

THE PALIMPSEST

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The Civilization of Corn

The idea seems to be widespread that the Indians developed the corn plant only part way and that the white man has improved it marvelously. The truth is that the Indians had every kind of corn that is grown to-day and a number of other varieties. White men have not put anything into the corn plant which did not exist there when the Indians ceased their corn breeding labors. What a marvelous job the Indians did with corn during the past ten thousand or twenty thousand years!

It is all a guess as to what may have been the wild prototype of corn. Botanists who have studied the question agree, however, that quite unusual work must have been done many thousands of years ago by the early Indian corn breeders in order to develop corn from its wild prototype to the state of perfection in which it existed when the white man first came to the North American continent.

Having given this tribute to the early Indian corn breeders, I must hasten to protect myself against those who know the type of corn grown by Iowa Indians and have compared it with the corn grown by present-day Iowa farmers. It is undoubtedly true that the corn now grown in Iowa does not trace its descent from the corn grown by Iowa Indians a hundred years ago. Most of our Iowa corn traces back to ancestry which came into the State from the East during the period extending from 1840 to 1910. It came mostly from Illinois and previous to that from Indiana or Ohio and still further back from Tennessee and Virginia, with some Pennsylvania and New England blood mixed in.

It is fairly certain that the Indians in Iowa grew eight-, ten-, or twelve-rowed flint and flour corn with rather broad shallow kernels. This corn was of blue, red, white, and yellow colors and the early settlers referred to it rather disrespectfully as "squaw" corn. The flour varieties of "squaw" corn were easy to grind and the Indians thought they had a finer flavor than the larger-eared, deeper-kerneled dent varieties brought in by the settlers from the East. The flint varieties were used for hominy.

The perfecting of dent corn is a story which probably will never be told. Undoubtedly dent corn existed long before the white man came to the continent, but apparently the Indians did not hold it in as great esteem as they did flour and flint varieties.

Possibly the climate was different several hundred years ago, which would account for the fact that dent corn was grown to some extent by the Indians of the southern States but not in the region now known as the Corn Belt. The Indians of Virginia, Tennessee, Missouri, and farther south apparently cultivated a kind of corn which the farmers to-day would call a shoe-peg dent corn. This extreme shoe-peg type of corn is now almost non-existent because it is so starchy that it will not withstand the diseases which accumulate where corn is grown on the same land several years in succession.

During the eighteenth and nineteenth centuries the farmers of Virginia, Maryland, and Pennsylvania both deliberately and accidentally crossed this deep-grained, starchy, shoe-peg corn from the South with flint corn from the North. These crosses between starchy shoe-peg corn and flint corn found their way west with the early settlers into Tennessee, Kentucky, and Ohio. To what extent corn grown by Indians in Tennessee and Ohio may have been incorporated with the corn from the seaboard is impossible to say, but the literature of the early nineteenth century indicates that there was a continual mixing of the flints and the shoe-peg strains.

The oldest of the varieties now grown extensively in Iowa is Reid yellow dent which traces to a cross accidentally made in 1847 in Tazewell County, Illinois. Robert Reid had come from Brown County in

southern Ohio in 1846 and had brought with him a late-maturing, large-eared corn which evidently was of the shoe-peg type. This corn did not germinate well in the spring of 1847 in central Illinois and so the poor stand was replanted with an early small yellow flint corn. The cross of the two gave a great diversity of type but Robert Reid and after him his son, James L. Reid, set themselves to pick out ears almost as large as shoe-peg corn but carrying kernels which were not so rough and had a larger germ and more hard starch. They tried to retain the high yielding power of the late Ohio corn and at the same time get earlier maturity. Most of this work was done from 1870 to 1890 and Reid's most striking triumph came in 1893 when he won a prize at the Chicago World's Fair.

Corn tracing to Reid yellow dent is probably grown on more millions of acres of land in Iowa today than all the other varieties put together. Yet Reid yellow dent did not come into Iowa in any large quantity until 1902. Previous to that time the most popular variety was Leaming. Leaming was not originated as early as Reid yellow dent but it came into prominence earlier because of winning a prize at the World's Fair in Paris in 1878. As a result J. S. Leaming of Ohio distributed his corn far and wide over the Corn Belt, and in Iowa previous to 1900 it was probably the most popular variety in the southern half of the State. Leaming was just as good a yielding corn as Reid yellow dent but it had a

slightly larger shank and was, therefore, harder to husk. Moreover the ears were not quite so pretty because the rows were not as straight, and there was a taper to the Leaming ears, whereas the Reid yellow dent ears were cylindrical.

Previous to the days of Leaming and Reid yellow dent corn in Iowa, the farmers grew very similar sorts which usually were just a little earlier, a little smaller eared, and a little shallower kerneled. These sorts, however, were of the same general mixture as Reid yellow dent and Leaming but had not been so carefully selected for pleasing appearance. Hundreds of these early unnamed varieties undoubtedly were just as good from a yielding standpoint as Leaming and Reid yellow dent. It should also be said, however, that hundreds of them were definitely inferior.

Real corn consciousness did not come upon Iowa farmers until 1902. Illinois had waked up a few years earlier and P. G. Holden, a graduate of the Michigan State College of Agriculture, was supposed to be one of the prominent young men in the Illinois corn movement. My grandfather, Henry Wallace, editor of *Wallaces' Farmer*, had always felt a very keen appreciation of the importance of corn in the welfare of Iowa. He watched the corn situation in Illinois with the greatest interest and urged the agricultural college at Ames to bring Holden into the State. I can remember the rather frequent corn conferences which Holden used to have

with both my father and grandfather. Incidentally I think they paid part of his salary for the first year or two.

With the college and *Wallaces' Farmer* behind him, Holden was able to stir up an enormous interest in corn during the following ten years. He was an evangelist with an unusual understanding of human nature. He established corn shows all over the State and brought with him Reid yellow dent corn. The corn show standards which he promulgated were of the sort which made it inevitable that Reid yellow dent would have things pretty much its own way in corn show competition. Reid yellow dent was a little later than most of the corn customarily grown in Iowa at that time and hence it was a better yielder in a good season on rich land. The better farmers on the richer soil took up with Reid yellow dent and profited very greatly thereby. Probably ninety per cent of the corn grown to-day in the southern two-thirds of Iowa contains at least some Reid yellow dent blood and is a result, directly or indirectly, of the genius of P. G. Holden for popularizing corn style.

There have been many men in Iowa who have spent all their spare time breeding corn. One of the earliest and most successful of these workers was A. J. Goddard of Fort Atkinson. More than half a century ago he began to work with the problem of finding high yielding early strains of both white and yellow corn for northern Iowa. Apparently he used

seed which came originally from Indiana and his problem was to pick out the early types. His yellow corn, called "Pride of the North", became popular in 1886 as a result of winning a prize at a Chicago exposition. His white corn known as "Silver King" won a prize at the World's Fair at New Orleans in 1884 and again at Chicago in 1886.

The publicity obtained in this way resulted in both Pride of the North and Silver King becoming quite popular in the northern part of the Corn Belt. Pride of the North is not grown extensively any more, but a selection from it by the Minnesota Experiment Station known as "Minnesota 13" is one of the most popular yellow dent varieties in the northern part of the Corn Belt. Goddard's Silver King is still the most popular white variety in northern Iowa. In my opinion A. J. Goddard was the most important Iowa corn breeder during the period extending from 1870 to 1900.

During the period from 1902 to the outbreak of the World War, corn shows animated by the spirit of P. G. Holden were the guide followed by the corn breeders of Iowa. Hundreds of farmers caught the contagion and bought seed corn from men who had won prizes. They then spent every spare hour during the late fall and early winter picking over thousands of ears in the hope of finding a few with just the right length and circumference and straight rows with wedge-shaped kernels of just the right depth and width and that intangible thing which

might be called corn character or corn personality.

Judges trained by Holden at Ames set the standard. While utility was not lost sight of the standards of the corn shows were fundamentally artistic. Hundreds of farmers developed a sense of the beautiful through the corn show. Other farmers who had no sense of beauty nevertheless had their attention centered on corn by the corn shows and as a result began to take a greater practical interest in selecting their seed corn.

After the World War the corn shows lost influence rapidly. H. D. Hughes, who had been professor of farm crops at Ames since 1910, experimented with a number of the different show strains of Reid and found that their yielding power varied tremendously, and that there was no particular relationship between the performance in the corn show and the performance in the field. Some strains of Reid yellow dent would actually yield twenty bushels an acre more than other strains. Apparently there were factors invisible to the eye which were of immense practical importance to farmers.

To discover these hidden yet valuable genetic factors, Professor Hughes launched the Iowa Corn Yield Test. Farmers sent in their seed to the Agricultural Experiment Station at Ames where these different kinds of corn were grown side by side on the same land, not only at Ames but also at a number of other places in the State. Some of the men who formerly had been active with Holden in the

corn show work turned their attention in this new direction and became quite successful. Among these were H. F. Osterland of Franklin County, Clyde Black of Dallas County, Fred McCulloch of Iowa County, and George Steen of Muscatine County. But in addition to these spiritual descendants of Professor Holden, other men who never had any use whatever for corn shows became interested — practical men who declared that they cared nothing about appearance just so the corn yielded well.

For the first time corn began to feel the compelling touch of modern efficiency standards. The men who picked corn for the corn shows had not been especially different in their methods of selection from the Indians. While their standards were somewhat different their methods were essentially the same. But now science came into the picture and with it careful methods of measuring — measuring not only the yields but also the percentage of moisture, the shelling percentage, the stiffness of stalk, the height of ear, and a great many other things.

The influence of this shift in point of view was demonstrated in 1925 when hybrid corn won the yield test for the first time. Each year since then hybrid corn has continued to produce the greatest yield. Hybrid corn in the modern sense of the term was developed by a method which was unknown to the Indians. The method was first discovered about a quarter of a century ago by George Shull now of

Princeton University and at that time located at Cold Spring Harbor on Long Island. The first to try to make a practical application of this method in Iowa were H. A. Wallace and Simon Casady, Jr., of Des Moines. In 1922 Mr. Casady had a contract with the Iowa Seed Company to produce an acre of corn by crossing two inbred strains. But this commercial venture was not very successful because the wrong inbreds were used.

Since then, however, Wallace and others have perfected the technique until now several firms are selling hybrid corn to Iowa farmers. In the spring of 1930 about five thousand bushels were sold or enough to plant about thirty-five thousand acres. Compared with the total acreage of Iowa corn this was a drop in the bucket but it is expected that during the next ten years the shift to hybrid corn will come rapidly. Since 1922 the Experiment Station at Ames has been inbreeding corn on a very extensive scale. So also have most of the other Corn Belt experiment stations. They have found large numbers of promising inbreds and know how to combine them with other inbreds to produce heavy yields. Distribution of this splendid genetic material will take place within the next four or five years.

When the Corn Belt shifts over in considerable measure to hybrid corn there will be some rather strange developments. A few farmers will do nothing but maintain inbred strains in isolated plots. This inbred corn will be remarkably uniform but

rather poor in appearance. Its redeeming feature will be the fact that previous experiments have positively proved that it will combine with certain other inbreds to do remarkable things. While only a few farmers will maintain inbred strains, a larger number will cross inbreds. Strain A in one row will inbreed in strain B in another row if all of the tassels are pulled out of strain B in July. This is the primary crossing stage. Final commercial corn will be produced by crossing two primary crosses the following year. For example corn A-B will be crossed with corn C-D. To produce the necessary seed will require the detasseling of three out of four rows on thousands of acres of corn. The process is detailed and technical but follows the normal laws of heredity.

The corn of the future, produced by these new methods, will not look especially different from the corn of the past. It will merely be more efficient in the use of soil fertility, and the stalks will be stiffer and more wind resistant.

In one sense corn will never be civilized. Probably it will not contain any valuable factors which were not there when the white man first came to the North American continent. The white man with all of his corn shows, his science, and his hybridizing will not have added anything new. The arrangement of the genes in the corn plant will be somewhat different than when Indians were engaged in corn breeding. The corn plant will respond more defi-

nitely to the particular needs of the white man as they change from decade to decade. But no matter how much the white man may accomplish in rearranging the corn genes, he may well remain humble as he contemplates the accomplishments of the corn breeders of ten thousand years ago. Corn has done more for the white men of Iowa than the white men have done for corn.

Corn growing methods, of course, have changed very rapidly during the past century. The Indians grew corn in hills just as the white man does, but they did not use horses or iron tools. Their bone hoes were big and clumsy and it took six or seven hours of man or squaw labor to produce a bushel of corn.

The first white men in Iowa grew corn like the Indians except that they used iron tools and horses. At first they planted their corn by hand and cultivated it with a plow having one or two shovels and drawn by a single horse. Two-horse cultivators of the single-row type were first used in Iowa during the early sixties. Horse-drawn corn planters were also introduced in the sixties but they required an extra man stationed on the machine to control the dropping mechanism.

To-day four-row corn planters, four-row cultivators, and two-row picking machines are pulled by tractors. With this machinery it is possible to produce a bushel of corn with five minutes of man labor and five minutes of tractor labor, though most of

the farmers of Iowa still require about twenty minutes of man labor and fifty minutes of horse labor to produce a bushel. Most Iowa corn is still planted in hills, but with this exception our corn growing methods are totally different from those of the Indians. Iowa in the days of the Indians produced only a few thousand bushels of corn. To-day 11,000,000 acres are planted to corn and the crop is usually worth over \$250,000,000.

Our machines and large scale operations have changed corn production methods steadily decade by decade ever since the white men took possession of the State about eighty years ago. Although a bushel of corn can be produced now with only two or three per cent as much labor as the Indians used, we have not yet accomplished anything very marvelous in corn breeding. There is reason to believe, however, that the next eighty years will see more significant changes in corn breeding than the past eighty years, and that the changes in corn machinery will be equally great.

H. A. WALLACE