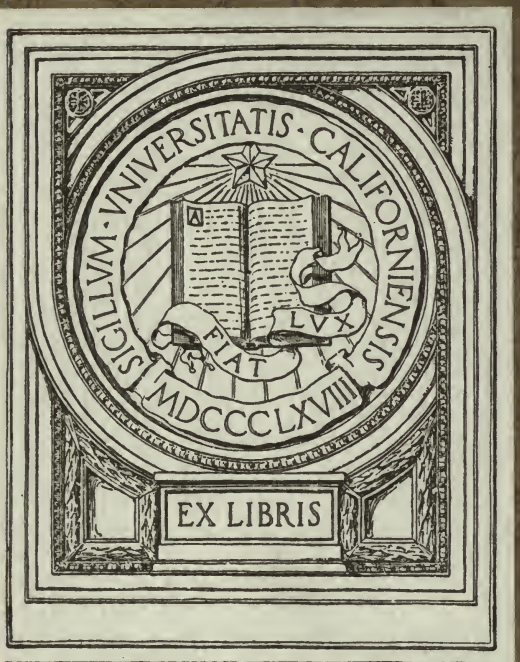

AGRICULTURAL NEVADA

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ISSUED BY
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MAIN DAM ON THE TRUCKEE IRRIGATION DITCH

CHAPTER I

In Which Is Contained Much that Is Decidedly at Variance with Outside Public Opinion Concerning the Agricultural Resources and Possibilities of this Great Arid-land State

A STATE where no special attention until recently has been paid to its agricultural resources; desolate and unpropitious when viewed from the car windows of the transcontinental trains which traverse little of its farming sections; and for fifty years given over to mining as its paramount industry, with stock-raising second and farming third in the industrial list; with a preconceived opinion in the minds of the public that, generally speaking, it is as hopeless of transformation into fields of husbandry as are the tablelands of central Asia, or the Desert of Sahara—Nevada is somewhat handicapped in its appeal to homeseekers in that conditions are not what they are understood to be and that this great inland empire has its own marvelous agricultural destiny.

Progress of Agriculture and Irrigation.

But we have been making progress the last few decades, and very much so in agriculture and irrigation. In keeping with this advance, economic pressure is constantly crowding the surplus population of the country into every opening and available field of opportunity. Necessity—that wise old mother of invention—has the comfortable faculty about the time we are apparently up against a stone wall to disclose that the wall is not an obstacle after all, but is capable of being turned to very excellent advantage.

Now, it happens that while many are bewailing that all the desirable public lands have been appropriated and no further opportunity is left the homeseeker, irrigation and agricultural progress—more particularly the conservation of the natural sources of water-supply, improved methods of irrigation, and more intensive methods of farming—have

quietly and without much ado embraced areas of the public domain once thought valueless within the domain of opportunity for settlement. Moreover it is a question whether the settler on the portion of public domain remaining unappropriated has not opportunities fully equal, if not better, than the Western pioneers of half a century ago. The landless of to-day overlook the fact that those early pioneers, while they unquestionably had the choice of lands easiest of cultivation, were yet heavily handicapped by distance to transportation lines and absence of social and educational opportunities. The twentieth century settler need not go beyond easy access to transportation lines, and ordinarily will find in the arid West, more particularly in Nevada, that he can procure land capable of reclamation and of producing, under irrigation, bountiful crops within close proximity to railroads, schools, churches, social opportunities and local as well as general markets. But the handicap of the first pioneer settlers, which is here obviated, is exchanged for another of a different character—the necessity of providing water for irrigation.

The Four Factors of Agriculture.

There are three factors which are essential to successful agriculture, in addition to the fourth which is the human factor of plowing, planting, and harvesting, namely: climate, with respect to the mean and extreme range of temperature of the seasons; soil, with respect to the constituents required for plant life, and humidity, with respect to the moisture necessary to grow crops. The latter factor in the arid region must be supplied by irrigation. It was once thought that Nature could not be improved upon by any artificial means of supplementing a natural deficiency of humidity. But that belief has been overthrown by the comparative results of the fruitfulness of like soils: in the one instance dependent on the uncertainties of rainfall, and in the other on moisture within the control of the agriculturist, to be given his crops when needed and withheld when not. Farmers who have had experience under both conditions are substantially unanimous in their preference of irrigation over rainfall. It is contended that not only is there a greater certainty of harvest, but that, other conditions being equal, equivalent lands will grow larger crops under skilful irrigation than with rainfall.

We have stated that Nevada, contrary to prevailing opinion, holds the promise of a great agricultural future. On what ground is this outlook based? The answer is: On climate, soil and irrigation; the conservation of the surface and subsurface waters of the State to supplement the deficiency of climatic humidity.

THE CLIMATE OF NEVADA

Nevada has a range of climate greater than any other state or territory, with the single exception of California. Its northern boundary is the same as that of Pennsylvania, its southern boundary is on the same parallel as the northern boundary of Mississippi, Alabama and Georgia. It wedges Southern California from Arizona on the south; and north, it adjoins Oregon and Idaho. Southern Nevada is semi-tropical, almost frostless, and with a growing season of over nine months' duration. Northern Nevada has a climate with moderate winters, temperate summers and a five-months' normal growing season from the middle of April to October. The elevations of its valleys are not extreme—from 3,000 to 5,500 feet in the northern and central parts of the State, and from 2,000 to 4,000 feet in southern Nevada. These altitudes are lower than many of the most fertile valleys of the other intermontane states.

Separating these valleys, one from another, are mountain ranges, some of great and others of moderate elevation, with a general north and south trend. These have a modifying effect upon meteorological conditions, tending to cause the precipitation of moisture on the high peaks and ranges rather than in the valleys and to temper the intense heat of summer in the latter with cooling winds from the mountains. The atmosphere is clear, healthful and invigorating. The absence of humidity during the summer months causes the earth, after sunset, to radiate its heat into space, with the result that even in southern Nevada the nights are comfortable. Between June first and the beginning of October, in

northern and central Nevada frosts rarely ever occur, and in southern Nevada frosts are confined to the late fall and winter months. Contrary to the belief of those unfamiliar with the climate of the State, the winters are as a rule mild. The stormiest season is from the middle of January to the middle of March. Snow rarely falls to a depth greater than two feet in the valleys, and the normal duration of snow on the ground is from three to five weeks. April and May are unsettled—days of balmy spring weather alternating with cold "snaps," raw winds and frosts. By the first of June, however, and frequently earlier, steady summer weather begins and lasts until October, with warm and hot cloudless days and cool but frostless nights. About October first occurs the equinoctial storm, lasting about ten days and usually accompanied with the heaviest rain of the year. After this, the remainder of October, all of November and frequently the greater part of December is glorious fall weather, compensating with its charms the disagreeable features of the spring.

Manifestly, on this showing, which is confirmed by reference to meteorological records, the climate of Nevada is generally, and in some instances extraordinarily, favorable to agriculture.

RICH AND FRUITFUL SOIL

Is the soil of Nevada's valleys inferior or destitute of the elements which nurture plant life?

Nature, to initiate, in this State has placed in her natural desert flora an almost infallible criterion of soil values. Ordinarily, in northern and central Nevada, the growth and thriftiness of the black sagebrush is determinative of the character of the soil, and only in exceptional cases the rule does not apply.

The alkali deserts are barren of vegetation other than a few stunted weeds and thorn-bushes. These deserts, in the present stage of agricultural science, at least, are hopeless of reclamation and are only valuable for their mineral contents of salt, soda, and borax.

Natural Soil Classifications.

The following classification of soil values, based on the character of the desert flora in Nevada, will be found substantially correct in almost every instance:

LUXURIANT BLACK SAGEBRUSH, from three to five feet high, denotes invariably a rich soil with all the constituents required by plant life including nitrogen and humus in abundance. Such land in Nevada will yield bountifully any crop within the climatic range.

MEDIUM BLACK SAGEBRUSH, from two to three feet high, reasonably thrifty in appearance, indicates invariably good soil free from alkali, with sufficient nitrogen, humus, and all other necessary constituents required by plant life. Such land under irrigation will produce in northern and central Nevada from three to seven tons of alfalfa to the acre, twenty-five to fifty bushels of wheat, or from 175 to 400 bushels of potatoes, and relatively all other crops within the climatic range.

MEDIUM BLACK SAGEBRUSH WITH GREASEWOOD, with occasionally thorn-bush or shadscale intermixed, or patches of wild rye, denotes first of all surface moisture and usually a soil rich in humus and nitrogen. The presence and relative thriftiness of the black sagebrush is the natural criterion by which to judge of the quantity of alkali contained. If the black sagebrush thrives, the fear of excess alkali in the soil may be dismissed. Lands of this character will frequently grow wheat, rye, emmer, potatoes and certain other crops without irrigation, due to the soil moisture naturally present, when dry-farming methods are followed. There are thousands of acres of land of this character in the State susceptible of cultivation without irrigation, which at the present time are lying fallow. Most of this is in private ownership, chiefly of stockmen.

STUNTED BLACK SAGEBRUSH AND THORN-BUSH are indicative of a soil deficient in nitrogen and humus, but not essentially of the other constituents required for crop-growing. The nitrogen and humus may be supplied, where the conditions otherwise are favorable, and such land be made very productive. Land of this character should be

A LOVELOCK WHEATFIELD—ONE HUNDRED ACRES THRESHED 6,700 BUSHELS

ALFALFA AT LOVELOCK, NEVADA

subjected to soil analysis as a determinative, with which its location and climatic conditions will govern the profitableness of its reclamation.

SHADSCALE AND SALTBRUSH are indicative of alkali more frequently than otherwise, and grow in the lowlands along the course of the drainage of alkaline waters from the uplands.

The moisture and heat variant, or relative aridity of one section of the State with another, is to be given consideration as modifying to some extent the foregoing classifications, more especially with respect to the thriftiness of the black sagebrush. The relative degree of moisture normally present in the soil will be reflected in a greater or less growth of black sagebrush on equivalent soils, provided the moisture is not excessive. Beyond a certain limit of soil moisture, it is to be understood that black sagebrush will not thrive but is displaced by greasewood, nor will black sagebrush grow upon lands containing more than a negligible quantity of alkali.

Area of Arable Land in Nevada.

Among the states and territories, Nevada ranks fourth in area, with 110,690 square miles of surface; 869 of which is water. The land area may be roughly classified, from the agricultural standpoint, into three groups, namely: alkali wastes and barrens; mountainous and rolling grazing lands, and arable valley lands. While no accurate computation has yet been made by either the State or the National Government of the lands in each group, sufficient data is obtainable on which to base a reasonable approximation. According to such calculations, the alkali deserts and verdureless barrens occupy approximately one-sixth of the total area of the State, or about 12,000,000 acres. The mountains, hilly and rolling lands, unsuitable for agriculture but affording excellent range for cattle and sheep, and on which 500,000 head of cattle and 1,500,000 head of sheep find subsistence, is estimated at 40,000,000 acres. The total area of arable valley lands is estimated at not less than 18,000,000 acres. The immensity of this latter acreage may be conceived when it is stated that it is equivalent in area to all of Massachusetts, New Hampshire and Rhode Island combined.

Any average quarter-section of this 18,000,000 acres of arable land under irrigation will support a family; on no inconsiderable portion of it, eighty acres under cultivation will support a family, and under intensive farming and fruit-raising, in many instances, sixty, forty, and as low as twenty acres will support a family. Including natural grass meadows, less than five per cent., or only about 750,000 acres of this arable area, is today under cultivation. But the farms that are reclaimed are an indication of the wonderful possibilities of the soil, latent until released to fruitfulness by the magic of irrigation!

THE REAL PROBLEM—WATER

On the foregoing showing, the problem for solution in the reclamation and colonization of Nevada involves neither climate nor soil. The climate is propitious! the soil of at least 18,000,000 acres is all that could reasonably be desired by the husbandman! The problem instead is to correct the deficiency of climatic humidity by artificial irrigation. Water is the talisman of the desert—without which the desert is, and with which the desert vanishes, transformed into waving fields of alfalfa and grain, the verdure of plant and fruit, tree and shrubbery, the homes of farmers, and the seats of villages, towns and cities.

Between the settler and the fruitfulness of the land lies this problem of water, and it is our purpose here neither to underestimate nor overestimate the difficulties which must be conquered. If unconquerable, there would be no necessity for this booklet. On the other hand, nothing will be gained by minimizing the obstacles which must be overcome. For a settler who under a false statement of facts might be induced to come to Nevada expecting to select a homestead on the public domain, and through his own efforts and at small outlay to develop a water right for it, would not find such conditions existing except in rare instances, and his grievance at the misrepresentation would be genuine.

While, unquestionably, there are many isolated tracts of land in Nevada on which a settler might discover and by his unaided endeavors conserve a water-supply for its reclamation, it is to be understood that such instances are essentially rare and not every search by the homeseeker might find reward.

Where, then, is the opportunity for the settler in Nevada? This will be answered clearly and definitely in the succeeding pages, after a discussion of the water-supply of the State, which is first in order.

Water-Supply of Nevada.

In that third of the United States lying between the Ohio and Mississippi rivers, on the east, and the beginning of the Rocky Mountains on the west, the country is level or undulating, without mountains or hills of any altitude worth mentioning. The result is a comparatively even distribution of rainfall throughout extensive areas. The topography of Nevada on the contrary shows approximately two hundred valleys, great and small, separated from one another by mountain ranges, anywhere from 2,000 to 7,000 feet higher than the valley levels. The effect of this on the distribution of rainfall is marked. The mountains gather the storms, intercept the precipitation, and while the valleys occasionally get rain or snow, the ratio between the rainfall of the latter and the mountains is probably not more than one to three. When it is stated that the average annual precipitation in the valleys of northern, eastern and western Nevada is not likely more than eight inches, in central Nevada not more than five inches, and in southern Nevada not more than four inches, this should not be understood to represent but a small part of the actual rainfall over the State. Moreover, there is often a wide variation in rainfall between one valley and another immediately adjoining it but separated by a mountain barrier. Several valleys have an annual precipitation very much greater than the averages stated above, others considerably less.

Effects of Mountains on Humidity.

These mountain ranges are factors of supreme importance in the agricultural reclamation of the State. The winter snow is conserved in the higher altitudes to melt gradually during the spring and summer, giving rise to the streams and rivers which supply water for irrigation. Moreover, the mountain valleys and cañons afford many opportunities for storage reservoirs. A dam thrown across the outlet of an upland valley through which a stream flows, or which is surrounded by a large catchment basin, impounds the waters. The run-off which otherwise would flow to waste in the early spring before irrigation begins and in the fall after irrigation ceases, is thus conserved and regulated to flow only when required for crop-growing.

Stream measurements of all the principal rivers of the State disclose the fact that without a water-storage system on a given stream, about seventy per cent. of the total annual run-off flows to waste during the non-irrigation season. As only a small fraction of the flood waters of the Nevada streams is yet conserved by water-storage system, it follows that not more than a third of the actual surface water-supply is yet utilized for irrigation. The field thus left open for reclamation enterprises is attracting lively attention at the present time, and will be discussed more fully under the chapter relating to the Carey Act.

Principal Rivers and Streams.

The waters of only five small rivers in Nevada reach the ocean, namely: the Virgin River with its tributary, the Muddy, in southern Nevada, which flows into the Colorado and thence into the Gulf of California; and the Owyhee, Bruneau and Salmon in northern Nevada which are tributaries of the Snake and the latter in turn of the Columbia. All the other streams either flow into lakes without outlets or ultimately disappear by evaporation or by percolation.

ONION FIELD NEAR RENO, NEVADA

The principal rivers are the Humboldt, Truckee, Carson, Walker, Reese, Muddy, Owyhee, Quinn, Virgin, Bruneau, Salmon and White. In addition to these are a great number of creeks and brooks which in some instances are feeders of the larger streams, and in others are independent and lose themselves in the valleys. To these sources of water-supply for irrigation must be added springs which occur in many parts of the State and from which considerable bodies of land are irrigated; also, artesian or subsurface waters, which latter have challenged special interest within the last two years and will be discussed separately.

Water Rights and Appropriated Waters.

Water, under the laws of the West, is subject to appropriation. The essence of ownership, however, is "beneficial use," without which no right exists. In the ownership of water, the season during which it is put to beneficial use is a limitation as well. Therefore, a farmer who has a water right will be protected in its enjoyment during the irrigation season, but during the remainder of the year any one else may make application for all or a part of that which flows to waste, termed "flood waters," and on impounding and putting the same to beneficial use may acquire ownership.

The natural flow of nearly all the streams during the irrigation season is already appropriated. But only a relatively small portion of the flood waters are appropriated. The State law permits the applicant for the flood waters of a stream to acquire by condemnation proceedings any lands in private ownership required for storage reservoirs, diverting canals and ditches. The appraised value is based on the actual use to which the land proposed to be condemned is put by the owner. As this is usually grazing, the acreage value is not high. If the reservoir site be on the public domain it may be secured by application to the Government.

We have stated that the appropriated waters of the State are utilized in the irrigation of approximately 750,000 acres of land. Were the flood waters of the streams that now flow to waste during the non-irrigation season impounded and conserved to flow only during the irrigation season, and all such surface-waters put to a reasonably high irrigation duty in place of the present more or less wasteful methods, it is safe to say that such waters would be sufficient to reclaim and put under a high state of cultivation not less than 3,000,000 acres of land.

Water Storage Systems Require Capital.

Unfortunately for the homeseeker, water-storage enterprises are expensive undertakings and, as a rule, have to be carried out on a scale sufficiently large to reclaim many hundreds of thousands of acres of land in order to bring the relative cost per acre within reasonable limits. Therefore, preceding the settler in such cases must ordinarily come the "reclamation project," carried through at the expense of the national or state governments or by private capital operating under the Carey Act. The storage reservoirs and diverting canals are constructed to bring the water to the land, when the land with the water right is sold to settlers on instalment payments covering usually ten years. A number of such enterprises are in progress in Nevada at the present time, the most notable being the Truckee-Carson National Reclamation Project in Churchill County. Carey Act projects by private enterprise covering proposals to reclaim something over one million acres of land are in various stages of progress, from that of the temporary withdrawal to determine the feasibility of the project, through the stage of final segregation of the lands and contract with the State to construct the irrigation works.

During the year 1912 and thereafter, portions of the lands of certain of these projects will be thrown open to entrymen. Under the State law water must be available for delivery to the entrymen before the land of a Carey Act project may be sold to settlers.

ARTESIAN WELL IN THE SMITH VALLEY, NEVADA

SUBSURFACE WATERS

In the foregoing we have discussed only surface waters. But in the last two years increasing attention has been given to the possibilities of reclamation by utilizing subsurface waters. Underground streams and lakes have been discovered at varying depths in many valleys. One would imagine that a state with such little rainfall and where evaporation is so great would be the last section of the country wherein bodies of underground water might be expected. The contrary appears to be true. In about twenty different valleys borings have been made, and in nearly all of these artesian flows have been encountered. Nor has the depth been great, usually between 200 and 400 feet. Some wells have found flows as shallow as 80 feet, and in only comparatively few instances has it been necessary to go deeper than 500 feet.

What is the origin of this artesian water? In most instances it may be satisfactorily accounted for as coming from the percolation of melting snows in the porous strata of contiguous mountain ranges and which is retained under pressure in the bordering valley basins by an impervious stratum above. But in many instances artesian water exists as abundantly in the regions of least rainfall. The most probable explanation of the latter phenomenon is made clear when we examine cross-sections of the surface contour of the State. From the region of greatest rainfall, including the extraordinary precipitation on the eastern slopes of the Sierras, there is a general southeasterly slope or decrease of surface elevation towards the Colorado River. It is well established that water has a gravity movement or flow underground as well as on the surface wherever opportunity exists. It is therefore quite probable that some portions, at least, of the underground waters found in southern Nevada were originally precipitated upon mountains and in valleys hundreds of miles distant.

The economic feasibility of developing subsurface water for irrigation depends upon three factors, namely: the cost of the well, the quantity of its flow, and the value of the land for agricultural purpose when reclaimed.

The last factor is the only one of the three which can be closely estimated in advance. The character of the soil, climatic conditions and proximity to market and transportation lines will enable a very accurate estimate to be made of the value of the land proposed to be reclaimed when under cultivation. Suppose the land be covered with a thrifty growth of black sagebrush, indicative of good soil, in northern and central Nevada such land will bring in a gross average income from $25 to $40 per acre, if in alfalfa; $20 to $50 per acre if in wheat; $75 to $300 per acre if in potatoes, and proportionally in all other crops. In the nine-months-long season of southern Nevada, where from eight to twelve tons of alfalfa per acre are grown, and fruits, cantaloupes, and other intensive farm-crops grow luxuriantly as well, the income of good land with water sufficient for its irrigation will range anywhere from $50 to $400 per acre.

Quantity of Water Required for Irrigation.

The quantity of water required per acre in all instances will vary according to the nature of the soil: whether porous and gravelly, or loamy and compact, and the proximity to subsurface moisture. On ordinary soils and under average climatic conditions, it has been determined that one-half an acre foot of water for each month of the irrigation season is usually sufficient. But it is to be understood that soils and climatic conditions vary, and while a less quantity might be ample on naturally moist and loamy soils, certain deep gravelly soils will require considerably more. Also, that there is a variation in the quantity of water required by different plants. The half-acre foot per month during the irrigation season, however, is a safe rule in the majority of instances. This is equivalent to a constant flow of 3.75 gallons per minute.

RESIDENCE STREET, RENO, NEVADA

HANDSOME RESIDENCE RENO, NEVADA

Artesian Wells.

The most practical artesian well is one having a casing diameter of 10, 12 or 14 inches. The cost of a 10-inch artesian well from 350 to 400 feet deep will be ordinarily somewhere between $1,000 and $1,250. Taking the higher figure as the cost of the well, a flow of 375 gallons per minute would be sufficient to irrigate 100 acres of land on the basis of one-half acre foot per month per acre. The cost of the water right would be, therefore, $12.50 per acre. On the other hand, a flow of but 125 gallons per minute would afford sufficient water for but 33 acres, making the cost of the water right $37.50 per acre. Shallow wells are proportionally less expensive, and many of the best wells so far drilled in the State are not over 250 feet. The flows of 10-inch wells range from as low as 50 gallons per minute to as high as 1,350 gallons per minute, in the case of the Passno well at Las Vegas.

With the factors of depth and flow indeterminable, except by actual drilling, and varying not only in each locality but with each well, it is obviously impossible to give other than a qualified estimate of the probable average cost of artesian water rights per acre of land. This is likely somewhere in the neighborhood of $20. But such estimate is not submitted other than as an approximation. The chief point to be considered is that artesian well drilling to reclaim arid lands is receiving such increasing impetus since its inception into Nevada as to preclude any thought that the average results are other than economically profitable. Where two years ago there was little or no drilling being done, at the present time there are perhaps twenty or more drilling outfits in active commission in different parts of the State.

Cheap Power for Pumping.

That cheap power is available in western and parts of southern Nevada will surprise many. Such, nevertheless, is the fact. The tremendous development of mining and its demand for power has stimulated the construction of hydro-electric power plants on the streams flowing from the eastern slopes of the Sierras, particularly on the Truckee and Owens rivers. About 20,000 horse-power is at present generated and conveyed by pole and wire lines for hundreds of miles in western and southern Nevada, supplying light and power for cities, towns and villages, mines, mills and manufactories, and traversing in their courses mountains and valleys, farming sections and arable wastes. These power lines have excess power in the spring and summer during 19 hours of the day, or other than between 6 and 11 o'clock in the evening, the time of the "peak load." Rates for power pumping for irrigation for 19 hours a day can be obtained at from 1.2 cents to 1.5 cents per kilowatt hour. This is equivalent to gasoline power at about 8 cents per gallon.

Cost of Electric Power Pumping.

On the basis of 50 per cent. efficiency for the pumping plant, the power cost of pumping one acre foot of water 10 feet elevation, with electric power at 1.5 cents per kilowatt hour, will be 31 cents; 20 feet elevation, 62 cents; 30 feet elevation, 93 cents; 40 feet elevation, $1.24, and 50 feet elevation, $1.55. On the basis of three acre feet of water required to irrigate the land, the power charge per acre would be at 10 feet pumping elevation, 93 cents per season; at 20 feet pumping elevation, $1.86; at 30 feet, $2.79; at 40 feet, $3.72, and at 50 feet, $4.65. These figures do not include allowance for deterioration, replacements and maintenance. With electric power the cost of maintenance is largely negligible, since the plant requires but little attention. The annual charge for deterioration and replacements may be estimated ordinarily at about 15 per cent. of the cost of the pumping plant.

A New Field for Reclamation.

It will be at once apparent that where water in sufficient quantity may be obtained at a pumping elevation not greater than 50 feet with electric power at such rates, pumping water for irrigation is economically feasible even for the growing of ordinary farm staples

such as alfalfa and grain. Where more valuable crops are grown, such as potatoes, fruits and market vegetables, the pumping lift may be 100 feet or more and still be within economical limits. The field that is thus opened is one to which very little attention has yet been given. Nevertheless, it is bound to challenge marked attention in the immediate future. Not only is the electrically-driven pump, in time, coming into its own in this State as a means of stimulating the flows of artesian or driven wells, but in many places water in abundance may be found in gravel strata 20 to 30 feet below the surface, and here the farmer may dig his well at odd times without appreciable expense and install a pumping plant at not excessive cost. Also, there are many places where it will be found cheaper to pump the water from a stream having little grade or fall to the land on its bank, than to secure rights of way and construct a ditch several miles in length to bring it upon the land by gravity flow.

An artesian well with an insufficient flow may be equipped with a pumping plant and a very large flow obtained. It is to be remembered that the pressure of a column of water 50 feet high is 21.68 lbs. per square inch; hence a pump in an artesian well, taking the lift 50 feet below the surface, may increase the flow surprisingly. More often than otherwise it will be found far more economical if electric power is available to equip a well with a pumping plant than to sink additional wells to secure the required amount of water. In recent years a great advance has been made in deep-well and centrifugal pumps suitable for irrigation pumping. One style of pump may be adapted to one set of conditions and unsuited to another, and it is very desirable that those contemplating the installation of a pumping plant get the best disinterested engineering advice. The Nevada farmer who is in doubt as to what style of pumping plant he may require should take up the matter with the State Engineer.

TRANSPORTATION

The practical homeseeker who has read the foregoing, with his interest and attention awakened, will at once put the question: "What are your market conditions? If I raise crops in Nevada, can I sell them? What are the transportation facilities to ship in what I require and to get to market what I produce?"

Replying to the latter question first: Three transcontinental railroad lines cross the State from east to west, the Southern Pacific, the Western Pacific (only recently completed), and the San Pedro, Los Angeles & Salt Lake Railroad. The first two traverse northern and central Nevada and the last mentioned, southern Nevada. In addition to these main lines, there are branches and feeders traversing the agricultural valleys and extending to the leading mining camps, aggregating a total length of over 1,000 miles.

Until within about a year, freight rates were excessively high. Since the rulings, however, of the Interstate Commerce Commission in 1910 and 1911 on class and commodity rates affecting Nevada, transportation charges are as reasonable as elsewhere. The effect of these traffic decisions is already felt in stimulating the industrial growth of the principal towns on the transcontinental lines. This is more particularly true of Reno, the metropolis of the State, which, by reason of its location as a distributing point, is succeeding to the wholesaling business for northern, central and western Nevada, hitherto monopolized by the Coast terminals.

Railroad transportation at reasonable rates therefor may be found conveniently accessible to nearly all the valleys, the exceptions being those in the extreme northern and south-central parts. Projected railroad lines are surveyed to traverse much of this territory.

THE MARKET FOR FARM CROPS

The market conditions in Nevada for home-grown agricultural products are unsurpassed in America. This is a large statement to make, but is borne out by an investigation of the facts.

We must remember that, relatively, only about the one-hundredth part of the entire area of the State is under cultivation, and that the greater portion of the population is not

TYPE OF THE INDIANS OF NEVADA

engaged in agriculture but in mining and stock-raising. Finally, it must be borne in mind that Nevada is one of the foremost states in raising cattle and sheep, hundreds of thousands of head of which are shipped annually to the San Francisco, Chicago, Omaha, Kansas City and St. Louis stockyards. Almost all the cattle and a considerable portion of the sheep are fattened before shipment in Nevada, consuming approximately 500,000 tons annually of alfalfa and other forage grasses fed from the stack. Hay for stock feeding sells uniformly at from $6 to $7 per ton on the farm. The finer grades of alfalfa intermixed with timothy and bluegrass are baled and sold in the towns and mining camps at from $12 to $20 per ton. Hay and forage crops, to date, constitute the chief agricultural staple, due to the pre-eminence of the stock-raising industry. Very little hay is exported, however, on account of the local demand, and this is also true of the cereals. The flour mills at Reno, Lovelock, Minden, Nordyke, Paradise and Sheridan not only purchase all the local wheat, barley and oats obtainable, but are large importers of these cereals from California and Utah. While the price of hay is fixed by the local demand, that of the cereals mentioned is governed by outside quotations.

Potatoes is the principal export crop; with hay, it is the only agricultural staple which the State produces in quantity sufficient for its own consumption. Nevada potatoes are said to be the finest grown in America, and all in excess of the local demand commands a ready premium in the California markets. The price varies through a considerable range, but for the past five years has been as often above as below sixty cents per bushel, or $20 per ton. The average yield is about six tons of marketable potatoes per acre. Yields as high as ten and fifteen tons to the acre are not uncommon where soil conditions are specially favorable and the grower is expert.

The market for all other vegetables, fruits, berries, butter, cheese, eggs, poultry and pork required to supply the local consumption of the towns and mining camps, is far in excess of local production, and enormous quantities are annually imported.

The Nevada farmer has no unsold crop on his hands at the beginning of the succeeding season. Moreover, he is not restricted to one or two possible crops for planting, but may choose from a considerable range for rotation in order to get the best results from his land and maintain its fertility for the longest period.

In Conclusion.

One other important fact needs to be presented in concluding this chapter on the agricultural outlook in Nevada. The early agriculturists of this State were primarily stockmen and farmers who raised forage crops exclusively. The stockman, unless he happened to have acquired a tract of natural meadow, gave little or no attention to land reclamation, preferring to buy hay of the farmer to tide his cattle or sheep over a hard winter or to fatten them for market, rather than to bother with growing it himself. This condition largely obtains still, and its effect has been to direct the agricultural development of the State almost exclusively until recently to the growing of hay and forage crops. The average Nevada farmer raises alfalfa in preference to anything else, and is not tempted by greater profits to grow any other crop. Alfalfa is sure money and requires but little attention. Once well seeded and properly irrigated, it will not be necessary to plow and replant it oftener than once in ten to fifteen years. Nor have the farmers of the State who grow such quantities of alfalfa given as yet any particular attention to raising hogs. While beef and mutton are exported in enormous quantities, not enough pork is raised to supply the home demand. Yet alfalfa is one of the best of hog foods, and the great profit to farmers has been demonstrated of turning a crop such as alfalfa into pork.

The very condition of the agricultural industry in this State, devoted so exclusively to forage crops, spells opportunity for the small and intensively cultivated farm.

APPLES FROM PARADISE VALLEY, NEVADA

CHAPTER II

Social Life in Nevada—The Landscape not Without Compensating Charm—Public Schools—State Institutions—Political Government—The People

In the preceding chapter is presented a general survey of the agricultural outlook in Nevada. Let us now briefly consider the physical, social and political characteristics of the State as a place of residence.

As before stated, the car windows of the overland trains as the vantage point of observation give anything but a true impression of Nevada. None of these three railroads passes within observation distance of other than a few isolated tracks of cultivated land, and these—seemingly transplanted oases, foreign to their environment—serve only to accentuate in the mind of the traveler the sense of overwhelming immensity and desolation. He sees nothing that is agricultural in the sense to which he is accustomed, and gathers his impressions of the social life of the people from the unprepossessing visible portions of the stations and towns along the way. What the traveler thus carries away with him lacks very much of being an adequate or true picture of Nevada, agriculturally, socially or otherwise.

Within a little distance of the railroad at Lovelock, for example, is one of the most productive farm sections in America, yet the traveler in the Pullman car does not observe it. Only the natural grass lowlands of the Truckee Valley, at Reno, may be seen from the overland train, the remainder of this highly cultivated valley, as well as the chain of rich farm valleys leading south for a hundred miles, are only visible from branch lines. And this is characteristic of the State. To see agricultural Nevada one must go where the cultivated sections are.

The Charm of the Nevada Landscape.

One who has lived for any length of time in sight of the ocean or of lofty mountains will ever afterwards find something wanting in a landscape without the one or the other. It is the lure of their immensity and grandeur which he misses, and the alternating moods which the face of Nature presents with every hour of the day and night. The morning breaks with a glory unknown to the level plains; the sun in setting paints the most wonderful of oriflammes in the sky. Peaks, crags and mountain crests an ever-changing panorama, a perpetually unfolding mystery! And men and women grow quickly to love the influence of these far stretches of desert, bounded by the hills, wherein is the charm of absolute freedom and the spell of eternal peace.

The traveler who has gained his impressions of Nevada from a Pullman car, and who has, moreover, never lived close enough to Nature to experience what is here stated, marvels that any one would choose Nevada as a place of abode. Yet thousands of very highly cultivated men and women reside from choice in this State. Indeed, the ratio of educated and refined people is fully equal to that of other states. Nevada possesses, proportionally to population, an exceptionally large number of resident graduates of American and European colleges and universities. This is attributable to the very conditions under which the State has been forced to make its progress. Mining and reclamation enterprises have each demanded the highest technical skill and training. Mining camps, also, have been a sort of magnet to attract not only the graduates of law and medical schools as favorable openings for getting a professional start, but have likewise lured young college men of varied attainments who sought fortune where opportunity seemed greatest. It is also characteristic of the Western pioneer that as he prospered he determined to give his sons and daughters the best education possible. Thus an unusually high percentage of the present generation of native Nevadans are college men and women.

Public School System.

The founders of the State in adopting a constitution provided that all moneys derived from the sale of public lands granted the State by the National Government should be

invested in United States bonds or the bonds of this and other states, and that the interest thereon should be forever dedicated to the support of the public schools. Including the balance due on contract lands, the State school fund aggregates, in round numbers, $3,500,000, on which the annual interest is approximately $160,000. In addition to this sum about one-fifth of the revenue derived from State taxation is applied to educational purposes. Each district is separately taxed for the erection and maintenance of its school buildings. The result is an efficient educational system comparing favorably with that of any other State. There are country schools wherever five pupils reside within a district; graded schools in the towns; one high school at least in every county, culminating with the State University, State Normal School and Agricultural College at Reno. Many of the recently-erected public school buildings are models of their kind. No people have evidenced greater sincerity and generosity in supporting and improving the efficiency of their public school system than the citizens of this arid-land commonwealth.

Roads and Highways.

The roads and highways of the State are kept up by the counties, and while varying from poor to excellent, have a good general average. The dry climate is advantageous to good roads, and it may be stated as practically true that all roads in Nevada are more or less satisfactory, except where there are occasional stretches of sand, and excluding some little-traveled mountain roads. A "good-roads" movement is on in the State, and many counties are spending considerable sums in road improvement. The State itself is engaged in constructing a fine highway from the California to the Utah lines, with convict labor. The system is voluntary instead of compulsory and is giving good results.

Political System.

The State and counties are governed by a thoroughly organized political system, preserving law, order and good government. One is ordinarily as safe in Nevada as he would be anywhere else. Election laws are stringently enforced protecting the purity of the ballot. The police system is effective and the State's judiciary is of a high order of ability and probity.

The People of Nevada.

The tourist who seeks for types such as "Alkali Ike" in present-day Nevada, may find such in remote places, as well as other opportunities for frontier diversion. It is a big State, with a population that is essentially cosmopolitan, and human nature is here found in all its characteristics from the highest to the lowest. But social lines are drawn as clearly in Nevada as elsewhere. One may find about any kind of society he seeks, and the choice is not forced upon him. He will find the substantial majority of the people wholesome, temperate, hospitable, generous and self-reliant. A people, in the main, accustomed to the comforts and many of the luxuries, who travel much and are well informed. Their home and social life is as refined and the conventions of good breeding observed as habitually as anywhere else.

CHAPTER III

Opportunities in Nevada Requiring Capital—Carey Act Reclamation Projects—Subdividing and Colonizing of Large Ranches—Industrial Openings

The National Government granted the State of Nevada, under what is known as the Carey Act, for its selection from any part of the public domain within the State two million acres of land. The lands subject to selection must be "desert in character." That is to say, they cannot be forest or mineral lands but must essentially be reclaimable arable lands.

Excluding the railroad land grants, forest reserves and all other lands held in private

ownership, the remaining area of the unappropriated public domain aggregates, in round numbers, 56,000,000 acres. Of this area, at least 12,000,000 acres* are capable under irrigation of producing crops. From this latter area the two million acres may be chosen. The least number of acres which may be selected in the State under the act is 1,280, or two sections, and the maximum is the largest tract which may be reclaimed under any feasible proposed irrigation system.

Outline of the Carey Act.

The Carey Act in its essence is intended to provide a means whereby private capital may profitably undertake enterprises for the reclamation of the arable lands of the public domain, of a lesser magnitude than the great undertakings of the Government. Under the Desert Land and the Enlarged Homestead acts, the settler can enter upon and reclaim from 160 to 320 acres and acquire patent. The Carey Act fills the gap between what the individual settler is able to do by his own efforts in reclaiming a single homestead or desert-land entry on the one hand, and the great undertakings of the Government on the other. What is beyond the ability and means of the settler to do for himself, and yet is too small for the Government to undertake under the Carey Act is left as a field of opportunity for private enterprise. The reclamation company does not acquire title to the land, but derives its profits from the sale of water rights to entrymen, quite similarly to the method adopted by the Government in its reclamation enterprises.

How the Carey Act Applies.

Owing to the general misinformation about the Carey Act, in order to explain its practical workings we will carry its operations through an hypothetical case.†

The applicant knows of a tract of arable public land which, in his opinion, may be reclaimed by impounding and diverting the flood waters of a certain stream. He ascertains that such flood waters are unappropriated and makes application therefor in the office of the State Engineer. At any subsequent time he may apply to the State Commission of Industry, Agriculture and Irrigation, which is charged with the administration of the Carey Act in Nevada, for the temporary withdrawal of the lands proposed to be reclaimed. He pays a fee of one cent per acre to the State and deposits a sum sufficient to defray the actual expenses of the State Engineer in making a preliminary examination of the proposed tract to determine, roughly, its feasibility. If the State Engineer reports favorably, the Commission will at once make application in the United States Land Office for the temporary withdrawal of the lands from entry and sale under any of the public land laws. The applicant has now one year to make all necessary surveys and determinations, and for the preparation of all the engineering data covering the proposed project. If after such is completed he is satisfied to proceed with the undertaking, within the year must file with the State Commission triplicate copies thereof and, on approval, two copies will be filed with the United States Land Office, accompanied with an application on the part of the State for the complete segregation of the land to Nevada as a part of the two-million-acre grant. The filing fee in the United States Land Office, $2 for each quarter-section, must be paid by the applicant. If the Secretary of the Interior approves the application, the segregation is made.

Within three months from the date of such approval the applicant or his assigns must enter into a contract with the State for the construction of the reclamation works, and also file a bond in a sum equal to five per cent. of the estimated cost thereof, conditioned on the carrying out in good faith of the terms of the contract. The contract will state the price at which the contractor agrees to sell water rights to entrymen upon the lands; the terms and conditions of payment therefor by the settler (usually in ten equal annual

*Part of the 18,000,000 acres of arable lands in the State hitherto mentioned.

†Bulletin No. 2, Nevada Bureau of Industry, Agriculture and Irrigation, Carson City, Nev., gives a complete analysis of the Carey Act. Sent free on receipt of four cents postage.

DAIRY CATTLE AT RENO, NEVADA

SUGAR-BEETS FOR THE FALLON SUGAR FACTORY

MAIN STREET, CARSON, NEVADA

payments, with interest on the deferred instalments at six per cent. per annum); the price at which the State agrees to sell the land to the entrymen (usually $1 per acre, payable in four annual instalments without interest); the quantity of water per acre required for delivery during the irrigation season to constitute a water right, and all other details with respect to the conduct and carrying out of the undertaking. Within three months from the date of the execution of the contract, construction work must be commenced, and prosecuted with reasonable diligence thereafter. One-tenth of the total construction work must be completed the first year and the whole project completed within three years, unless an extension of time is granted for reasonable cause.

When the work has so far progressed that the contractor is able to deliver water upon a part of the project, it may be thrown open for sale to entrymen in units. When the project is completed, any lands within the segregation which are found not economically feasible to reclaim may be relinquished. Each water right is a definite interest in the irrigation system, and when all the lands are sold and the settlers have completed their final instalments, they own not only the land but the entire irrigation system as well, and the contractor is eliminated.

Large Profits in Carey Act Enterprises.

Carey Act projects, properly conducted, are very profitable, and where the engineering work is competent, there is no reason why they should not possess the maximum certainty of success. The water-supply is subject to accurate measurement beforehand. The cost of the impounding dams, reservoirs, canals, ditches and laterals can be likewise estimated with substantial certainty. And, lastly, the value of the lands when reclaimed can be determined by soil analysis, in conjunction with the climatic conditions. The States charges but $1 per acre for the land and allows the contractor to charge as much for the water right as the soil's fruitfulness when reclaimed will justify, and yet leave the settler "abundantly satisfied with his acquirement of the land and water right." The price for the water right will range from $25 to $75 per acre in northern Nevada, and to $100 per acre in southern Nevada. Such price is gauged almost entirely by the land values, irrespective of the cost of the reclamation works per acre; and the project is not "feasible" if the margin of profit to the contractor between cost and selling price of the water right is not sufficiently large. As a general rule, the difference between the estimated cost of the water right and the authorized selling price to entrymen is not less than 100 per cent. and frequently very much larger. While the contractor never owns any of the land which the irrigation system reclaims, he is protected as thoroughly as though he did. For from the date of the execution of the contract with the State, a statutory lien attaches against the land for the selling price of the water right, and this lien is superior to any mortgage or other obligation which the entryman can put upon it, and is only lifted on the final payment for the water right.

Only within the past two years has Nevada given any attention to the Carey Act. The Legislature of 1911 passed a comprehensive measure covering the administration of Carey Act lands, generally considered now to be the model law of the kind among the arid land states. Its tendency is to eliminate fraud by close State supervision, and to be of practical aid to legitimate enterprise devoted to the reclamation of the State's arid wastes.

Artesian Carey Act Projects.

The discovery of artesian water in many of the valleys has led to a number of applications for Carey Act lands where the proposed system of reclamation is by means of artesian wells and pumping plants. In order to meet the situation, which is without precedent elsewhere, the State Commission devised and adopted a procedure which enables the contractor to undertake the sinking of artesian wells on a segregation without being compelled, under his bond, to carry out the enterprise beyond the limits of "economic

APPLES AS THEY GROW IN STAR VALLEY, NEVADA

feasibility." In other words, the State recognizes the inherent uncertainties of the undertaking and will not compel the fulfilment of a proposed project beyond what is reasonable and just, but permits the contractor to relinquish all lands which he originally undertook to reclaim, on proper showing that the progress of the undertaking has demonstrated that such lands cannot be reclaimed except at greater expense than the profits of the undertaking warrant. The field of opportunity for artesian Carey Act projects in Nevada is very extensive and yet is only in small part covered.

SUBDIVIDING THE GREAT RANCHES

As previously stated, the second industry in importance in the State, after mining, is stock-raising. Nearly all the early farmers, as distinguished from the stockmen, had each a herd of cattle or a flock of sheep. The State land grants until they were exhausted enabled land to be acquired at a low price and in large tracts. The result was that big ranches became the rule, and tracts of thousands of acres passed into single ownerships. The agriculturist was thus deprived of many opportunities for securing arable lands which he would have been glad to have entered upon and reclaimed.

Each succeeding year, now, more and more of the arable lands of these great ranches is becoming too valuable for mere grazing purposes. In some instances there are vested water rights sufficient to reclaim extensive areas, and in other cases the land is so situated with reference to natural streams as to be entirely feasible of reclamation. In former years the stockmen viewed with little favor the advent of the small farmer. That day is past; more particularly since the Government adopted the policy of leasing and exercising federal supervision over the public range lands. The stockman is thus protected from trespass in what he leases, and the fear that the new settler may encroach upon his range, after once getting a foothold as a farmer, is removed.

A number of owners of arable tracts capable of reclamation and subdivision into small farms, within the past year have signified willingness to put them on the market. The ranch owner, as a rule, is not disposed to attempt the colonization of the tract himself, but prefers to sell outright for a lump sum, usually part cash and the balance in annual payments with interest. The prices asked, as a rule, are reaonable, and afford opportunity for the purchaser to make a very substantial profit by subdividing the tract and reselling it in small holdings.

These great ranches also offer special inducements for community colonization; that is to say, where a number of homeseekers and their families desire to immigrate in a body in order to settle in a new country with their kinspeople and neighbors. There are instances where ranches of from ten to fifty thousand acres can be acquired, part arable lands and part range lands, capable of a combination of both farming and stock-raising, and which offer special opportunities for whole communities to settle upon and develop into prosperous little commonwealths.

Drainage of Swamps and Lowlands.

There are several instances in the State of extensive areas of swamp-lands along the course of the various rivers which could be drained at reasonable expense, and thus reclaim in each case several thousand acres of rich silt bottom-lands. This land is now covered with tules and natural grass and is used for pasture and the growing of wild hay. The soil is likely to contain some alkali, but which may be readily leached out when the land is drained. The high subsurface water-table causes the alkali to rise and in many cases about all there is of it is immediately visible on the surface. The construction of drainage ditches followed by the "washing" of the land—flowing fresh water over it for a few weeks during the fall or spring—in the majority of instances will remove the salts. The silt is frequently from ten to fifty feet deep, black from the humus of decomposed vegetable material. Its fertility when drained is prodigious. Crops of from fifty to seventy-five bushels of wheat, ten to fifteen tons of potatoes and from twenty

to thirty tons of onions per acre are not unusual on these drained bottoms. Such land, after drainage and with a sufficient water right, is worth easily from $150 to $250 per acre. The drainage problem does not involve tiling, but deep ditching transverse with the land's gradient, and these laterals leading into the main drainage ditch or channel deepened to permit the water-table of the tract to be lowered from three to six feet.

INDUSTRIAL OPPORTUNITIES

Local capital and enterprise have largely kept pace with the industrial requirements of the State. While in some isolated instances there may be profitable openings, it may be stated, as a general rule, that Nevada is well supplied with mercantile establishments of all kinds, foundries, machine shops, flour mills, and the lesser local industrial shops and manufactories. The State is growing rapidly, however, and there is always an opening for a live man with capital in any community, and especially in this virgin commonwealth.

We can mention, nevertheless, a few special opportunities for financial enterprise which, at the present time, are entirely open, as follows:

WOOLEN MILLS: Since Nevada clips annually about 6,600,000 pounds of wool, has abundant cheap electric power and an invigorating climate for workmen, it would seem that where the raw material is produced in such quantity there should be an opening for a profitable woolen mill. At the present time the Nevada clip is shipped to Boston or Philadelphia for manufacturing into goods which are shipped back again to the Coast.

BEET-SUGAR FACTORIES: The first beet-sugar factory in the State will be completed and in operation at Fallon by the time this booklet reaches the public. It will have a daily capacity of 650 tons, and was erected at a cost of about $600,000. This season's operations will hardly be an indication of its success or failure, since the beet acreage planted is inadequate, and the farmers are not as yet familiar with beet culture. The operating company has had wide experience in manufacturing beet-sugar, however, and in carrying through to success the educational propaganda required to teach the farmer the art of growing beets. Their practical enthusiasm over the outlook is extremely reassuring. Beets grow prolifically in the State and are found to contain an extraordinarly high per cent. of saccharine. The ultimate success of this initial factory from which so much is hoped will supply the incentive for the erection of others, by reason of the fact that many other great tracts of land in different portions of the State are equally adaptable to beet culture.

LIGNITE BRIQUETTING PLANT: Coal retails in Nevada from nine dollars to seventeen dollars per ton, and is shipped in from Colorado, Wyoming and Utah. The larger part of the fuel used for domestic purposes is wood. At several points in the State are extensive veins of sub-bituminous coal and lignite, conveniently located to railroad transportation, and of a tested quality that would make excellent briquettes. The local demand for such fuel would alone make a briquetting plant on any of these veins a highly profitable enterprise.

ALFALFA MEAL MILLS: While Nevada is pre-eminently an alfalfa-growing state, the first alfalfa meal mill has yet to be erected. There are several localities where such a mill would prove profitable. It is to be remembered that the supplies for all the mining camps off the railroad have to be transported by teams. Owing to its convenience in handling, alfalfa meal would have a ready sale to teamsters in preference to baled hay. The demand from this special source alone would be extensive.

CREAMERIES: There are a number of profitable creameries in the State. But there are opportunities for many more. The climate and great extent of grazing and forage lands should put Nevada naturally in the first rank as a dairying state. This is one of its greatest lines for development and as yet, we might say, the industry is but fairly started. The conditions in Nevada—high altitude, pure water, abundant nutritious grazing and forage crops, and a specially healthful climate for stock—are ideal for dairying. The butter and cheese produced by the present creameries are unsurpassed.

CHAPTER IV

Opportunities for the Homeseeker of Limited Capital but Rich in Courage and Enterprise—He Must Come Prepared to Accept the Conditions of a New and Unusual Environment—To Succeed He Must Be One to Enter into the Spirit Which Actuated the Men and Women of the New West—The Spirit Which Delights in the Conquest of Adverse Nature in Order to See the Wastes Spring Forth with Abundance

It was a government reclamation engineer* who said:

"The call of the West comes to us to-day insistent and inviting. The desert—mysterious, silent, expectant, quivering under cloudless skies—holds a promise of freedom and independence to the careworn and to the discouraged. It offers the uplift of unmeasured distances and the individual home with that broader freedom of action which comes with life in the open. Irrigation canals long enough to girdle the globe with triple bands have spread wide oases of green in the arid places. Cheerful and prosperous communities dot a landscape once vacant and voiceless."

Versatility of the West.

Not every homeseeker will be satisfied with conditions in the arid West. Not every homeseeker can cope with conditions in Nevada. America is so large and the West so wonderful in its versatility that there are places and opportunities suitable to everyone who will but seek and find. This State holds opportunities for men and women of a special type. Those who have in their blood something of the venturesome pioneering spirit, who can cheerfully and courageously cope with some adversity, and, if necessary, with hardships, who are energetic and resourceful, and to whom a few years of struggle is as nothing if the goal of a thrifty competence is assured.

There are many thousands of such men and women in America, who, if they but knew of the opportunities here, would give this State first choice, and who would find nothing but hope and happiness in the conquering of success. On the other hand there are multitudes for whom it would be a mistake to come here. For them there are other sections of the country infinitely better suited. But for the homeseeker, adapted to meet the conditions here, there is no other land which holds for him such promise.

Qualifications Required of the Settler.

Let us digress briefly to discuss the qualifications which a homeseeker should possess who expects to acquire unimproved land in Nevada and through his own labor and resources bring it under cultivation. This is the pioneer settler. We are not here referring to the homeseeker who is able to buy improved property, but to the one who must start on the virgin desert, clear the sagebrush, till and plant the land, and where was waste when he began will, in time and through his labor, experience and effort, transform it into a homestead of trees, garden, orchard and field.

It is quite evident that he and his family should be of strong fiber and have that in their characters which takes joy in the wide freedom of the desert; who have a natural love for mountains and far-stretches of gray landscape; and who will not repine from loneliness and longing for scenes left behind, but can from the day of their coming call the wastes "home."

And the homeseeker will have to possess some little capital, proportional to how many are dependent upon him. It is not easy to fix any minimum. Much will depend on his ability and resourcefulness. If we say $2,500, some would succeed with less and others need twice and three times that. Perhaps we can give a clearer idea by assuming a hypothetical case.

The Hypothetical Settler.

Let us assume that the settler has a wife and possibly children, none of the latter old enough to be of material assistance. He writes to the State Commission issuing this booklet, stating all the pertinent facts about himself; what experience he has had in farming and if any in irrigation; what farming implements he has; whether any work-

* C. J. Blanchard.

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horses, wagons, mowing machines, etc., and the extent of his cash capital. Also what crops he has been accustomed to raise and the kind of farming he prefers. The Commission will advise him to the best of its ability as to the locality or localities in the State he had best visit and will put him in touch with those from whom he can secure land, the price of the land, the terms of payment, and the character of the soil.

If he writes asking if he may not take up land in the State under the Homestead or Desert Land acts, he will be told that if he has not previously exercised such right he can do so in Nevada, since the unappropriated public domain covers millions of acres. But that he can do nothing with any land he can homestead or acquire under the Desert Land Act, however naturally arable, without there is water obtainable for its irrigation. That while dry-farming may succeed in certain places in the State, the successes so far have been usually where there is a natural subsurface water-table close enough to supply

CUTTING ALFALFA ON THE W

F THE NEVADA SOIL

a substantial part of the moisture required for the crop. That he might, if he prefers to undertake the search, in time find a quarter-section on which he could file that is susceptible of reclamation from some unappropriated natural stream, but he must bear in mind that there are not many streams in the State whose natural flow during the irrigation season is not already appropriated. On the other hand, that the conservation of the flood waters of any stream by the construction of a private storage system is likely to be beyond his individual resources. Lastly, that if his resources permit, he might find a quarter-section favorably situated for the development of artesian water and employ a custom drilling outfit to put down a well. If he encounter a flow sufficient to reclaim twenty acres or more to begin with, he is independent and on the highway to success.*

* The State Commission is preparing a bulletin on artesian reclamation in Nevada, and special attention will be given to the subject from the standpoint of the individual entryman on the public domain.

He will be told that unimproved land, with a water right sufficient for its irrigation, can be purchased on the instalment plan for from $30 to $75 per acre, depending on the location and the value of the land when reclaimed. For $50 per acre to the higher price he should get level sagebrush land within close proximity to a railroad and to some settled community. Eighty acres of such land, under ordinary cultivation, and forty acres under the best farming methods, will support a family.

Possibilities of a Sixty-acre Tract.

Let us assume that the hypothetical settler possesses $2,500 cash capital; has some farming experience but none in irrigation; has disposed of all his horses, wagons and farming implements and has retained only his domestic and household effects. That he exercises good judgment in selecting a sixty-acre tract of level sagebrush land with a good water right, for which he contracts to pay $65 per acre, one-tenth in cash and the balance in nine equal annual instalments, with interest at six per cent. That he brings his family and household effects with him and takes possession of the tract in the early fall. He will need a house to live in and this will have to be primitive. If he is at all skilful he can build it himself. A three-room house, 14x35 feet ground plan, with tongue and groove floor, rough board walls, lined on the outside with building or roofing paper and battened, with windows, doors, etc., will cost for the materials about $300. Such a house cloth and papered on the inside will be reasonably comfortable and inviting. He will need to buy a wagon, a span of good work-horses, harnesses and a cow. These three items will cost him about $500. A shed, stable and corral will cost him for the materials about $75 more. He will need about eight months' supply of hay to feed his stock, unless there is a convenient pasture near which he can rent. This will require about ten tons which, hauling it himself, will cost him about $75. He must purchase groceries and supplies for himself and family during the ensuing twelve months, which at $30 per month will cost $360. Allowing $50 more for clothing and incidentals, these several items foot up to $1,750. He will need to buy a plow, mowing machine, rake, and various farming implements before he can harvest his crop, costing altogether about $175. And he will need to buy seed.

During the fall, winter and early spring he will be able to clear his land and do what leveling is necessary. The sagebrush stumps he can use for domestic fuel. He will have to dig his service ditch from the source of water-supply, possibly half a mile in length. He had best employ a surveyor for a day, costing $10, to give his grade lines and those of the principal diverting ditches on his tract. He will plow his ditches and afterwards shovel them out. He will require a few dollars' worth of lumber to make his distributing boxes.

By planting-time he will have decided as to the best crops to put in. During the fall and winter he has gathered all the information possible from local farmers, corresponded with the Nevada Agricultural Experiment Station at Reno, and supplied himself with government and experiment station bulletins regarding irrigation methods and the culture of the crops he has selected. He has finally decided, let us say, to grow twenty acres of alfalfa, five acres of potatoes, and put the balance of his ground in wheat. Reserving one acre for house yard and corrals, this leaves him thirty-four acres for grain. His soil being the ordinary gravel loam which underlies the black sagebrush will not require plowing before seeding for either alfalfa or wheat.* He will follow competent advice as to the time of planting, as also the furrowing of the land for irrigation. The spring moisture in the soil will start the crop. The alfalfa this first year will have to be watched with the greatest care, not to give it too much water or too little. From the middle of April until his crops are harvested he will employ an experienced irrigator whom he will pay about $40 per month and found for four months and a half, at a total expense for labor and keep of about $200. His alfalfa, wheat, and potato seed will cost him another $200. He will have to hire a custom reaper or header to cut his grain and a machine to thresh it. All the other work will be done by himself and

* Not every soil can be planted in alfalfa or grain without plowing, but it has been found satisfactory on much of the black sagebrush land where the surface is even, and resulted in excellent stands.

his hired man. After paying for all, his original cash will be exhausted, but he will have his crops harvested. If he has employed a competent irrigator, they should be reasonably good.

The first year from his twenty acres of alfalfa he should get one crop of from thirty to thirty-five tons. Reserving what he will require for stock feed, he will have possibly twenty tons to sell which at $7 per ton will bring him in $140. His wheat, on new soil, should yield ordinarily thirty-five bushels to the acre and at $1 per bushel bring him in about $850 net, after sacking and transportation charges. From his five acres of potatoes, assuming a fair normal yield, he would harvest about thirty tons, which should bring him in about $500 after reserving seed for the following year. The total value of his marketable crop, therefore, would be close to $1,500. After paying his second instalment, amounting to $590.60, principal and interest, he will have about $900 left, also all his grain and potato seed, and a considerable part of his farm-grown food supplies to carry him over until next harvest. He has learned much of the art of irrigation and, with the experience gained, the following year should largely increase the value of his crops. His twenty acres of alfalfa, for example, the second year and thereafter should produce five tons to the acre.

The foregoing, while it expresses conditions and results more or less ideal, is based on the substantial assumption that the settler had selected a tract of good land requiring little or no leveling; that he had taken possession of it the fall before, thus giving him time to clear it, construct his ditches and establish his home before planting-time; that he had purchased the best of seed, sown it at the proper time and that instead of attempting to irrigate the tract himself, had the wisdom to employ an experienced irrigator who prevented him from ruining any crop by the blunders his inexperience would naturally make, and that his water-supply had been adequate. The price of $65 per acre for the uncleared land and water right is reasonably ample to get land and a water right of the character described. And in addition it will be noted that the conditions of level land and the crops chosen are such as to permit the seeding of most of the total acreage without plowing.

Even in this instance, it is evident that the settler could not well have succeeded with less than $2,500 capital. Yet we know of settlers who have been successful with as low as $1,000 capital, and some who have not succeeded with $5,000 capital. The largest factor in the equation is the settler himself. Good judgment in selecting his land and water right, in conducting the business of clearing and seeding his farm, and then, if he knows nothing of irrigation, in employing the most skilful man who does. Where crops are grown by irrigation, the man with the irrigating shovel holds the key to the situation. By giving a crop too much or too little water, or at the wrong time, he can cause the loss in a day of more than his wages for a year. But under his skill the kiss of the water to the thirsty soil causes the desert to smile with verdure and bloom, and arid Nature to grow pregnant with harvest.

The Homeseeker with Capital.

The homeseeker with more capital may exercise his choice between a larger acreage of unimproved land, or to purchase outright improved land. Improved farms of from eighty acres to several hundred acres, depending on location and fruitfulness, will cost all the way from $50 to $250 per acre. Many of such farms are in the hands of owners who are far from being up-to-date agriculturists, and can be made to produce four and five-fold greater harvests than at present. The homeseeker with from $8,000 to $25,000 capital will do well to visit the agricultural districts of the State with a view to acquiring improved farm property. The opening in Nevada to secure farm lands which can be made highly profitable is unsurpassed, and is due largely to the fact that only in a degree has the farming industry in the State as yet made any transition from the old-style farming—following the lines of least resistance—to the new, where the soil is made to give forth its greatest possible abundance.

CELERY AT FALLON, NEVADA

CHAPTER V

Agricultural and Horticultural Crops, Plants, Fruits and Trees Which Thrive Generally or in Special Localities in the State

Unless along the banks of some river or stream where cottonwoods grow, the valleys of Nevada in their natural state were destitute of trees, if we except the Yucca or joshua-tree which can be found standing in uncouth shapes on the southern deserts. In the high mountains are indigenous pines and piñon, fir, juniper and cedar, and along the mountain streams grew the quaking-aspen, elder, choke cherry, and a considerable variety of bushes and shrubs.

Ornamental and Shade Trees.

Wherever civilization has established itself in the valleys, ornamental, shade and fruit trees have been planted and many varieties grow with extreme thriftiness. Perhaps the quickest growing of these trees for general purposes is the Carolina poplar, and one of the most valuable for shade and ornamental purposes. In five years it attains large proportions, lives to a considerable age, and is profitable to grow as a fuel. The cork-bark and English elm, black walnut, locust, maple, hawthorne, box elder, mulberry, and many other varieties of northern trees do well in all parts of the State, including most of the ornamental evergreens. In southern Nevada may be added the catalpa, palm, olive, and possibly in places certain varieties of the eucalyptus. Some of the glorious trees of from ten to forty years old in the towns and early farming settlements testify to the possibilities of ornamental shade trees in this State.

FRUIT-GROWING

Very little attention has as yet been given to fruit culture, save in a few instances. While most of the farmers have an acre or two of orchard, as a rule the trees are not cultivated, alfalfa or other grass grows at will between the trees and little care is given to intelligent pruning. Only in rare instances are any preventive measures taken against frosts, with the result that the crop is uncertain and during the bearing years the trees are too heavily loaded. There are, however, a few well-kept orchards, well located along the hill slopes to escape the frosts, and which bear prolifically. Apples, pears, peaches, plums, prunes, apricots, cherries, quinces, pomegranates, nectarines are grown, and it has ceased to be a question as to whether or not certain favorable sections of the State will not eventually develop into important fruit-growing districts. The frost-protected hill slopes are to be chosen, and the homeseeker looking for an orchard site will find what he is seeking in a number of places and be able to secure the land at low cost. The fruit crop, while limited as yet, is unexcelled both in flavor and in keeping qualities. It is possible that in some portions of Pahrump Valley and on the Virgin River, in extreme southern Nevada, oranges, lemons, and grapefruit may be grown. The danger being from winter-killing is due to the fact that throughout southern Nevada there is apt to be each winter a few nights when the temperature will fall below the frost point and once in several years as low as fifteen degrees Fahrenheit. The improvement in orchard heating in recent years and the rareness of frosts and extreme cold in southern Nevada give promise that such citrus fruits may yet be successfully grown.

Berries and Small Fruits.

Blackberries, raspberries, dewberries, loganberries, gooseberries, currants, strawberries and the like grow thriftily in almost every section of the State.

Cantaloupes and Watermelons.

Southern Nevada, like Imperial Valley, is a natural home for the cantaloup, casaba, and watermelon, which are grown and shipped by the carloads East from Moapa and Las Vegas. The cantaloupes grown on the Muddy River bottoms and at several other

BALING ALFALFA HAY AT MINDEN, NEVADA

points south will rival those produced anywhere else in the country. The crop is very profitable, bringing in a gross income of from $100 to $350 per acre. While cantaloupes and watermelons are raised generally throughout the other agricultural sections, it is more for household and local consumption.

Market Gardening Crops.

POTATOES: This is the principal export crop of the State. Not every section of America is adapted to growing this great staple. The Nevada potato has taken the first award at several fairs, international expositions and produce shows, and if equaled in points of good qualities by those grown in any other favored sections of the country for the tuber, it is unsurpassed, to say the least. It grows evenly, when properly cultivated, of uniform size, clear and healthy skin, firm texture, free from disease, is not watery and when cooked is dry, mealy and white as a snowdrift. In every market where the Nevada potato is known it commands a premium. It is no mean agricultural art to get the best results in potato-growing. It requires experience and intelligence to know when and how to plant the crop, how deep the irrigation furrows should be and the precise quantity of water required. But where the art is mastered the profits from potato-growing one year with another are very great. The average yield is about six tons to the acre, or 200 bushels, under any reasonably skilful handling, but the leading potato growers of the State grow from eight to fifteen tons per acre. The average selling price is about twenty dollars per ton or sixty cents per bushel. A net profit of $200 per acre on the crop is not unusual in seasons of good prices.

ONIONS: This is likewise a very profitable crop, but for the best results requires a black silt soil, usually found only along the river-bottoms. From fifteen to thirty tons per acre are harvested from such lands. The market varies between wide extremes, some years hardly paying the cost of the crop and another year giving an enormous profit. This is an important export crop.

SUGAR-BEETS: To supply the new sugar-beet factory at Fallon with 65,000 tons of sugar-beets per annum, a large opening is created for the growing of sugar-beets throughout the tributary territory. As stated in a previous chapter, the local farmers are as yet unfamiliar with beet culture. For the homeseeker who is, there is a great opening to lease land of the farmers on shares, to acquire lands by purchase or to homestead on the Truckee-Carson Reclamation Project. Tests of beets grown in the vicinity for a number of years gave a general average of seventeen per cent. sugar; purity 89.95. The price paid for the beets is based on sugar content: five dollars per ton on a base rate of fifteen per cent. sugar, and thirty cents per ton for each per cent. above. In addition there is a compensating additional allowance for varying distances of transportation from the field to the factory.

CELERY: This is a crop which seems to be particularly adapted to the soil and climatic conditions in the State. There is a strong demand both from local sources and for export. Nevada celery is tender, brittle, grows thriftily and is free from rust and disease. It requires a sandy loam or silt soil, and its growth is extremely profitable.

ASPARAGUS: Like celery, asparagus is a crop now attracting attention in many places where tests have proved it to be specially adapted. About 200 acres are grown in the Muddy Valley, maturing in March, and commands a high price in the Chicago and New York markets. Profits as high as $400 per acre have been made.

OTHER VEGETABLE CROPS: All ordinary garden vegetables, such as corn, tomatoes, lettuce, squash, pumpkins, cucumbers, egg-plants, turnips, carrots, etc., may be grown generally throughout the State.

FORAGE CROPS.

ALFALFA: This is the State's most important agricultural crop. All soils, excepting those containing an excess of alkali or having a water-table nearer than six feet below the surface, are adapted to its growth. The yield will vary from two tons per acre on

inferior soils in northern and central Nevada to seven and eight tons on better soils and as high as twelve tons in southern Nevada. In the higher altitudes, 4,000 feet and over, two crops are grown, with the third crop left for fall pasturing; at lower altitudes, approximately 3,800 feet elevation, three full crops are harvested; while five and six crops mature in southern Nevada. For stock feeding, the hay is fed on the ranch and sells uniformly at about $7 per ton. The finer grade, mixed with timothy and bluegrass, is hauled or shipped to the towns and mining camps where it brings from $12 to $20 per ton.

SORGHUM: The recent introduction of several varieties of the sorghums in a few sections of Nevada, including broom corn, sweet sorghum, Kaffir corn, and milo, with the most satisfactory results, indicates that the soil and climate are all that could be desired for the growth of these valuable staples. Milo, especially, is a drought resisting crop and may yet be successfully cultivated here by dry-farming methods in certain localities. Under irrigation, however, the sorghums do extremely well and seem to grow as thriftily as anywhere in the Middle West.

CHAPTER VI

Conditions in Nevada Exceptional for Raising Hogs for Export and to Supply the Local Markets—Most of the Pork, Bacon and Ham Consumed Is Imported from the Middle West—Poultry Business—Apiaries

The hog, for no reason other than the farmer has slept on a money-making opportunity, has been grossly neglected in Nevada. Recently, however, there has been somewhat of an awakening. A number of farmers in different sections of the State have discovered that the humble porker is full of money-making possibilities, and have turned their attention to swine-raising. They have discovered that there is large and certain profit in the enterprise and with no danger that the market will be affected by any excess supply. Moreover it is found that one acre of alfalfa will support and fatten from eight to twenty hogs.

PROFIT IN THE HOG

The best practice is to have the alfalfa acreage divided into fenced lots, permitting the hogs to forage on one lot at a time so that the land may be irrigated and have a chance to partially dry out before the pasture rotation brings the hogs again on the field. Where the hog has plenty of room, his inclination to root is very much abated. Moreover his general healthfulness and freedom from contagious disease such as hog cholera is materially improved. At the Nevada Experimental Station, at Reno, hog cholera serum is prepared, and the Nevada farmer, discovering a case of supposed cholera in his drove, can isolate the suspect, innoculate him with the serum and the whole drove if necessary. The day is past when the hog grower, if he is informed, need fear any considerable loss from this formerly disastrous contagion. Alfalfa hay as a winter ration is almost as satisfactory as when grazed in the field. The farmer, however, to get the best results should grow wheat, oats, barley, corn, cow peas, sugar-beets, pumpkins, potatoes or pie melons, depending on the climatic conditions and character of his soil, as a side crop, to be fed with the alfalfa for a month or two at fattening time. Every crop best suited to producing pork seems to be specially adapted to growth in this State, added to which as an advantage is the moderate winter climate. Under good handling, alfalfa, turned on the farm into pork, is equivalent to selling the hay crop for $25 or more per ton, instead of $7 per ton. A forty-acre Nevada farm, with thirty acres in alfalfa and ten acres in a side crop, will grow everything required to produce annually from 50,000 pounds to 100,000 pounds of pork, which at five and one-half cents per pound, the minimum price, will bring in an income of from $2,750 to $5,500 per annum. Thus the farmer on a forty-acre tract, if he is wide-awake, can make more money than the back-number farmer on a quarter-section of the same kind of land.

POULTRY-RAISING

The poultry business has its technical side, and one person may succeed in it where many others will fail. There is much detail about it, some special knowledge required of the habits, diseases and characteristics of the domesticated feathered family, and the successful are those who make poultry-raising a study and the marketing of the eggs and fowls a specialty. From the standpoint of poultry-raising in Nevada, the following facts are important: First, that not enough poultry and eggs are produced to begin to supply the home consumption; second, that the prices for both are higher than perhaps anywhere else in the country; third, that the climatic and other conditions are as good here as anywhere else, and lastly, that those who have in recent years gone into the business in the right way appear to be making money. The homeseeker, looking for an opportunity to go into poultry-raising will find Nevada as promising a field as any, to say the least.

NEVADA HONEY

We have claimed hitherto in this booklet that Nevada is a state wonderfully adapted to alfalfa; that the Nevada potato, if not the best grown in America, at least has no superior, and now we are going to make the same claim for honey.

Clear, white, translucent, with a flavor of alfalfa bloom and as delicious as fabled nectar, if any other section of America produces better honey than this State, in Western parlance, it has to go some! Let us investigate the reasons. We will not have to prosecute the inquiry far. There are two, namely: The great stretches of alfalfa fields, whose purple blossoms distil the sweets, and the cloudless sunshiny days during the season when the bee gathers honey. There are no days when the worker has to lay off and get a grouch on about the lowering weather. She can be up with the lark between the time the first spring blossom comes on the hillside, the white sage appears, and the apple trees begin to bloom, until the last belated blossom withers in the fall. There is no rain or moisture in the flower to trouble and annoy her in getting at the sweets. The busy bee earns her reputation in Nevada not only by the quantity which she puts up but by its exquisite quality.

Apiculture is an important industry in Nevada and is growing rapidly at the present time, due to the introduction of Nevada honey in the Eastern markets and the attention its fine quality has attracted. At the present time there are about 10,000 colonies, and from the great extent of the honey flora there is room in the State for at least 100,000 colonies.

CHAPTER VII

Valleys, River Systems, Cities, Towns, and Agricultural Communities

The river systems of the arid region largely determine the geography of the agricultural sections. Along the rivers the pioneer farmers first settled and diverted the waters for irrigation, following the lines, successively, of least resistance. In time, most of the land capable of reclamation by local capital and enterprise was put under cultivation. Now has begun the era of Government and Carey Act reclamation projects, the breaking up of large ranches into small farms, and the beginning of intensive farming.

THE HUMBOLDT RIVER SYSTEM

The Humboldt River from the source of its longest tributary to the sink where its waters are lost by evaporation, is nearly 1,000 miles in length. Its drainage area covers 13,800 square miles. About 175,000 acres of land along the river and its tributaries are under cultivation. The upper valleys at the source of the river have an elevation of approximately 6,000 feet, descending to about 5,000 feet at Elko, 4,500 at Battle Mountain, 4,300 at Winnemucca and 4,000 at Lovelock. Some of the richest farming districts of Nevada are along this river. Near Wells is the Pacific Reclamation Company's Carey Act project which is opening up for settlement a 30,000-acre tract of good land suitable for growing alfalfa, grain and general northern farm crops.

HUMBOLDT RIVER NEAR WINNEMUCCA, NEVADA

SHEEP AT MINDEN, NEVADA

CATTLE NEAR RENO, NEVADA

The town of Metropolis came into existence on this project. The water-supply is derived from a storage system of the flood waters of Bishops Creek and its tributaries.

South of Wells is Clover Valley, not properly a part of the Humboldt River system, however, but contiguous to it, about thirty-five miles long and from five to ten miles wide. Although the elevation of this valley is 6,000 feet, and the winters are somewhat severe, there is a five months' growing season, producing good crops of alfalfa and grain. Some splendid apples are grown here, and the valley is worthy of attention from those interested in a climate producing an apple of the longest keeping quality. The average annual precipitation is fifteen inches.

About Deeth on the Humboldt, and including Marys River Valley, Star Valley and Lamoille Valley, is an extensive agricultural section containing about 30,000 acres of alfalfa and natural grass lands, and a very much larger acreage which is susceptible of reclamation. It is possible that extensive tracts of lowlands in these valleys, possessing a high water-table—natural moisture within a short distance below the surface—can be made to grow the "dry-farming" varieties of wheat and cereals without irrigation. The Fort Halleck Irrigation District recently organized under a new state law, is constructing an irrigation system to reclaim about 10,000 acres near Lamoille Valley, at an outlay of about $225,000. Throughout these valleys are a number of very attractive ranches.

ELKO, the county seat of Elko County, is the center of the greatest cattle and sheep ranges of the State, and with considerable of a farming section in the immediate vicinity. It is a thriving town of about 2,000 population, with the outlook for an important future. It lies on both the Southern Pacific and Western Pacific railroads and is the business center of a prosperous tributary territory. From Elko north extends a great stock-raising, mining and agricultural country, clear to the Idaho line, the importance of which from the agricultural standpoint is not yet more than dimly realized. Here are the valleys of the Owyhee, Bruneau and Salmon rivers, whose waters ultimately reach the Columbia and the Pacific. This is a country, as yet, of vast cattle ranges and far from railroad communication. It is well watered and with great possibilities for ultimate colonization.

From Palisade south for fifty miles is a succession of long narrow valleys, through which extends the Eureka & Palisade Railway, the latter continuing on to the famous old mining camp of Eureka, still on the producing list and once the greatest lead camp of the world. Only about 5,000 acres of land are under cultivation on Pine and Hot creeks in these valleys. Practically all the farming is a side issue to stock-raising.

Along the Humboldt, between Palisade and Oreana, a distance of about 160 miles, some 50,000 acres are under cultivation, chiefly in natural grass meadows and alfalfa. Much of the soil is river-bottom silt, susceptible of easy drainage in many instances, in other cases not requiring any and naturally highly productive. Here, again, farming is secondary to stock-raising, with large ranches almost universal. On Spring Creek, for example, is a tract of 25,000 acres of level arable sagebrush land, only a small part of which is under cultivation but practically all of which is feasible of reclamation. This tract is part of a great stock range. In this stretch of country along the Humboldt it is safe to say that there is room for 2,000 farm families to acquire independence, where today the land is owned by perhaps a hundred.

South from Beowawe extends Crescent Valley, nearly forty miles in length by ten miles in width. In many places there is a high water-table, suggestive of possibilities for so-called "dry-farming," where the subsurface moisture supplies most of that required for crops. The land is level and arable. The possibilities for artesian water in this valley are excellent.

At Battle Mountain is the confluence of the Reese River with the Humboldt, but only in seasons of high water do the streams mingle. It is the Humboldt's longest tributary, rises 120 miles south, and flows through a series of narrow fertile valleys, along which for the most part is the Nevada Central Railroad, terminating at Austin. About 15,000 acres are under cultivation throughout the entire river system. Stock-raising predominates over farming, although there are a number of highly cultivated farms.

BEGINNING CONSTRUCTION ON LAHONTAN DAM ON THE CARSON RIVER

AUSTIN, the county seat of Lander County, is the principal town of the Reese River Valley. Thirty years ago it was one of Nevada's great mining camps. After a long period of quiescence it is entering upon a revival of its former mineral production.

WINNEMUCCA, the county seat of Humboldt County, like Elko, is the center of a great stock-raising, mining and agricultural territory; is on both the Southern Pacific and Western Pacific railroads, and is geographically situated to grow. The attractive portion of the town is not visible from the railroad. Its population is about 2,000. It contains many pleasant residences, good schools, churches, a national bank, business houses and a handsome theatre. From Winnemucca is shipped annually about 3,500,000 pounds of wool and about 1,600 carloads of cattle, sheep and horses.

Extending north from Winnemucca for fifty miles on the Little Humboldt River is Paradise Valley, the upper end of which is an extremely fertile farming country. A town of the same name is situated in the center of the cultivated section. It contains a flour-mill, stores, hotels, and two churches. About 30,000 acres are under a thrifty state of cultivation. The principal crops are alfalfa, wheat, barley, fruit and vegetables. Several fine orchards are in the valley and the conditions seem favorable for fruit-growing. A more perfect conservation of the water-supply would bring under cultivation a much larger area of arable land.

Northwest from Paradise Valley over a mountain range lies the Quinn River Valley and west of this, Kings River Valley. While neither of these two valleys belongs to the Humboldt River system, they are contiguous to it and will be mentioned here. There are a number of cultivated farms. Stock-raising is the principal industry. Here are vast stretches of arable desert land, naturally well watered and capable of reclamation to support a considerable farming population.

The Ellison Ranch Company is completing a Carey Act project to reclaim and open for settlement 38,000 acres of rich lands on the Quinn River and its tributaries.

LOVELOCK, the last town on the Humboldt, is the center of perhaps the richest agricultural section in northern Nevada. The soil is the accumulated silt of ages of river flow finally deposited in this lower extremity of the great Humboldt Valley. Wells sunk fifty feet and over do not pass through the black humus-laden soil. Here yields of seven tons to the acre of alfalfa and sixty bushels of wheat excite no comment. About 25,000 acres are under a high state of cultivation, the principal crops being alfalfa, potatoes, wheat, barley, and oats. Here is located an important flour-mill. This valley should make a wonderful spot for the growing of sugar-beets, and undoubtedly a considerable acreage will be planted from now on as it is within shipping distance of the sugar-beet factory at Fallon. Crops such as celery, asparagus, corn, sorghum, tomatoes, etc., grow luxuriantly. Land here, as in many other places, is held in large tracts, but already the demand for small acreages of such rich soil is insistent. Its colonization with the intensive farmer on twenty and forty-acre tracts is likely in a few years to occur. Near here is the Carey Act project of the Lovelock Land and Development Company, which is constructing an irrigation system to impound 57,000 acre feet of the flood waters of the river in a reservoir site near the Humboldt House to irrigate certain lands held in private ownership and to reclaim 10,000 acres of desert land. The latter on the completion of the project will be thrown open to entrymen.

TRUCKEE RIVER SYSTEM

Lake Tahoe, lying partly in California and partly in Nevada, pronounced by tourists as the most beautiful lake in the world, is the source of the Truckee River. After flowing about 125 miles, during which it falls 2,442 feet, it empties into Pyramid Lake, the latter also a surpassingly beautiful sheet of water, somewhat larger than Lake Tahoe. The scenery along the Truckee is superb. The Eastern traveler on the Southern Pacific, entering the Truckee Valley, seven miles below Reno, gets his first and only view from the car window of what might be called "Agricultural Nevada." Even here it is only the natural grass lowlands or "meadows" that are within the range of vision. Nevertheless the view of this beautiful valley, walled in by the great Sierras on the west, is inspiring.

CANAL OF TRUCKEE-CARSON PROJECT WHICH IS CONVERTING A DESERT INTO A 200,000-ACRE FARM

About 45,000 acres are cultivated from the Truckee River, not including the lands reclaimed by the Truckee-Carson Reclamation Project lower down. The stream is harnessed at a number of places with hydro-electric plants, generating energy to light and supply power for domestic, industrial and mining purposes from Reno to as far south as Yerington and Wabuska, including Virginia City and the great mines of the Comstock Lode.

Surrounding Reno is a rich agricultural section with medium-sized farms under a compartively high state of cultivation. The principal products are alfalfa, potatoes, and onions with other more or less diversified crops.

RENO, the county seat of Washoe County, and the most important city in the State, is located on both banks of the Truckee. Its population in 1910 was 10,867. Three miles distant and connected by electric street-car system is the town of Sparks, population 2,500. Reno is a live, progressive Western city, and its busy thoroughfares thronged with people, with clanging street-cars and innumerable automobiles, give the visitor the impression that this is a place of no mean importance, and he is not in error. Its location so far as scenic environment is concerned is not surpassed even by Colorado Springs. Its position as a business center with railroads radiating north, east, south and west gives it an enormous tributary territory. Here are modern business blocks, department stores, excellent hotels, fine public buildings, schools, churches, libraries, and a modern theatre where the stars of the first magnitude appear, and Schumann-Heink and Gadski have sung. It is a city also of beautiful residences, trees and shrubbery, asphalt and macadam streets. There are churches of all denominations, and a splendid Y. M. C. A. building; also four large banking institutions with combined resources aggregating $10,000,000.. Here are located the Nevada State University and Experiment Station. The University is richly endowed by the state and federal governments and by Mrs. John Mackay and Clarence Mackay, of New York, widow and son respectively of the late master spirit during the bonanza days of the Comstock Lode. There is an able corps of instructors, and 350 students. The Reno Commercial Club is an organization of leading business men and citizens, with extensive club headquarters and will reply to inquiries with respect to the city and surrounding country.

The average annual run-off of the Truckee River is 674,000 acre feet, or sufficient water if conserved to irrigate 225,000 acres of land. Immediately north of Reno are several arable valleys capable of reclamation from the river, containing 73,000 acres now in sagebrush. The "meadow" lands on the east side of the Truckee Valley, containing about 5,000 acres, could be drained by deepening the river channel near Vista about six feet, thus reclaiming from swamp a body of wonderfully fertile bottom-lands. South of the Truckee Valley lies Steamboat Valley, also highly cultivated and beyond this is a succession of farm valleys for fifty miles, through which runs the Virginia & Truckee Railroad and its Minden branch.

THE CARSON RIVER SYSTEM

Like the Truckee, the Carson River rises in the Sierras and flows northeasterly about 200 miles, to empty in the Carson Sink. Its estimated annual run-off is 436,000 acre feet, or sufficient to irrigate if conserved 145,000 acres. Carson Valley, situated on the upper Carson, elevation 4,750 feet, is second to no other valley in Nevada in soil fertility and grandeur of natural scenery. On its west side the picturesque Sierras rise abruptly and afford a mountain perspective over the verdure of the fields and thrifty farms to satisfy the most ardent Nature lover. Five to seven tons of alfalfa and forty bushels of wheat are ordinary crops. The largest dairy industry in the State centers here, the farmers owning the Gardnerville Creamery co-operatively, and they have grown wealthy from turning their forage crops into butter and cheese. Here is also a large flour-mill, second only to the Riverside flour-mill at Reno in importance. A large land estate in this valley is being subdivided into small farms, and many new colonists have in the last few years acquired homes. Land so productive is valuable. The settler will get exceptional value in fruitful soil, but he must expect to pay anywhere from $150 to $300 an acre for improved land.

BEET-SUGAR REFINERY, NEVADA SUGAR COMPANY, FALLON, NEVADA

MINDEN FLOUR MILLING COMPANY AT MINDEN, NEVADA

TRUCKEE-CARSON IRRIGATION DAM NEAR RENO

There are four thriving towns in the valley—Minden, Gardnerville, Genoa and Sheridan—surrounded by 30,000 acres of land under the highest state of cultivation—with an additional 15,000 acres of arable lands at the north end of the valley which are rapidly being reclaimed.

Along the Carson River, between Empire and the Truckee-Carson project at Fallon, including the farm acreage about Dayton, about 20,000 acres are under cultivation, producing alfalfa and potatoes as the leading crops.

Immediately north of Carson Valley lies Eagle Valley, containing 12,000 acres of arable lands, about a third of which is under cultivation, due to scarcity of water-supply but which will in time be remedied by pumping and storage systems. The Carson River traverses the lower side of this valley, consequently its waters cannot be utilized.

CARSON CITY, the capital of the State, is situated in the center of Eagle Valley, only fourteen miles from Lake Tahoe. The population is about 2,500. In addition to the State buildings located here, there is a fine federal building. The city is charming from its picturesque setting and wealth of magnificent trees which line all the streets. It is expected that during the coming year several thousand acres of rich silt lands close in to Carson City will be opened to colonization.

TRUCKEE-CARSON RECLAMATION PROJECT

The first reclamation project undertaken by the Government under the National Reclamation Act was begun in 1903 in Nevada and is still in process of construction at an ultimate cost of approximately $7,000,000. The first unit of the project was completed in 1907-08, consisting of a great canal to divert the waters of the Truckee at Derby, twenty miles below Reno, to the vast tract of arable land in the neighborhood of Fallon in Churchill County. Work on the second unit of the project was inaugurated the present year, 1911, namely, the construction of an impounding dam across the Carson River about fifteen miles from Fallon to store the waters of the canal and the flood waters of the Carson during the non-irrigation season in a great artificial lake, capacity 350,000 acre feet. The dam will be of earth and concrete, 800 feet long, 110 feet high, 400 feet wide at the base and 20 feet wide at the top. It will be completed in 1913, and with the existing appropriated water-supply of the river and canal system will be the means of reclaiming a total of 200,000 acres of what was once known as the "Forty Mile Desert," about 70,000 acres of which are now under cultivation. The dam will supply many thousand hydro-electric horsepower as well.

FALLON, the county seat of Churchill County, is situated at the terminus of a short spur of the Southern Pacific beginning at Hazen; population about 1,000, not including those on the immediately surrounding farms; elevation, 3,970 feet; maximum temperature 105 degrees, minimum 5 degrees, mean 48 degrees, humidity low.

The soil about Fallon is of many kinds, as would be expected in a large tract of land formed from river and lake deposits, including light drifting sands, loams, clay, adobe and black peat soils, all occurring in large quantities and affording an extensive variety for choice. A wide range of crops are grown here: alfalfa, wild hay, corn, grain, sorghum, potatoes, sugar-beets, celery, asparagus, melons, orchard fruits, berries, etc. This country is at its beginning, with an outlook such that ten years from now should see its fruition as one of the greatest agricultural sections of the West. Here is located a new sugar-beet factory with a capacity of 650 tons per day and which will give market for a crop that will net the skilful grower from $50 to $75 per acre. One after the other the older farms are being broken up and sold to settlers in smaller tracts. Also the vast acreage being reclaimed by the Government is open to homestead entry at a cost of $30 per acre, payable in ten instalments without interest, and sixty cents per annum maintenance cost.

Northwest of Fallon, at Fernley, on the line of the Truckee Canal, a fine tract of land is being reclaimed by homesteaders. This is on "thornbrush" land deficient in humus and nitrogen but which is artificially supplied, with the result that splendid yields of alfalfa in every instance have rewarded the settlers. For information address, Project Engineer, U. S. R. S., Fallon, Nev.

CATTLE GRAZING AT CARSON VALLEY, NEVADA

THE WALKER RIVER SYSTEM

The Walker River is formed by two branches—East and West forks—which rise on the eastern slopes of the Sierras. The latter traverses Antelope and Smith valleys and unites with the West Fork in Mason Valley, thence flowing into Walker Lake. In Antelope Valley is a natural reservoir site capable of impounding—depending on the height of the dam—from 105,000 to 240,000 acre feet of the flood waters of the stream. There are also several storage sites on the East Fork. On both rivers are a number of power sites. For a reclamation company possessing the necessary capital to quiet certain conflicting water rights and put in the storage and canal systems requiring about $1,000,000, there is no more profitable and feasible undertaking in the West than the consummation of what is known as the Antelope Valley Project which is still open. The acreage subject to reclamation by this project is estimated at 80,000, including lands now in private ownership but with an uncertain water-supply due to the variation in the river flow. The annual run-off of the East Fork is 154,000 acre feet and of the West Fork 222,000 acre feet, a total sufficient to reclaim 135,000 acres, aside from the lands which, under the topography of the valleys, are reclaimed by seepage, aggregating probably 50,000 acres more. Elevations: Smith Valley, 4,800 feet; Mason Valley, 4,350 feet. Climate mild.

The present acreage under cultivation in these two valleys, including East Fork Valley which is a continuation of Mason, is about 75,000. In Smith Valley artesian water is demonstrated at depths ranging from 100 to 300 feet, with strong flows, and there is much activity at present in artesian reclamation. Electric power is available for pumping in both valleys, and in many places surface-waters in abundance can be obtained under twenty feet pumping lift. The Nevada & California Railway, a branch of the Southern Pacific, beginning at Hazen and now being extended to connect with Los Angeles, passes through Mason Valley at Wabuska, from which the Nevada Copper Belt Railway extends through a portion of Mason Valley and into Smith Valley, terminating at Hudson. At Wabuska is located a copper smelter to reduce the great bodies of copper ores in the vicinity of Yerington.

The Carey Act project of the Walker River Power Company proposes to impound the flood waters of the East Fork and to carry the stream by a high-line canal to reclaim 50,000 acres of fine sagebrush lands in Mason Valley, as well to generate ultimately about 30,000 hydro-electric horsepower. This project is well under way and will probably be largely colonized by Mennonite farmers from Pennsylvania.

From an agricultural standpoint Smith and Mason valleys are two of the most fertile areas in Nevada and capable of supporting a very large farming population. About the same variety of farm crops thrive here as at Fallon and in Carson Valley. There are splendid local markets. The country is also tributary to the rich mining districts of Tonopah, Goldfield, etc. For the intending settler these two valleys offer special opportunities at the present time. The principal towns are Mason, Yerington, Wabuska, Nordyke, and Wellington.

SMALL STREAM SYSTEMS: NORTHERN NEVADA

Aside from the river systems mentioned there are in the State innumerable cultivated tracts varying from a quarter-section to several thousand acres reclaimed from the flow of springs and mountain creeks. The total irrigated area of this character, owing to the immensity of the State, is not likely less than 100,000 acres. Wherever there is a brook or spring in nearly every case will be found some occupant of the land.

The White River, so-called in east-central Nevada, length about seventy-five miles, flows about 28,000 acre feet of water per annum. It is fed from four great thermal springs at Preston and Lund. The White River Valley contains a large acreage of arable lands, only about 5,000 of which are cultivated. Owing to the limited water-supply, about 9,000 acres would represent the maximum that is feasible of reclamation by storage.

Steptoe Valley, in White Pine County, is about 100 miles in length and from six to twelve miles in width, elevation 6,000 feet. It is traversed by Duck Creek flowing

BEEF CATTLE READY FOR SHIPPING

from the north and Steptoe Creek from the south. Along these creeks are extensive tracts of natural meadows. Fruit, alfalfa and grain are profitable crops. Contiguous to this valley are the great copper mines at Ely, rivaling those of Butte, Montana, as the largest in the world, and which afford market for everything grown. The water-supply of both creeks has been purchased by the copper companies, which limits the acreage subject to future reclamation. East of Ely is Spring Valley, and about Osceola are several great ranches under a high state of cultivation. The annual precipitation in this section is about twelve inches.

In Lincoln County are a series of valleys—Duck Valley, Desert Valley, Pahroc Valley, Coal Valley and Pennoyer Valley—which may be said to be on the border line between northern and southern Nevada. There are many thousand acres of cultivated lands in these valleys in isolated tracts, reclaimed from springs and mountain creeks. In Coal Valley a private company has constructed an impounding dam to store the flood waters of a number of small streams. The run-off of the creeks would seem to limit the area feasible of reclamation by the surface-water supply alone to about 5,000 acres.

In the northern part of the Meadow Valley Wash, about Caliente and Panaca, on the San Pedro, Los Angeles & Salt Lake Railway, elevation approximately 4,400 feet, is an extremely fertile farm country under a high state of cultivation. The growing season is about seven months, and extraordinary yields are obtained on the irrigated lands. There is room on small tracts in this section for a considerable number of farmers.

About Hawthorne, in the Walker Lake Valley, west-central Nevada, are some cultivated lands and with many thousands of acres additional of arable lands which will probably ultimately be reclaimed by pumping. In Fish Lake Valley are several thousand acres of highly productive cultivated lands.

Big Smoky Valley, one hundred miles in length by from five to fifteen miles in width, with 250,000 acres of arable lands, only about 1,500 acres of which are under cultivation from springs and mountain streams, is alluring of possibilities of reclamation in part by artesian irrigation. Pumping wells have been encountered at reasonable depths at Millers. Electric power for pumping is available, and 115,000 acres of the lands are now covered by Carey Act projects proposing to ultilize the subterranean waters. Ralston Valley, Hot Creek Valley, Fish Spring Valley, Little Smoky Valley, and Paranagat Valley each contains an enormous acreage of arable desert lands, some little of which is under cultivation and the remainder awaiting some feasible means of reclamation, restricted, however, probably to artesian flows.

In the neighborhood of these valleys are the great mining districts of Tonopah, Goldfield and Manhattan, producing annually approximately $20,000,000 in precious metals, affording markets for agricultural crops and, as well, the railroads and electric power lines leading to them the means of transportation and power.

SOUTHERN SUB-TROPICAL NEVADA

We have now to consider a portion of Nevada lying between the thirty-fifth and thirty-seventh parallels, elevation between 1,600 and 2,000 feet, with a maximum temperature of 116 degrees, mean 61.7 degrees, and lowest recorded 10 degrees Fahrenheit, where frosts are practically unknown between the first of May and the beginning of November, and where the growing season is nine months long. This section includes the Muddy River Valley, Las Vegas Valley, Pahrump Valley, Indian Spring Valley, and tracts in the Amargosa Desert, all of which are tributary to the San Pedro, Los Angeles & Salt Lake Railway, the Las Vegas & Tonopah Railway and a part of the Tonopah & Tidewater Railway.

THE MUDDY RIVER SYSTEM

The Muddy River rises in certain thermal springs near Arrow Cañon, in the Arrow Cañon Mountains, flows southeasterly, enters the Meadow Valley Wash and continues to Saint Thomas, a distance of forty miles, where it empties into the Virgin River about twenty-five miles above its confluence with the Colorado. The normal

PLOWING THE BROAD ACRES BY GASOLINE-DRIVEN ENGINE

SAN PEDRO, LOS ANGELES & SALT LAKE RAILWAY DEPOT AT LAS VEGAS, NEVADA

THE FERTILE COUNTRY IN THE VICINITY OF LAS VEGAS, NEVADA

annual flow of the river is about 28,000 acre feet. There are about 12,000 acres of arable lands along the Muddy, of which about 5,000 are under cultivation. This valley is an agricultural pardise in respect to fertility. Six crops of alfalfa are harvested; cotton grows luxuriantly; cantaloupes and watermelons return small fortunes from a few acres; it is a natural home for the fig, olive, grape and apricot, and here is grown perhaps the finest asparagus raised in America. The State of Nevada maintains an experiment station here. Five hundred carloads of melons, lettuce, asparagus and fruit, on the completion of the railroad from Moapa to Saint Thomas, it is estimated, will be shipped to Eastern markets next season and thereafter. Two crops are ordinarily harvested from the same land each year. In this valley are four prosperous towns, Moapa, Logan, Overton and Saint Thomas. Considering the value of the crops, land can yet be secured at reasonable prices. The scarcity of the water-supply has hitherto limited the cultivated acreage, but artesian irrigation to reclaim the remainder of the arable lands is believed to be feasible. This little valley is capable of supporting 500 families on twenty-acre tracts, with an adequate water-supply. For additional information, address Moapa Valley Chamber of Commerce, Logan, Nevada.

THE LAS VEGAS VALLEY

About sixty miles southwest of Moapa on the railroad is Las Vegas, situated in what was once believed to be an inhospitable desert—aside from the Vegas spring in the center of the valley and the spots made fertile by the flow of mountain creeks along the base of the surrounding hills. Today this desert is being transformed into a wonderfully fertile oasis; slowly perhaps, relative to its great extent, but the encroachment of the farms upon the desert has now reached several thousand acres and is rapidly increasing. In 1906 the first artesian well was drilled, developing a strong flow of subterranean water under 300 feet depth. It was several years before the full importance of the discovery began to attract the attention it deserved. About two years ago artesian well drilling began in earnest, with the result that a large number of wells are now flowing and drill machines are constantly at work developing new flows. Not all the soil of the valley is arable, owing to the presence in places of hardpan or a stratum of gypsum close to the surface and in other places alkali, but aside from these there are extensive tracts of good soil made especially valuable by reason of the climatic conditions. Even on much of this thin soil with suitable treatment crops of all the shallow-rooted varieties will produce abundant harvests. The range of crops is about the same as at Moapa, and on the best lands enormous yields of grapes, cantaloupes, watermelons, lettuce, fruit, large and small, are grown. There is room about Las Vegas for a large farm population, and here twenty to forty acres of average soil with a flowing well spells opulence. The Carey Act project of the Las Vegas Irrigated Fruit Lands Company in drilling wells to open up an 8,000-acre tract for colonization.

LAS VEGAS is a thriving town of 1,500 population, with attractive business buildings and charming residences, oiled streets, schools, churches, banks, and an atmosphere of enterprise and prosperity in keeping with its outlook as ultimately the distributing center for one of the largest and richest agricultural sections of the State. The Las Vegas Chamber of Commerce will supply any information on request.

THE PAHRUMP VALLEY

West of Las Vegas, across the Charleston Range which is well timbered and contains many beautiful mountain parks, lies Pahrump Valley with about 75,000 acres of arable land. The elevation at Manse is 2,775 feet. At Manse and at Pahrump, about seven miles apart, are two great springs which supply water for the irrigation of about 1,000 acres, transforming the desert into an oasis of subtropical vegetation. The range of crops is about the same as at Las Vegas and Moapa. In this valley is an empire of the most fertile character, provided that artesian water can be found as abundantly as at Las Vegas. The Pahrump Valley Land & Water Company, a Carey Act project, is actively engaged in drilling to determine if subterranean waters exist to reclaim a tract of 15,740 acres. If this exploration proves successful, in a few years will be opened up for entrymen a country second to none in the Southwest

ARTESIAN WELL, LAS VEGAS, NEVADA

for subtropical fertility. While as yet the valley is without railroad communication, both Pahrump and Manse are within thirty miles of the Tonopah & Las Vegas Railway and a less distance to the Tonopah & Tidewater Railway. The agricultural development of the valley will in time insure a branch line from one or both.

CHAPTER VIII

Agricultural Development Stimulated by the Mining Industry

We have previously referred to the exceptional local markets for agricultural crops in Nevada due to the excess proportion of the population engaged in mining and other non-agricultural pursuits. The mining industry in the State since the culmination of the great mining boom, beginning in 1901 and ending in 1907, is not on the wane, as many not familiar with the progress of the industry since the latter year may suppose. Legitimate mining—the exploitation of the State's wonderful deposits of mineral wealth—has made greater strides during the years since the so-called "boom" collapsed than ever before. A comparison of the mineral output at present with the preceding sensational period will show that the annual production of gold, silver and copper has increased from $21,500,000 in 1907 to approximately $40,000,000 for the year 1911. The mines are being exploited and not the public, which accounts for the enormous increase in mineral production. The former great mining discoveries are now thoroughly equipped with modern hoisting and reduction works. The older mining camps, such as the Comstock Lode, Austin, Pioche, etc., due to advanced metallurgical processes and the introduction of hydro-electric power, are taking on new leases of life. Also new discoveries of great importance not widely heralded are becoming substantial producers. The copper mines at Ely are now practically the first in importance in the world. At Yerington are great copper mines which, after ten years of development, the latter part of this year will begin turning out copper ingots from the new smelter at Wabuska.

The opening up of great ore bodies in new regions and at greater depths at Tonopah have advanced the production of that district enormously and extended the probable life of the camp indefinitely. Goldfield continues its unexampled production with no indications of probable abatement for a decade at least.

To supply the hundreds of mining camps and discoveries, great and small, the Nevada farmer finds a constant market for many kinds of crops and at a range of prices higher than obtained elsewhere in America.

INFORMATION

For further or special information regarding the State of Nevada, address Nevada Bureau of Industry, Agriculture and Irrigation, Carson City, Nevada. Any representative of the Traffic Departments of the Southern Pacific, Western Pacific, or San Pedro, Los Angeles & Salt Lake railroads throughout the country will be pleased on application to answer inquiries about the State, including railway rates and service.

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