THE TREMENDOUS ECONOMIC GAIN THROUGH DRY FARMING IN OUR ARID REGIONS: BY A. S. ATKINSON

While vast sums have been invested in the construction of large irrigation dams and canals for reclaiming the arid regions of the West from their infertile dryness, a new art of farming the desert acres has come into vogue that is little short of a revolution of past conditions. This new system of agriculture is spoken of as "dry farming," and its application to the dazzling stretches of white sandy desert of the West, overhung at times with its alkali dust, has already redeemed thousands of worthless acres from utter waste. Dry farming is the development of a scientific principle so simple that it can be stated in a few words. It is the art or science of conserving every particle of moisture in the soil by means of intensive cultivation and preventing evaporation by continuous tilling of the land.

Twenty years ago, when the pioneer dry farmer of America tried to demonstrate the correctness of this principle in Nebraska, he received as little encouragement as most prophets do in their own country. H. W. Campbell of Lincoln, Nebraska, was a practical farmer and a man of some scientific attainments. He preached and practiced the theory that by cultivating the top and subsoil of the alkali deserts continually every part of the moisture falling on the land could be held in the soil for plant use, and if surface cultivation was continued the year round the desert could literally be clothed with plants and flowers. He took up many plots of ground in the desert and demonstrated his theories. A few others, who were convinced by his achievements rather than by his words, followed, and wheat, corn, alfalfa, barley, grasses and fruits sprang up on the desert where before flourished only the yucca, greasewood and sage brush.

How these farms scattered on the edge of the desert, and sometimes in the very heart of it, could manage to live and flourish was a mystery to many Eastern visitors, and even Western farmers were impressed by the magic. A few years ago the Department of Agriculture was duly impressed by the achievements of dry farming, and the matter was taken up for practical experiment. Now that the approval of the plan has been officially promulgated, dry farming is having a remarkable boom and within a decade it will have a tremendous influence upon our crop production.

The active pioneer dry farmers worked with simple and crude tools, and their achievements are the more remarkable for it. The
modern dry farmer has special tools and machines made for him, and the work is greatly simplified. It has furthermore been scientifically demonstrated in the last few years that crops can be raised on land where the average rainfall is only ten inches, and as the average precipitation in the foothills of the Rockies is about fourteen and ninety-three hundredths, the arid region is not really irreclaimable. But of this the pioneers knew nothing.

THE present method of dry farming is to plow the land a year before any crops are planted. The soil is broken to a considerable depth. Disk subsoil plows break the soil and pack it into a firm bed, leaving a sort of hard-pan through which water cannot seep away. Moreover, this well-packed subsoil prevents the excessive salts that lie four or five feet below the surface from rising by evaporation. These salts have been the agencies for burning and blighting all vegetation. The surface soil is then pulverized and cultivated until it is as fine as powder. This acts as a mulch so that when the snows and rains of the wet season fall they are held there by the finely pulverized mulch. The moisture cannot leak through the hard-pan, and the secret of the system then is to prevent its evaporation.

The principle is to work and till the surface soil continually so that like a wet sponge it can hold the moisture. The work never stops on the land, and after every rain the surface soil must be pulverized anew. For a year the land is treated by this endless process of cultivation which always keeps the surface soil moist and soft. Then comes the seeding and more cultivation until the plants occupy the land. The cultivation must continue until the plants are large enough to act as their own mulch. In the harvest season, the crops are garnered, and immediately the plow and harrow are put in the field again to prepare the land for the next season’s crop. It is then allowed to lie fallow until seeding time.

This is the method pursued by the dry farmers, and under old conditions it was discouraging work; but there have been developed for the arid regions giant machines which make dry farming no more expensive than ordinary farming. Engines of thirty-two horsepower cross the desert, dragging behind them twelve fourteen-inch plows, iron rollers, clod breakers, harrows and pulverizers. These are followed in the planting season by drillers and seed spreaders. Through such methods thirty-five acres of land can be plowed, tilled and planted at an average cost of ninety cents an acre. Under the early system of culture by the pioneer dry farmers the cost was at least five dollars per acre.
NATIONAL RICHES FROM DRY FARMING

So much for the use of improved machinery to make dry farming in the arid region successful. A further saving is effected by the use of seed. On land that has been continuously cultivated to retain every particle of moisture twelve quarts of seed wheat go as far toward a maximum crop production as thirty or forty quarts in the ordinary wheat belt. The difference is due to the method of cultivation whereby the soil is pulverized so that nearly every grain of seed finds fertile lodgment. It is difficult for the farmers of the older agricultural fields to appreciate the value of fine culture until presented with some concrete illustration such as this.

WHEN the Department of Agriculture took up the study of dry farming in the arid region experts were sent to Russia to investigate the wheat fields near the Sea of Azov. In this great dry region conditions are almost the same as in the new wheat fields of the arid West. The amount of rainfall is even less on the average, and the soil is of the same sandy nature. Yet for centuries flourishing wheat fields have been harvested in this Russian province. But it is a different kind of wheat—the durum from which macaroni is manufactured. This wheat is harder than our American variety, but possesses all the nourishing qualities for food. Upward of two million five hundred thousand pounds of durum flour for the manufacture of macaroni have been annually imported into this country for decades past, and the demand for it is steadily increasing. In nineteen hundred and one the Department of Agriculture imported some of the seeds of durum wheat and raised the first crop near El Paso, Texas, selecting dry lands for the experiment, with improved dry farming culture. In the first season the yield proved over forty-seven bushels to the acre. Since then the grain has been raised in many parts of the arid West, and today the crop is an important part of our wheat output. Last year the total yield in this country of durum wheat reached the enormous total of thirty million bushels. Nearly all this wheat was raised on the dry lands where the ordinary grain has never flourished. So important is the durum wheat culture becoming that millers who at first objected to grinding it on account of its greater hardness are installing new and heavier machinery. In the past year a dozen large mills have been equipped with special grinding machinery for handling the new wheat product of the arid regions. Within a few years dry farming in parts of the West has thus wiped out the importations of a manufactured product and made a new market for a very important food stuff. Manufacturers have converted the durum wheat into a variety of breakfast foods and its use is becoming a factor in our economic life.
NATIONAL RICHES FROM DRY FARMING

The vastness of this new industry may be appreciated from a study of the wide region of barren lands in the West which is susceptible of cultivation by the new system of farming. The great strip of country commonly known as arid America stretches from the Canadian border on the north to the Rio Grande on the south. It includes nearly all of those foothills of the Rockies which are made desolate by the dryness of the soil and climate and by the peculiar salty nature of the earth. Great storms of alkali dust sweep over portions of it and the salts of the subsoil work up and burn all vegetation. Farming in the past in this great region has proved disastrous. For half a century back thousands of homeseekers have lost all their possessions in trying to raise crops from this uncongenial soil.

The arid regions are some twelve hundred miles in length and from one thousand to thirteen hundred miles in width. In this empire there are some six hundred million acres of public lands. At least seventy million acres of the country are desert land and have been pronounced as entirely worthless. On the edge of this desert the Government has constructed at great expense enormous irrigation plants, and by turning the water into artificial canals thousands of acres have been reclaimed. But to reclaim all of this arid region by irrigation would mean the expenditure of billions of dollars. Owing to their great distance from any water course, some of the sections could not be cultivated at all, and irrigation would prove too expensive an operation even for the national Government. Unbroken stretches of alkali dust meet the eyes of the traveler crossing this barren region, and the whole place is shunned almost as though a pestilence raged there.

THE dry farming movement proposes to convert this desert into a blooming garden, not by means of expensive water storage reservoirs, but by taking advantage of simple laws of Nature. The possibilities of the region are thus almost beyond belief. It has been demonstrated that forty acres of this dry land properly cultivated will support a family of from three to five. At this rate it is estimated that the dry regions alone could support a population of upward of thirty-five million people.

Irrigation has had its fruitful results and has converted large sections into splendid farming land, and its benefits must continue to spread; but more practical and profitable is the reclamation of land by simple, scientific farming that makes Nature do the work of storing and holding the water for crop production. The dry farmers have already demonstrated that it is possible to raise from thirty-five
NATIONAL RICHES FROM DRY FARMING

to fifty-five bushels of wheat per acre from this dry soil. Against this we have the average of twenty bushels from older sections of the wheat belt. In nineteen hundred and five the average wheat yield of the Kansas crop was less than thirteen bushels to the acre. The increased yield in the arid region is due partly to the superior intensive culture which is essential to any kind of a crop. In combating the natural dry conditions of soil and climate, the dry farmers are thus giving to the wheat just the conditions of tillage that make it thrive and produce abundantly.

Throughout many parts of the West the dry farming propaganda is going on under the cooperation of individuals, societies, State experiment stations and experts of the Department of Agriculture. The Campbell Dry Farming Association of Denver, named after the pioneer in this new industry, has carried on a campaign of education among farmers in cooperation with the State Agricultural College. In nineteen hundred and five the Eastern Colorado Fair Association made a remarkable display of the finest wheat and grass grown in the desert without irrigation. Some of the wheat stalks and grain were the largest ever exhibited at any fair. At the Pomeroy Model Farm, at Hill City, in western Kansas, the efficient value and success of dry farming has been demonstrated to perfection, and at the Fort Hays agricultural station, a sub-station of the Kansas State Agricultural College, it has been repeatedly proved in a practical way that four cuts or crops of alfalfa can be raised from the same acre by dry farming on poor arid soil. At the experiment station in Sedgwick County, Colorado, a yield has been obtained of thirty-five bushels of wheat per acre, or fifty of corn, or two hundred of potatoes, thirty of rye, sixty-five of oats, or five tons of cane for forage.

It would be possible to mention many more such achievements by the dry farmers. Farming associations, such as the Scientific Farming Association of Bennett, Colorado, and the Young Men’s Club of Cheyenne, have taken up the matter of instructing young men in the new system of agriculture and spreading broadcast information about the possibilities of the arid region. The Business Men’s Association of Limon and Julesberg have associated themselves with the experts of the Department of Agriculture to carry on the work in a scientific and businesslike way. The result of this whole campaign must mean a tremendous difference in the future of a region equal to nearly one-third of the United States.