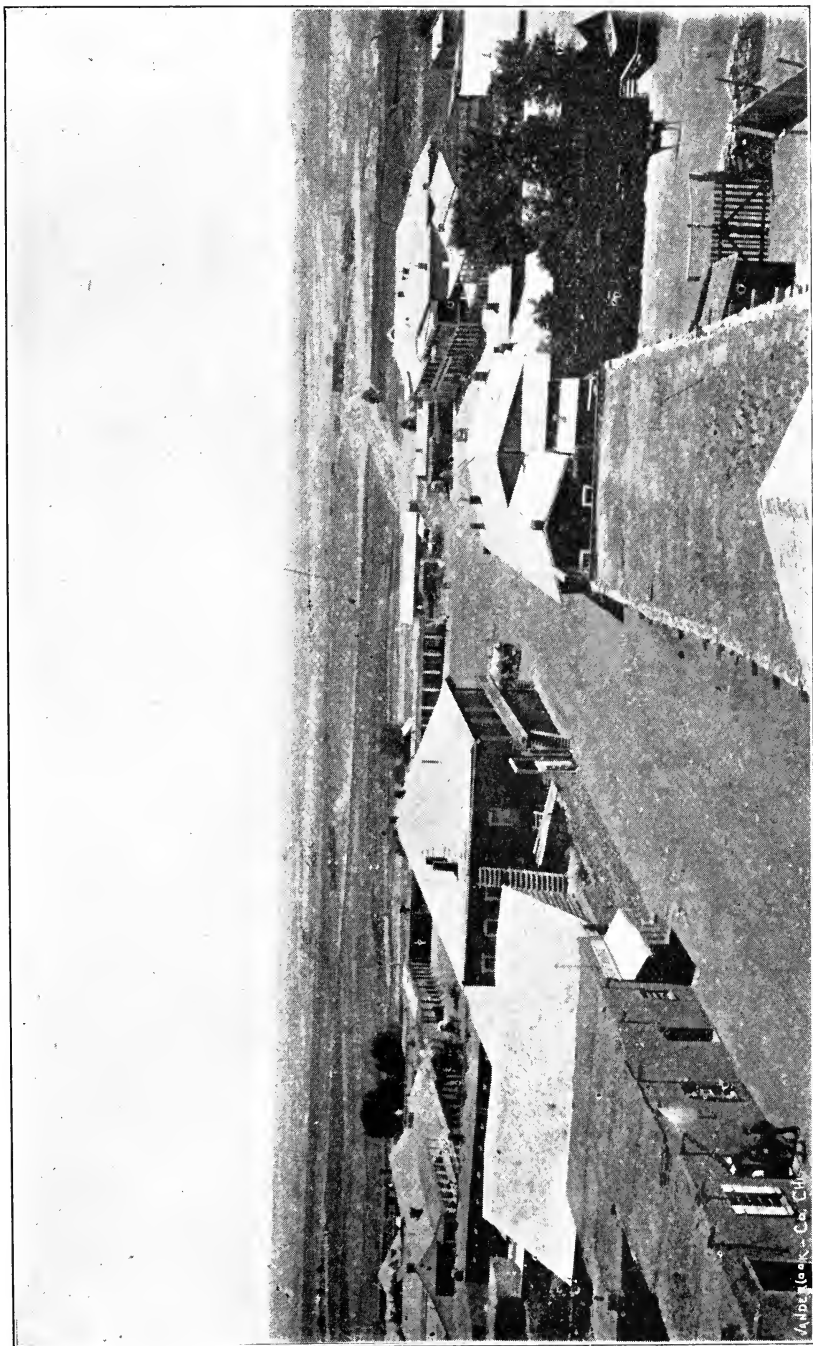
From this period until 1680 Santa Fé was the only European settlement of note, but the Spaniards had spread out and established towns for miners and settlements of families in every direction. Rude prospecting went on and much mineral was found. They impressed the Indians as slaves and laborers, and were embarking on big schemes of mining, the Indians apparently serving patiently if not cheerfully at their heavy tasks.

The Pueblo Revolution.

So matters progressed until 1680, when Otermin was governor. Then the Pueblos, maddened by forced labor in the mines and fields and the rigid scrutiny exercised by the Inquisition over their religious practices, revolted under the leadership of a Taos Pueblo named Popé. Their plans were thoroughly well laid, and one of the features of their organization was a sentence of death against any of the men who revealed anything concerning the movement to a native woman. When the outbreak occurred the outlying ranches were ravaged with fire and violence. Governor Otermin, with his soldiers and 1,000 women and children, were besieged in the "old Palace," still standing on the north side of the plaza in Santa Fé. On August 21, 1680, the garrison found the palace cut off from food and water. A vigorous sortie was made, the natives routed, and, glad of the opportunity, the beleaguered Spaniards took up their sorrowful retreat.

In October the same year they entered El Paso, a sorry crowd of 1,946, including 300 friendly Pueblos, all that was left of the Spanish colonies. In the rebellion 401 persons, including 78 soldiers and 21 priests, were killed.

The Pueblos retained control of New Mexico from 1680 to 1692. Many valuable records were ruthlessly destroyed. The Spanish language and the planting of grains and seeds intro-



Fort Bayard, Grant County.

100-100-100



duced by the conquerors were prohibited. Popé took every opportunity to strengthen himself, and above all else was at pains that every trace of a Spanish mine should be obliterated. Otermin invaded the country the following year without success, and it is doubtful, if Popé had not exasperated the Pueblos by his growing arrogance, whether the Spaniards could have mustered sufficient strength to have recaptured their lost dominion. The half century of Spanish control seemed to have unfitted the Pueblos for self-government, and their independence of twelve years was one long series of internecine wars.

The Reconquest Under De Vargas.

In the spring of 1692 Don Diego de Vargas Zapata Lujan was appointed governor of the lost province. Quickly assembling an army of 300 Spaniards and 100 Indians, he invaded, overran and reconquered the Territory in 1692, and returned to El Paso to bring back the families who had been so summarily evicted by the Pueblos. He again entered the province in 1693, but the same rapidity of victory did not mark his progress. The Indians showed their real spirit, and it was only by the exercise of the most consummate bravery, talent and generalship that he was successful. After a two days battle he reduced the pueblo that the Tanos Indians had established on the ruins of Santa Fé, and by rapid, well-timed incursions into the surrounding country brought something like order out of the reigning chaos. Among his wonderful feats was the capture of the Black Mesa, which to-day frowns over the Santa Fé Southern railroad near San Ildefonso. Its siege occupied nearly a year but its capture taught the Pueblos a lesson, and they were quiet for two years. In 1696 there was another outbreak, but De Vargas in June subjugated the Tanos and Teguas at Santa Clara cañon, in July the Jemez, Acomas and Zuñis at Jemez cañon, and in October he defeated the remnant of the insurgents on the Nambe mountains.

De Vargas is a most romantic figure in New Mexico's history; of rapid decision, great energy, ready resources and wonderful

tact, he was too great a competitor for the Indians. His valor was, however, repaid by removal and imprisonment for three and a half years in the old palace. He was then released, visited Mexico and returned as governor in 1703. In the following year he died at Bernalillo. His successor, Rodriguez Cubero, who filled the gap in De Vargas' governorship, was the worst ruler New Mexico ever had.

The 18th Century.

From De Vargas to 1800, twenty-four governors ruled in the old palace at Santa Fé. In 1706, Albuquerque was founded, and named for the then governor, who bore the high title of Duke of Albuquerque. Galisteo was settled by Indians in the same year. In 1720 Pedro de Villazus, guided by L'Archiveque, the betrayer of the celebrated La Salle, attempted to reach and explore the Missouri river. From that time until 1746 a number of mines were entered and opened, but yielded poorly, all except the Old and New Placers in southern Santa Fé county. The story of the reigns of the governors of this century is too long for enumeration, and would be tiresome on account of its ceaseless reiteration of the plots and intrigues that characterized the time.

The First Americans.

In 1804 Baptiste Le Laude, an unscrupulous trader employed by Mr. Morrison, of Kaskaskia, penetrated New Mexico and sold his wares at such prices that he determined to settle, omitting the formality of an accounting with his employer. The next to enter New Mexico from the north was James Purseley, in 1805, a hunter, trapper and trader, who had become lost in the Rocky mountains. He brought with him many fine specimens of gold and silver ore from the section now known as Colorado, and although repeatedly importuned to lead a party of Mexicans to the ledges whence they came he refused. To his patriotism is owing the fact that these rich mines were reserved for the American and not the Mexican republic.

Pike's Expedition.

In 1806 Lieut. Zebulon Montgomery Pike entered New Mexico. Unwittingly he had erected a fort and raised the American flag on Mexican soil in the San Luis valley. For this he was placed under arrest, brought to Santa Fé and forwarded to the City of Mexico. Describing the country and people, he says: "There is nothing particularly characteristic of this province that will not be embraced in my general observations of New Spain, except that being frontier and cut off as it were from the more inhabited parts of the kingdom, together with their continual wars with some of the savage nations who surround them, renders the New Mexicans the bravest and most hardy subjects of New Spain. * * * * * Their isolated and remote situation causes them to exhibit in a superior degree the heaven-like qualities of hospitality and kindness, in which they appear to endeavor to fulfill the injunction of the scripture which enjoins to feed the hungry, clothe the naked and give comfort to the oppressed of spirit; and I shall always take pleasure in expressing my gratitude for their noble reception of myself and the men under my command." His meeting and conversation with Alencaster, then governor, is a model of high courtesy.

The Opening of the Santa Fe Trail.

In 1812 a party of St. Louis merchants, under the command of Mr. McKnight, entered New Mexico from the northwest. They were arrested as spies, their goods confiscated, and sent south to follow Pike. They were held as prisoners until the success of Iturbide liberated Mexico from the Spanish crown.

The next adventurous trader was named Glenn, who brought a small caravan to Santa Fé. His cheap calicoes and plain cottons brought as high as \$2 and \$3 per yard. When these prices were reported in Missouri the "commerce of the prairies" was opened. From then on commenced an era of romance and adventure. Westport, now part of Kansas City, Mo., and Santa Fé were the outposts of the American and Spanish civilizations.

The long drive over the boundless prairies, from out whose bosom slowly rose glorious snowy peaks, was often interrupted by savage nocturnal surprises; but usually this journey was marked only by successive stages over the flowery prairies or through the wild and steep passes of the Raton and Santa Fé mountains. This all conspired to throw a wonderful glamour over this traffic, which was heightened by a few weeks of pleasure during the sale of goods in the quaint old capital.

The trail, however, was not really and permanently open until 1822. In that year seventy men brought, according to the Missouri invoice, \$15,000 worth of goods to Santa Fé. From that date until 1843 the trade increased until 350 men and 230 wagons, loaded with \$450,000 worth of goods at first cost, were transported to this El Dorado of western trade in one caravan.

During the early era of this commerce some trouble was caused by reason of the fact that the New Mexicans had captured, harshly treated and imprisoned a Texas filibustering expedition. Their comrades sought to make reprisals on the caravans of the Santa Fé trail, and Don Antonio Jose Chavez, a very prominent New Mexican, was murdered with his escort on the trail, and about \$30,000 stolen from him. This was the more abominable as this man's family had done all in their power to mitigate the sufferings of the Texans.

New Mexico Asserts the Right to Home Rule.

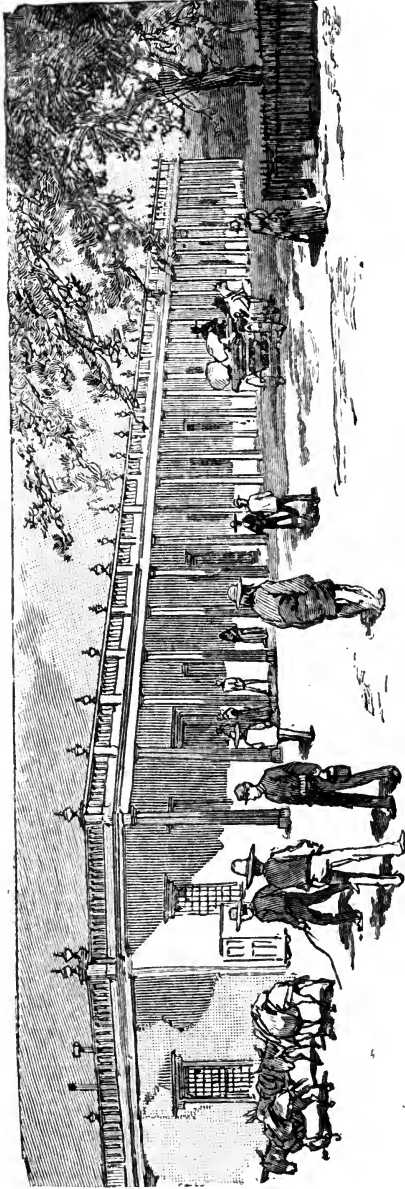
In 1837 Albino Perez, a colonel in the Mexican army, was appointed by President Santa Ana governor of New Mexico. The New Mexicans were used to have their rulers appointed from among their own community, and this installation of an outsider incensed them beyond measure. It is true that Facundo Melgares had been from Mexico, but he was well known and greatly beloved by all the Spanish speaking people on account of the part he had taken in the liberation of Mexico. Pike speaks of him as a man of the rarest ability, courage and courtesy. Between him and Governor Perez ten native governors had intervened. Besides, with the latter's advent new taxes

were imposed, and the Mexican constitution changing the Territory into a department or state was distasteful. The first pretext of rebellion was therefore taken and an insurgent camp pitched at Santa Cruz de la Cañada. Perez marched against them and a battle took place at San Ildefonso, during which the majority of his forces deserted, and Perez was defeated. Retreating on foot to better escape discovery, he was betrayed, captured and killed between Santa Fé and Agua Fria, a short distance from Santa Fé; and in a few weeks, or by August 9 of the same year, all of Perez' political followers were killed or captured. Jose Gonzales, a Pueblo Indian, was elected governor, but was completely outgeneraled and defeated by Gov. Armijo, appointed by the Mexican authorities.

When Gonzales was captured he advanced to Armijo with the greatest familiarity, addressing him as "compañero." Gov. Armijo replied urbanely to the salutation, and then said "confess yourself, compañero. Now shoot my compañero." And Gonzales was accordingly shot.

New Mexico Under the Flag.

Armijo was the last Mexican governor. In this sketch no attention is paid to the transition of the country from the control of Spain to that of Mexico, for the reason that it did not create a ripple in its affairs. The capture of the country by Gen. S. W. Kearney, by a series of well timed forced marches, was almost equally uneventful. Kearney, with a small army, came down from the north, quietly captured Las Vegas, and then pushed on to Santa Fé. Considerable force was sent out to intercept his march but he eluded it and appeared on Fort Marcy, a high hill overlooking Santa Fé and within 200 yards of the Governor's Palace. The town surrendered at discretion; and Gen. Kearney on August 22, 1846, raised the flag in the plaza and declared New Mexico to be part of the United States. Not a shot had been fired or a drop of blood spilled. Thereupon Gen. Kearney appointed a territorial government, mostly from among the citizens of the Territory, as follows: Chas.



Governor's Palace, Santa Fe.

Bent, governor; Donaciano Vigil, secretary; Richard Dollain, marshal; Francis P. Blair, U. S. district attorney; Chas. Blummer, treasurer; Eugene Leitendorfer, auditor; and Joab Houghton, Antonio Jose Otero and Chas. Beaubien, judges of the supreme court. He also set a commission to work codifying the laws, and had a complete government in working order in twenty-four hours after taking possession.

In the following year Don Diego Archuleta and Don Tomas Ortiz stirred up a revolution, which was easily put down before it gathered head. During this affair the first territorial governor, Charles Bent, who was at Taos to quell the disturbance, was killed by a mob of Mexicans and Taos Pueblo Indians. An expedition was dispatched to Taos and the pueblo of Taos was captured by the troops under Colonels Price and St. Vrain. The guides were Manuel Chaves and Nicolas Pino, heads of two well known Santa Fé families. In the fight some fifty Pueblos were killed. The president exonerated the leaders of the conspiracy from the charge of treason on the ground that Mexico being at war with the United States, and this being merely a captured province, until a final treaty was signed there could be no such thing as treason on the part of a New Mexican in fighting to support his mother country.

It must not be supposed that because so slight a resistance was offered to the occupation by the United States that the New Mexicans were a weak or cowardly people, and their record in the field during the rebellion will entirely disprove this. The fact is the people were tired of paying to Mexico a multitude of burdensome direct taxes and were only too ready to accede to the liberal terms of Kearney. The disaffected found it impossible to raise a following among the people. Indeed, the crimes, arrogance and extortion of Armijo made the people welcome Kearney as a deliverer. Armijo was a large, blustering man, whose motto and expression was "It is better to be thought brave than to be so;" and who was wont to cane his subjects on the open streets. He was a tyrant, but a man who played on the weaknesses of others and therein found his strength.

Modern New Mexico.

The history of New Mexico down to the opening of the great civil war in 1861 is uneventful and practically devoid of interest except for numerous fights and campaigns against Navajoes and Apaches by United States troops and New Mexico volunteers.

At that period, however, it became the theatre of some of the most thrilling and important operations of that great struggle. The prime necessity of the south was a source of revenue, and its leaders planned a remedy for this defect by the capture of the great southwest, including New Mexico, Colorado, Arizona and California. This was, even then, known to be the treasure house of the world. Besides this, it would open the important ports of the Pacific to the southern commerce. Perhaps no greater dream of empire ever entered the mind of man. If successful the Confederacy would have controlled a coast line from Chesapeake bay on the Atlantic, through the Gulf of Mexico and then along the Pacific from Lower California to Puget's sound; in addition to which it would have owned the greatest mineral fields known and might by liberal legislation have invited the choicest immigration of the world. The Southern leaders reasoned that New Mexico had been too short a period under the flag to become greatly attached to its interests. They forgot, however, that when New Mexico applied for statehood under the guarantee of the treaty of Guadalupe Hidalgo this people almost unanimously swore allegiance to the United States; they forgot that in the simple ethics of this people such an oath is of paramount obligation; they also forgot that the New Mexicans were opposed to and in their constitution prohibited slavery. When, therefore, a small army of well drilled and armed troops of the South, principally Texans and their descendants who had so thoroughly thrashed Santa Ana, invaded New Mexico in 1862 they were met by the small force of regulars and the native militia at Valverde, Cañon del Apache and Pigeon's Ranch. Fierce battles took place, and although the Texans, under Gen. Sibley, pushed on and captured Santa Fé,



Route of the Las Vegas Hot Springs, N.



which they held for about two months, the fight against them was so bitter that they were compelled in one campaign to retreat across the Texas border. During the war New Mexico sent more men into the field, in proportion to population, than all the western States and Territories together, if Kansas and California are omitted. Indeed at times all the men capable of bearing arms were in the field, either as U. S. volunteers or territorial militia, engaged in fighting fierce and bloodthirsty Apaches and Navajoes and guarding the frontier against Confederate and Mexican inroads and attacks.

Indian Wars.

From 1865 to 1881 the Territory was plunged in the horrors of two terrible Indian wars. Up to this period the U. S. government had already expended many millions in the subjugation of Indians in New Mexico and Arizona, which up to 1863 was a county of New Mexico. During these wars, as also in the rebellion, Kit Carson and a regiment of New Mexicans greatly distinguished themselves. Indeed during the war from 1860 to 1865 the New Mexico militia when not operating against the Texans were busily engaged in fighting the Navajoes and Apaches. It was also during this period that Gen. Carlton issued orders to kill without parley every Indian found with arms. In the summer of 1863 there was an effective force of 3,000 men employed in the Indian campaigns, composed of regular troops and New Mexicans, and a continual fight was waged against the Apaches and Navajoes. The militia were under the command of Kit Carson; they took no prisoners from among the braves. They killed 301, wounded 87 and 703 surrendered. On the last day of February Gen. Carlton reported that the Navajoes acknowledged defeat, after a struggle against the Spaniards, Mexicans and Americans of 108 years.

Kit Carson then headed an expedition to capture the remaining Navajoes, among them Manuelito, a famous chief. Although many were killed or taken Manuelito escaped and was for a long time head chief of the tribe.

In 1867 a commission was appointed to investigate the Indian wars. They reported that \$500,000,000 and 20,000 lives had been expended in the Indian wars, principally against the Apaches and Navajoes. The Apache war which continued from 1861 to 1870 cost the government above \$40,000,000.

Again in 1878 Victorio broke away from the reservation and with about 200 braves desolated southern New Mexico; and from that date for over two years he never left the war-path, keeping Grant, Sierra and Socorro counties in continual terror. He was killed at the fight of Tres Castillos, in the State of Chihuahua, in September, 1880, by Mexican troops under Colonel Joaquin Terrasas.

These Indians were not really ousted from New Mexico until 1886; and it was only after vigorous campaigns by Gens. Crook and Miles that the Apaches were driven onto the San Carlos reservation in Arizona.

American Development.

The development of New Mexico under American control properly began with the introduction of railroads. On the 15th of February, 1880, the road was completed to Santa Fé, three hundred and sixty miles having been built in 260 days to save its charter. In a short time thereafter it was completed to El Paso, and by branch lines to Deming, Silver City and Lake Valley. By connections with the Atlantic & Pacific it obtained connection with Los Angeles and San Francisco, Cal. The Denver & Rio Grande railroad afterwards pushed into the Territory and now controls 150 miles in the northwestern part, and over the Santa Fé Southern has direct connection with Santa Fé. The Southern Pacific road also crosses the southern tier of counties from Arizona to El Paso. According to the census there were in 1889 1,326 miles of railroad in New Mexico, or one mile for every 92.42 square miles of country, or 120.64 in the number of inhabitants. Since that date the Pecos Valley railroad has completed ninety-seven miles of road, and it is projected on to a junction with the Santa Fé, a

distance of 150 miles more. So that there are now 1,423 miles of railroad in actual operation in the Territory. It is since the advent of railroads that the real progress of New Mexico has begun. In 1880 this was a frontier country. Its resources were absolutely unknown except to a few adventurous spirits. There were no towns of any size or importance, except Santa Fé. Since that date Las Vegas, Albuquerque, Silver City, Deming, Eddy, Roswell and Socorro have come into notice as thriving and growing communities. The urban population of the Territory has increased more than 25,000. In agriculture, the principal industry of man, great progress has been made. In the northeast the Maxwell grant reservoirs and canals have actually opened to use 55,000 acres, and its projected works will cover 150,000 acres more. In the Pecos valley, in the southeast, there is an assurance of 500,000 acres fit for high class culture. In the southwest 25,000 acres are being prepared for occupancy. In San Juan county 30,000 acres are reclaimed, with a certain prospect that over 400,000 more may be put under water as occasion requires. In the great central valley of the Rio Grande there are large projects under consideration, whose ultimate area of reclamation cannot now be estimated. In a word, New Mexico has made more actual progress in industry and reclamation than any State or Territory in the Rocky mountain or plains region except Colorado, and is overshadowed by her neighbor simply because she is cut off from the benefits of self-government. As much as a Territory can do has been accomplished.

It is felt now to be certain that the patience of her people will soon be rewarded, and that at sometime during the 53rd Congress New Mexico will be advanced to the dignity of statehood. Those who would wish to realize the full benefits of this action of Congress should be citizens of the Territory with a voice in shaping her State constitution.

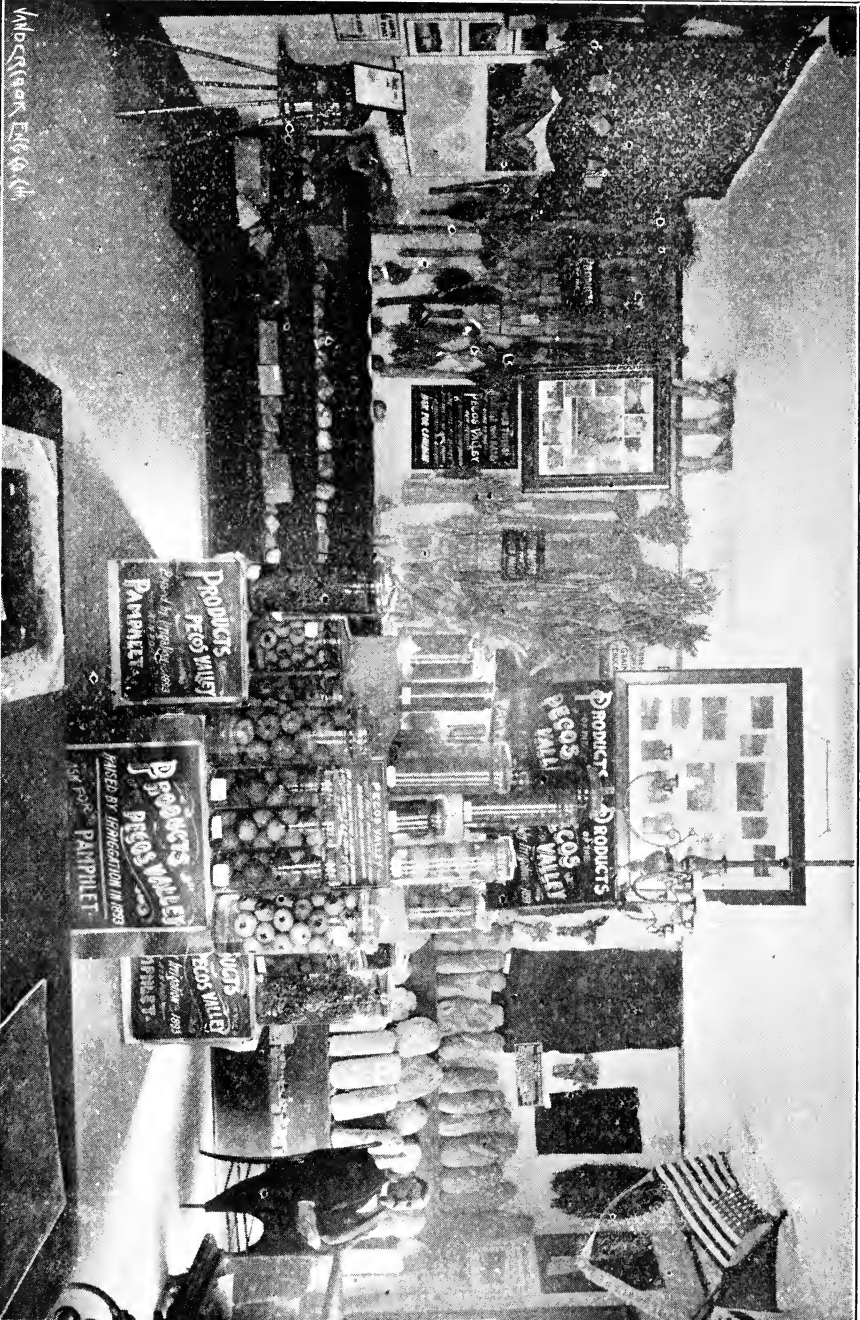
Efforts for Statehood.

The history of the efforts of New Mexico to be admitted to

the Union of States is very interesting. The treaty of peace signed at Guadalupe Hidalgo contained an implied promise that this admission should be just as soon as Congress could carefully examine into the matter. Consequently, even before the proper admission of New Mexico as a Territory the people met in delegate convention and adopted a constitution, which was submitted to the people, who ratified it almost unanimously. Under authority of this action a State Legislature met on July 1, 1850, and elected two United States Senators. The people during the previous June had elected a Congressman. The Senators and Congressman proceeded to Washington and presented the constitution and their credentials for approval. In the meantime, however, Congress had passed the organic act creating the Territory of New Mexico, and refused to seat the Senators elected, but admitted the Representative as territorial Delegate in Congress. In the light of subsequent events, it is curious to note that Congress refused to admit New Mexico to statehood at that time because "she was too far ahead of the times," the reason being that her constitution provided that "all men being born equally free and independent, and having certain natural and inalienable rights, * * * * therefore no male person shall be held by law to serve any person as a servant, slave or apprentice after he arrives at the age of twenty-one years, nor female, in like manner, after she arrives at the age of eighteen years, unless they be bound by their own consent after they arrive at such age or are bound by law for the punishment of crime."

This was the first declaration of popular freedom south of Mason and Dixon's line. In the terrible war of the rebellion the New Mexicans sealed their faith in universal liberty with their blood. Yet since the close of the war there have not been wanting bigots and ignorant men to hurl the charge that New Mexico is not liberal enough to be admitted to this Union. The serf of Russia can be a full fledged American citizen in five years; but the native New Mexican, who blazed the path of freedom, watered it with his blood, fought heroically for the

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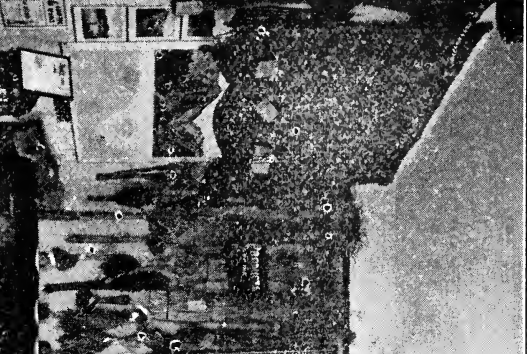
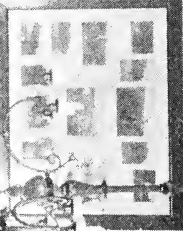
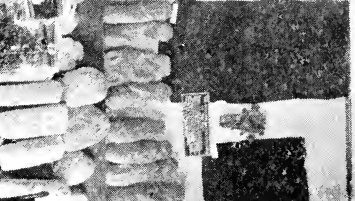
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vital interests of his government, has been restrained in a state of pupilage for half a century. The story of the peculiar and unique devotion of the New Mexican of Spanish descent to the American flag is a theme for eloquence, but the limits of this chapter only permit a cold detail of the facts.

Since the organization of this Territory half the Legislatures have petitioned for statehood. In 1871 the Legislative Assembly passed a law authorizing the assembling of a constitutional convention. At the election following 20,000 votes were cast for Delegate to Congress and less than 4,000 were against the constitution, which was broad and liberal. Again Congress refused to admit the Territory. In 1874 the national House passed an enabling act for the Territory and the Senate concurred therein, but a few trifling amendments were added, upon which no vote was had, and therefore the bill failed. In the following Congress, the 44th, it passed the Senate by an overwhelming majority, but was killed in the House. In every Congress thereafter bills were introduced to admit New Mexico to statehood, but none were passed by either house, except during the 52nd Congress, when the House passed an enabling act, which was not brought to a vote in the Senate. Favorable reports have, however, been introduced in almost every Congress by the Committee on Territories.

New Mexico, in her resources, in her population, her wealth, her schools, her people, is not behind, but far ahead of States having an equal population. She has a greater number of people and more riches than any Territory, except the two Dakotas, at the date of its admission, and it is confidently expected that this Congress, the 53rd, will right this great wrong.

NEWSPAPERS.

The following is a list of the newspapers (with class and location of each) published in New Mexico December 15, 1893, the date at which this report closes:

San Juan County.

The Index..... Weekly..... Aztec.
The Times..... Weekly..... Farmington.

Rio Arriba County.

The Northwest New Mexican... Weekly..... Chama.

Taos County.

The Herald..... Weekly..... Taos.
The Miner..... Weekly..... Amizett.

Colfax County.

The Range..... Weekly..... Raton.
The Reporter..... Weekly..... Raton.
The Stockman..... Weekly..... Springer.

Union County.

The Democrat..... Weekly..... Clayton.
The Enterprise..... Weekly..... Clayton.
The Metropolitan..... Weekly..... Folsom.

San Miguel County.

The Optic..... Daily and weekly..... Las Vegas.
La Voz del Pueblo..... Weekly..... Las Vegas.
Revista Catolica..... Weekly..... Las Vegas.
The Stock Grower..... Weekly..... Las Vegas.

Santa Fe County.

The New Mexican..... Daily and weekly..... Santa Fé.
El Nuevo Mexicano..... Weekly..... Santa Fé.
The Sun..... Weekly..... Santa Fé.
El Boletin Popular..... Weekly..... Santa Fé.
The Rustler..... Weekly..... Cerrillos.
The Galisteo Democrat..... Weekly..... Cerrillos.

Bernalillo County.

The Citizen..... Daily and weekly..... Albuquerque.
The Democrat..... Daily..... Albuquerque.
The Times..... Daily..... Albuquerque.
The Gleaner..... Weekly..... Gallup.

Socorro County.

The Advertiser.....	Weekly.....	Socorro.
The Chieftain.....	Weekly.....	Socorro.
El Heraldo.....	Weekly.....	Socorro.
The Bee.....	Weekly.....	San Marcial.

Sierra County.

The Advocate.....	Weekly.....	Hillsborough.
The Shaft.....	Weekly.....	Kingston.
The Black Range.....	Weekly.....	Chloride.

Grant County.

The Enterprise.....	Weekly.....	Silver City.
The Southwest Sentinel.....	Weekly.....	Silver City.
The Headlight.....	Weekly.....	Deming.
The Liberal.....	Weekly.....	Lordsburg.

Dona Ana County.

The Independent Democrat.....	Weekly.....	Las Cruces.
The Republican.....	Weekly.....	Las Cruces.

Lincoln County.

The Eagle.....	Weekly.....	White Oaks.
The Leader.....	Weekly.....	White Oaks.

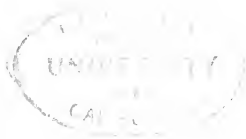
Chaves County.

The Register.....	Weekly.....	Roswell.
The Record.....	Weekly.....	Roswell.

Eddy County.

The Argus.....	Weekly.....	Eddy.
The Citizen.....	Weekly.....	Eddy.
The Current.....	Daily and weekly.....	Eddy.
The Independent.....	Weekly.....	Eddy.

This makes a total of six dailies and forty-four weeklies.



INDEX.

	Page.
Bernalillo County.....	179
Climate.....	272
Colfax County.....	123
Doña Ana County.....	234
Education.....	282
Grant County.....	224
Historical Sketch.....	321
Hot Springs.....	305
Indians.....	293
Irrigation.....	42
Lincoln County.....	209
Live Stock.....	296
Membership of the Bureau.....	2
Mining.....	65
Mora County.....	142
New Mexico—general article thereon.....	3
Newspapers.....	342
Property.....	318
Railroads.....	299
Rio Arriba County.....	106
San Juan County.....	92
San Miguel and Guadalupe Counties.....	151
Santa Fé County.....	163
Sierra County.....	215
Socorro County.....	200
Staple Products.....	311
Taos County.....	113
The Pecos Valley—Eddy and Chaves Counties.....	244
Union County.....	138
Valencia County.....	191



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