The Democratic Advocate.

$1 PER ANNUM. WESTMINSTER, MD., SATURDAY, APRIL 15, 1905. VOL. 40.--NO. 26.

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A full car load of the Original Perry Wood Frame Harrows, the Syracuse Lever Harrow, Roderick Lean Peg Harrow, Oliver, Wiard and Chattanooga Chilled Plows, Superior Disc Harrows and Corn Drills, Black Hawk and Evans Check Row Corn Planters, the Brown and Hench & Dromgold Riding Cultivators, Triple, Double and Single Shovel Plows, Brown and Thornhill Farm Wagons.

We have made contracts with the Frick Company and A. B. Farquhar Company, and will answer all inquiries made regarding their Engines, Separators, Saw Mills, &c. We will also handle the full DEERING LINE of

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If you want to make Good Butter, and the Most Butter from your cows, you cannot do without a

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Roanoke, Va., Dec. 31-01.

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june11 1904, 1 yr

COMMISSIONERS' NOTICE.

The County Commissioners of Carroll county will meet at their office, in Westminster, every MONDAY in APRIL, 1905, for the transaction of business. By order,

FRANCIS L. HANN,
apr1 Clerk.

The above cut represents a Mosler Corliss Safe put in last week by the Farmers & Mechanics' Bank of this city. In unloading the safe, which weighs over 12,000 pounds, many persons were attracted to the depot and a large number followed the hauling of it to the bank to see it unloaded and placed in position. The six large horses of Mr. Levi Barnes, near this city, pulled the immense structure of steel to its destination.

This safe is composed of solid gun metal throughout and consists of a sphere within a sphere. The inner sphere which performs the functions of the door, is larger than the opening in the outer sphere, and has steps to meet corresponding steps in the outer shell, which are ground absolutely air tight. When these steps are brought together, the joint is perfectly maintained against all outward pressure by means of an expanding ring, which encircles the entire circumference of the door or inner sphere. It is made slightly shearing, and is planned so as to accurately fit the corresponding slot in the outer shell. When the safe is closed and locked, and this bolting ring is projected or expanded, so that one half remains in the door or inner sphere, and the other half in the outer shell, it becomes an immense bomb proof against the practical use of explosives.

The cut printed above is an exact picture of the new safe with the inner sphere or door revolved. After reading the description herewith given and viewing the illustration it will be seen how absolutely safe would be the contents of such a safe. It is made by the Mosler Safe Co., of Hamilton, Ohio, and has a reputation that is second to none.

Several other safes were examined by the officers of the bank and they decided upon the above safe, which from a thorough examination and tests made as to burglar, fire and mob proof. The Westminster Deposit and Trust Company have also purchased a safe from the same company. The sale of the above safes was made by Mr. W. J. Moss, Agent, Hagerstown, Md.

Corn Culture and Breeding.

BY A. D. SHAMEL, ILLINOIS EXPERIMENT STATION, URBANA, ILL.

The Impetance of Fertile Soil.

The important points under the farmer's control in the production of a profitable crop of corn are fertile soil, improved seed, and the best methods of culture. By farmer's control is meant that the corn grower can influence the above conditions so that they may be made to produce the largest yield of corn per acre most economically. The fertility of the virgin soil seemed almost boundless to the pioneer farmer. He planted crop of corn after crop of corn, or crop of wheat after crop of wheat, or rotated corn with wheat, producing large yields of both crops. Little attention was given to the application of the principles of plant growth to our farm crops. In Indiana and Illinois such systems of farming have reduced the fertility of the soil to such an extent that profitable crops can no longer be produced by the old one crop system of farming. The early settlers broke the prairie sod or cleared the timber fields and cropped them until they would no longer produce profitable crops. These farmers then moved into a new spot, plowed the new fields, or cleared the timber, and farmed as before. Sooner or later in any state the new and unbroken fields will all be plowed and cultivated. In Illinois the children of the pioneers are being crowded back on to the exhausted fields, and it is their problem to find some practical way of restoring the fertility to the soils. Any farming community which practices a one crop system of farming is bound to eventually become poverty stricken. The fertility of the soul is like a bank account; by continued drafts without any deposits the balance will, sooner or later, will be found on the wrong side of the ledger.

At the Illinois Experiment Station corn has been grown year after year on a field of the college farm without any application of manure or fertilizer of any kind. This experiment was begun 24 years ago, and the best kind of cultivation and methods of preparing the seed bed have been used in the growing of the crops. The crop has been carefully weighed from year to year. The yields per acre have been kept since 1888, but previous to the establishment of the experiment station no authoritative records were kept. The record since 1888 is as follows (per acre):

	Ear corn.	Stover.
1888	60.13 bus.	1.26 tons.
1889	47.15 "	1.21 "
1890	41.87 "	1.19 "
1891	26.67 "	1.23 "
1892	30.92 "	.75 "
1893	21.78 "	1.04 "
1894	34.83 "	1.26 "
1895	63.81 "	1.51 "
1896	62.31 "	1.74 "
1897	40.10 "	1.61 "
1898	18.11 "	1.39 "
1899	50.09 "	1.61 "
1900	48.03 "	1.29 "
1901	23.65 "	1.14 "

In other words, in 1901 it cost 50.6 cents per bushel to raise the crop. It is a noticeable fact that the yield per acre has gradually decreased on this field. The appearance of the soil has been changed. It is a clayish, white color, compared to the rich black color of the adjoining rotated fields. The yield varies with the season, but is less than half that of rotated fields or the ordinary fields of the station farm, with similar original conditions of soil fertility.

There is a marked similarity between these results and the results of continuous wheat growing for 50 years on the Broadbalk fields of the Lawes & Gilbert experimental farm in England. Continous cropping and taking the crop off the field exhausts the fertility of the soil, and it has been found that soils so treated are very difficult to bring back to their original state of fertility. The mechanical as well as the chemical condition of the soil is changed, and it requires many years of careful and expensive treatment to renew soil productiveness. This is found to be the case in ordinary practice, and the problem before every corn grower is to keep up the fertility of the soil, so that it will continue to produce profitable corn crops.

There are several practical methods for accomplishing the desired results, which will be treated briefly in this discussion.

One of the most important ways of getting the soil in good condition for the corn crop is by means of the leguminous or "cover crops" e. g., cow peas, soy beans, clover and alfalfa. The soy bean and cow pea crops have been found to be specially beneficial to the soil, valuable as food, and successfully grown under widely differing conditions. In Illinois and Missouri the crops grown in the fields for a single year have been found to increase the yield of corn from 5 to 18 bushels per acre. The hay has been found to be at least as valuable as ordinary red clover hay, and the crop is harvested in much the same way. As the land becomes more and more exhausted, it becomes more difficult and expensive to secure a stand of ordinary red clever. Where alfalfa can be grown, this crop is very valuable for preparing the soil for corn. In most seasons cow peas and soy peas drilled between the rows of corn, just after the last cultivation, give good results. These crops will produce from 1 to 2½ tons of hay per acre, and will increase the fertility of the soil. Where the soil is a rich prairie loam, the soy bean is more successful than the cow pea. On such rich soils the cow pea runs to vines and does not mature a seed crop. It is in such soils the soy bean gives the best result. The rich soils stimulate the production of plant and seed, and the crop becomes increasingly valuable. The soy bean is easily harvested, but great care must be taken to secure good seed.

If the cover crops are grown and rotated with corn, and the crops taken from the fields, the soil will eventually become exhausted. The leguminous crops add to the supply of nitrogen in the soil, but they do not add the other elements of fertility, particularly potash and phosphorous. With continuous cropping of any kind, the fertility is bound to run out eventually. The only way by which corn growers can continue to grow profitable crops is by feeding the corn and hay crops to live stock and returning the manure to the soil. There is no fertilizer so valuable as barnyard manure, and it is only by the careful conservation of the manure from the corn and other crops fed to live stock, and its judicious application to the fields, that the soils will continue to produce profitable corn crops.

Improved Seed Corn.

The second important feature of the growing of a corn crop is seed corn. It has been found that corn can be bred like cattle. From the fact that we secure a complete crop in a single season, the results from corn breeding are secured more quickly than from animal breeding. It costs no more to grow a large crop upon the field than a small crop. The expense of cultivation, interest on investment and labor are the same in both cases. If by breeding the yield can be increased five bushels per acre, this increase is pure profit to the grower. Therefore any advantage from breeding is of great importance to the farmer.

Development of Corn Breeding.

Previous to 1897 little was done in the way of systematically breeding corn. Some few men, early in the past century, realized the far-reaching importance from well bred seed, and began crude attempts at improving their strains of corn. One of these men, J. S. Leaming, of Wilmington, Ohio, through selection, so changed and improved the type of corn grown on his farm that other farmers began to secure his seed corn for their use. This work was begun, according to his son's account, about 1825. As a result this type of corn was brought West to Illinois and rapidly became popular with Western corn growers. In Ohio, the corn was a tapering, short eared type, with particularly large butts. When the corn was brought West, the ear was lengthened by careful selection, the shape changed from the undesirable tapering type to a cylindrical shape, and the enlarged butt bred out of the ears. The improved Leaming bears little or no resemblance to the original Leaming, the smooth kernels have been replaced by rough, deep kernels, and the whole type of the variety has been changed through less than 15 years' selection by Western breeders. The valuable results from such a long period of attention to selection are found in the fact that in the comparative test of varieties at the Illinois station, since its establishment in 1888, the Leaming variety stands at the head of the list of the many varieties tested in yield per acre.

Another pioneer in this work was James Riley, of Thorntown, Ind. Mr. Riley was a live stock breeder of high standing, and, applying the same principles to the production of corn that he used so successfully in the improvement of his breeds of live stock, developed an improved variety of white corn. He began selecting seed from the ordinary white corn grown in Indiana at that time, and, by giving particular attention to the weeding out of barren stalks and other undesirable types in his seed fields, succeeded in producing a type of improved corn, which he called the Boone County White. This type was determined upon about 1875, and by continued selection from year to year it has been improved, until at the present time it is the most popular variety of white corn grown in Indiana and Illinois. At the Illinois station, the variety out yielded all other varieties of white corn in the comparative tests.

The fact of the matter is, that careful breeding and selection result in more profitable types of corn. The valuable results from improved breeds of live stock have increased the wealth of the American farmer millions of dollars. The results from improved breeds of corn indicate that we may obtain equally valuable results from highly bred varieties of corn.

Barren Stalks in Fields.

By careful counts made in various counties in Illinois, for the last three years it was found by the farmers that almost one-third of the stalks in the field were barren. These barren stalks are weeds of little or no value to the farmer. They probably take nearly as much fertility from the soil as the stalks bearing ears, and they cost as much to grow as the fertile stalks. On the 137 farms of the Sibley estate, Ford county, Illinois, it was found that nearly 80 per cent. of the stalks were barren. On this estate, especial attention has been given to seed selection, and the probabilities are that the corn on these farms is more free from this condition than on the average farm.

By looking over the corn in the cribs in any of the corn sections of the United States, a very small proportion of uniform perfect ears are found. The majority are very weak in some particular, as in shape of ear, filling out at butts and tips, depth and shape of kernel, purity of color and other points. That the average quality of corn is very poor is shown by the average yield per acre. The average yield per acre in the great corn States, according to government statistics, is about 30 bushels per acre. If every stalk in a hill produced a well developed ear, at the average width of planting, 3 feet 6 inches by 3 feet 6 inches, with only two stalks in a hill, the yield would be about 100 bushels per acre. As a matter of fact, the average number of stalks per hill is more than two. How can we account then, for the difference between 100 bushels per acre and the actual yield of about 30 bushels per acre? This difference must be due to the fact that every stalks does not produce an ear and that the majority of the ears that are produced do not become well developed ears.

Corn Breeders' Organizations.

In view of these facts, a few extensive corn growers organized the Illinois Seed Corn Breeders' Association in 1900. The object of this organization is to systematically improve, through co-operation with the State Experiment Station, the breeds of corn in this State.

Results From Improved Seed Corn.

As a result of the work of the breeders of this association, improved and carefully selected seed has been sent to the farmers of various sections of the corn belt. To show the results from such work, a few instances will be cited in the following discussion.

A corn grower of McLean county, becoming interested in improved seed, secured enough well bred seed to plant eighty acres. In this body of land there are about 10,000 acres devoted to corn. On this field the yield per acre was within one-half of twenty-three bushels more per acre than in any of the other fields of the farm. This corn grower has secured enough well-bred seed for the coming season to plant the entire corn land on the farm. The total increase in 1902, due to good seed has been estimated at 70,000 bushels.

In southern Illinois another farmer secured enough improved seed to plant 120 acres. This field yielded 15 bushels per acre more than any other field on the farm or in the vicinity where the yield was obtained. This farmer paid $40 for the seed, and figures that the net profit from the investment was $840, all of which was the result of planting improved seed corn.

Standard Varieties of Corn.

At present there are seven recognized varieties of corn, (white) Boone County White, Silver Mine, and White Superior; and (yellow) Leaming, Riley's Favorite, Reid's Yellow Dent, and Golden Eagle. The varieties will doubtless be added to in the near future as the types are grown under different conditions of soil and climate.

Methods of Corn Breeding.

The system of breeding is as follows: The variety must be kept pure and free from all mixture. This is a difficult problem in most cases, because the pollen will drift at least 80 rods. The breeding must therefore be done where the breeding field can be protected from other corn fields, as by hedges, timber, or other natural barriers to pollen drifting, or in a very large field of the same variety that is being bred. This last plan has been used with good results in developing sweet-corn varieties, but is not so quick in results as the plan of isolating the breeding fields. This is due to the fact that if the breeding field is located where it will be pollinated by the pollen of inferior stalks, even of the same variety, this fertilization will be detrimental to the development of the variety and the weeding out of the unfavorable types. A field of about an acre in size of the best corn land is selected.

The character of soil is of extreme importance. The placing of the breeding plat in a poor soil a single year may destroy the work of many years' careful breeding. The land should be carefully prepared, according to the best methods of fitting the seed bed in that locality. The plan is to plant each ear by itself in this field, either in plats ten hills square or in a row.

The plat and row systems are being used by corn breeders, and it will take several years to demonstrate the most successful plan. For simplicity the row will system be described, and the same principles will apply to the plat as to the row plan. Select thirty-two typical ears ears of the variety to be improved. This seed should be secured from some breeder of this variety, because he has accomplished what would take the beginner many years to develop. In other words, the corn grower can begin where the breeder left off. Lay out this acre with marker. Shell off the tips and buts of the ears to be used for seed, and plant three kernels in every hill by hand, covering with the hoe. Plant one row 112 hills long for each ear. Now cultivate ordinarily. As soon as the corn begins to tassel, go through the field three times, once every day, and cut off or put out the tassels of all stalks that have produced no shoots, all weak stalks, and all suckers. These barren and poor stalks produce more pollen than the stalk bearing ears, and it is important that this pollen does not fertilize the future seed. The seed kernels will produce plants more like the parents, and if one of the parents is week, the chances are that this weakness will crop out in some of the progeny. In Illinois this per cent. of barren stalks has been reduced from sixty-two per cent. to twelve per cent. in five years, from such attention. In the fall, the number of good ears should be counted in every row. The seed for the next seed field should be selected from the ten rows producing the largest number of good ears. The prepotency in the seed for the production of this improved type can thus be taken advantage of and the undesirable types weeded out of the variety. The rest of the field can be used for general planting. Following is an outline of the above described field, the figures at the left are the ear numbers:

1.	18. ....
2.	19. ....
2.	20. ....
3.	21. ....
4.	22. ....
5.	23. ....
6.	24. ....
7.	25. ....
8.	26. ....
10.	27. ....
10.	28. ....
11.	29. ....
12.	30. ....
12.	31. ....
14.	32. ....
15.	33. ....
16.	34. ....
17.	

Testing Vitality of Seed Corn.

The vitality of all seed corn should be tested. A good profitable stand can only be secured from vigorous seed. This vitality can be tested by every corn-grower by this simple and practical method. Take three kernels out of every seed ear—one from near the tip, one from the middle, and the other from near the butt of the ear. Fill an ordinary china dinner plate nearly full of sand and pour water on until thoroughly saturated. Now plant 100 kernels, point down, in the sand. Place a second, somewhat smaller, plate over the first, to prevent the too rapid evaporation of the moisture, and set in a warm room. Keep a record of the time and number of kernels sprouted in this kind of table:

Name of variety..........
Date of testing..........
Number of kernels..........
Source of seed..........

Date	Temperature	Number germinated.	Per Cent. germinated.
......	......	......	......
......	......	......	......
......	......	......	......
......	......	......	......
......	......	......	......

In seven days ninety-five per cent. should have germinated. If less, the seed should be discarded and better seed secured.

Selection And Storing of Seed Corn.

The seed should be thoroughly dry, in order to keep the vitality unimpaired. A simple and effective plan in ordinary seed selection is to select the good seed corn in the field. Tie a box to the rear of the wagon box and when a particularly fine ear is found on a well developed stalk, throw the ear into the box. A second selection can be made at the corn crib and the ears finally chosen for seed stored in boxes. These boxes should be thoroughly lined with screen wire drawn over the open top. This will prevent mice and rats from eating the seed, and will permit of free ventilation. Now set these boxes in an attic or other room provided with a stove, and keep up fire or heat until the ears are thoroughly dried out. The old-fashioned plan of hanging up the seed ears by husks over the open fire was an admirable plan for effecting this result. After once dry, the seed will not be affected by the extremes of temperature. In moist and immature kernels the cold freezes the moisture in the young plant and swells the cell, bursting the delicate tissue. If the seed is to be stored on an extensive scale, a special building should be prepared, set on tile, to prevent mice getting into the seed room. The ears should then be ricked up in regular order. A good plan is to lay them between two-by-six uprights and set the ricks several inches apart so that the dry air may circulate freely on all sides of the ear. A small stove will dry out the seed in two or three weeks' continuous drying.

Selection of Ears of Seed Corn.

In selecting the seed ears, the object is to select such ears as will produce the largest amount of shelled corn. The grower is after corn, and it is with this idea in view that the seed must be selected. In the first place, rough ears of medium size, with a large number of rows of kernels, weigh out the most shelled corn. The rough kernel is the deep kernel, and with a large number of rows on the cob the greatest amount of corn can be crowded on an ear. This can best be illustrated by an actual weighing test of two different types of corn. In one instance, an unimproved ear seventeen and one-half inches long, with broad, smooth kernels, weighed fourteen ounces; an improved ear of Boone County White, nine and three fourths inches long, and of about equal circumference to the long ear weighed seventeen ounces. When shelled the long ear produced nine ounces of shelled corn, while the short ear yielded fifteen ounces shelled corn. The deep kernel type actually outweighed the long, shallow type, and there was a difference of six ounces of shelled corn in favor of the short ear. Applying this test to field conditions, providing there were two ears to the hill and an equal number of long and short ears, the improved, short ear type would outyield the unimproved thirty-nine bushels per acre.

Standards For Varieties.

The length of ear will vary with locality—the shorter the season the longer the ear, and vice versa. In general, the ordinary type of corn should be between ten and eleven inches in length and 5, 7 and 8 inches in circumference. There is no objection to a longer ear, providing it is proportional and will mature in the season in which it is grown. In fact, one of the objects of breeding is to develop size. With recognized varieties, the standards of length, circumference [redacted]

Uniformity.

In selecting seed corn, the ears should be of uniform size, shape, color and indentation. A uniform product is the result of good selection and breeding, so that it is very important that the ears be uniform. The variety type should be strong. In Boone County White, the characteristics of this variety should be well developed. This is one of the most important points connected with the study of seed corn. It is impossible at present to describe these points so that the student may become familiar with the variety type without actual study of the varieties.

Shape of Ears.

The shape of the ears should be cylindrical. This cylindrical shape carried from the butt to the tip of the ear means an even, regular, deep kernel, resulting in a large per cent. of corn to cob. In tapering ears, the kernels become irregular at the tip, some of the rows are lost, and the proportion of corn to cob becomes small. This type is undesirable for every purpose. The rows of kernels should run parallel with the cob, straight and regular. If some of the kernels are not filled out, the adjoining kernels swell out into irregular shapes in an effort to occupy all of the space. In shelling the ears for seed, the irregular kernels on the butts and tips of the ears should be shelled off and discarded.

Color of Ears.

If a yellow corn, the cob should be a deep red, and if a white corn, the cob should be pure white. In the present standard varieties, the color has not been given particular attention and is frequently not pure. This mixing of color indicated mixing of varieties, which is injurious to the development of improved varieties. Mixture between white and yellow varieties is indicated by a white cap in the yellow ears, and a yellowish cast to the flinty portion of the kernel in the white ear.

Market Conditions.

The ear should be sound and firm; this indicates that the ear has fully matured and dried out in the season where it was grown. If the ear is loose, the kernels shriveled, it indicates that the ear is chaffy and has not fully matured under the conditions where it was grown.

Tips of Ears.

The tips should be filled with regular rows of kernels, so that no point of the cob projects beyond the kernels of corn. Poorly-filled-out ears indicate a small proportion of corn to cob and poor selection. By selecting well filled-out ears, the maturity of the different parts of the ear is brought to approximately the same season, so that the pollen produced by a variety will be sufficient to supply the entire ear on all the stalks in the field.

Butts of Ears.

The butt of the ear should be filled out about the shank, so that a medium-sized shank will be produced. It has been possible to make the kernels in the butt fill out to such an extent that the shank has been crowded so small that it will not support the ear on the stalk. On the other hand, a big, poorly-filled out butt is usually accompanied by a large, coarse shank, difficult to break in husking and with an unusual amount of husk in proportion to the size of the ear. In such ears fungus diseases, as dry-rot, frequently destroy the ear of corn.

Uniformity of Kernel.

The kernels should be of the same size, shape and color, and should be of the type of the variety. The uniformity of kernels enables the grower to secure an even stand, from the fact that the planter will drop a regular number of kernels. To study kernels, take out two of the kernels from about one-third the distance from the butt to the tipend and lay them beside the ear for close examination.

Shape of the Kernel.

The best shape of kernel is that of wedge. This shape will permit of the largest number of rows of kernels on cob. This shape has been developed as the result of breeding, and makes it possible for ears to have from twenty to twenty-four rows of kernels, resulting in a large per cent. of corn to cob. The kernel is the unit of the ear, and great attention should be paid to the develpment of the ker-[redacted]l.

Space.

By space between rows is meant the furrow [redacted]tween the tops of the rows of kernels and [redacted]e space between the tips of the kernel at the [redacted]b. It indicates a reversion to the original [redacted]allow-kernel type of corn, which is unprofit[redacted]le to the present-day corn-grower. There [redacted]ould be no furrows or space, and with the [redacted]proved types of kernels there is no space [redacted]t on the ears.

Length.

The length will vary with the variety. In [redacted]neral, a good ear of corn is between ten and [redacted]en inches in length. Measure the length [redacted]om the extreme butt to tip.

VARIETY STANDARDS.

	Reid's Yellow Dent	Golden Eagle	Riley's Favorite	Leaming	Boone Co. White	Silver Mine	White Superior
Ear: Shape ...	Slowly tapering	Slowly tapering	Slowly tapering	Tapering	Cylindrical	Cylindrical	Slowly tapering
Length	10 in.	9 in.	9 in.	10 in.	10 in.	9 in.	10 in.
Circumference	7 in.	7 in.	7 in.	7 in.	7½ in.	7 in.	7 in.
Kernel: Condition	Firm, upright	Loose, upright	Firm, upright	Firm, upright	Firm, upright	Firm, upright	Firm, upright
Color.....	Light yellow	Deep yellow	Deep yellow	Deep yellow	Pearl white	Cream white	Starch white
Indentation	Medium smooth	Very rough	Rough	Very rough	Rough	Very rough	Medium rough
Shape ...	Long wedge	Broad wedge	Medium wedge	Medium wedge	Medium wedge	Broad wedge	Very broad wedge
Rows: Number	18-24	16-20	16-20	16-24	16-22	16-20	18-20
Space....	Narrow	Medium	Medium	Medium	Medium	Narrow	Medium
Arrangement	Pairs	Distinct	Pairs	Pairs	Pairs	Pairs	Pairs
Butt: Filling out	Deeply rounded compressed	Moderately rounded compressed	Moderately rounded compressed	Moderately rounded compressed expanded	Moderately rounded compressed	Moderately rounded	Shallow rounded depressed
Tip: Filling out	Regular rows of kernels	Regular rows of kernels	Regular rows of kernels	Irregular rows of kernels	Regular rows of kernels	Regular rows of kernels	Regular rows of kernels
Shank: Size	Small	Small	Small	Medium	Medium	Small	Medium
Cob: Size	Medium	Small	Small	Medium	Medium	Small	Medium
Color.....	Deep red	Deep red	Deep red	Deep red	White	White	White
Per cent. of corn	88	90	90	83	86	90	88

The Score Card.

In studying the seed corn the score card is a very useful helper, and the card adopted by the Illinois Corn Growers' Association is given here as a suggestion in the studying of the various points in an ear of corn according to their relative importance:

	Name.	Perfect score.	Explanation.
1	Uniformity..........	10	Uniform type, size, shape, color and indentation.
2	Shape of ears..........	5	Cylindrical, partly cylindrical and taper.
3	Color of ears..........	10	White kernel, white cob; yellow kernel, red cob.
4	Market condition..........	5	Soundness, maturity.
5	Tips of ears..........	10	Filled out with regular rows of kernels.
6	Butts of ears..........	5	Kernels swelled around shank evenly.
7	Uniformity of kernels..........	5	Uniform type, color, size and shape.
8	Shape of kernels..........	5	Wedge shape.
9	Space..........	10	Narrow, medium and wide.
10	Length..........	10	Conformity to standard for variety.
11	Circumference..........	5	Conformity to standard for variety.
12	Per cent. corn..........	20	Conformity to standard for variety.
		100	

Circumference.

The circumference will vary with the variety. It should be measured at about one-third the distance from butt to tip of ear. In ordinary corn, seven and one-half to eight inches is the circumference proportional to the ordinary length of ear.

Per Cent. Corn.

The corn-grower produces the corn for the actual amount of shelled corn produced. With the rough, deep-kernel type, with a large number of rows of kernels on the ear, all available space being taken up with corn, the per cent. is greatest; hence, such corn is the most profitable to grow. To find per cent., weigh the ear, shell the corn, and weigh the shelled corn. Divide the weight of the shelled corn by the total weight of ear, and the result will be the per cent. of shelled corn. This per cent. will vary with the variety, but in general it is about eighty-eight per cent. A large enough cob to support the rows of corn is needed, and this per cent. of corn represents about the proportion which will give the best results.

Selection for Quality.

The composition of the corn kernel is of great importance to the feeders, stockmen and gluecose factories. If the per cent. of protein can be increased by breeding, the corn becomes more valuable feed for live stock. It is brought nearer a balanced ration, in other words, and is of great importance to stockmen. The composition of the kernel can can be varied by breeding through selection of seed, as proved by experiments of the Illinois station since 1896. The variation in the crop is shown by the following table, quoted from the work of the station. The table further shows that the proportion of oil may be increased at the will of the breeder. This will be of tremendous importance to the glucose factories:

	Protein in seed.	Protein in crop.	Oil in seed.	Oil in crop.
1896	.. ..	......	......	......
1897	12.54	10.92	5.33	4.70
1898	12.49	11.10	5.20	4.73
1899	13.06	11.05	6.15	5.15
1900	13.74	11.46	6.30	5.64
1901	14.77	12.32	6.77	6.12

The analysis of corn showing average composition, is as follows:

Ash	1.43
Fiber	2.66
Oil	4.70
Protein	10.92
Carbohydrates	80.35

The composition of the kernel may be determined in part by simple mechanical examination. The proportion of hard, flinty part of kernel to soft starch at the top of the kernel and under the germ indicates per cent. of protein and starch in the kernel. The size of the germ indicates the approximate proportion of oil and protein. In selecting seed it is a good plan to select ears having kernels with good sized "chit" or germ. These breeding experiments have proved that the amounts of protein, oil and starch may be varied by the corn breeder, both to increase or decrease any one of these elements of composition. The development of milk producing qualities in the dairy breeds, or the per cent. of sugar in the sugar beet indicates what may be accomplished by corn selection.

Culture.

The third important feature in the production of a corn crop is the culture; that is, the preparing of seed bed, kind of planting and cultivation. The preparation of the seed bed should be of such a nature as to furnish the requirements for germination of the seed corn; moisture, warmth and air. The depth and time of plowing, the floating, disking and harrowing of the seed bed must vary with the soil and climate. However, the general principles of a thorough fitting of the soil, destroying the weeds before the corn is planted, and the securing of a mulch to prevent the escape of soil moisture, are the foundations of successful corn culture.

Distance Apart of Hills.

In planting corn, the distance apart of the rows and hills in the row is important. The general tendency is to bring the hills closer together and plant fewer kernels in the hill. Ten years ago the ordinary width planter was at least 3 feet 10 inches, and varied to as wide as 4 feet 4 inches. Today the most popular width planter is 3 feet 6 inches, varying to as narrow as 3 feet 2 inches. To show the reason for this bringing together of the rows, a 3 foot 8 inch planter will plant 3240 hills in an acre. A 3 foot 6 inch planter, just two inches closer together, will plant 3556 hills per acre, a gain of 316 hills. If these hills contain two well developed ears, this would mean a gain of about nine bushels per acre.

Number of Stalks in Hill.

With improved seed it is not necessary to plant a large number of kernels in the hill. The latest improved planters are so arranged that, if set to drop two kernels in a hill, about 90 per cent. of the hills will be found to contain two kernels. With improved seed corn, at least, 97 per cent. of the kernels will produce stalks, so that, if two kernels are put in a hill, we are certain of securing two stalks. As the seed corn becomes more and more improved, we can depend on every stalk producing an ear. When this condition is secured, two stalks in the hill will produce as large yield per acre as the soil can yield in a season; so that the evolution of the number of stalks per hill is toward less stalks to the hill, an average of about two stalks per hill giving best results.

Hilling vs. Drilling.

In a new country, the usual practice is to drill corn. With few noxious weeds, with abundant soil fertility, the farmer was able to put in more stalks in an acre than would be possible in hilled corn, and the results were generally satisfactory. However, as the most destructive and harmful of weeds spread over the corn belt, it was found to be difficult to get rid of them in drilled corn. As the excessive fertility was drained out of the soil by continual cropping, the large number of stalks became detrimental; so that the tendency is away from drilling back to the old plan of planting in hills.

Many farmers contend that by stringing out the kernels in the row of drilled corn, the stalk will produce better ears than in the hills. With the idea of trying to ascertain the facts, the Illinois station carried on a series of experiments for several years. The experiment was so arranged that an equal amount of ground was given to drilled corn and hilled corn. The same number of stalks in the hill were strung out in the row of drilled corn. The corn was all thinned after planting, so that we secured an equal number of stalks in the drilled field as in the hilled field. The fields were kept free from weeds, and the same cultivation given in both cases. The experiment was repeated with different soils, varieties of corn and seasons. As a result, we found in figuring up the average yields, there was less than a bushel difference in the yields of the drilled and hilled fields. Further experiments are in progress along this line, which will add to the interest of the experiment. But it is safe to say that there is little difference in yields in the two practices, and that one system has little advantage over the other, up to four stalks in the hill. With improved seed, it is not necessary to plant this number of kernels in the hill. In view of the great advantage of hilled corn during cultivation, the evidence is largely in favor of the practice of hilling.

The depth of planting is another question which varies with the soil condition. Corn can be planted deeper in a sandy soil which drains out readily in the spring and warms up quickly, than in the heavier clay soil. The corn should be planted deep enough to secure sufficient moisture for the best germination, but not so deep that it will be placed in a cold, wet soil, where the kernel is liable to rot and decay, and, in any event, to cause protracted germination, which is injurious to the plant. No matter what depth the seed is planted, the roots branch out at about a constant distance from the surface. In ordinary prairie loam this distance is between two and three inches. If the kernel is set down lower than this point it sends out a root system, which develops a tube-like structure, reaching to within two or three inches of the surface. At this point the real root system branches out, the stem of the plant is sent to the air, and the first root system decays and is lost. Such a condition must result disastrously to the young plants, and reduce the yield of the crop.

Cultivation of Corn.

The cultivation of the corn crop must depend upon the condition of seasons, soil, and the amount of weeds in the field. The cultivation of the crop is for the purpose of destroying weeds, conserving soil moisture, and aerating the soil. The weediness of the field will depend upon the work done on the seed bed. If the seed bed has been properly handled preparatory to planting, most of the weeds will have been destroyed, so that the principal object of cultivation is that of conserving the soil moisture.

CONTINUED ON FOURTH PAGE.