

THE CONQUEST OF ARID AMERICA.



HE material progress of the United States in its first century under the Constitution is a supreme record of achievement in the history of nations. The patriotic orator and writer ascribe these results to triumphant democracy; members of political parties claim a large share of credit for their public policies; and much has been said of the inventive genius and the peculiar industry and intelligence of the American people. But all these explanations of the nation's amazing strides to the goal of material greatness are essentially false and delusive. Incidentals have been confounded with fundamentals. The national egotism has appropriated to itself a credit that belongs chiefly to a much higher power.

The material greatness of the United States is the fruit of a policy of peaceful conquest over the resources of a virgin continent. The first movement of population subjugated the Atlantic seaboard to the uses of modern life. The next carried civilization across the Alleghanies, and expanded northward to the lakes, and southward to the gulf. The third peopled the Mississippi basin, largely with the veterans of the war for the Union. These three eras were intelligible and eventful. They made virtually complete the conquest and occupation of eastern America, and in eastern America more than ninety per cent. of a nation of seventy million people dwell to-day. The lust for sudden riches, the opportunity for the development of a few seaports, the necessity for at least a sparse agricultural population to feed the mines and towns, have attracted a few millions into the far West. But speaking in broad terms, and with a view to its ultimate capabilities, the conquest of the continent is only half accomplished. The mighty forces which molded the prosperity of the past have ceased to operate. The great engine of material progress stands idle in its tracks. The nation halts and falters upon a mysterious boundary line which marks the ending of familiar conditions and the beginning of problems strange and new to Anglo-Saxon men. Thus the splendor of national prosperity pales in the grim presence of national stagnation. And yet beyond the line where the armies of civilization have bivouacked, if not laid down their arms, sleeps an empire incomparably greater and more resourceful than the empire those armies have conquered. Here lie the possibilities of a twen-

tieth-century civilization—a civilization new, distinctive, and more luminous and potential than any which has preceded it in the world's long history.

A MOMENTOUS MERIDIAN LINE.

THE one-hundredth meridian divides the United States almost exactly into halves. East of that line dwell sixty-four million people. Here are overgrown cities and overcrowded industries. Here is surplus capital, as idle and burdensome as the surplus population. West of that line dwell four or five millions. Here is a great want both of people and of capital for development. Here is the raw material for another war of conquest, offering prizes far greater than those of the past, because natural resources are richer, and much more varied and extensive. The new empire includes, in whole or in part, seventeen States and Territories. It is a region of imperial dimensions. From north to south it measures as far as from Montreal to Mobile. From east to west the distance is greater than from Boston to Omaha. Within these wide boundaries there are great diversities of climate and soil, of altitude and other physical conditions. But everywhere the climate is healthful to an extraordinary degree, and in all, except the great plains region of the extreme east, the scenery is rugged and noble beyond description.

The one-hundredth meridian is not merely the boundary line of present development. It is much more significant as indicating the beginning of the condition of aridity. To the popular mind "arid" means only "rainless," and "rainless" is synonymous with "worthless." But "aridity," when properly defined and fully comprehended, is seen to be the germ of new industrial and social systems, with far-reaching possibilities in the fields of ethics and politics. It would be idle to attempt to predict how the American character will be modified and transformed when millions of people shall have finally made their homes in the arid regions, under conditions as yet untried by Anglo-Saxon men. But that millions will live under these conditions is inevitable, and that the new environment will produce momentous changes in methods of life and habits of thought is equally certain. This sounds now like mere assertion. But the truth will be revealed by a study of a few representative colonial undertakings on

arid lands during the last fifty years, by a brief statement of the larger problems involved in the conquest of Arid America, and by a reference to the experience of foreign peoples, ancient as well as modern, with similar conditions.

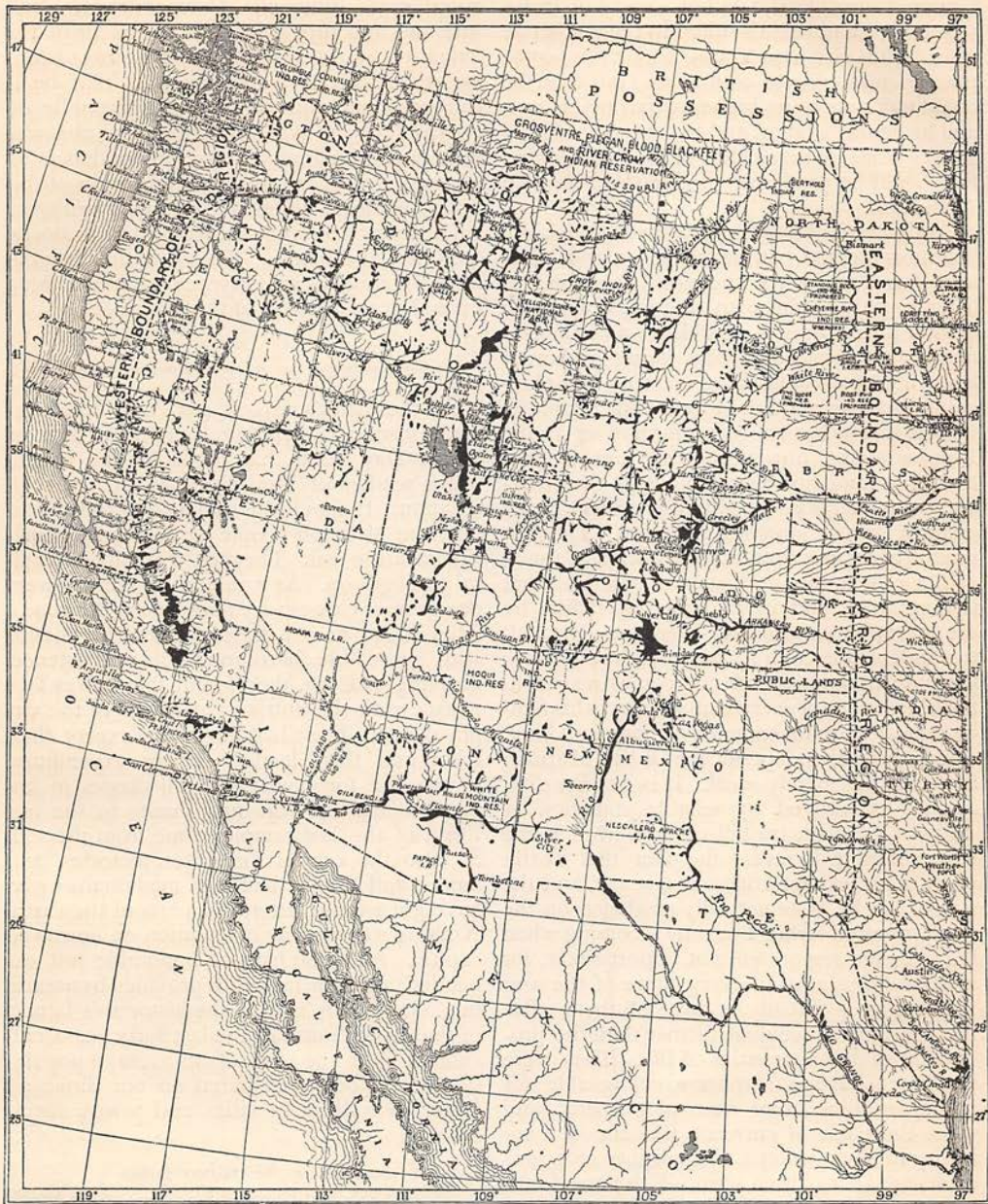
LESSONS FROM UTAH EXPERIENCE.

THE experience of the people of Utah over a period of more than forty years furnishes the best available light for the problems of the arid region as a whole. This is due to a combination of important circumstances. First, it is not the experience of a few individuals, or of a single colony, but of a whole people. Furthermore, it is not limited to agriculture, but illustrates in a much larger way the development of a commonwealth. Again, Utah is, fortunately for our purpose, almost the exact geographical center of the arid region. What has been done there is a fair test of average possibilities. Utah would be far less useful as an object-lesson if it exchanged places on the map with either Montana or Arizona, which represent the northern and southern extremities of the far Western country. All these circumstances are exceedingly fortunate for a study of Utah institutions with relation to the future of Arid America; but there is yet another circumstance of still higher importance to be mentioned. This is the fact that the industrial system of the coming State was founded by a man of genius, who had both the disposition and the power to mark out new ground for the human race. Putting polygamy wholly outside the limits of this discussion, and speaking in the light of existing industrial conditions throughout the United States, and of probable future demands upon the arid region, it may be said that the economic structure of the State founded by Brigham Young appears to approach marvelously near to perfection.

On July 14, 1847, President Young and his fellow-pioneers passed through the picturesque outlet of Emigration Cañon into the valley of the Great Salt Lake. Utah was then Mexican soil, and the leader believed he could found whatever character of institutions should suit him and his people. In the bitter anti-Mormon crusades of the past it has been alleged that "Brigham Young had chains on men's souls." There is no doubt that religious superstition, rendered effective by the marvelous machinery of the church, was partly the source of the leader's irresistible power with his own people; but back of the religious superstition and the church organization stood the brain of a great and masterful man. He knew that his power, to be enduring, must rest upon something material and tangible; and this something he discerned to be the prosperity of the people themselves.

Brigham Young was an organizer of prosperity. This was the real source of his strength. He did not aim at mere temporary prosperity. On the contrary, he fought everything that tended to that end, going to the length of actually forbidding the opening of the rich mines in the mountains near at hand, because he abhorred the spirit of speculation. He chose for the corner-stone of his State the principle of industrialism; and that principle lies there yet, at the base of a noble edifice of economic fact, reared by human toil, and held firmly in place by the average prosperity of all who had part in its building. If the great architect, and the superintendents and foremen who surrounded him, enjoyed a larger share of the profits than the workmen, it is also true that the humblest hewer of stone and carrier of mortar was paid in proportion to the importance of his labors. And what fair mind can object to an industrial system that yields these results?

So far as can be learned, Brigham Young had no previous knowledge of irrigation when he entered Salt Lake valley. He quickly realized that he had come to an arid country, which would be hopeless for agriculture unless artificially watered. With marvelous perception, he saw that irrigation was not a drawback, but an advantage of the most important sort. He realized that it meant freedom alike from the dangers of the drought and of the flood. He discovered that, having a rich soil and ample sunshine, and adding moisture by the construction of ditches, it was actually an improvement upon nature to be able to turn the "rain" either on or off with equal facility. And therefore he rightly concluded that he had found in these conditions the basis of the most certain worldly prosperity, and the most scientific agriculture. It remained for a later genius to remark: "Irrigation is not a substitute for rain. Rain is a substitute for irrigation—and a mighty poor one." But if the Mormon leader did not say so, he evidently felt it. He perceived, furthermore, that irrigation was much more than an insurance policy upon the crops. It brought all the processes of agriculture within the realm of known facts, and that is science. It even rendered possible the control of the size of vegetables, and this became important many years afterward, when the Mormon people added a great sugar-factory to their industrial system; for it is important to grow sugar-beets of about a standard size to get the best results. Moisture is required to give the beet a vigorous growth at the beginning; but when it is well started, weeks of uninterrupted sunshine are desirable in order to develop the saccharine qualities. Much sunshine at the wrong time dries up the crop, while much moisture at the wrong time produces a



DRAWN BY D. B. KEELER.

FROM THE ELEVENTH ANNUAL REPORT OF THE UNITED STATES GEOLOGICAL SURVEY.

ARID REGION OF THE UNITED STATES, SHOWING AREAS IRRIGATED.

beet pleasing to look upon, but unprofitable at the factory.

Brigham Young also realized, almost at the first, that the necessity of careful irrigation largely increased the labor upon an acre of land; but he found that this labor was generously rewarded by the increased yield both in quantity and quality. And from this fact he drew the most important principle of his commonwealth, which was the division of

land into small holdings. Closely related to this is the other twin factor in Mormon prosperity—the diversification of farm products to the last degree. Natural conditions, even where there is the most abundant and well-distributed rainfall, are often favorable to the production of only a few crops. But the Mormons realized that the skilful application of water just where and when needed, and in just the right quantity, and by the very best method,

rendered possible the widest variety of fruits, vegetables, and cereals suited to the temperate zone. Thus Brigham Young taught the people that no man should own more land than he could cultivate to its highest point by his own and his family's labor, and that no man should go to a store for any article of food or clothing that could be profitably produced on his own small farm.

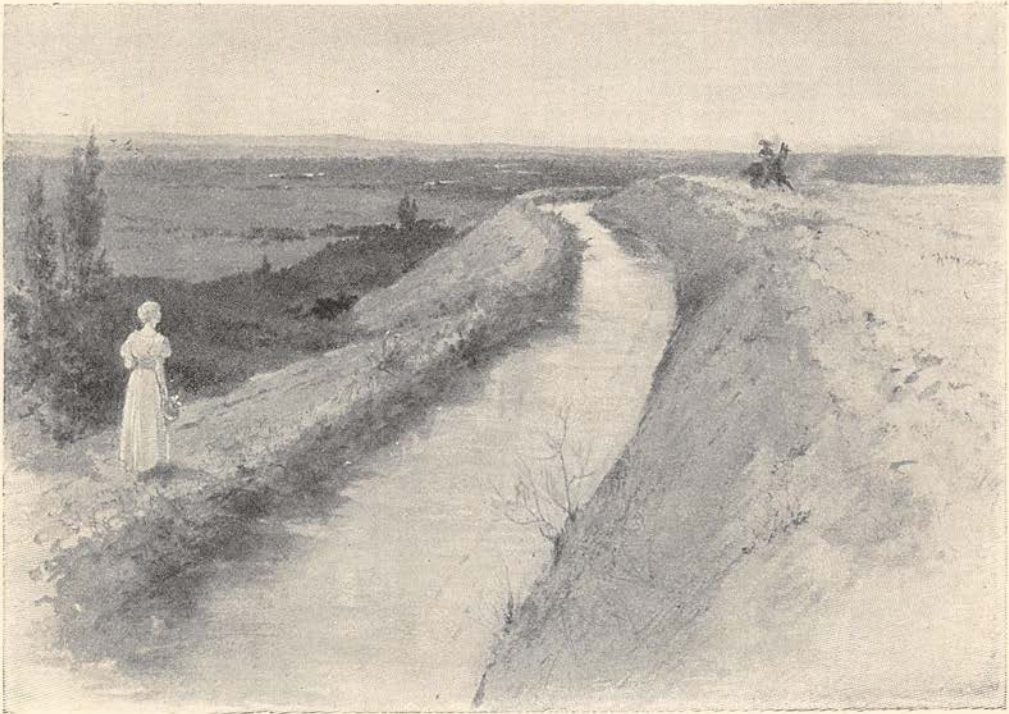
And here is the first great lesson which the Mormon people can teach the world. The time has come when the world is willing to listen eagerly to the man or people who can demonstrate how it is possible for an indefinite number to gain a generous living by honest labor, not as servants, but as masters. Employment, however good the wages and certain the tenure, is in its last analysis a form of servitude. Proprietorship, however severe the original hardships and however prolonged the struggle, is sovereignty. The hired president of the greatest railroad system is a servant. The proprietor of twenty un-mortgaged acres, planned with a view to the production of nearly all that is consumed, and insured against failure by the irrigation canal, is a sovereign. He realizes independence in its best and truest sense; for industrial independence comes nearer to the hearthstone of every man who loves his family than does independence of pope and king. The industrial independence of the Mormon farmer is not merely ideal. It is an actuality, as may be proved by reliable statistics. A study of the ordinary bill of fare, even at the best hotels, will reveal the fact that nearly every item, except coffee, tea, sugar, and the spices, can be systematically produced on the small irrigated farm. The time is coming when the irrigated region will not import sugar, for it will be produced in every State of the arid West, as it is already in three of them. But the Mormons have gone further than the production of the necessities of life. They were taught to have a surplus exchangeable for money or some other form of property, and when the national currency was almost a curiosity in their valleys, the surplus crop was exchanged for church scrip. This passed current at the best stores in the Territory, buying the cloth, shoes, furniture, and many other products of the home factories, and purchasing with the same facility such articles of Eastern or foreign manufacture as were occasionally required. But in Utah foreign goods are not a badge of honor. The Utah man wears Utah clothes, made in Utah factories, from wool sheared from the backs of Utah sheep, with the same pride that a New York man wears a London hat and a New York woman a Paris gown. The manifestation of pride in both cases is the same, but the source of in-

spiration is different. Independence, absolute and uncompromising, is in the air of the irrigation empire. When a man learns to control the "rainfall," and discovers that he is the president and cabinet of a republic of twenty acres, he avoids all entangling alliances with outside manufacturers and producers of all sorts. What are the financial results of this policy of home industry, beginning with the small diversified farm and leading up to stores, factories, and banks? The policy has been in force for more than forty years. This is long enough for a fair test of the principle.

EXPENDITURES OF THE MORMON CHURCH.

At the writer's request, Mr. A. Milton Musser, historian of the Church of Jesus Christ of Latter Day Saints, has made for the benefit of the readers of *THE CENTURY* a careful calculation. It should be understood that whatever the Mormon people possess came primarily from the soil. They had virtually no capital to begin on. As a rule, their recruits were drawn from classes very poor in worldly goods. They toiled across the plains and mountains with incredible hardihood and persistence. Arriving in Utah, they found themselves face to face with the untried conditions of the virgin desert. They had no assets except their labor and their leader. Every expenditure of the last forty years, for all classes of improvements, from the first shanty to the last turret of the last temple, came from the soil. So also the capital for stores, factories, and banks, and for the bands of missionaries who have gone to the uttermost parts of the earth. Nothing was won by speculation on borrowed capital. All is the fruit of honorable toil, expended upon raw materials provided by nature, but adapted by man. The historian's figures of the expenditures of the last forty years, calculated upon the basis of an average population of 120,000, distributed on ten thousand farms, as well as in cities and towns, are as follows:

Cost of establishing the 10,000 farms (\$187.50 per farm per annum).....	\$75,000,000
Cost of making irrigation canals and ditches (\$37.50 per farm per annum).....	15,000,000
Cost of irrigating 10,000 farms and gardens (\$24.00 each per annum).....	9,600,000
Building factories.....	5,000,000
Building temples.....	8,000,000
Building churches and schools.....	4,000,000
Cost of missionary work.....	10,000,000
Cost of immigrating and sustaining the poor.....	8,000,000
Living of the farmers (\$875 to each family per annum).....	350,000,000
Cost of roads and bridges in mountains and valleys.....	4,000,000
Cost of Indian wars, building forts, stockades, breaking up settlements, etc. . .	5,000,000



DRAWN BY MARY HALLOCK FOOTE.

BETWEEN THE DESERT AND THE SOWN.

Cost of feeding and clothing Indians and establishing Indian missions, farms, schools, etc.	2,000,000
Cost of resisting the invasion of the Army of 1857, and of the people of Salt Lake County and the counties north moving south into middle and southern Utah. . .	6,000,000
Loss sustained by crickets, locusts, and grasshoppers	2,500,000
Unsuccessful early experiments in making iron, sugar, paper, nails, leather, cotton-raising, mining, etc.	6,000,000
Cost of defense against anti-polygamy legislation believed to be unconstitutional.	3,000,000
Heavy freight-rates from the Missouri River and the Pacific coast before the railroads	8,000,000
Cost of establishing the Overland Mail and Express Company, purchase of Fort Bridger, and establishment of Fort Supply, abandoned and afterward absorbed by the Army of 1857	2,000,000
Protecting overland travel, succoring and feeding California, Oregon, and other emigrants	1,500,000
Cost of colonizing Carson and Green River counties, abandoned because of the Army of 1857	2,000,000
Cost of establishing colonies on Salmon River, in Lower California, and the Sugar Plantation near Honolulu	1,500,000
Cost of local telegraph and railroad lines	3,000,000
Cost of obtaining fuel, and building and fencing materials, from the rugged mountains and cañons many miles away	10,000,000
Cost of making settlements on the Muddy, Call's Landing, Florence, Sunset, and	

other localities, afterward abandoned because of adverse conditions subsequently developed.	1,000,000
Losses by fire (\$20,000 per annum). . .	800,000
Taxes	8,000,000
Miscellaneous expenditures	12,000,000
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	\$562,900,000
Less the personal property brought into Utah by immigrants, such as cattle, wagons, cash, etc.	20,000,000
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	\$542,900,000

In his note transmitting these figures Mr. Musser writes: "The inclosed has been submitted to the inspection of Presidents Woodruff, Cannon, and Smith, and Bishops Preston, Burton, and Winder, as well as to others conversant with such matters. All agree that the estimates are as fair as they can be given." And he adds, with a reverence characteristic of his people: "While much of our prosperity is doubtless due to industrious, temperate, and frugal habits of life, yet we never lose sight of the overruling hand of the Almighty in all these results, and to him be given praise and thanksgiving without stint."

But while these elaborate figures tell the story of the prosperity of the commonwealth, their true significance may be better studied when they are brought down to the basis of the individual family. The census shows that only five per cent. of all the American people have

any proprietary interest in the land on which they dwell, while ninety per cent. of the Mormon people are owners or heirs of the soil. Still further, the figures presented by the historian show that the average gross income of the Mormon farmer over a period of forty years has been \$1357.25, or \$482.25 above the cost

tivated by methods of irrigation, they will be found wonderfully productive, and their products will support a population as great as that found in the United States at the present time."

The Mormon scheme of industry is rapidly becoming the model of all colonial developments in the irrigated regions. There can be



DRAWN BY MARY HALLOCK FOOTE.

THE ENGINEER'S MATE.

ENGRAVED BY M. HAIDER.

of his living expenses. It is to be seriously doubted whether any other people on the face of the earth can make such a showing. And the great importance of the matter is not that the Mormon people have accomplished these results, but that there is sufficient water and land in Arid America to sustain an additional population of between fifty and one hundred millions upon precisely the same basis. The most conservative authority on the subject of the water-supply, which is less adequate apparently than the land available for irrigation, is Major J. W. Powell, late director of the Geological Survey. He is so conservative that Western men have sometimes denounced him for belittling their resources; but in the course of an elaborate review of the question he has used these words: "When these acres are cul-

no question but that it will be improved upon. Higher ideals are beginning to rule elsewhere, and the tendency is constantly upward. Such faults as there are in Mormon agricultural methods are due to the fact that too little effort is required to get a bare living from a small irrigated farm to awaken ambition for the highest results. And yet beyond a living these people have realized nearly five hundred dollars annually over a period of forty years. If it be assumed that a living equal to that at an ordinary hotel for a family of five is worth \$1000 per year, this and the surplus furnishes an annual income of \$1500. That is precisely the income which the purchaser of \$50,000 of government bonds, netting three per cent., enjoys. In other words, the man who invests \$1000 in purchasing and developing a small

irrigated farm enjoys precisely the same living and hope of a competence as the man who invests \$50,000 in government bonds. The difference in the amount of money invested is represented by human labor.

SOCIAL CONDITIONS.

SOCIAL changes of a marked character will be wrought by the occupation of the arid region. In this matter also Mormon experience is luminous. Brigham Young sought to found his prosperity not only on industrial ethics, but also upon the happiness of the people. He would not tolerate idleness, and the walls of cobblestones still standing in the older portions of Salt Lake City were invented that the church might pay for the labor of men who would otherwise have been temporarily supported by charity. As a means of furnishing entertainment, various diversions were planned, including the Saturday-night dance, led by the bishops of the wards. The leader's wisdom is almost as clearly exhibited in his social scheme as in his plan of industry. The central idea in it was the farm-village. A village site, generally a half-mile square, is selected in the midst of a tract of five or six thousand acres to be colonized. In Utah there are many small valleys between the towering mountains, and the village site is generally located near the center of the valley, and near the river from which the water is diverted into canals on each side at a sufficient elevation to command the irrigable lands. The half a square mile is then laid out into blocks of four acres, with broad avenues between, and the blocks are divided into lots of an acre each. On these acre lots the farmers have their homes. Here also are their commodious barns. Here they have their poultry and swine, while considerable space is devoted to a market-garden. The farmer then has his farm on the outlying lands, which are divided into lots ranging from two acres up to twenty acres. There are scores of villages of this sort; but, for the purpose of illustration, Huntsville, in the Ogden valley, has been selected. A map of it is presented in connection with this article. A study of this map will reveal the physical basis of a plan which completely revolutionizes the social side of farm life as generally known. From the public park in the center to the farthest outlying farm is only two and a half miles. Most farmers traverse a much shorter distance to reach the farm from their homes. On the other hand, the women and

children enjoy the important advantage of having near neighbors, while the church, school-house, stores, and post-office are near at hand. Under this system the advantages of town life are blended to a very considerable degree with the charms of rural existence. It is a system full of delightful possibilities. The Mormons have realized its substantial advantages in neighborhood association; but their model will be much improved upon by many colonies of more recent establishment. Farm life under the old conditions has involved isolation. The hunger for human sympathy and company has driven thousands from the country to cities already overcrowded. This factor is responsible for many a social tragedy, as well as for the problems which have arisen in congested city populations. There is no reason why farm-villages patterned after those of Utah should not have a social life and an outward beauty quite as pleasing as, for instance, the suburbs of Boston. There the architecture seems almost uniformly pleasing. Attractive lawns, with trees, vines, and flowers, are everywhere. People of small means will be able to surround themselves with similar advantages in the farm-villages of the arid region, while realizing all the benefits of independence and equality inseparable from the industrial scheme of irrigation.

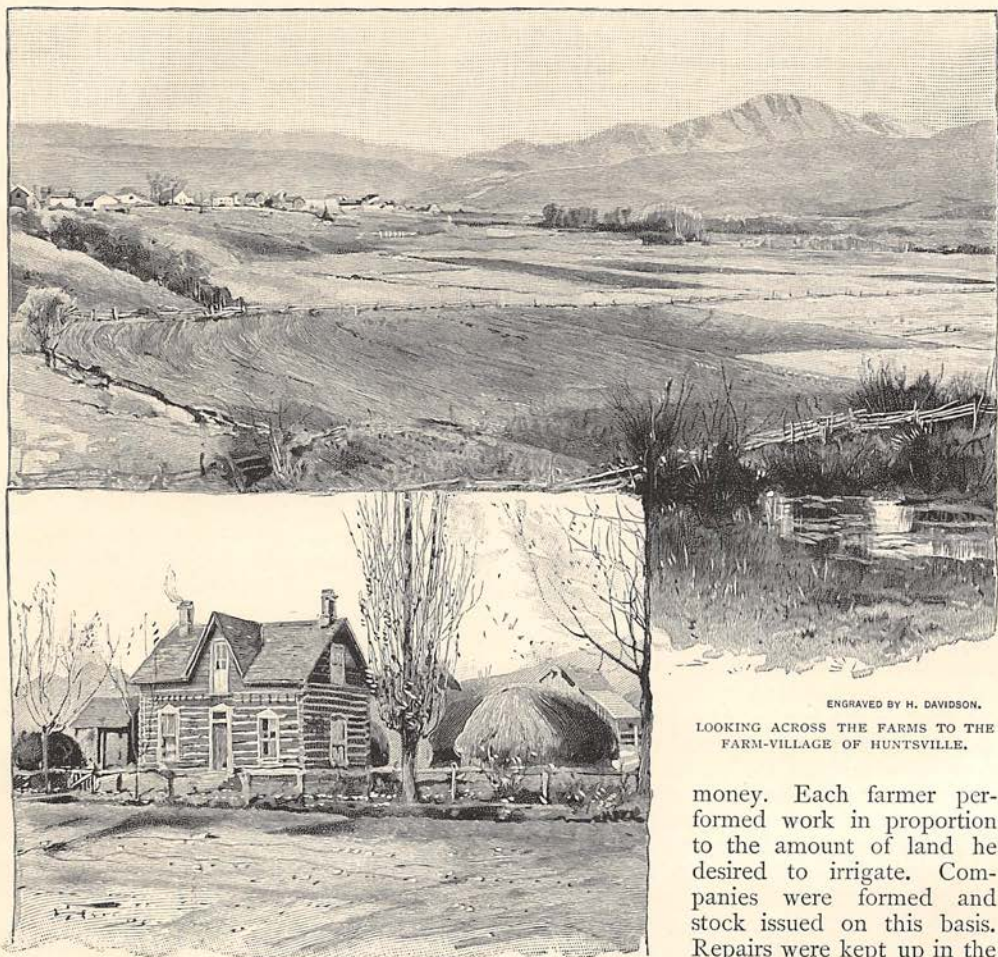
On the map of Huntsville the figure placed upon a village lot and the corresponding figure on the outlying farm represent, respectively, the home and the farm of an individual. It will be observed that there is a great variety in the size of the farms. This is due merely to the taste of individuals. Men acquired whatever amount of land they thought necessary for



DRAWN BY HARRY FENN.

ENGRAVED BY S. DAVIS.

ARTESIAN WELL IN YAKIMA VALLEY, WASHINGTON.



ENGRAVED BY H. DAVIDSON.

LOOKING ACROSS THE FARMS TO THE FARM-VILLAGE OF HUNTSVILLE.

DRAWN BY HARRY FENN, AFTER A PHOTOGRAPH BY C. R. SAVAGE.

TYPICAL HOME IN THE FARM-VILLAGE OF HUNTSVILLE.

their support, and many of them preferred a very few acres. Many of the smaller farms are owned and operated by polygamous widows and their children. When the laws against plural marriage were made effective, a good many polygamists divided their property among their several families, and thus provided for their future.

It will be seen that the farm-village had an important part in Brigham Young's plan of making the people contented after they had first been made prosperous. In a day's drive of seventy miles the writer recently passed through portions of twenty of these settlements, including Huntsville. This fact furnishes a good idea of the density of population in northern Utah.

Another important feature of the Mormon system relates to the ownership of water. The canals were built by the common labor of the settlers, and practically without the use of

money. Each farmer performed work in proportion to the amount of land he desired to irrigate. Companies were formed and stock issued on this basis. Repairs were kept up in the same way. No single item in the long list of natural resources which Brigham

Young found on entering the territory offered so good a chance for a safe speculation as the water in the mountain streams. It was absolutely essential to existence, and a shrewd speculator might have taken possession of it at that time, and levied perpetual tribute upon the agricultural industry. But the same principle which had led him to frown upon speculation, and to insist upon a small farm unit and universal landownership, made it a logical necessity to prevent any monopoly in the control of the water-supply. And here, as in other vital matters, the far-sighted leader established a precedent of the highest importance in the development of the institutions of Arid America.

THE GREELEY COLONY.

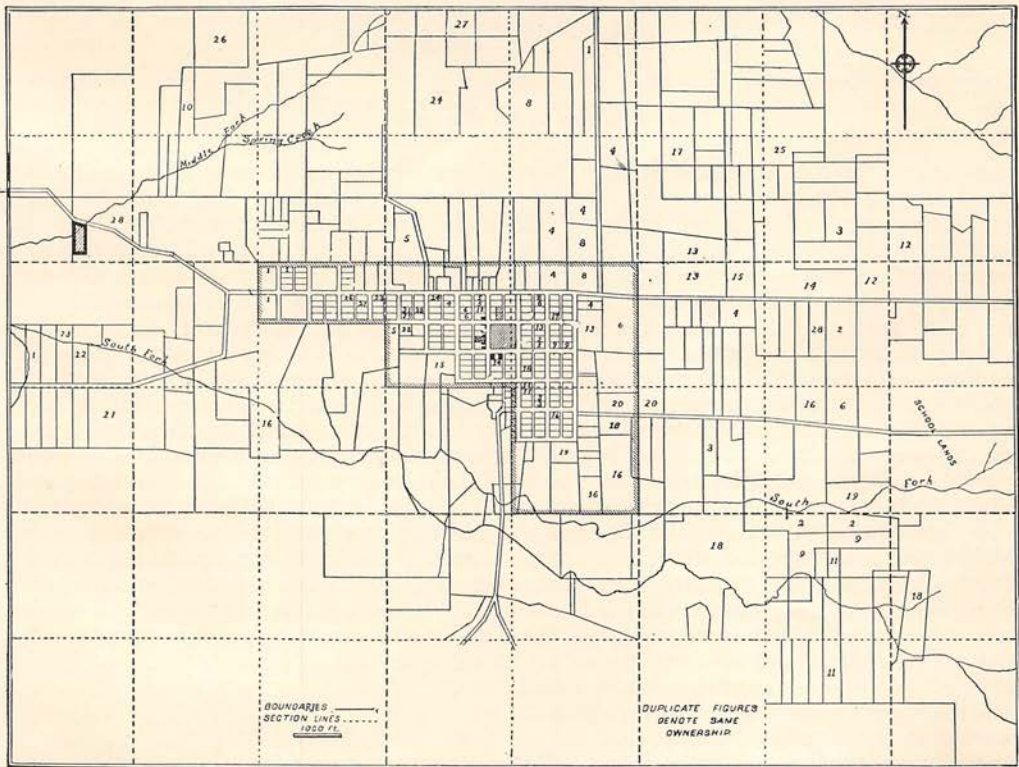
NEXT in importance to the Utah development is the story of the Union Colony at Greeley, Colorado. This was the inspiration of N.

C. Meeker, a member of the staff of the "New York Tribune," who had previously been a follower of Fourier, and a resident of one of the ill-fated colonies of Ohio. The undertaking had the cordial support of Horace Greeley, in whose honor it was named. The first call for this colony was published in the "New York Tribune" in December, 1869. It outlined a scheme of coöperation, although it was proposed to have individual landholdings. The advantages of irrigation, of the farm-village system, and of the independence of agricultural life were attractively set forth. Fully one thousand people made application within a week for membership in the colony, and the first meeting was so largely attended as to make it necessary to adjourn from the "Tribune" office to a room in Cooper Institute. Horace Greeley presided, and, although that was twenty-five years ago, complained in his speech that "New York is filled with people, yet there are thousands who want to come hither. I do not know that emigration is the best remedy, but I think so." He described the history of Londonderry Colony in New Hampshire, founded by his ancestors, and entered upon a most interesting discussion of the proposed colony in Colorado. Among other things he said :

I believe that there ought to be not only one, but one thousand colonies. Still, I would advise no one who is doing well to leave his business and go West, unless he is sure of bettering his condition. But there are many men working for wages who ought to emigrate. I dislike to see men in advanced life working for salaries in places where, perhaps, they are ordered about by boys. I would like to see them working for themselves.

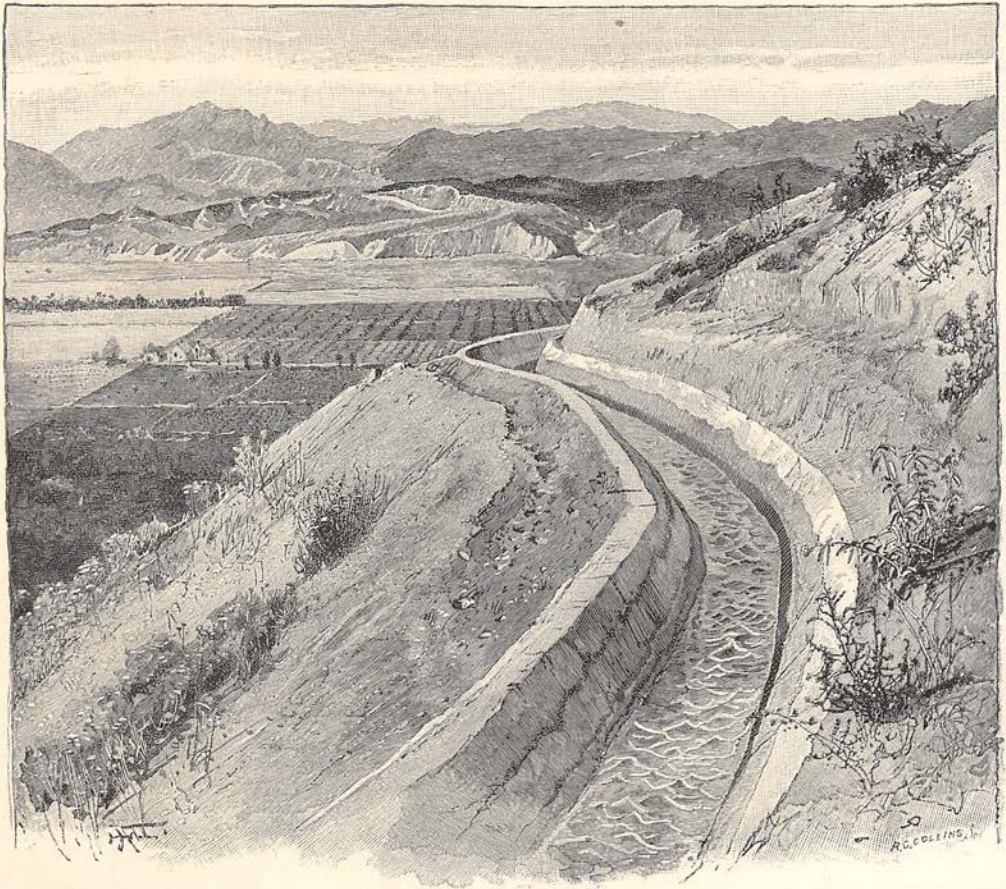
If Greeley could come back and speak to-day upon existing conditions in the United States, he could say nothing more appropriate to the times.

The Greeley Colony was composed of the best elements of Eastern citizenship; and the first and most important lesson it teaches is that people of this class are responsive to such a call as Mr. Meeker put forth. He did not appeal to the instinct of speculation. He pleaded for new institutions, and aimed at high ideals; and he found that men of culture and of means were ready to coöperate heartily in such an undertaking. This fact lends encouragement to those who are hoping for great things to come from the development of the arid region. The site of the Greeley Colony was not well chosen — or, at least, it did not in all respects meet the expectations of those who selected it. They were



DRAWN BY D. COMINGS.

MAP OF HUNTSVILLE, WEBER COUNTY, UTAH.



DRAWN BY HARRY FENN, FROM A PHOTOGRAPH BY C. B. WAITE.

ENGRAVED BY R. C. COLLINS.

A TYPICAL SCENE IN SOUTHERN CALIFORNIA: STONE AQUEDUCT WATERING FIELDS AND ORCHARDS, WITH RUGGED MOUNTAIN BACKGROUND.

therefore unable to realize all their plans. They made some serious miscalculations. For instance, they estimated the cost of their canals at twenty thousand dollars, while the actual cost was more than twenty times as great. Fruit-culture was mentioned in the prospectus as certain to be an important industry, but the soil and climate proved unsuitable. The dream of an improved household economy, based on a plan for coöperative bakeries and laundries, also proved delusive. There were other disappointments; but the fundamental claims of irrigation were all vindicated at Greeley, as they have been whenever and wherever brought fairly to the test.

A few years of intelligent labor brought a high degree of average prosperity, based upon substantial foundations. Even the severe panic of the summer of 1893 did not materially disturb these foundations. During those trying weeks, when mines and smelters shut down, and banks and stores closed their doors, water, soil, and sunshine continued to do their perfect work in the Union Colony. Greeley seemed like an oasis of prosperity in a desert of despair. The farmers received as the reward of the summer's

labor more than a million dollars in cash for the single item of potatoes. But this is the chief crop at Greeley, after the necessities of life have been provided for; and the wide reputation and handsome financial returns won for the Greeley potato illustrate the wisdom of a surplus crop of the highest quality. Greeley's civic institutions are like her potatoes. They represent the best standard available, and are the pride of the people. To sell any kind of intoxicating liquor within the boundaries of the Union Colony invalidates the title to the soil. This is one of the original plans which worked well; and the schools, churches, libraries, and lyceums are all in keeping with this high standard of public morals. A careful study of the development of Greeley, alike in its social and industrial aspects, would throw much more light upon the problems of Arid America; but this cannot be entered upon now.

CALIFORNIA EXPERIENCE.

PROBABLY the public is more familiar with the orange-colonies of southern California than

with any other institutions in the arid West. The story of these colonies is very interesting, but it possesses less value to the American people than the experience of Colorado and Utah, because southern California is semi-tropical, and therefore not fairly representative of average possibilities. In southern California institutions are almost ideal because of the peculiar climatic conditions. These beautiful valleys, narrowly restricted, but well-nigh perfect within their limitations, constitute the private box in the theater of Arid America; but the vast majority of people must always sit in the parquet and gallery. It would be utterly unfair and untrue, for this reason, to build hopes of average development upon the experience of this small but charming corner of the Western empire; but it teaches some lessons that may be generally applied.

Southern California furnishes an extreme illustration of the value of water in an arid country. Land assessed at seventy-five cents per acre without water, being useful only for the pasturage of sheep, when brought under irrigation sells in the raw state for \$100 per acre and upward, with an extra price for water-right. Improved with orange-groves at the

stage of maturity, it ranges in selling value from \$500 to \$2000 per acre, and has sometimes paid fifty per cent. interest per annum on the latter figure. Perhaps the most perfect type of these communities is Riverside, founded less than twenty-five years ago by Eastern colonists of the same class as the settlers of Greeley. Here landownings are divided into five- and ten-acre lots, and the homes are a long succession of beautiful country villas, surrounded by lawns, trees, and glowing flowerbeds. Magnolia Avenue, a boulevard bordered for eighteen miles with double rows of palms, and intersected in the middle by a third row, is lined throughout its entire length by homes of this kind. There is free postal delivery, with other advantages of town life. The civic institutions are fully equal to the highest New England standard. The California colonies have the highest forms of irrigation canals and methods, but perhaps their best contribution to the fund of common knowledge is their latest, which is the cooperative fruit exchange.

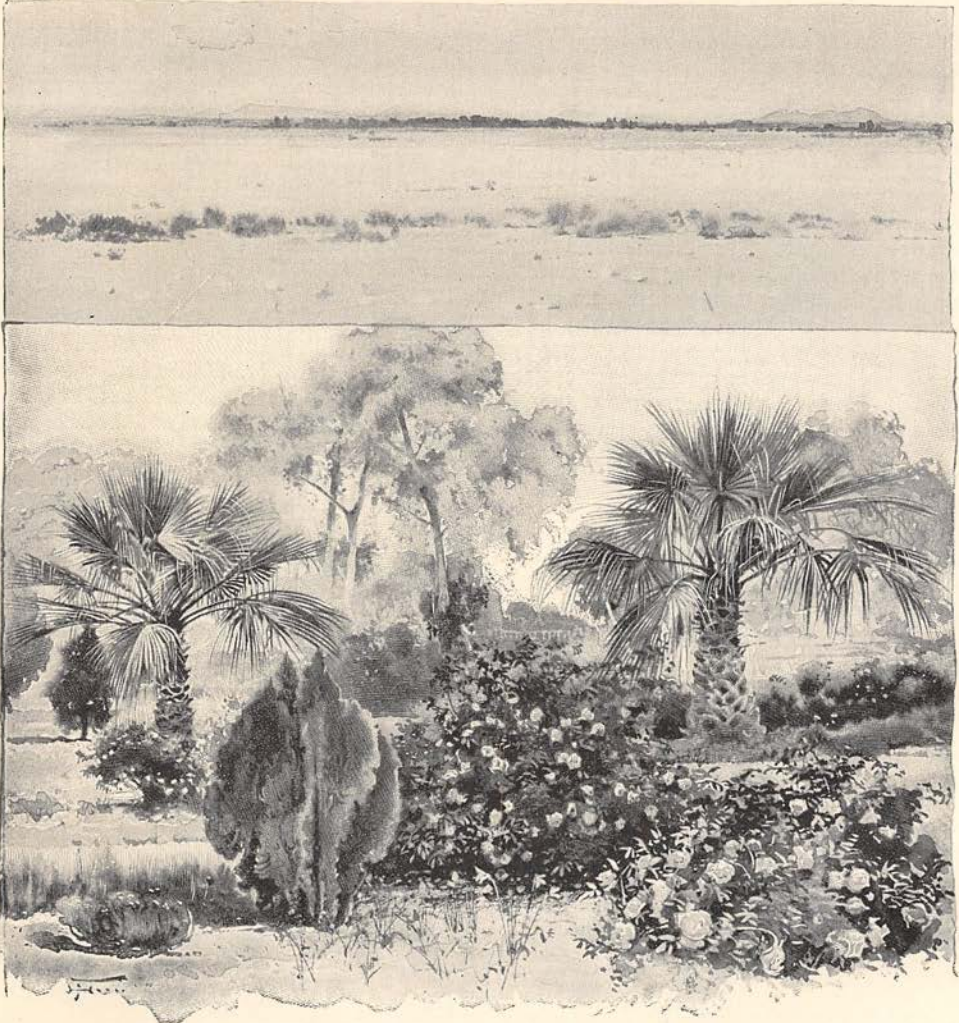
A problem of rising importance in the arid region is the organization of industry and of markets. Modern development has conferred its chief advantage upon the large producer;



DRAWN BY HARRY FENN, AFTER A PHOTOGRAPH.

ENGRAVED BY C. W. CHADWICK.

SWEETWATER DAM, CALIFORNIA: A REPRESENTATIVE WORK OF IRRIGATION.



DRAWN BY HARRY FENN.

THE MIRACLE OF IRRIGATION IN THE ARIZONA DESERT.

FROM A PHOTOGRAPH BY F. A. HARTWELL.

but the multitudinous small producers are the very essence of the new life of the West. Here are anomalies that must be harmonized in some way to subserve the common prosperity. The fruit exchanges recently organized in California foreshadow the coming system. These are stock companies, owned and managed by the producers with the purpose of dispensing with the services of the pernicious commission man. The commission system has been grossly abused. This was inevitable; for it is utterly illogical, since the interests of the middleman frequently run counter to those of the producer. Production is vain without a market. Under the old plan this market is absolutely in control of an element whose interest it is to depress the price of fruit to the lowest point in order to stimulate large sales. This system in practical operation has depressed the producer's income without conferring a corresponding benefit

upon the consumer. The middleman has controlled the situation and consulted only his own interest. Now, if there is any class of men who are capable of managing their own affairs, it is the fruit-growers. They are men of high intelligence, as well as of energy and enterprise. The great items of capital involved are their land and labor. Their highest interest demands that they should rigidly control the standard of the fruit sent to market, and deal directly with the agencies of transportation and the consuming public. There seems to be little doubt that the new California system will prove enduring, and become a very important part of the commercial machinery of Arid America. But this is only the first step in the wise organization of industry, which, in the full development destined to come with rapid strides, will introduce far-reaching changes into the economic life of the United States.



DRAWN BY HARRY FENN.

FROM A PHOTOGRAPH BY F. A. HARTWELL.

IRRIGATING A YOUNG ORCHARD BY THE FURROW METHOD, ARIZONA.

AN EXAMPLE FROM ARIZONA.

It is impossible to attempt at this time even a meager outline of the physical basis of Arid America. It can only be said that this neglected and often derided half of the continent is full of the potentialities of greatness. Its rich and varied mineral resources are already conceded, but the items of transcendent significance are water and land. Only a single instance can be cited here. The transcontinental traveler who passes through southern Arizona carries away the impression that this great Territory—this State of the early future—is an almost hopeless waste. He sees only the vast desert, its soil like

ashes, marked with no vegetation save the grim pillar of the cactus and the gnarled branches of the mesquit. But if the traveler would leave the main line at Maricopa, the train would carry him in an hour into the heart of the real Arizona. Here he would behold the miracle of irrigation. The Salt River valley has felt the touch of living water, and its deserts have been transformed into green pastures, gardens, and orchards. The productiveness of the gray soil when watered surpasses description. Phoenix, the capital, is surrounded by tens of thousands of acres of irrigated land; and here the flag of civilization has been planted in the heart of the primeval desert. Ten acres of this soil will bring



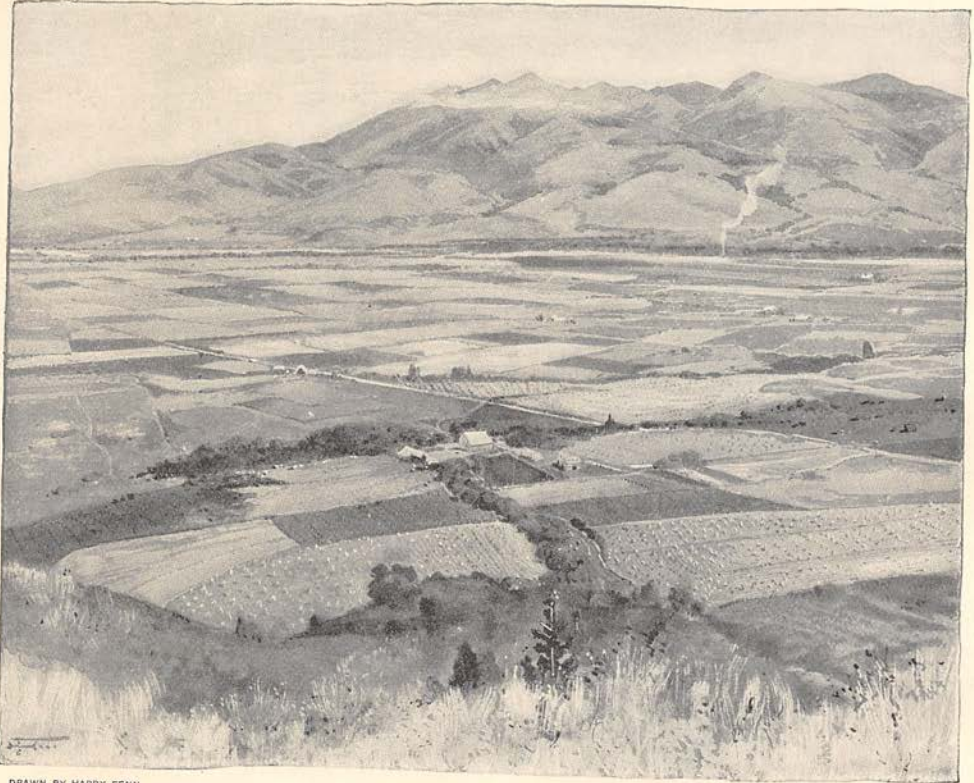
DRAWN BY HARRY FENN.

FROM A PHOTOGRAPH BY F. A. HARTWELL.

WINTER FLOOD IN SALT RIVER, ARIZONA, SHOWING LOSS OF WATER WHICH SHOULD BE STORED IN MOUNTAINS AND FOREST RESERVES.

a higher reward to labor than one hundred acres cultivated under the old conditions in the Eastern States. The possibilities of derided Arizona beggar the imagination. The day will come when the proudest State will not blush to stand under the same flag with the Territory which sheltered the ancient civilization of the Aztecs.

large degree the fruit of continental conquest, then the restoration of the national prosperity may certainly be sought by a renewal of the policy of national development. Inconceivable sums of money and incalculable human energy will be required to overcome the natural difficulties of the situation ; but man thrives on



DRAWN BY HARRY FENN.

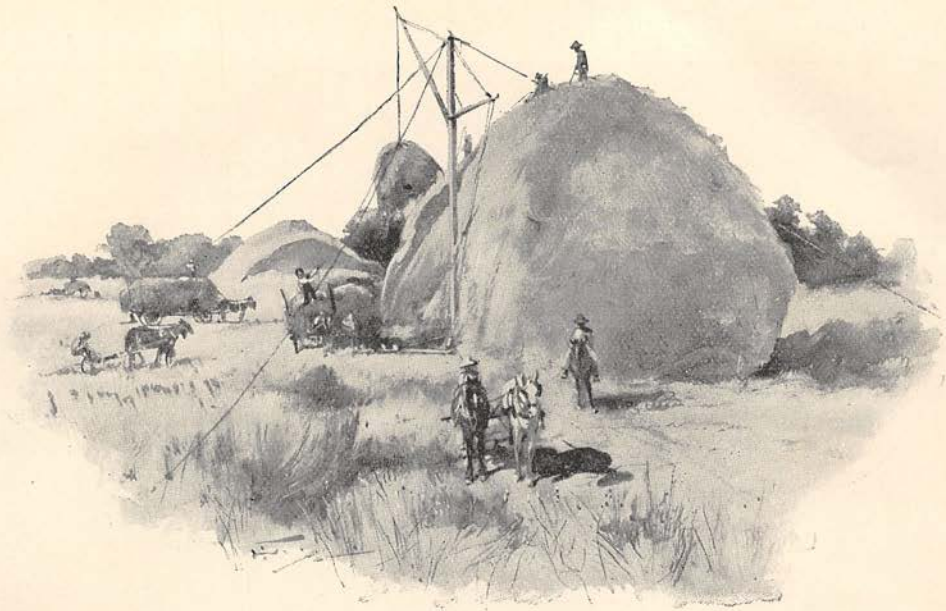
LOOKING DOWN ON A RECLAIMED VALLEY IN UTAH.

THE OUTLOOK.

THE work of reclamation has been going forward silently, but gradually and surely, for the better part of a generation. Between ten and twenty millions of acres are now under ditch, and some slight rivulets of population have begun to trickle in upon the lands. But the threshold is scarcely passed. The arid region as a whole comprises more than 800,000,000 acres. Of this empire more than half a billion acres is still the property of the Government. It is the priceless heritage of the children of America. The work of scientific discovery of water-supply has not yet gone far enough to furnish a reasonable basis for an estimate of the amount of this land open to ultimate reclamation. But no one disputes that the entire present population of the United States could be accommodated in the arid region. If the present greatness of the American people is in any

struggle, and waxes great on conquest. The time seems ripe for the advance. But if this is to be longer delayed, there are certain things which the nation ought to do, and which enlightened statesmanship ought not to postpone.

The arid region is full of great and peculiar problems which require to be studied from a national standpoint. Water is the foundation of all. The forests are nature's storage reservoirs. They are being constantly destroyed by fire and avarice. The forest reservations made by the last and the present administrations are wise steps, but they cannot be effective unless accompanied by some comprehensive system of patrol. The National Irrigation Congress has pronounced in favor of the plan put forward by Professor Sargent of Harvard, providing for the education of skilled foresters at West Point, and the control of the forest reserves by the army. This would furnish the basis for a scientific system of forestry like



DRAWN BY HARRY FENN.

ALFALFA HARVEST, KERN DELTA, CALIFORNIA.

those employed in some European countries. If public sentiment would rally to the support of this demand for an enlightened policy of forest preservation, there is no doubt that legislation could be obtained at an early day. And if public opinion realized the vast interest at stake, it could not and would not hesitate. The most valuable irrigable lands are being steadily acquired for speculative purposes, under laws inadequate, if not infamous, in an arid country. The pasturage lands are the prize of lawless elements who fight and shed blood in the struggle for possession. The interstate streams are becoming entangled in rival appropriations, and developing a state of affairs that in any country but this would involve civil war. Interna-

tional questions have already arisen over waters common to the United States and to Mexico, and are certain to arise in the future with Canada. Here is a class of large problems which will call for the highest statesmanship, and which already merit careful preliminary study and investigation. And beyond these lies the great practical question as to the manner of reclaiming the lands. This involves many nice questions between the nation and the States, and between the States and private companies and individuals.

But nothing can be hoped for until the American people have had their eyes opened to the importance of the stupendous national asset comprehended in Arid America. It is civilization that pleads for progress. It is humanity that cries aloud for more room in which to build its habitations. To say that the national valuation will be enhanced by untold millions is merely to mention a sordid fact. But to say that the voiceless desert will blossom with the homes of men, and that these homes will rest upon social and industrial systems better and purer than any the past has known, and that the future population will be ruled under a nobler code of ethics—these are considerations that cannot appeal in vain to the American spirit. The new century will invite us to a new task of transcendent possibilities to the human race.

William E. Smythe.



DRAWN BY HARRY FENN.

FROM A PHOTOGRAPH BY F. A. HARTWELL.

AN IRRIGATION CANAL THROUGH THE DESERT IN ARIZONA.

cessors will be judged long after he has retired from the scene. He has proved that management is an art, not a speculation, and that the elevation of the stage is not only practicable, but immensely profitable.

The Effect of Large Ideas on Small Minds.

ONE of the most interesting of psychological studies is the effect of a large idea upon a small mind. A large idea entering a large mind balances and dignifies it; its effect upon a small mind is often completely upsetting. The man becomes intellectually top-heavy and unsteady.

When one becomes observant of this phenomenon he finds much to amuse, and again much to deplore. He is amused, for instance, to notice the results of this overloading throughout a long career. Where a subject is thus acted upon by a succession of ideas, each embodying an important truth which the man is incapable of carrying, his receptivity to impression proves to be his bane. The sudden realization for the first time of a fundamental principle makes a monomaniac of him. Another sudden realization of still another fundamental principle, and he is spinning off at a new tangent.

But there are times when this effect of large ideas upon little minds is most mischievous and deplorable. Thus is bred the race of incurable cranks in philosophy, theology, art, and politics. The word «crank» has been maliciously misused for purposes of cynical ridicule; but it is too descriptive a name to be set aside. The

congenital crank is always started on his career of inutility by this application of a big idea to a small brain. The most tiring thing about him is his self-complacency, owing to his knowledge of the fact that better men have been miscalled by his own accurately descriptive cognomen.

A large half truth is as upsetting to a small intellect as a whole truth. A half truth in such a mind rapidly turns into a complete lie, and the poor brain throbs and shrills on like millstones grinding air.

Such a description of certain psychological phenomena should perhaps be illustrated with actual incidents. But, after all, the statement will give satisfaction to more persons without, than with, such illustrations. History is full of facts which go to prove the thesis, and each reader will remember cases which fall in with his own theories and prejudices. And as for the present, every community teems with illustrations; they are so numerous and so close at hand that the cap will find more heads to fit if the latter are unnamed than if it were possible to point them out with individual minuteness.

It should be remembered that few men have done their whole, fearless duty in the community without at some time being mistaken for fanatics and cranks. But this does not diminish the danger to which a community is subjected when some of its most well-meaning citizens betray a tendency to eccentricity, owing to the impinging of large thoughts on small intellects.



The Plight of the Arid West.

THE conquest of arid America, as outlined in the May CENTURY, will scarcely be realized unless there is an early and radical reform in existing land laws. If these arid wastes are to be changed into fertile fields; if those who give their labor and means to the work of reclamation are to have an adequate reward; if the irrigated home is to have the same security as that in regions of abundant rainfall, then there must be laws and institutions in conformity with physical conditions and industrial needs. This is not the case at present. The extension of irrigation has been marked by continuous controversies and disastrous litigation over water rights. Throughout the entire arid region the nature of these rights is as yet involved in confusion and uncertainty, if not open controversy. The adoption of the doctrine of ownership of water apart from land, already recognized in more than half of the arid States and Territories, makes it a speculative commodity, and threatens its users with exactions which no lover of his country can contemplate with satisfaction.

Thus far this conquest has been one of spoliation as well as development. With the creation of homes has

gone the destruction of the mountain forests upon which their prosperity largely depends. Not since the strife between the herdsmen of Abraham and the herdsmen of Lot have there been more serious contests over range rights than those now prevailing in many sections over the possession of the free grazing-lands—contests which cannot be ended like the biblical one, because there is no unoccupied land to the right hand or the left.

These evils have their origin in inadequate land laws. The attempt to extend to this region the operation of a land system framed for a region of abundant rainfall, ignoring the changes in climatic conditions, is so serious an error that the best results are impossible. It prevents the best use of either irrigable, forest, or grazing-lands, and by ignoring wholly the water-supply opens the way for endless abuses. The truth of these statements can best be shown by considering each of these classes of land separately.

IRRIGABLE LANDS.

ABOUT one tenth of the arid region can be reclaimed. The ultimate percentage will depend upon the methods employed to secure the conservation and proper use of the water-supply. The success and prosperity which at-

tend this reclamation will depend largely on the methods employed in its distribution and control.

The history of irrigation shows that to prevent abuses water rights must inhere in the land and pass with land titles. It is only where the irrigated home controls both elements of fertility that success is assured. Successful land laws must recognize these facts. In disregard of manifest requirements and of the teaching of experience, we have a land system which divorces them at the outset. The public land of the arid region belongs to the General Government; the water-supply is owned or controlled by the several States. Title to land comes from the nation; title to water from the State. No right to water goes with a land patent. Each arid State has a different law governing water rights, and in none are the titles adequate or satisfactory.

Under the present land system there is neither supervision over the location of canals, limitation of their number, or protection for the investments made in their construction. As a result, canals are improperly located and streams are often notoriously over-appropriated. A visitor to St. Vrain Cañon, Colorado, will find three canals leaving the east side of the stream, so near each other that a stone can be thrown across the whole. They parallel each other for miles, reclaiming a region which could have been watered equally well from a single channel. It needs no acquaintance with irrigation to recognize the waste of money in constructing three canals instead of one, in the maintenance of three head-gates and supervision of three diversions, where one would have served every purpose. To one familiar with the subject the enormous loss of water from seepage and evaporation becomes the most serious evil of this haphazard development.

This is not an isolated instance. The last report of the State engineer of Colorado estimates that sixty per cent. of the water wasted in irrigation is due to the needless multiplicity of canals. Eighty-five ditches have been built to divert the water of the stream which supplies the capital of Wyoming. Nine months in the year the city's appropriation absorbs its entire flow. The water secured by the other eighty-four appropriators is entirely accidental. One of the largest ditches, which it cost thousands of dollars to construct, has never secured a gallon of water from the stream. Nine tenths of the ditches, with the money spent in their construction, are not only wasted, but are a prolific source of mischief in promoting water-right controversies. In every arid State the significance of these facts is understood. The importance of limiting the number of ditches, and the gain which would come from their location according to a prearranged plan, are fully appreciated; but so long as there is no local control over public land, State supervision is impossible.

Under the present land system much of the best land and the largest rivers are unused. The Platte, Yellowstone, Missouri, Snake, and Colorado are all examples of the extent of our wasted resources. This is because of lack of protection for the money required to divert and distribute their waters. Small streams can be diverted by individuals, but coöperative effort or corporate capital is required to control a river. The outlay thus made must be returned by the use of the water. It can be insured only by reserving the land under canals for actual

cultivators of the soil and users of water. Except where provided for in lands under State control, there is no way of insuring this result. The homestead law does not require reclamation, but only nominal residence for a brief period. By means of this law all the land under a canal may be absorbed by speculative filings, while its builders, deprived of its source of revenue and subjected to heavy charges for maintenance, are driven into bankruptcy.

Intrinsically there is no more meritorious or secure investment than the construction of irrigation works. There is scarcely an instance in which the increase in land values has not been far greater than the cost of the work; but because this increase does not go to those who make the outlay, results have been unsatisfactory. In all the West, though millions of dollars have been invested in canals, there is not, to the writer's knowledge, a large irrigation work built to water public land which has not been financially disastrous to its builders.

There is no necessity for this condition of affairs. There are thousands of home-seekers willing to occupy and use the irrigable lands, and to pay for the works to reclaim them. The lands should be reserved for them. The remedy is simple. *Make the title to all irrigable land depend on reclamation.*

THE FOREST LANDS.

ALONG with the proper management and use of the water-supply is the problem of its preservation. It is this which gives value to the forest lands. All perennial streams have their sources among the snow-clad summits of the mountains. It is also in this region of summer frosts that the timber lands are found.

The head waters of the streams are covered by the forests' cooling shade; here the snows are held and the waters retained until the time of greatest need on the thirsty plains below. The value of a river for irrigation depends not on its yearly discharge, but on its proper distribution. A mountain torrent in May, if followed by a dry channel in August, is of little value. Yet this is the result which will follow the removal of the forests from our mountain slopes.

The greatest menace to their preservation is fire. The industrial value of the timber is, as a rule, limited; and the actual use of a century would be less than the destruction wrought by two fires witnessed by the writer. The latter of these destroyed fully one third of the timber along the eastern slope of the Big Horn Mountains. In the thirty days during which the fire raged there was greater loss to the available water-supply of this region than will be replaced by all the reservoirs constructed within the lifetime of this generation.

The question to be solved is, Can these areas be protected from fire? To do this will require comprehensive action and adequate governmental supervision. The forests will all be destroyed before these lands pass into the hands of private owners and have their preservation assured by the incentive of self-interest. Left, as they now are, exposed to the carelessness of tourists and hunters and to the indifference of those using them as grazing-areas, their destruction will increase with the facilities of travel and the settlement of the lands below.

THE GRAZING-LANDS.

THE irrigable and forest lands comprise but a small fraction of the arid region. Between the valley which can be watered and the mountain snows is an expanse of hill and plain, embracing nearly one third of the United States, which has no agricultural value except for the pasturage it affords. In the aggregate this is very great. The live stock supported thereon has in the past constituted more than half the taxable wealth of several arid States, and has given employment to a large percentage of their people. For the past few years the press of this region has been filled with accounts of conflicts over the possession of this range. In the autumn of 1894 flocks of sheep driven from Utah into Colorado met with armed resistance from the settlers of the latter State. In the spring of 1895 similar resistance met an attempt to occupy the grazing-land of Colorado by flocks from Wyoming. Eight hundred men were reported as under arms in the region in dispute. For several months there was daily danger of an armed conflict, and it was finally averted by an agreement which, without any warrant of law, divided the occupancy of the region in dispute among the warring factions.

At the last session of the Wyoming legislature a bill was introduced making it a misdemeanor to graze sheep on public land within two miles of the boundaries of a settler's home. Although the State has no control over these lands, so strong was local feeling that it came near passing. Since its failure force has largely taken the place of law in an attempt to prescribe boundaries on the open range.

This condition results from the absence of any statute providing for the management of the grazing-lands. At present they are an open common; there is not a line in our land laws which recognizes their existence or provides for their disposal. Those using them pay nothing for the privilege, either to the State or the nation, nor do they observe any rules as to the limit of territory occupied or the number of animals grazed thereon. The temptation to overstock the range, to make the most of the present, regardless of the future, is too great to be resisted. While the owners of herds of cattle, as a rule, observe fixed boundaries, flocks of sheep range from Oregon to Nebraska and from Arizona to the British possessions. The native pastures are grazed over until every vestige of vegetation disappears. In Eastern meadows, where the recuperative forces are tenfold greater than those of the arid plains, rest and reseeded are required: they are much more necessary in a region parched in summer by continual drought. The destructive effects have become, therefore, too marked to be mistaken. Where the early emigrants to California and Utah found abundant support for their teams and attendant live stock, one can now travel a day's journey without securing support for a single animal. Ten years ago nearly one million cattle were returned for taxation in Wyoming; in 1894 only one third that number were assessed.

In many places the profitable cultivation of irrigated land depends on the preservation of the contiguous pasturage. Lands remote from railways or local markets, as is much of the reclaimed area, can be profit-

ably used only to provide the winter food-supply for stock grazed on the open range in summer. With the destruction of the latter is lost the greater part of the value of the irrigated holdings, and in many cases the possibility of occupying them at all. Because of this there has been growing friction between those having homes of this character and the owners of nomadic flocks who disregard their necessities. A continuance of the present policy means a continuance of the warfare for possession, and the ultimate destruction of the native grasses, with all that it implies.

Where the development of a country requires that force shall take the place of law, where the reward of toil spent in the creation of homes and adding to the country's permanent wealth is endangered by a pursuit which improves nothing, develops nothing, and which, if continued a thousand years, would leave this region less populous and productive than it is to-day, a change in conditions cannot be too swift or comprehensive.

The arid West does not reflect the best tendencies of irrigated lands. Our water laws are inferior to those of both Canada and Australia, countries in which the practice of irrigation is of more recent origin than with us. The time has come for a more adequate appreciation of the importance of this subject, and for national pride in securing the best possible results.

CHEYENNE.

Elwood Mead,
State Engineer of Wyoming.

Were Colonial Bricks Imported from England?

IN THE CENTURY for December, 1894, John Williamson Palmer, in his article "Old Maryland Homes and Ways," says that "here [in Maryland] stood the sturdy domicile, broad and square, *built of bricks brought over from England* in the ships that came for tobacco." Now Maryland was settled in great measure by Virginians, and Mr. Palmer repeats only what is current as an accepted tradition in Virginia.

But traditions are not history, and if Mr. Palmer has any facts from the Maryland records to support the tradition, I, for one, would like to know what they are. On the contrary, the facts from the Virginia records are all the other way. In spite of the tradition, there is not a case to be found in the annals of Virginia of bricks imported from England.

Indeed, the objection to the tradition is at the threshold. It stands to reason that it was easier to import brickmakers than brick. Moreover, the importation of settlers was a paying business, since for every immigrant there were allowed fifty acres of land to the importer. Many ships went to England yearly with tobacco from Maryland and Virginia, but they came back freighted, not with brick, but with immigrants, servants, and dry-goods. There is no lack of bills of lading giving evidence of such cargoes. Sober thought seems to repudiate the idea of importing across 3000 miles of water, in the little vessels of that day, a commodity like brick, which in damp weather would absorb vast quantities of water, endanger the vessel, and bring no adequate return.

We know that there is no lack of good brick clay in Virginia and Maryland; and the truth is that if there was anything, after the making of tobacco, in which the