CORN FROM THE KERNEL TO THE STALK.

The seven states of Ohio, Indiana, Illinois, Missouri, Kansas, Iowa and Nebraska may be properly classed as the principal corn-growing region of the United States. They are almost wholly located between latitudes 41 and 37. These lines of latitude bound on the north and south the great populational belt of the United States. They define as to north and south limits the greater portions of the productive corn area of this country. They establish the American corn laws by which those who desire to cultivate that cereal extensively are commanded to live and practice agriculture within those latitudes.

The attention of thoughtful citizens who read THE CONSERVATIVE is called to the following table, which shows the acreage, the average yield per acre, the total number of bushels and the total valuation of the corn raised in the seven states above mentioned during the year 1897:

	Acreage.	Yield per acre.	Total bushels.	Valuation.
Nebraska	8,042,283	30.	241,268,490	$41,015,643
Illinois	7,107,018	32.5	232,928,085	48,914,898
Missouri	6,612,457	26.	171,923,882	41,261,732
Iowa	7,589,281	29.	220,089,149	37,415,155
Kansas	9,024,596	18.	162,442,728	35,737,400
Indiana	3,660,841	30.	109,825,320	23,063,317
Ohio	2,835,864	32.5	92,165,580	23,041,395

Reliable data gathered from reputable sources show that in 1897 there were 80 million acres of corn raised in the United States. In 1898 there were three millions less acreage in corn, there being only 77 million acres of that cereal grown in that year in the entire republic.

The Corn Flower.

The Indian corn plant is one of those which has two kinds of flowers, both on the same stalk. The kernels and silk are the female part and the tassel the male part. That is, the tassel has the stamens which furnish the pollen; and the ear has the pistils and ovaries. But neither are simple flowers. The tassel is an aggregation of staminate flowers; the ear an aggregation of pistillate flowers. Each kernel has a thread of silk attached to it. The silk is the pistil and the kernel at the end is the ovary. Each kernel and its thread of silk therefore constitute a separate pistillate flower. As a matter of fact the kernels are as independent as if they were each on a separate ear. By breeding and development we have made corn what it is, that is, a large, long cob, with many rows of kernels. Wild corn was originally only one kernel enclosed in each husk, something like grains.

Now as the pollen in the tassels ripens, the pollen cases burst and the pollen in the form of a dust is set free to be blown about by the wind, and so find its way to the silk. The silk is sticky. The pollen grains fall upon it, adhere and begin to grow. The tube is a long one for it grows down the entire length of the silk to the kernel at the base. Then it fertilizes the kernel, as in the case already described. It appears to be necessary that each kernel should be fertilized by material from the pollen in order to develop normally or to be capable of reproducing a plant. The imperfect kernels are believed not to have been fertilized.

Considering the number of kernels on each ear of corn, it appears little less than marvelous that every kernel should be fertilized. Some, of course, fail of being fertilized and we have incompletely developed kernels. But a large proportion are fertilized and developed if the conditions are favorable.

The growth of the plant is now complete and the energy of the plant can be devoted largely to supplying materials for filling out the kernels. The kernels pass through the milk stage, fill out, the contents become of thicker consistency, the outer cell walls thicken, forming a hard seed coat and finally we have the ripened grain.

Water Used by Corn Plant.

The following table (King, Wisconsin experiment station report) shows the amount of water used by the corn plant in comparison with barley, oats and peas.

Table Showing Amount of Water Required for a Pound of Dry Matter in Wisconsin.

Pounds of Water Used.	Lbs. of dry matter produced.	Lbs. of water per lb. of dry matt'r.	Computed yield per acre.		Computed amount of water used.	
1891.			Mean.	Pounds.	In tons per acre.	In inches.
Barley 1, 158.3	0.3966	309.14	401.74	7441	1494.67	13.19
" 2, 141.03	.3488	404.33				
Oats 1, 234.25	.4405	509.31	501.47	8861	2221.75	19.69
" 2, 220.7	.4471	493.63				
Corn 1, 300.45	1.0152	295.95	301.49	19845	2991.53	26.39
" 2, 293.65	.9727	307.03				
1892.						
Barley 1, 216.12	.576	375.21	375.21	14196	2663.89	23.52
" 2, 206.12						
Oats 1, 174.6	.3022	525.59	525.59	8189	2152.11	19.00
" 2, 167.58						
Corn 1, 235.93	.9905	326.96	316.99	19184	2642.37	25.00
" 2, 225.24	.5657	308.15				
Clover 1, 337.36	.5977	564.43	564.43	12486	3367.84	29.73
" 2, 348.06						
Peas 1, 155.24	.3252	477.37	477.37	8017	1913.48	16.89

It will be observed in the second place, that the corn crop, the great American staple, has during these trials consumed less water per pound of dry matter than either of the other crops, barley, clover or peas, the average of the four cases being only 309.2 lbs. as compared with 388.48 for barley, 477.37 for peas, 513.52 for oats, and 564.43 lbs. of water for one pound of dry matter in clover. One of the chief reasons, in my judgment, for the relatively small consumption of water by corn is to be found in the fact that much less water is lost from the soil by direct surface evaporation on account of surface cultivation during so much of the growing season.

Field Experiment With Corn.

In the field of corn in which two cylinders were placed the water content of the soil was determined down to a depth of four feet, in the spring at the time of every planting, and again at the end of the growing season. The yield of dry matter per acre was also very carefully determined. One portion of this ground was manured while another portion was not, and the average amount of dry matter per acre was 6,351 pounds on the unmanured ground, and 7,740.6 on the manured ground.

The mean amount of water in the soil near the time of planting for each column of soil one square foot in section and four feet deep was 88.09 lbs., and at the time of harvesting it was 74.78 lbs., on the unmanured ground and 74.47 lbs. on the manured.

The total rainfall during the growing season was 100.29 lbs. per square foot. A large amount of this rain, 10.5 inches, or 54.6 lbs. per square foot, fell between the time of planting and June 30, when the corn was yet small, and must have been mostly lost by percolation. Supposing this amount to have been lost in this way during the season, the amount of water used per square foot must have been 59 lbs. for the unmanured and 59.3 for the manured ground. Under these conditions it must have required 404.6 lbs. of water for a pound of dry matter on the unmanured and 333.7 lbs. on the manured ground, while the average in the cylinder was 316 lbs. of water for a pound of dry matter.

Relation Between the Amount of Dry Matter Produced and the Number of Inches of Water Consumed.

In the last annual report, page 130, attention was called to the fact that while the yields of dry matter calculated per acre of the crops grown in the cylinders were very much greater, in every