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ENVIRONMENT IN THE HISTORY OF AMERICAN AGRICULTURE*

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For purposes of advanced study we may divide the United States into four parts, the East, the South, the North Central or Mid-Continental and the West.

The East as we are now taking it, is really the northeast, including the New England and Middle Atlantic state groups of the Census. It is a region of mountains and dissected plateaus, with a broken shoreline and without much coastal or lake plain, embracing both the oceanic and the continental type of climate. Its unity is largely historical and industrial, being the area of densest population, high urban percentages, the center of New-World manufactures and for America old.

The South reaches from Delaware and Maryland to Texas, a plain crowded by a wedge of Appalachian highland, old in the Atlantic and lower Mississippi, young in Texas and Oklahoma, a region of subtropical heat, and sparse population, being agricultural, and non-industrial, a conservative society awakening to new interests.

The North Central or Mid-Continental region is mostly plain with a continental climate. It is historically youthful, a child of the East, mainly agricultural but showing great local unfoldings of industry. Let us drop the words Middle West, a symptom of the westward movement which now has only the meaning of a fossil.

The real and only West in our time is almost literally the western half of our domain from central Kansas onward, graduating from Mid-Continental and South by the vague climatic and vegetation boundary that we associate with the one hundredth meridian. Here are plateaus and mountains, and the intermontane valleys of the coastal states. The climate is oceanic on the border, and desert in the interior save at higher altitudes. It is historically adolescent, non-industrial, scattering in population, and having an agriculture of special types.

* Read before the New England History Teachers' Association, at Clark University, March 19, 1921.

Already we get glimpses of the pervasive principle that physical and human conditions are inextricably tangled in the skein. The suspicion dawns on us that physical features are a part, but not the whole of environment. What would the panorama of America, the cross section of the continent be today, if America had been settled from the West and not from the East? I do not mean by Japanese or Chinese, but, if it were conceivable, by European stocks coming to the continent across the Pacific Ocean. We cannot construct imaginary history, but if we could we might be better able than we are to evaluate geographic influences. Some of our conclusions might be upset, and we might become cautious in entering that great field where heredity, race and tradition meet the factors of present environment.

Looking at our four sections as farming regions, the East is a place of diversified farming, with grass and other forage in the ascendant. The South is a one-crop country with growing specialties. The Mid-Continental country is a zone of cereals and livestock, while the West is the place of irrigation and dry farming, with local rainfall adequate in spots, and a great variety of crops.

In all of the four regions are local variations and intensive cultures, growing out of adjustments both to natural and social features of environment. A short list of some of these specialties will be useful just here. Among them are market-garden areas, dairy regions, fruit districts, and sections given to tobacco, flax fibre, cane sugar, hops, or special cereals such as spring wheat, buckwheat, rice and dry corn.

Specialization and intensification have not gone far enough to rule out the phrase "cheap-land farming" as applied to American agriculture as a whole. This is the most conspicuous fact in the history of American farming, and has been true of our country thruout the westward movement. With the exhaustion of free land, within the memory of some of us, intensive agriculture has been encouraged, but vast areas of cheap land still remain. Cheap-land farming is not as sometimes thought, reprehensible, it has been an imperative part of the program of youthful America. Our goal could not be the largest yield per acre, but the largest product per man. Labor has always been and still is nearer the center of our problem than land.

With this outlook of a general sort, we may state certain conditions or factors that influence the distribution of crops. Our question in this paper is,—how far are these influences physical and to what degree may they be historical, social, and industrial? We cannot, nor indeed can any one answer this query precisely or quantitatively, but we shall gain much if we learn that a thing apparently so simple

as where we raise corn, wheat, sugar beets, or dairy cows, may hinge on a complex of conditions, that this complex is shifting, and that environment is only partly in control, unless indeed, we include in that term the facts of human development and human needs.

Climate, especially the elements of rainfall and temperature, are more pervasive and powerful than the land forms, and perhaps more controlling than the soils. Thus temperature is the main difference between the South and the Mid-Continental states. The essential thing in the southland is a period of at least seven months which is frost-free. The surfaces in both regions are typically lowland plains, well watered. Glacial and lake plains predominate in the northern area and most of the South has coastal and alluvial lowlands. This distinction, however, is not of critical importance; it is the condition of temperature that puts cotton in Alabama and wheat in the Red River Valley.

Within the cotton belt differences of soil cause differences in acreage and yield, but, and here I am quoting authority, "the outer boundaries of cotton production are determined almost entirely by climatic factors." Even here let us stop to observe that the language quoted does not tell the whole story of the northern boundary of cotton. During the chaos of the Civil War, some cotton was raised in southern Illinois. Here was a historical factor overruling in a small measure climatic control. At the present time, far more cotton might be raised in Kentucky and North Carolina, and would be there raised, but for the greater profit of raising tobacco in those states. Here comes in an economic factor to minimize a physical element in the problem.

Looking at cotton again; this fiber, powerful as it is in making the South a one-crop region, is not so merely because the South has a summer long enough and hot enough to raise it; there is a social-economic reason for its dominance. The exposition of this social reason is one of the features, if I mistake not, of the new interest in the history of the South, shown by our historical scholars in recent years. It has to do with the Negro and the plantation and the personality of the plantation owner and it has been modified but not removed by the freedom of the black man, and by the tendency toward diversity and local adjustment in southern farming.

Moreover there is a powerful commercial reason for one crop in the South. It needs but to be named, the steady, world market—for a sure money crop, embracing about two thirds of the world's commercial cotton. The wheat market of Europe may be satiated by the Argentine, by Australia, in normal times by Russia, in the days of

the World War, by ourselves, giving up some of our wheaten supply; but in spite of British, German, French and Russian efforts to produce colonial cotton, the unhindered voyage of the southern cotton bale proceeds, to Liverpool, to Havre, to Genoa, to every center of cotton spindles in Europe. The exports of cotton in 1920 amounted to \$1,381,000,000.

What then has taken this fiber, and in a little more than a century made southern cotton outrun the linen and woolen, of the world? The reasons for what we see are several—and they include at least these—temperature, the invention of the cotton gin, the Negro worker, the planter aristocrat, and the world market.

If we compare the East and the Mid-Continental regions on the one hand, with the West on the other, the principal difference, from the agricultural point of view, is the amount of rainfall. Here we are considering the West as a whole, and must take account of local differences in that vast area. Thus the extreme Northwest is wetter than the East, while the far Southwest is very dry and much of it very hot.

It will be of some interest to compare the land forms, climatic features and crops of New York with those of the State of Washington. New York has alluvial valley floors, lake plains, with plateau and mountain areas of high geological antiquity. Washington has the intermontane lowlands of the Puget Sound Valley, lava plateaus and mountain belts, younger in the main than corresponding features of New York. The Empire State has large rainfall on the seaboard, dropping to moderate precipitation in the Niagara region. Washington has the largest rainfall of the United States on the Pacific border, dropping to semi-arid conditions behind the Cascade Range. Thus the range of rainfall is greater and the seasonal range of temperature is smaller than in New York.

Turning to the crops, New York has general farming, with cereals, forage, pasture and livestock, apples and hops, Washington also has all of these with some differences. Its wheat is in part raised by methods of dry farming, its apples by irrigation, and its livestock leans more to beef and less to dairy. New York, by reason of greater age and large urban groups, has more specialties of tillage, as in garden vegetables, grapes, onions, and dry beans.

Summing up the comparison, natural conditions show general resemblances, with differences of detail, and the same is true of the crops. New York on account of its age and population shows more special and intensive culture, but modern invention tends toward swift adjust-

ment in the more youthful state. The glacial soils of western New York are as well adapted to wheat as the residual lava soils of eastern Washington, and the plains of the Genesee country are in themselves as well suited to big machines as the bonanza farms of the Columbia basin: but social, historical and economic conditions have cut western New York into small fields, and made its land too valuable for its bread-raising specialty of seventy-five years ago.

Here is well illustrated a statement which we quote from Bailey's *Cyclopedia of American Agriculture*,—"All intensive and special types are likely to develop in any region as they are controlled less by material factors than by economic and personal ones." A good example of this principle is seen in the strawberry, which thrives in all American latitudes, which to a certain extent is favored by special soils, but in general is grown where it is needed, and it should be added, when it is wanted, being grown in southern lowlands to meet early markets in northern cities.

Falmouth on Cape Cod is a strawberry center, the soil is good and the climate is good, but we must not forget that the Portuguese are born fruit raisers, willing to clean up oak scrub, for the lure of the Boston market. With a certain amount of natural adjustment, it is after all a market demand, an economic factor that has put strawberries on the lake plains of New York, the coastal plains from New Jersey to Florida, in the Appalachian Valley of Tennessee, on the alluvial lands of southern Illinois, in the maturing plateaus of the western Ozarks and in the Willamette Valley of Oregon.

Thus we may say that the entire outfit of natural, including climatic factors, conditions of population and market demand, with developed transportation, devices for preserving, hereditary and personal aptitudes and the historical maturity or youth of a region, all go to determine the detailed and special distribution of crop production.

Having endeavored to state and in some degree to illustrate the principle of a composite control by natural and human factors of environment, working in ever shifting combinations, with results that sometimes bring about natural adjustments and sometimes work away from them, we may now look more closely at certain specific crops, as regions have grown historically older and as the pioneer zone has moved westward.

New England has changed from general to special and limited farming. In the early days it must raise all the food and fiber it needed, save for a few luxuries, or certain necessities, few also, which it could not manufacture. For long now the larger general supplies have been

to advantage raised far away and shipped to New England consumers. The industrial population has outrun the capacity of the home farms which are needed for bulky and perishable products raised near home markets.

There is no natural reason why corn may not be raised on Cape Cod and tall corn can be seen today in the gardens of Barnstable County. It was raised there and was exported largely, for the days of small things. This has passed now because the large-scale production of the corn belt and the modern railway have made it economical to buy the corn for the pantry and the poultry yard. Cranberries, however, stick to Plymouth County and the Cape because they are closely adjusted to the natural environment. Gardening develops around Boston or Providence and the milk trains reach far out into New England because of the market demands. Tobacco and onions in the Connecticut Valley and potatoes in the Aroostook country are also examples of the modern intensive stage.

New York has had a similar development and few details need be given. Its capacity for wheat has been noted, and the state raised 11,000,000 bushels in 1919, but the population requires more than 60,000,000 bushels. New York farms are serving the cities of the Empire State and in special areas are raising congenial crops, such as onions, grapes, apples, hops, buckwheat and dry beans. Its controlling industry is the dairy. Here the natural and the economic factors pull together, as they do in New England. Cool, thin-soiled uplands favor grass and permit of corn raised to the silo stage, and it is therefore no undue strain on natural conditions that the millions on and around Manhattan Island daily reach out across hundreds of miles to the St. Lawrence and the Genesee.

Wisconsin is old enough to have passed to a degree thru the cheap-land stage to harmony with physical and human environment. In Dane County, in which is Madison, the capitol, wheat was the staple and the money crop down to about 1870. Corn could be raised but could not be taken to market. It was supposed that grass and clover would not flourish. Capital was needed for stock and the winters were thought too long and severe for profit in this industry. Hence the farmer stuck to wheat, in spite of soil impoverishment, winter killing and poor marketing. The county raised 3,000,000 bushels in 1860 and less than 80,000 in 1900.

This period marked the change to diversified farming. Vermonters and Ohioans came in with sheep. Ohio men had learned the culture of tobacco at home and brought it with them. During the war sorghum

and honey were tried in lieu of sugar. The farmers experimented with hemp and flax and failed. They bought more farm animals and raised more corn and oats and less wheat. Hops came in with farmers from central New York, had a short run and went out. Tobacco remains, an important crop. There was vast growth of the dairy after the Civil War when a pound of butter was sometimes worth more in Madison than a bushel of wheat. Here is another example of social influence,—Swiss immigrants moved in and began to make cheese. Wheat dropped to one fortieth in forty years and the dairy increased five fold. Today Wisconsin stands for dairy, tobacco, potatoes and truck, with general farming. Here are ignorance, lack of transportation, intelligence enlarged by testing, and farm knowledge diffused by one of the most efficient of State Universities, the building of roads and the growth of cities,—all these forces have cooperated to bring a great commonwealth whose statehood and first railroad are so recent as the middle of the last century, into fairly close adjustment to nature and to man.

In 1850 the center of American wheat production was in Ohio, in 1860 in Indiana, in 1870 and 1880 in Illinois and in 1890 in Missouri. In 1900 it had taken a sharp leap to the northwest and rested west of Des Moines, within seventy miles of the Missouri River. In another ten years it was still farther northwest in eastern Nebraska.

There is no time to fill in the outline. Wheat has followed the migration of the frontier. This was partly because the western lands were suited to large-scale production, with small man power and much use of machinery. In 1830 it took 160 hours of labor to produce fifty bushels of wheat. From 1865 to 1896 but 7.43 hours were required. Historical and economic reasons have played large in the migration of wheat. Settlement began in the East and notwithstanding the drainage of population westward, the East has come to high densities and great urban centering of population. Thus vast industrial groups have formed and the demand for bulky and perishable products of the soil has made the land too costly for the raising of wheat. Wheat has built the western railroads, wheat can stand the transportation, and can be brought not only across a continent but from the antipodes.

Let us not omit another human factor in this march to the northwest, the invention of a cleansing process that made spring wheat desirable and sent production to Minnesota, Dakota and the plains of Western Canada.

Wheat can be raised and is raised about as much in the East as formerly, absolutely—of course not relatively. When the West is

as full of people and big cities as the East what will happen to wheat? We may import it from Canada. But when Canada is closely peopled, what then? We must fall back on more intensive cultivation, becoming like France and the eastern parts of England, which after centuries of tillage produce twenty and thirty bushels per acre. Then the soil exhaustion and the straw burning that have gone along with wheat will be checked by better farming methods, serving a population increasing slowly or static in numbers, as in France.

The greatest unfolding in American agriculture is in the West. Here aridity is the rule, adequate rainfall the exception. Here therefore tillage is special, and in modes definitely responsive to physical conditions. The less important but by no means negligible method is by what is known as dry farming, which, in a word, means that the farmer, by cultivation, by selection of varieties and by breeding varieties, makes the most of small rainfall.

The major method is irrigation, applied by the Mormon community about 1850, by the Greeley colony in 1870, by hosts of individuals and corporations after that time and by the Federal Reclamation Service since the present century came in. This method means that waters from the mountains and in less measure from the ground, are spread over lands which otherwise raise only the sparse vegetation of the desert.

The result of irrigation activities is the intensive cultivation of limited areas and the production of a large variety of special crops, of which several have been taken over from the Eastern Hemisphere. It means also from the social point of view, close community life for farmers, high standards of living, public utilities for rural population, social development in schools, churches, clubs and associations of every kind. It means in concentrated areas, rapid growth, creation of large property values, with returns in taxes, foods and fibers, to government and to the people of the nation. It means the application and the development of keen intelligence, under the bright skies and in the sharp air of the desert.

In deserts where only sage brush grew and the coyote howled, in a part of the basin of the Snake River, in the time that it takes a baby to reach the fourth grade, ten thousand people had come, stacks of hay and grain arose, there were herds and flocks, fifteen hundred farm homes, and highly organized schools whence every afternoon a thousand children rushed for the school wagons that would bear them to their country homes. This school included household arts, manual

training, agriculture and a practice dairy, all perfectly ventilated and heated by electricity. This is one sample.

Few of the western states, that is, states beyond the one hundredth meridian, would be more than territorial annexes to the federal group today but for this mode of culture. Save for small beginnings this enrichment of western life has come about in half a hundred years. If it be desirable for a nation to be self sustaining, the new varieties of crops in this great western region will take us far toward the goal.

It is time to make a brief summary. Since the days of Plymouth and Jamestown, a human stream has flowed over a reserved continent and for a hundred years it has been a flood. Mixed crops belong to the pioneer, or cheap-land stage in a new country, prior to effective means of transportation. Hence the natural features have a large but not a maximum influence, climatic features dominating those of a physiographic nature. This last is true of crop growth in all stages of development, not denying the large functions of soil, slope and exposure. All conditions save fundamental climatic differences are overruled by the isolation and the comprehensive needs of the pioneer.

In the advanced stage of dense population, of mechanical appliances and of modern knowledge of farming methods, specialized agriculture prevails, and is largely the result of close adjustment to natural environment. But this perfection of adjustment is modified by economic conditions, such as great urban markets, crop failures in other states or on other continents, thru bad seasons, pests, plant diseases, or war. Whether it wills it or not, the human world is now, thru invention, in some sense one, and economic needs may at any time put stress on ideal adjustments to nature.

American agriculture in its swift conquest of a vast domain is unique in the history of the world. Europe was slowly subdued during three millenniums, by civilized men. America was suddenly found as an empty continent, providing a ready overflow for crowded Europe. The great onrush has been during a hundred years of invention. The only comparable countries are southern Canada, Argentina and Australia. Of the latter two, Argentina is smaller than the United States and Australia is by nature behind us in possibilities. Both are in the Southern Hemisphere, away from the vast, progressive populations of the North Temperate Zone. The American achievement is and seems likely to remain without a parallel.