INDIAN CORN.

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Indian Corn is not a new plant in this country of ours. More than two hundred and fifty years ago, the first colonists of Jamestown and of Plymouth found the natives successful in its culture, and dependent upon it, in part, for their sustenance. The history of the Incas tells us that it was largely cultivated in Peru centuries before this. The better opinion is, that it is indigenous to America. You, gentlemen, have been familiar with it all your lives, and I have annually raised a crop of it for the last twenty-five years. We ought, all of us, therefore, to understand fully what pertains to its growth and culture; but I fear that there is much regarding these which we have yet to learn. I am free to admit the limitations of my own knowledge, which invariably appear upon every attempt to penetrate the unsolved mysteries of its development.

I rarely apologize; but, on this occasion, I feel constrained to say, as I stand here to speak of this most important of our New England cereals, that an uncomfortable sense of my imperfect knowledge of the subject comes over me, and recalls an incident in the life of the late Gen. Israel Boyd, once a resident of this State, and a gentleman more distinguished for his social qualities and his chronic impecuniosity than for characteristics of a higher order. He said, one day, to a few cronies whom he had chanced to meet, "Let us go and have a little exhilaration. This solitary quarter of a dollar is all the capital I have. It is not enough to do business on, but it will buy a small amount of

tipple, and that I shall be most happy to share with you." My capital stock, on this occasion, is not as large as I wish it was, but, small as it is, I shall be most happy "to share it with you."

Indian corn possesses great flexibility of character, and readily adapts itself to most soils and climates found in the United States. Its northern limit is an isothermal line ranging through some seven degrees of latitude, and having a mean temperature of sixty-five degrees above zero, for two and a half months in each year.

In following such a line westward, across the continent, we start on the forty-sixth parallel, in New Brunswick; and thence, passing on, we descend to the forty-fifth, in Maine, and to the forty-fourth, in New Hampshire, but suddenly rise to the forty-seventh, near Quebec. Descending again, in New York and Canada West, to the forty-sixth, and, still farther on, as we encounter the cooling influences of the lakes, to the forty-fifth, we continue on that, almost to Minnesota. On reaching the vicinity of Lake Winnipeg, we ascend to the fiftieth parallel, and, as we pass still farther west, in some instances to the fifty-first, the most northern limit of its cultivation on this continent. The line terminates abruptly at the one hundred and twentieth parallel of longitude, west of which it cannot be raised.

While there is but a single species of Indian corn, this is found in almost numberless varieties, from the smallest pop-corn, with ears two inches long, to the large, thirty-six-rowed kinds, with stalks from fifteen to twenty feet high.

The ears of these different varieties are widely unlike in color, some being pearly white, some cream-colored, some blue, while others are respectively black, red, or yellow. Their stalks, also, vary greatly in size. Those of some are exceedingly small, and do not exceed two feet in height. Any of you, as may have visited Nantucket, may have noticed such growing upon the sandy soil of that island. On the other hand, those of others are more than an inch in diameter at the ground, and tower aloft like trees. Their periods of growth differ widely. Some small, eight-rowed kinds mature in sixty days, while others do not ripen in less than two hundred. Those most common with us require about one hundred and twenty.

We also find great diversities in the number, size, form, and internal structure of the kernels of different varieties. As seen upon the ear, those of one large class are convex, smooth, and highly polished. These are generally designated as "flint corns." Those of another, owing to a contraction of the endosperm, upon drying, have shallow pits upon their outer surfaces, a characteristic which has given rise to the designation, which they commonly bear, of "dent corns."

If we count the kernels upon ears of different kinds, we shall find their numbers varying widely. I found, a few days since, upon a tiny ear of yellow pop-corn, one hundred and eighty; and, upon a good-sized ear of Western dent corn, no less than six hundred and forty-eight.

The kernels also vary much in size and form. Some are small and shallow; others are large and deep. Some are wide and thick, while others are thin and narrow. Some have pointed tops; some are covered with husks.

If we examine the horn-like envelopes which cover them, we shall find differences of more importance. Those upon the flint varieties, while thickest on the sides of the kernels, are by no means thin upon the tops. In the dent varieties, however, the corneous portion is found almost entirely upon the sides; while in Tuscarora corn it is wanting altogether.

As these are filled with minute six-sided cells containing oil, the relative value of different corns for fattening purposes is largely dependent upon the proportions of these parts to the others of which the kernel is composed; some varieties, like the Tuscarora, just mentioned, containing no oil whatever, while into the composition of others it enters to the amount of eleven per cent.

All contain starch, in greater or less proportions, the dent corns, as a general thing, having larger percentages of it than the flint varieties. The different kinds also vary widely in the amounts of gluten, dextrine, and phosphates, which they severally contain.

The characteristics of the several varieties determine in a great measure their different market values. While at this time (January 28, 1879) the dent varieties are quoted at forty-eight

cents per bushel in Concord, the flint varieties are selling at sixty-seven cents. And this difference in price doubtless does not exceed that of their intrinsic values for feeding purposes.

In stock-raising, the man who is accurately informed of the particular characteristics of each variety, can feed with far greater economy than another who is ignorant of them, and to whom all corn is simply corn, and who blunders on without any knowledge or care as to its constituent ingredients.

We now come to the inquiry, and a very important one it is, what soils, climates, and systems of culture are most favorable to the growth of Indian corn?

1. *What soils?* I need not tarry long on this point. You all know what a good corn soil is; that it is a light, warm, moist, deep one; rich in nitrogen, phosphates, and potash, having, withal, a sunny exposure. Maximum corn crops are not economically possible on land possessing opposite characteristics, and hence the maxim so common among us, — "Raise corn on corn land!"

2. *What climates?* As before stated, the growth of corn is possible at some points on this continent as far north as fifty-one degrees, but only in small varieties and unprofitable crops. We must remember that it is a tropical plant, delighting in an abundance of solar heat and high temperatures. It will not germinate at a point below 48° above zero. It flourishes in highest luxuriance upon the rich lands of the tropics, but at the same time accommodates itself to the soils and climate of New England.

Our sure corn season is a brief one, of only about one hundred and twenty days, interposed between spring and autumn frosts, in May and September. To insure its maturity, a corn crop must have a certain amount of high heat afforded to it in one or more brief periods, or extended in less intensity through larger portions of the season.

I say high heat, for its tropical nature demands such and must have it. Although the mean temperature of England is above that of New Hampshire, Indian corn will not ripen in that country. I have, however, met with it quite high up among the Alps, where the shelter of the mountains and the intense summer sunshine made its ripening possible.

It delights in the hot waves which sweep over us in July and August. Its growth, at such times, is very rapid, and may be measured from day to day. Some persons have even imagined that they could hear it grow. I have been told of an old curmudgeon who was wont to put his pocket-book under his pillow, when he went to bed, in order, as he said, that he might wake up in the night and hear his notes drawing interest. He had far better sleep in his corn-field and listen to the rapid accretions of his corn-plants, growing into luxuriant development, hour after hour, throughout the hot night watches.

3. *What culture is best adapted to the fullest development of this important cereal?* And in the term culture, I include both soil manipulation and fertilization.

I know of no better way for us to solve this vital question than by studying nature's own processes, as we may see them develop under favorable circumstances; for nature is God, who never misleads his honestly inquiring children. To this let us now devote a few moments, and, by the aid of the drawings you see upon the wall, made at different times the last summer, from living plants, try to learn how corn grows, and gather such hints relative to its culture as its habits of development shall supply.

HOW CORN GROWS.

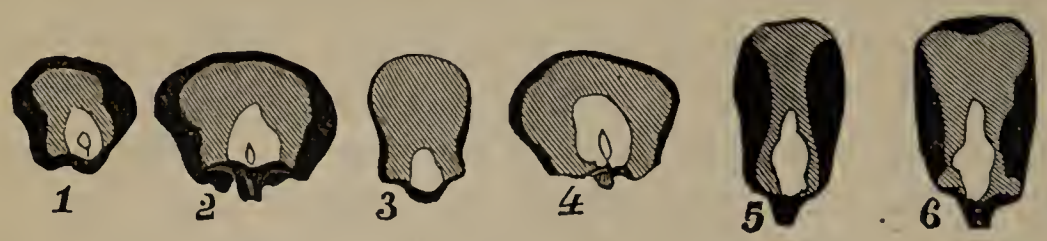
We will begin, if you please, with the kernel; a very small thing, but in corn-growing a very important one. If this is weak or in any way defective, we shall have reason to fear that the plant springing therefrom will also be imperfect.

If, with a sharp knife, we remove one side of a kernel of corn and lay open to view its interior structure, we shall find it to consist, —

1. Of a hard, horny covering, of varying thickness, which envelops and preserves it from such accidents as are most likely to befall it. This, varying in color, in different varieties, is composed of gluten and oil, the latter, as before stated, being contained in minute six-sided cells. It is thickest upon the sides of the kernels. In the dent varieties, it is exceedingly thin upon their outer surfaces, and sometimes wanting altogether.

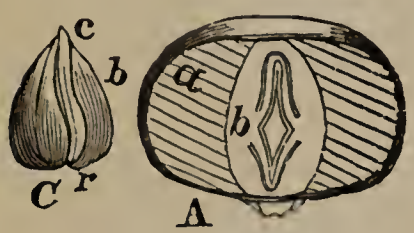
2. Of an interior of lighter color, composed largely of starch.

In most varieties, this constitutes one-half or more of the kernel's substance, and forms what botanists term the endosperm.



In the above drawings of sections of six varieties of corn, the outer and darker portions represent the corneous envelope above mentioned; those more highly shaded the starchy parts, while those not shaded at all contain the germ. No. 1 represents a section of pop-corn; No. 2, of improved King Philip corn; No. 3, of New Mexican black corn; No. 4, Tuscarora corn; No. 5, of shoe-peg corn; No. 6, of improved white gourd-seed corn.

3. Of the chit or germ embedded in the endosperm. This is the most important part of the seed. It is, in fact, the future plant in embryo, and has already formed, as Professor Johnson remarks, "its root, stem, leaves, and a bud." Under certain conditions its radicle, plumule, and cotyledon may be clearly seen.



In Figure *C*, *r* represents the radicle, *c* the plumule, and *b* the cotyledon. In Figure *A*, *a* represents the starchy portion of the kernel, and *b* the germ.

When, therefore, we plant a kernel of corn, we as really set out an organized plant, as does he who removes, from his nursery to his orchard, a young tree. The shelly covering, which has heretofore enveloped the seed, softens under the influence of moisture and solar heat. The plumule awakes to life and springs upward, piercing with its sharp, green needle the soil above it. The radicle, also awakened, starts downward, developing, as it goes, minute rootlets, whose tiny mouths absorb nourishment, first from the cotyledon, next from the endosperm, and subsequently, upon the exhaustion of these, from the ground.

Fig. 1.

Fig. 1 represents a stem and root of corn ten days after planting.

For a time, these rootlets are exceedingly delicate

and require food easily assimilated and near at hand, just as, in the animal kingdom, the newly born requires nutriment within easy reach and adapted to its infantile development. Soon, however, they grow stronger, and, in search of food, penetrate the soil in all directions.

At the expiration of a week, or thereabouts, from planting, the tip of the nascent stalk appears above ground. Under favorable circumstances, its increase is rapid.

Fig. 2 represents a stem, leaves, and roots, about three weeks from planting.

Fig. 2.

Leaf after leaf unfolds and bends gracefully outward and downwards in curving lines from the central stem. The hot sunshine and warm showers of June and July stimulate it to a growth of marvelous rapidity.

By the last of July, in ordinary seasons, the tassel lifts itself into view from out its green envelope, and the stalk, which sustains it, throwing out its alternate leaves of deepest green, rises in ten or fifteen days to its normal height. If we now examine it with care, we shall find it jointed at intervals of from six inches to a foot. At each of these has grown out, on alternate sides, a long and graceful leaf, the base of which clasps and strengthens the stem which gives to it support — fit emblem of the sustaining power which the God-given wife affords the husband upon whom she leans.

Fig. 3 represents a corn-plant at the time the silk has formed.

We shall also find, upon more careful inspection, that, at the axil of each leaf, on the lower half of the stalk, a tiny ear has started into being, those highest up being the most advanced in their development. A little dissection will reveal them to the number of half a dozen, more or less, always upon the concave sides of the stalk, and continuing upward from the bottom as far as concavity extends. These nascent ears and these inter-

Fig. 3.

nodial hollows for the accommodation of their stems, suggest very strongly nature's willingness, under the necessary conditions, to produce an ear at every node. Could we secure the full development of all of these, we should thereby increase our ordinary corn crops some five or six fold of what they now are. As a general thing, under present culture, the upper one only attains perfection. At times, to be sure, a stalk produces two, and occasionally even three, well-developed ears.

In Fig. 4 the lower leaves have been removed, to show the incipient ears just mentioned.*

Soon after the stalk has attained its normal height, its flowers appear; the stamens, charged with fertilizing pollen, being borne aloft upon the tassel, while the pistils, attached to the pointed chits of the kernels, protrude in silky bundles from the extremity of every ear. Upon these last, ere long, gravity, aided by the winds, showers down the fructifying dust, without which perfect development would be impossible.

Fig. 5 represents the silk attached to a kernel, a bundle of which is seen protruding from the end of an ear in Fig. 3.

Fig. 6 represents a mature stalk, as it appears just after the husk has partially separated itself from the ear.

Such are some of the physiological and botanical points one meets while watching the growth of a stalk of Indian corn, — the awakening to life of the dry seed; the putting forth of the nascent stalk and root; their gradual development; the appearance of the tiny ears; the flowering of the plant; and the fertilization of its growing seeds. What hints do these afford us as to the best methods of its culture? I reply, —

1. That the new plant cannot long depend for support upon the sustenance which nature has so thoughtfully stored up in the seed. This can last for but a few days, at longest.

2. That, as the roots of the plant begin to form from the radicle and from the base of the stock, their minute stems and branches, tender and of extreme delicacy, require a warm, moist, and light earth-bed, into which they may freely extend

* This cut, intended to show the embryonic ears, is but approximately correct, the ears being relatively too large, and standing out too far from the stalk.

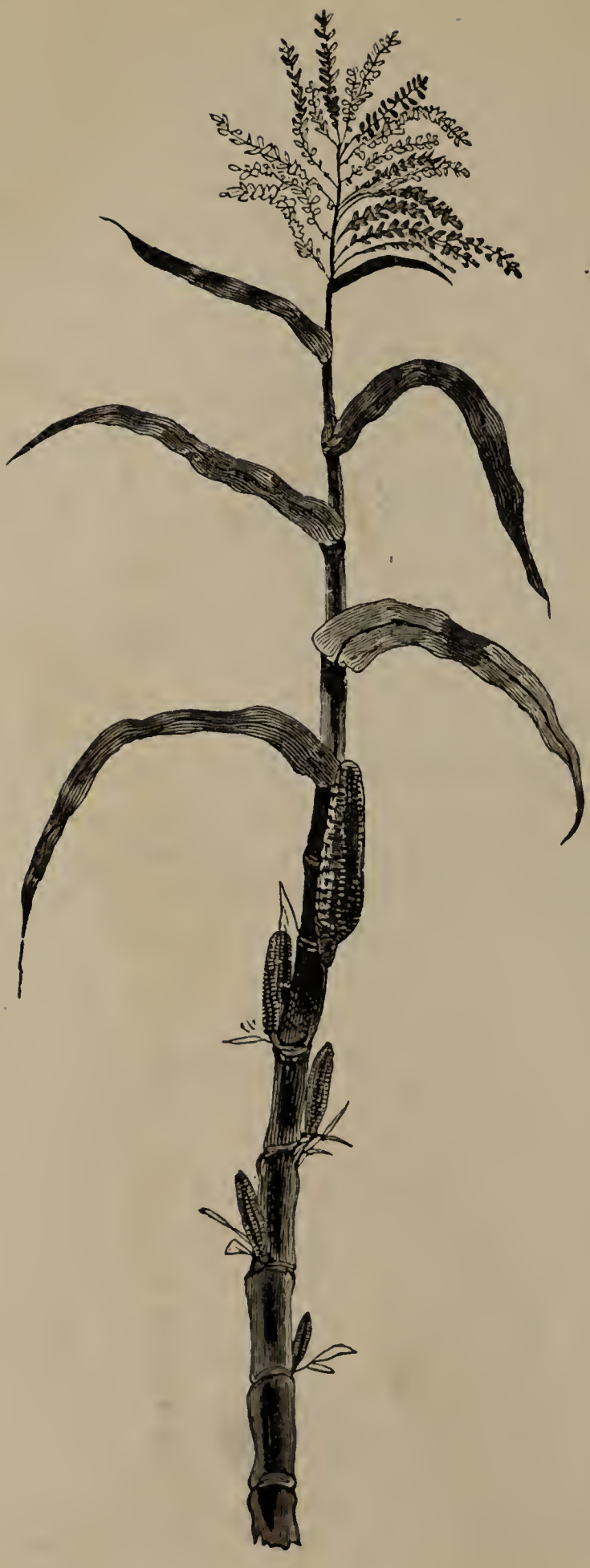


Fig. 4.

Fig. 5.

Fig. 6.

and expand themselves. One of an opposite character retards the plant's growth and causes a loss of time, which, in our short seasons, we can ill afford to incur.

3. That they require, within immediate reach, a full supply of easily assimilable food, adapted to the plant's existing wants. In other words, some soluble and comminuted fertilizer is needed in each hill. Unevenness of growth and tardiness of development may be often seen in corn-fields, wholly due to the want of this, and resulting, at harvest, in far more barren stalks, as well as defective or unripe ears, than the season or the soil affords occasion for. The great bard of universal humanity somewhere says : —

> "The fault, dear Brutus, is not in our stars,
> But in ourselves, that we are underlings."

And so, friends, the fault, very often, is not in the weather, or the ground, but in our neglect of this one condition, that our corn crops start slowly, and, in the end, come short.

4. The rapid development of the roots reminds us of the fact that there can be no flourishing vegetation, if warmth, air, and moisture have not free access to the soil ; and suggests its frequent stirring, by such pulverizing implements as will most economically accomplish this purpose. *Most economically*, I say with emphasis ; and mean, by that expression, that the hoe is not the best instrument with which to attain this end. While we cannot dispense with it altogether, any more than can society yet do without war and gunpowder, we may, to a great extent, substitute for it some one or more of the excellent cultivators now on the market, and secure, therewith, a more complete pulverization of the soil than the hoe affords, as well as an important saving of money.

5. This extension of the roots also suggests that there must be a full supply of plant-food outside the hills, and that a sufficient fertilization should pervade the entire area occupied by the crop.

6. The appearance of an incipient ear at every node, on the lower half of the stalk, may well excite our attention and give rise to the reflection, that, if by any means these may be excited to perfect development, our corn crops may be quadrupled, and

even sextupled, in amount. I regret to say, that I can give you but little, if any, information to aid you in efforts to this end. An eminent authority in corn-growing has suggested root-pruning, as conducive to an increase of the number of ears. In absence of personal experience in this direction, I can only say, that I do not readily see how a lessening of the area of the plant's support and an increase of the number of its feeding-roots will be any more likely to result in an enlarged number of ears, than would a multiplication of mouths secure increased growth to a calf, the capacities of whose digestive system were limited to the amount of food easily swallowed from one.* The point is an important one, and I commend it to your careful study and experimentation. †

7. The method adopted by nature for the fertilization of the ear, suggests that corn be so planted, with reference to prevailing winds, and in areas of such size and shape, as to favor the saving and an even distribution of the pollen upon the silks of the ears. Such care will also tend to secure from prostration many hills which violent storms are liable to assail.

FERTILIZATION.

And here arises the very important question, What fertilization, all things considered, is best for a field of corn?

To this, no one universal answer can be given. It will depend very much upon the condition and composition of the soil.

* I would sooner select seed from twin or triplet ears, and endeavor, by isolation, careful cultivation, and a removal of all barren and one-eared stalks, to render permanent its characteristics. Just as, in the production of a new breed of cattle, a person starts with animals the nearest to his ideal which he can obtain, and thence works patiently onwards, towards its attainment.

† "At the late meeting of the National Agricultural Congress, at New Haven, Mr. G. W. Bradley, of Hamden, Conn., exhibited stalks of corn containing eight and nine ears, respectively. The variety was the Tennessee corn, and we made the following notes concerning its habits of growth: Stalk tall, leafy, sixteen nodes in all; one ear on the fifth, sixth, seventh, eighth, ninth, tenth, eleventh, and twelfth node, respectively; the grain is a dense, heavy, white variety, eight-rowed; moderate-sized cob; the ear eight and one-half to nine inches long, and containing forty-five to fifty kernels in the row." — *The Scientific Farmer*, October, 1878, page 147.

If it be asked, what do fifty bushels of corn, — an acre's ordinary yield — withdraw from the soil? the answer is easy. This number of bushels withdraws, in its grain and stalks, 72.8 pounds of potash, 51.0 pounds of phosphoric acid, 75.1 pounds of nitrogen.* I say nothing of the other elements, which the soil supplies in abundance and but rarely runs short of.

Whether the application of these ingredients, in the quantities stated, will insure fifty bushels of corn, above the soil's natural yield, is a matter of entire uncertainty. It may or it may not. Applying but one or two of them will sometimes do it, while a dressing of all three not unfrequently fails. Every corn-grower can best solve this question by personal experimentation upon his own soil.

By your permission, I will refer, in illustration of this point, to two experiments of my own, the past season. Rude calculations, made last spring, from the best data then at command, inclined me to think that these three ingredients — potash, phosphoric acid, and nitrogen — could be as cheaply had in stable manure as in special fertilizers, and I made this my main dependence for fertilization on a corn crop of about nine acres and a half. At harvest time I encountered these unexpected results, viz.: One measured acre of good Merrimack-river intervale broken up in the fall of 1877, after it had lain in grass for six years, dressed with six cords of stable manure, spread broadcast and plowed in, supplemented by about one hundred and fifty pounds of Bradley's XL superphosphate, applied in the hill, produced one hundred and forty-seven baskets (each holding one and one-fourth bushels) of ears of sound corn, which shelled out seventy-three and one-fourth weighed bushels of fifty-six pounds each in January and February, 1879, and seven baskets of ears of pig corn.

Adjoining this acre, one hundred and two square rods of ground, of the same quality and previous culture, was manured, in the hill only, with two hundred and sixty pounds of Bradley's XL superphosphate, or at the rate of about four hundred pounds per acre, and, on the same day, planted with the same kind of

* Report of Connecticut Board of Agriculture for 1876, page 215.

corn. This piece yielded at harvest ninety baskets of ears, or at the rate of one hundred and forty-one and nine-sixtieths baskets per acre; equal to seventy and one-half bushels of sound, shelled corn. In other words, to summarize the two statements: Six cords of stable manure and 150 pounds of superphosphate gave 73¼ bushels of shelled corn, and 400 pounds of superphosphate alone gave 70½ bushels, — a difference of only 2¾ bushels; while the cost of manure per acre on the first piece was $45.37, and on the second piece $9, — a difference of $36.37. It is obvious that a portion only of the stable manure could have been appropriated, and still remains in the ground.

In 1877, about four hundred pounds of the same brand of superphosphate, applied in the hill upon unmanured land of the same kind, gave forty-five bushels of shelled corn per acre.

The four hundred pounds of superphosphate used in the second experiment, added to the soil 50.84 pounds phosphoric acid, 11.36 pounds nitrogen, and no potash. While the 70½ bushels of corn withdrew from it 71.90 pounds of phosphoric acid, 105.88 pounds nitrogen, 102.64 pounds potash.

In other words, I took from the soil about 21.06 pounds of phosphoric acid, about 94.52 pounds of nitrogen, and about 102.64 pounds of potash, more than I supplied to it.

From these three experiments, I infer, as to my own land,—

1. That the analysis of a given corn crop is not a sure guide as to the manurial needs of the particular soil upon which it may be proposed to raise it.

2. That personal experimentation is the most reliable means of ascertaining the wants of a soil with reference to a particular crop.

3. That for my land, superphosphate of lime is the most economical corn fertilizer which I have yet found; and that I shall do well to apply my barn and stable manure to my grass crops, and fertilize my corn-fields with superphosphate.

But do not understand me as recommending this course to any of you, until you have ascertained, by careful experiments, that it is the one most likely to meet the wants of your land and crops. Rather, in scripture phrase, "Prove all things; hold fast that which is good."

Several corn fertilizers are upon the market, and their several values can be best determined by trial.

1. Three or four cords of stable manure, with a small amount of some soluble fertilizer in each hill, to give the plants an early start, will secure a good crop in a favorable season on any good corn soil.

2. I have already mentioned Bradley's XL superphosphate. Five hundred pounds of this, costing $11.25, at the price of this year (1878), contains, according to Professor Goessmann (Mass. Agriculture for 1877–78, page 330), 39.05 pounds soluble phosphoric acid, 2.50 pounds reverted phosphoric acid, 22.00 pounds insoluble phosphoric acid, 14.20 pounds nitrogen.

3. Forester's corn manure is one with which I have no personal acquaintance. According to the manufacturer's circular, eight hundred pounds, costing $19.00, is the proper quantity for an acre of ground, and contains plant-food for seventy-five bushels of shelled corn, as follows: 50 pounds of ammonia, 44 pounds available phosphoric acid, 72 pounds potash, 8 pounds magnesia.

4. The Stockbridge corn fertilizer has produced good results. It is claimed that eight hundred pounds applied to an acre of good corn land will produce from forty to sixty bushels of shelled corn. This quantity, costing $18.00, contains, according to Professor Goessmann (Mass. Agriculture for 1876–77, page 275), 20.48 pounds of soluble phosphoric acid, 12.80 pounds of reduced phosphoric acid, 9.92 pounds of insoluble phosphoric acid, 63.04 pounds of nitrogen, 78.00 of potassium oxide.

The best fertilizer is undoubtedly stable manure. While it contains all the ingredients of a perfect corn food, it holds them in the slowly yielding grasp of a large quantity of vegetable matter retentive of water. In seasons of protracted drought, this manure continues to afford moisture and plant-food to crops long after those fed with chemicals have become too dry for active vegetation and ceased to grow. In a word, land fertilized by chemicals sooner feels a drought than it would have done had it been dressed with stable manure.

Other points, of much importance to the corn-grower, demand his careful consideration, and questions like these arise: —

1. How shall the seed-bed be prepared?
2. Are eight or twelve rowed varieties preferable?
3. In harvesting, is it best by a single operation to cut the stalks at the ground and stook them, or, by two, remove first the upper portions, and subsequently the butts and corn?
4. Is corn a profitable crop?

THE SEED-BED.

The seed-bed should be in warm and thoroughly pulverized ground, and have a depth of not less than five inches. The dressing applied broadcast should be fine and evenly incorporated with every part of it. That placed in the hills, to give the plants an early start, should be thoroughly mixed with the soil. The common practice of dropping this in compact masses and thus leaving it, indicates either great ignorance of the needs of young plants, or gross indifference thereto.

ARE EIGHT OR TWELVE ROWED VARIETIES PREFERABLE?

A visit to a hundred New Hampshire farms, selected at random, would doubtless show that eight-rowed corn was the kind raised upon at least eighty of the hundred. And I incline to the belief that the popular verdict is the true one, for several reasons.

The eight-rowed varieties yield a larger amount of shelled corn to a given amount of stalks than do the twelve-rowed. On like soils, similar culture will produce more bushels per acre of the former than of the latter. In other words, a bushel of eight-rowed corn can be raised for less money than a bushel of twelve-rowed, and consequently yields a higher profit to the producer.

The eight-rowed varieties mature in a less number of days, and incur less injury from frost than do the larger kinds. Their plants may stand nearer together, allowing a larger number upon a given area. An acre of eight-rowed corn on my farm produced last season, as above stated, seventy and one-fourth bushels of sound shelled corn, while the same area of twelve-rowed, on similar ground and with similar culture, yielded but sixty-one bushels.

The cobs of the eight-rowed kinds are much smaller than

those of the twelve-rowed, and the corn upon them dries quicker by several weeks. The same may be also said of their stalks. Consequently, the time of the crop's exposure in the field at harvest may be more brief than in the case of the kinds last mentioned, and the field be earlier cleared for the succeeding crop; an important consideration, where fall seeding to grain or grass is practiced.

Profitable corn-raising is largely dependent upon obtaining a maximum yield of corn from a minimum amount of stalk. Ordinarily, the latter costs as much, or more, than its market value, and the profit, if any, comes from the grain. A little figuring based upon tables * showing the chemical ingredients of the grain and stalks, will make this clear.

Fifty bushels of shelled corn, weighing fifty-six pounds per bushel, contain: —

.6	pounds of	sulphuric acid,	worth, at	3	cents per pound	$0 02
16.5	"	phosphoric acid,	"	10	"	1.65
.8	"	lime,	"	1	"	.01
5.6	"	magnesia,	"	2½	"	.14
10.4	"	potash,	"	7	"	.72
44.8	"	nitrogen,	"	20	"	8.96
		Total cost of fertilizers				$11.50
		Value of corn, at 75 cents per bushel				37.50
		Value of corn over that of mineral ingredients				$26.00

A corresponding amount of stalks, say two and one-half tons, contains: —

7.8	pounds of	sulphuric acid,	worth, at	3	cents per pound.	$0.23
34.5	"	phosphoric acid,	"	10	"	3.45
26.0	"	lime,	"	1	"	.26
16.9	"	magnesia,	"	2½	"	.42
62.4	"	potash,	"	7	"	4.37
31.2	"	nitrogen,	"	20	"	6.24
		Total value of chemical ingredients				$14.97
		Value of stalks, at $6 per ton				15.00
		Value of stalks over chemical ingredients				$0.03

It appears, therefore, considering only the expenses of fertilizers appropriated by the crop, that while the grain has fur-

* Report of Connecticut Board of Agriculture for 1876–77, page 215.

nished a profit of $26, the stalks have yielded none worth mentioning. The corn-producer, therefore, should endeavor to raise a given amount of corn upon the least possible amount of stalks.

CUTTING STALKS.

Two methods of cutting up corn prevail in different localities, and often among different farmers of the same locality. One is to cut the top stalks when the ears begin to glaze, and, at a later day, the butts. By the other, the stalks are severed, once for all, near the ground, and, with the corn, immediately stooked, to remain in the field until dry and the ears have become fit for husking.

This latter is the preferable method for several reasons, viz.: —

1. It lessens the expense of stalk-cutting, one-half.

2. It preserves the butt stalks in as good condition as the tops, while the first leaves them exposed to rains and frosts, which diminish, greatly, their feeding value.

3. It secures an earlier storage of the corn and fodder, the low severing of the stalks causing a rapid drying of both.

IS CORN-RAISING A PROFITABLE BUSINESS?

I can only say, in answer to this question, that, skillfully raised on good corn land, I think it is. Allow me to present to you, in detail, the cost of one acre raised on my own farm, the past season. It was as follows, viz.: —

Eight quarts of seed	$0.25
One-sixth cost of breaking up sod ground	.67
Harrowing same twice	.75
Marking same	.50
Three hundred lbs. Bradley's XL superphosphate	6.75
Dropping seed	.75
First cultivating both ways (two and one-half hours)	.75
First hoeing (one day)	2.50
Second cultivating both ways	.75
Second hoeing	1.50
Third cultivating	.75
Cutting up and stooking	2.50
Housing	2.00

Husking one hundred and forty bush. ears, at five cents per bush.	7.00
Shelling seventy bushels corn, at seven cents per bushel	4.90
Whole expense of crop	$32.32
Deduct for two tons of fodder, at five dollars per ton	10.00
Net cost of seventy bushels marketable corn	$22.32

Or about thirty-two cents per bushel. This, at seventy-five cents, will afford a net profit of $30.18 per acre.

The net cost of forty-five bushels per acre in 1877 was $18.07, or forty and one-tenth cents per bushel. This, at seventy-five cents, afforded a profit per acre of $15.75.

From these statements, I infer, —

1. That variations in the number of bushels produced per acre change but little the expense of the crop. In the two cases just cited, there was a difference in the yield of twenty-five bushels, worth, at seventy-five cents per bushel, $18.75 ; while the cost in the one exceeded that in the other only $4.25.

2. That the larger the yield from a given expenditure, the less will be the cost per bushel, and the greater the profit.

3. That maximum crops are the most profitable.

Ordinarily, careful management and the expenditure of about twenty-five dollars, on an acre of good corn land in the Merrimack valley, will secure a crop of sixty bushels of sound corn, which, at present prices, will afford a net profit of twenty dollars per acre, to meet insurance, interest, etc.

In raising corn, as in the production of many other farm crops, we cannot avoid competition with producers upon the virgin soils of the West. At two points, however, we hold them at a disadvantage: 1. Our markets are near at hand, and we avoid the expense of long transportations. The reverse is the case with them. 2. The varieties which we raise are superior to those grown upon the prairies, and command better prices by from fifteen to twenty cents per bushel.

But we must not forget that freights are becoming less and less every year. And we may as well anticipate that, ere long, steam-culture and large farming will convert corn-growing in the West into a manufacturing enterprise, under which immense farms, abundant working capital, high agricultural skill, and the best farm implements and machinery will produce corn at

prices lower than any yet attained. To meet successfully this competition, we must raise the best varieties, and at prices which the less enterprising of our farmers now regard as impossible. When we have reduced the cost of a bushel of corn to thirty-five or forty cents, we need not fear competition. That we can do this, by better preparations of the soil, the use of better seeds, more careful fertilization, and the substitution of the horse-hoe for the hand-hoe, I am fully confident. That, sooner or later, we shall do it, I feel equally assured. *Qui veut peut?*

But I have consumed the time allotted me, and will only say, in closing, that, while our glance at this important plant has been largely from an economical stand-point, there is another from which it appears more attractive, and that is the historic and poetic one.

The Ojibways said that the corn-plant was the gift of the Great Spirit, sent to them from heaven, and they called it "Mondamin."

Mr. Prescott, in describing the favorite residence of the Incas, of Peru, at Ucay, says: "The spacious gardens were stocked with numerous varieties of plants and flowers, that grew without effort in this temperate region of the tropics, while parterres of a more extraordinary kind were planted by their side, glowing with the various forms of vegetable life skillfully imitated in gold and silver. Among them, the Indian corn, the most beautiful of American grains, is particularly commemorated; and the curious workmanship is noticed with which the golden ear was half disclosed amidst the broad leaves of silver, and the light tassel of the same material, that floated gracefully at its top."

And Mr. Longfellow describes with such wonderful grace and beauty an Indian husking, that one cannot help wishing he were an Indian, and that corn-raising was all husking. He says, in his "Song of Hiawatha": —

> "Summer passed, and Shawondasse
> Breathed his sighs o'er all the landscape,
> From the South-land sent his ardors,
> Wafted kisses warm and tender;
> And the maize-field grew and ripened,
> Till it stood in all the splendor
> Of its garments green and yellow,

Of its tassels and its plumage,
And the maize-ears full and shining
Gleamed from bursting sheaths of verdure.

. . . . . .

And the merry Laughing Water
Went rejoicing from the wigwam,
With Nokomis, old and wrinkled,
And they called the women round them,
Called the young men and the maidens,
To the harvest of the corn-fields,
To the husking of the maize-ear.

On the border of the forest,
Underneath the fragrant pine-trees,
Sat the old men and the warriors,
Smoking in the pleasant shadow.
In uninterrupted silence
Looked they at the gamesome labor
Of the young men and the women;
Listened to their noisy talking,
To their laughter and their singing,
Heard them chattering like the magpies,
Heard them laughing like the blue-jays,
Heard them singing like the robins.
And whene'er some lucky maiden
Found a red ear in the husking,
Found a maize-ear red as blood is,
'Nushka!' cried they all together,
'Nushka! you shall have a sweetheart,
You shall have a handsome husband!'
'Ugh!' the old men all responded,
From their seats beneath the pine-trees."