SB 211
.P8 G8
Copy 1

"S RAISE TWO POTATOES, WHERE NOW WE RAISE ONE"

MONEY IN POTATOES.

by JOSEPH. Greiner

400 BUSHELS TO THE ACRE. AS A FIELD CROP

• FRANKLIN NEWS CO • PHILA •

Copyrighted 1885, Franklin News Co.

MONEY IN POTATOES.

400 BUSHELS TO THE ACRE AS A FIELD CROP.

A COMPLETE INSTRUCTOR FOR THE POTATO GROWER. OUR NEW SYSTEM FULLY EXPLAINED IN SEVENTEEN CHAPTERS AND FORTY LESSONS. WITH MANY ILLUSTRATIONS. APPENDIX. THE NEWER VARIETIES, THEIR MERITS AND FAULTS.

BY TUISCO GREINER (JOSEPH).

"FROM DAY TO DAY THE NUMBER OF MOUTHS TO BE FED FROM EACH ACRE IN OUR COUNTRY INCREASES LET US NEGLECT NO MEANS TO MULTIPLY THE PRODUCT OF OUR LAND."

LIBRARY OF CONGRESS
COPYRIGHT.
APR 15 1885
7915
CITY OF WASHINGTON.

PHILADELPHIA:
FRANKLIN NEWS COMPANY, PUBLISHERS.
1885.

SB211
.P8G8

PREFACE.

It cannot be the intention of the author (who himself feels the responsibility for a small part of the modern potato literature) to deny that the subject treated in the following pages has received its full share of attention by the agricultural press during the last decennium.

Here are many valuable suggestions relating to potato culture presented to the world, but being scattered over a wide space of time and territory, they are not accessible to the general reader.

No apology is deemed necessary for the attempt to collect and sift all this matter, and present what is good of it (incorporated into our own original method) in a handy and inexpensive form. We have been guided by the desire to teach common-sense methods, expose erroneous notions, and tell, in plain words, how *we* have attained success, and how the *general* farmer can easily reach it.

Is not the average potato yield ridiculously low? More knowledge on the subject is what the farmer needs to double it. May this work contribute toward *making two potatoes grow* where *formerly grew but one*; that is the heart-felt wish of

THE AUTHOR.

NAPLES, N. Y., February 1st, 1885.

CHAPTER I.

SELECTION OF GROUND.

Desirable Soils. Soils to be Avoided. Virgin Soil. Clover Sod.

Success in potato culture is obtainable not only in different climes, but also in a very great variety of soils. Under otherwise favorable conditions, the tuber will grow as well in clear sand as in stiff clay. The happy medium is generally the best.

LESSON 1.—*Soils varying between a sandy and clay loam, if naturally drained and otherwise in proper condition, may be relied on for a profitable crop.*

A thin layer of fertile surface-soil, resting upon clay subsoil, which is impervious to water, should never be used for potatoes, not even if thoroughly underdrained.

The tubers are more apt to rot in heavy, sticky soils, particularly in a wet season, than on light sandy or gravelly ones.

LESSON 2.—*Avoid all soils so stiff that they cannot be perfectly fined and pulverized.*

It is a very common practice with farmers to plant potatoes on clover-sod, plowed in the spring. This selection is a good one, provided, however, that as in the case of young and rank-growing clover, the sod is such as to admit of thorough pulverization, or that the field can be plowed early enough during the summer or fall previous to give ample time for the sward to rot and thus make cross-plowing practicable. Otherwise, when the clover field is old and the roots of grasses and weeds are woven into a tough, thick sward, which cannot be easily broken and pulverized, it would be advisable to have a crop of wheat, rye, oats, or corn precede the potato crop.

An admirable selection: For Early Sorts—Clay loam, very rich. For Late Sorts—Sandy or gravelly loam, of medium fertility. Naturally drained, loose and mellow clover-sod, or stubble after stiff sod is the best imaginable condition or state of cultivation in either case.

The potato thrives best in a cool and moist climate or season. Its home is on lime-stone lands.

CHAPTER II.

MANURE AND ITS APPLICATION. FEED THE LAND AND THE LAND WILL FEED YOU.

Stable Manure. Clover. Commercial Fertilizers. Chemicals. Potato Pulp.

LESSON 3.—*Stable manure should be fine and thoroughly rotted, spread evenly during the fall previous, and if on stubble, incorporated into the soil at once.*

Coarse, unfermented stable dung is nearly worthless for the potato crop, unless as a mulch on very porous and dry soils. Thoroughly rotted compost in moderate quantities is a good fertilizer for tall-growing varieties, while low-growing (early) sorts are greatly benefitted by more liberal applications.

The clover on the pasture lot or meadow selected for a potato field should not be grazed or cut very late in the fall. We could hardly wish for a better fertilizer than a good growth of clover, covered during the fall with a coat of fine old manure or barn-yard scrapings, lighter or heavier—according to variety to be planted—and, if possible, applied with a Kemp manure spreader or, at least, evenly and finely distributed by means of harrow or otherwise.

For stubble ground, fall manuring can be recommended only on condition that the manure is harrowed or cultivated into the soil and thus left until spring.

LESSON 4.—*A field which had been heavily manured for the preceding crop, is in first rate condition for a potato crop.*

On land manured the year previous, potatoes will do well without additional fertilizing, still the application of wood ashes or lime often increases the yield.

Newly applied stable manure seems to attract the wire-worms, and therefore has the tendency to produce scab in the tubers. Coarse manure is a frequent cause of prongs, protuberances, "fingers and toes."

Commercial fertilizers meet with no objections of this kind. The fairest, smoothest and best shaped tubers are generally grown on well pulverized soils which were fertilized with chemical manures, or not at all the same season.

LESSON 5.—*If the soil is in the right mechanical condition but lacking in fertility, the application of commercial manures often pays exceedingly well.*

In recommending such fertilizers, we enter debatable ground. While we have never failed to see good results from the application of phosphates, etc., whenever we tried them on potatoes or other crops, there are many cases on record, as reported by different farmers, where even complete fertilizers—those containing ammonia, phosphoric acid and potash—utterly refused to respond. Still we believe that the fault is with the man oftener than with the material.

LESSON 6.—*Apply the element or elements of plant food in which your soil is deficient.*

Commercial manures and chemicals give us one great advantage. Of the three most important elements, ammonia, phosphoric acid, and potash, the soil may contain a sufficiency of one or two. If we know, from previous experiments, which these elements are, it will be only necessary to supply the one that is lacking. Thus, our own soils were always deficient in phosphoric acid, and therefore greatly benefitted by its application, next by that of potash, but not noticeably by ammonia. On other soils ashes, or some other forms of potash, either alone or in combination with phosphoric acid, or ammonia will greatly increase the yield.

LESSON 7.—*Safe in almost every case is the application of complete manures.*

If previous experiments have not been made to determine the relative proportion of these elements in the soil, complete manures like Mapes' or Stockbridge (Bowker) special potato fertilizers, Powell's potato producer etc., which contain the three ingredients in about the right proportion for the crop, can be relied on with safety. From 600 to 800 pounds to an acre should be applied broadcast, just before planting, and deeply harrowed into the soil, or in drills, about an inch or two above the seed and covered by a few inches of soil.

The well-known English experimenter, Sir J. B. Lawes of Rothamstead, used 300 pounds of sulphate of potash (130 pounds actual potash), 350 pounds superphosphate of lime, 540 pounds nirate of soda, to produce a crop of 400 bushels. This means almost a mere manufacturing of the crop out of chemicals, without calling on the soil for assistance (as to the supply of raw material); and such manufacturing might be carried on year after year on the same land.

The cost of raw material would be about as follows:—

300 pounds of Sulphate Potash at 2½ cents, . .	$7.50
350 pounds superphosphate at 3½ cents, . . .	12.25
540 pounds nitrate of soda at 3 cents, . . .	16.20
Total . . .	$35.95

Expensive as this manuring appears to be, we could well afford it, if thereby we make sure of a crop of 400 bushels.

Where unleached wood-ashes are obtainable at little cost, they may take the place of sulphate of potash, and perhaps show better results at less expense. The cheapest source of phosphoric acid for potatoes, probably, is, dissolved South Carolina Rock, containing about 27 to 30 per cent. of bone-phosphate, and costing $16.00 per ton.

Nitrate of soda is an awkward thing to handle, on account of its great solubility, and dear also. However, it has this one great advantage; that there is no need of applying it sooner than the growing vines show the lack of it. Never apply it in the fall

A rank growth of clover or of clover roots, turned under, supplies all the ammonia needed, and is generally the cheapest form in which ammonia can be obtained. This manurial substance plays a very important part in giving thrift and luxuriance to the foliage, and while large tops, *in themselves*, are not our object, we can hardly hope to reap a large crop of tubers without their assistance.

LESSON 8.—*Potato pulp is an expensive manure, but the most necessary of all fertilizing materials.*

The supply of ammonia, especially if scarce, should be supplemented, reinforced, as it were, by the application of potato pulp, represented in a *sufficiency* of seed.

CHAPTER III.

PREPARING THE SOIL.

Fall and Spring Plowing. Fining the Soil. Marking. Depth of Furrows. The Rural Method.

In the selection of ground we took occasion to emphasize the necessity of having land that would admit of being made fine and mellow. This, then, is the primary condition of success.

LESSON 9.—*The field must be plowed or re-plowed just before planting.*

There is no need of plowing such land in the fall. When planting time draws nigh, carefully turn over that slice of surface soil, which has been in cultivation previously, if it has a thickness of from 7 to 9 inches. It is not safe to turn up more than one-half inch of new soil in one year. Every balk left unredeemed, must necessarily diminish the yield.

LESSON 10.—*It is of great importance to have that part of the soil which is to serve as the feeding grounds for the potato roots, thoroughly pulverized.*

In some instances, cross-plowing may be advisable, or even necessary. Use a heavy harrow, or one heavily weighted with a piece of plank or stick of timber; let the teeth go down into the

soil clear to the beams. It will pay to use the Acme. If lumpy, roll, and repeat the harrowing and rolling as often as necessary to get the land in good condition,—that is,—perfectly pulverized, as deep as practicable. This extra labor will pay you well.

LESSON 11.—*A good shovel-plow, or a common plow is the best implement for making the furrows.*

Rows, straight and uniform in width are more satisfactory than crooked and irregular ones, if for no other reason than that the operator will take more pride in, and pains with his field. The use of a marker is therefore to be recommended. Have the marks three feet apart, and if there is nothing to hinder it, crosswise of the last plowing. Now follow each mark with the winged-shovel plow, pressing the same well down into the soil; or with a good common plow, drawn by one or two horses, making the furrows wide and deep.

Mr. E. S. Carman, Editor of the *Rural New Yorker*, who can boast of having obtained the greatest yields of potatoes on record, *i. e.*, 1300 or more bushels to the acre, (in experiments made in the season of 1884), lays great stress on wide furrows, and the thorough pulverization of the soil in the bottom of the furrows, believing his extraordinary sucesss to be due chiefly to a condition of the soil which offers the least resistance to the expansion of tubers. From this reason he recommends, at least for field culture, the use of a narrow cultivator in the bottom of plowed furrows.

This operation of pulverizing the soil in the bottom of the trenches, while of little importance on loose, porous soils, which are thoroughly disintegrated by a single plowing, may be a matter of the greatest consequence on soils of more tenacious structure, especially if such were not well pulverized previously. We suspect, however, that the multiplication of rootlets, consequent on the favorable condition (mellowness) of their feeding grounds, and the greater availability of their food supply, resulting from the same cause. should have the credit of being more potent factors in the production of extraordinary results than the removal of mere mechanical obstructions to the swelling of the tubers.

The bottom of the furrows must be made, or left about four inches deep (below the level surface), a depth which generally proves to be the very best in an average season. With very *light* seeding, however, 3 inches may be preferable, though it should not be less, thus interfering with our method of after-cultivation.

CHAPTER IV.

SELECTION OF SEED.

The Best Variety. For Home Use or Market. High Breeding of Potatoes.

What variety to plant, is the next question. The answer depends very much on the use you intend to make of the crop.

LESSON 12.—*Select the variety best adapted to your soil and market.*

In planting for home consumption, merely, the very first things to be considered are quality and yield. Almost all varieties differ in their relative worth on different soils, and no variety will do equally well on all kinds of soil. This variation is so great, that one sort may be utterly worthless on one soil, or in one locality, and yet yield enormous crops in others. For family use, we plant the Early Ohio, the White Elephant and the Adirondack. All these are of exceptionally good quality, and, with us, heavy croppers. The Early Ohio is distinguished by its extreme earliness; the Elephant, by its enormous yields; the Adirondack, by its superiority as a late keeper.

These varieties, however, may not be the ones to which your soil shows a particular partiality ; and the selection is properly left with every planter.

In many local markets, a potato is a potato ; one sells as well as another. In such an emergency, the most desirable potato to be found, is the one which promises the heaviest yield. If that happens to be one of inferior quality, like the Peerless, or Mammoth Pearl, it would seem to be of little consequence to you, though we should prefer to sell to our customers tubers of the best quality.

The early bird catches the big worm, and to catch the big price in the early markets, we need very early sorts. The Early Ohio, where it succeeds, is the variety for this purpose. It requires a rich clay loam, rather moist than otherwise, close planting and particularly heavy seeding. Other seedlings of the Early Rose, like Early Vermont, Early Gem, Sunrise, Chicago Market, and Beauty of Hebron follow next. The Snowflake, though later, is also counted among the early sorts. It is apt to produce a large number of small, unmarketable tubers, and therefore needs lighter seeding.

The leading late varieties, demanded in the large city markets, are the Burbank, White Star, White Elephant, Peerless, Mammoth Pearl, O. K. Mammoth Prolific and Dunmore Seedling. Plant the one of these which seems to suit your soil the best, and you cannot go amiss. Under no circumstances, plant at hap-hazard. Success or failure may depend on the selection of variety. Previous experience with different sorts, on your own land, is the only infallible guide. The novice must ask his predecessor, or one or the other of his intelligent neighbors, if he is fortunate enough to have such, for the desired and desirable information.

Another factor in the case, hardly less important than the selection of the variety required by your particular soil, locality or climate, is the selection of the right specimens for seed. Like produces like, it is said. That is true as far as it is meant. "What ye sow, that shall ye also reap."

LESSON 13.—*Only the fairest and smoothest of the larger and medium sized tubers are fit to be planted.*

Good seed, persistently planted, year after year, will either result in an improvement of the variety, or at least keep it from deteriorating. Refuse potatoes as seed may produce handsome crops for a year or two, or in exceptionably favorable seasons, but if their use is continued, it must end in deterioration of the variety, in gradually decreased yields and at last in utter failure.

We need, we want high-bred seed potatoes; they are of greater importance than high class poultry. The same care in

selection should be exercised that the stock raiser or dairyman uses in the selection of his cattle. Reject all under-sized or badly-shaped specimens for seed.

The best time for selecting the seed is during the potato harvest, the fall previous.

CHAPTER V

CUTTING THE SEED.

Single Eye. Drs. Sturtevant and Terry. Yields Resulting from different Amounts of Seed. Reliable Tests.

Various theories have been advanced and various methods of cutting the seed recommended. One of the latest of these, and widely practiced because the most ably defended, is the *one-eye system*, as advocated by Dr. Sturtevant, of the New York Experimental Station, and baptized "Cutting from North-east to South-west," by B. F. Terry, its most enthusiastic champion.

Figure 1 explains Dr. Sturtevant's discovery. Each bud is the terminus of a branch connecting it with its source of nutriment in the middle of the tuber. The dotted lines indicate how the tuber should be cut in order to supply each eye with a share of this most important interior substance, in other words, to leave a reasonable amount of root to each coral branch.

Figure 1

Dr. Sturtevant's statement, to the effect that merchantable tubers cut in this manner, have yielded him six times as much as eyes cut shallow, four times as much as those cut in the ordinary manner, and twice as much as potatoes planted whole, and Terry's and other writer's reports, have done much towards popularizing that method.

LESSON 14.—*The single eye system, except for soils exceedingly rich in ammonia, is a delusion and a snare.*

Our own experiments during a series of years, faithfully and persistently repeated on different soils and under different

conditions, have long since forced us to abandon our former partiality for light seeding, and to accept the inference that the cry "too much seed," raised by some writers, and resulting in the popular error of using an insufficient amount of seed, together with the check-row system, is the chief cause of the low average of the potato yield, which is but a fraction above eighty-five bushels to the acre. We have not held back with our views. Our cries of warning have sounded through the Agricultural press repeatedly.

If Dr. Sturtevant, Terry, *et al.*, who, under peculiar circumstances, (on lands containing an excess of ammonia), or with peculiar knack, have made the one-eye system a success in their hands, now wish to induce the common farmer to adopt this system for their common farm soils, they proclaim a mischievous doctrine, which can only result in a further decrease of this low average yield. Meaning well, they do great harm. They are the false prophets, whose teachings, in this respect, we hear but not heed, while in many other respects we listen to them with the ears of the faithful.

LESSON 15.—*A sufficiency of seed is the basis, the* conditio sine qua non *of our* 400 *bushel crop on common farm soil.*

The amount of seed influences the yield fully as much, if not more, than any other single thing or circumstance, degree of fertility not excepted.

Let us look at the theoretical side of the question. The chief function of the foliage is of a digestive character. The storage of a considerable amount of pulp in tubers, like the accumulation of flesh and fat in animals, is utterly impossible, even with an abundance of food, unless the digestive organs are fully developed and in perfect working order. You might make light of the absorptive powers of the foliage—as feeders in the air,—or of the benefits derived from their services as mulch, (which are not to be despised in a dry season), yet, you cannot dispute away the fact, that a diminution of the product in flesh or tuber, must be the inevitable consequence of every mutilation, crippling, or retarded and imperfect development of the digestive machinery. This influence of the amount of

foliage upon the yield, is full established by the comparative yields of early and late, that is of dwarf (low top), and tall varieties, the latter out-yielding the former, generally, in about the proportion of their tops.

LESSON 16.—*The larger the seed piece, the earlier and more thrifty will be the growth of the tops.*

How is the desired luxuriance of the foliage, and particularly its *early* development to be obtained? By accepting Nature's method of seeding. If we want to raise a fine calf, we let him suck all the fresh milk he wants. No substitute will fill the place of that diet; and without it, great care is required in bringing him up. Nor is there any food that agrees with a new born babe as well as the food which Nature intended for it—a

Figures 2 and 3.

healthy mother's milk. The analogy between these instances and the case of the potato plant is unmistakable. The mother-tuber contains the natural food for the plant in sufficient quantity to support the young growth, to supply it with a large number of roots and thus to make it strong and able to look for its food supply elsewhere. If the infant-food in the tuber is materially shortened or divided among a great number of mouths, by close cutting, the plantlet is thrown on its own resources before having gained sufficient strength, and forced to partake of food little suited for its weak digestion. Retarded growth of foliage, if not a weakly condition throughout the season, with decreased yield of tubers as a natural consequence,

is the almost sure penalty of this common error. The single eye system is the root-hog-or-die plan. See figures 2 and 3.

Repeated applications of liquid manure in the early stages of growth, or frequent rains soaking through a manure-filled soil, may sometimes counterbalance the ill effects of light seeding, but heavy seeding is the only method applicable to general field culture.

Thus far we have dealt with theory only. How is this supported by the results of tests and stubborn facts?

In Bulletin 12 of the Missouri Agricultural College (1884), Professor J. W. Sanborn, in summarizing the experiments which he has conducted personally during nine years, with the Early Rose, says:

"The following table will give the average returns for seven years from measured ground and weighed potatoes, the product of two farms, and in agreement with the unrecorded results on a third farm:

PRODUCT PER ACRE.

From seed of whole potatoes, large, ...	227	bushels.
From seed of whole potatoes, small, ...	177	"
From seed of stem end of potato, ...	148	"
From seed of seed end of potato, ...	168	"
From one eye to hill, ...	81	"
From two eyes to hill, ...	104	"
From three eyes to hill, ...	160	"

Of the season of 1881, he reports a complete failure as to the one, two and three-eye-to-a-piece system of planting. The yield of the one-eye seed was but five bushels to the acre, against 176 bushels from whole large potatoes.

"Not much over one-half of the seed broke the ground in germination, and a part of these were so small and weak, compared with fuller seeding, that a few slightly covered died. The balance, under a very wet season here, did not thrive. This result is given to show how great a variation may occur under unfavorable conditions, between ample seeding and deficient seeding. * * * * *. Since beginning these trials, I have seen two foreign tests, covering about seven years each, wherein the effect of cutting on the future vigor of the plant

was studied, with results against fine cutting. One eye and small potatoes gave less favorable results at the Ohio Experimental Station, last year, than whole large potatoes."

Let us now look at the tests conducted by the generally very careful *Rural New Yorker*, and reported in the issue of March 15th, 1884.

"Test 46, A. The seed potatoes were selected all of the same size, and peeled, all eyes being cut off except the strongest near the middle, that is, whole potatoes were peeled so that but one eye was left with a ring of skin about it. * * * * * The variety was the *Peerless*; the amount of chemical fertilizers used, 1000 pounds to the acre. * * * * * Yield, 806.66 bushels to the acre.

Fig. 4.

"Test 47, A. The pieces were cut as shown by figure 4, and of that size. Planted three inches deep. So many of the pieces either failed to sprout or died after sprouting, that no estimatecould be made of the yield per acre.

"Test 48, A. In this test cylindrical pieces were cut through the potato, as shown in figure 5, with a strong eye on one end * * * * * Yield, 211.75 bushels to the acre."

Fig. 5.

"'Enough is as good as a feast,' concludes the *Rural*. But what would be enough in a wet spring, might prove too little in a dry one; what might serve in a rich soil, might prove insufficient in a poor soil. The quantity of flesh, which should go with each piece is, theoretically, that which, without unnecessary waste will best support the eyes, until by the growth of roots, support from the flesh is no longer required."

From many other tests, which brought forth similar results, we will mention only our own of last season, 1884.

The soil selected for the test is a rich loam, having been used as an onion field for a number of years, and repeatedly and heavily manured with hog and hen manure, salt, ashes, kainit, high-grade super-phosphate, &c. Variety selected—Early Gem.

Planted in drills three feet apart, eighteen inches apart in the drill. On account of the high fertility of the soil, we did not expect to see a great difference in favor of heavy seeding. A quantity of large, smooth potatoes, weighing about a half pound each, were selected for seed.

The plants of the heaviest seeding were the first to come up, and the amount of foliage, about four weeks after planting, indicated the exact proportion of the yield afterwards.

With yield from whole potatoes taken as 100, the result was as follows, viz.:—

Whole Potato.

Whole potatoes, ...	100.00	per cent.
Single eye on whole potato. . . .	66.10	"
Single eye, cut from N. W. to S. E. .	42.40	"
Seed end half, ...	61.02	"
Stem end half, ...	61.00	"
Whole large potato, without seed end, .	106.78	"

while Prof. Sanborn's tests show the following per centage:—

Whole large potatoes, ...	100.00	per cent.
Whole small potatoes, . . .	79.02	"
Single eye, ...	36.16	"

From our own tests we must infer that even a high state of fertility of the soil, or a sufficiency of moisture during the whole

season, (which were the conditions of our soil), does not always materially lessen the benefits derived from heavy seeding.

A very common circumstance bears testimony in favor of liberality in seeding. Every farmer has occasionally come across a *self-seeded* plant, grown from a *whole* potato which had happened to escape the vigilant eye of the digger, and if he is in the least observing, the *unusually large* yield of such a hill, often growing under unfavorable conditions—in the shade of a corn hill, or right in the midst of a potato patch, perhaps between the rows—can hardly have failed to attract his notice.

Prof. Sanborn's experience fully coincides with our own and serves to fortify our position. He says, (Bulletin 12.) :—"The growth of the tops in the early season displayed more difference in favor of large seed than the harvest indication, showing that a vigorous leaf at the early period of potato growth is of much importance. This difference has been noted every year of the trials." * * * * *

"The leaf is broader, the stem stronger, and the whole top always, in my experience *much in advance* of those tops grown from severely cut or from small potatoes."

Incidentally we have mentioned some advantages of a mere mechanical nature, resulting from heavy seeding. The tops from large seed pieces, appearing above ground *from one to two weeks earlier* than those from single eyes, soon meet, shade the ground, retain the moisture (and perhaps ammonia), and choke out weeds' growth, thus saving a considerable amount of labor in cultivation and in fighting the bugs.

LESSON 17.—*Heavy seeding is always the safest with dwarf (early) varieties.*

There is a great difference in the innate vigor of the varieties. Low tops, as a rule, yield less than taller varieties. This lack of constitutional vigor must be counterbalanced, and heavy seeding will do it. We can hardly *conceive of any combination of circumstances, which might prevent a corresponding increase of yield from heavier seeding, with early varieties.*

LESSON 18.—*The less vigorous the variety, the more seed is desirable.*

The peeling off of the seed end of varieties with many eyes, seems to increase the yield of large tubers considerably more than it decreases that of small tubers.

With early varieties, our choice of seed, therefore, is as follows in the order named:

1. Large potato, peeled at seed end.
2. Whole large potato (4 ounces or more).
3. Small potato (less than 4 ounces).
4. Seed end half of large, or medium potato.
5. Stem end half of large or medium potato.

The tops even of dwarf varieties should cover the ground, and stimulation, high feeding with potato pulp is necessary for the purpose. Late, that is, strong-growing sorts generally do that with lighter seeding, even on common farm soils; yet with so vigorous a grower as the White Elephant, the halves of large tubers planted on soil of hardly medium fertility, check-row fashion, have largely outyielded lighter seeding. Poor land will give the best results from whole potatoes; lighter seeding is recommendable, often necesesary for late sorts on soils which are rich in vegetable matter (humus).

"The more favorable the season, and the better the conditions," says Prof. Sanborn, "the greater the relative yield from light seeding. Our farmers must bear in mind that the good results reported from light seeding of potatoes, are often guesses, generally from market gardeners, or obtained under favorable conditions, while the failures are not reported."

We have said before, that a large yield is not to be expected without a thrifty top growth; but we do by no means assert, that the former is a necessary sequence of the latter. An excessive amount of foliage, together with a mere pittance of tubers has come under our observation more than once. We know, however, how to avoid the undesirable coincidence.

Starvation is possible in various ways. One person may have an abundance of the very choicest food within his reach,

yet die from lack of nourishment, because he is in the last stages of dyspepsia, another may be blessed with a powerful digestion, but have no food to digest.

At the sacrifice of a considerable amount of potato pulp in seeding, we have provided the plant with wonderful powers of assimilating food. That is all. His food, the raw material in the manufacture of tubers, must come from the soil, and if the latter be deficient in phosphoric acid and potash, or in a single one of the two, the plant dies without producing full-sized tubers. Fortunately for the grower, the majority of soils contain those two essential ingredients in sufficient quantity for a potato crop, and if the plants are strong enough, they are able to look up this food and make it available. If it is lacking, it must be supplied, or potatoes cannot be grown.

We will not entirely ignore the objections that are urged against the use of large seed pieces. It is claimed by some writers, that a large seed piece throws up a large number of sprouts, which, having to struggle for mere existence, grow up slim and weak. Such an idea is only to be derided. The facts refute it. The great majority of the eyes on a potato planted whole *never come to life.* Those buds which are the strongest, and most forward, seem to eat up the nourishment in the mother tuber before the weaker (dormant) ones have time to start. A whole potato generally produces from 3 to 8 large heavy stems, which should all be left, as the thinning, according to one of our tests, and in agreement with the general principles, results in a decreased yield. The removal of part of the stalks, where they are very numerous, is admissible in the earliest stages of growth, and only then. Increased size of tubers is the gain, slightly decreased yield the loss.

A single-eye piece often develops two or three buds, every one of which is stunted. Figures 2 and 3 show the comparative growth of stems and roots.

That the proportion of large and small (merchantable and unmerchantable) tubers in the yield speaks in favor of light seeding, we freely and cheerfully admit. But if we can double our yield of salable tubers through the agency of heavier seed-

ing, we will gladly accept the increase of small potatoes to three or four-fold their former yield as a free gift. We have use for them in the hog pen and poultry yard. In practice we have no reason to grumble. In spite of our heavy seeding, the percentage of small potatoes harvested by us, can always be written with one single figure.

The most serious objection, however, is that of expensiveness. Can we afford to use so much seed?

That depends largely on the cost. A price of two dollars or more per bushel excludes, the practicability of heavy seeding.

Now let us consider the case of early potatoes for which we recommend the very heaviest seeding. We plant in rows 3 feet apart. Dropping a 4 ounce potato every 18 inches in the drill, thus making 9680 hills per acre, we need for them 40 bushels of seed, or at 15 inches apart, 48½ bushels. Planting single eyes would require only from 6½ to 8 bushels of seed, and therefore be a saving of from 33½ to 40 bushels per acre.

Supposing the heavy seeding (at 18 inches), to yield 200 bushels per acre, the yield from the one eye planting would be 72.32 bushels, taking Prof. Sanborn's tests as the basis of calculation. Thus, we save 33½ bushels in seeding and lose 127.68 in harvesting.

Supposing that the planting of whole potatoes brings 400 bushels to the acre, we would harvest from single eyes but 144.64 bushels. Hence a saving of about 40 bushels of seed would result in a yield decreased by 255.36 bushels. In other words, for the 40 bushels of potatoes applied as manure, we receive in return 255.36 bushels.

If our figures are correct, or nearly so, heavy seeding will pay us a number of hundred per cent. on the investment, even if potatoes are cheaper in the fall than in the spring previous.

For early varieties, the *minimum* average of seed should be a 3-ounce potato or piece of potato per hill, using about 36 bushels of seed. For late sorts, the amount of seed should be regulated by the degree of fertility of the soil. One quarter of a medium tuber (a piece of not less than 1½ ounce), may be considered as a minimum on common farm soils.

The judicious planter always plants largely when many growers, in consequence of a glut in the market, quit the business in disgust. When potatoes are worth but 15 or 20 cents a bushel he can well afford to use a sufficiency of seed, thus improving his chances for a large crop, which is likely to sell for from 50 to 75 cents or even $1.00 per bushel. On the other hand, when the potato business is booming and the average planter doubling his usual area, the shrewd grower may use the one-dollar-a-bushel seed more sparingly. The crops will probably find but slow sale at bottom prices.

With high priced, new varieties, it is generally advisable to resort to the single eye method. In that case, the manner of cutting recommended by Dr. Sturtevant, shown in figure 1, is the *only correct* way, as it insures an even distribution of potato pulp among the pieces. The grower, however, should not forget that single-eye planting, even in the case just mentioned, is justifiable only and solely in combination with the drill system.

If more than one eye is to be used per hill, have them all in one piece, which is much preferable to two pieces with one or two eyes each; it makes the plant stronger and saves labor in planting.

LESSON 19. *Prepare the seed just before planting time.*

It is no advantage, as is claimed by some, to have the seed cut days, or even weeks, before planting, and to treat it with plaster, or otherwise. With us, it has repeatedly proved a real damage. Prepare the seed (cut it if required), when you get ready to use it.

CHAPTER VI.

PLANTING.

Time of Planting. Distance Apart. Covering.

Again we find it necessary to make a distinction between early and late varieties.

LESSON 20.—*For early market or early home supply, plant as soon as the ground can be got in the proper condition.*

If a very early crop is desired, we must run the risk of having it damaged by late frosts. It will generally escape and

come out all right. A light frost may utterly destroy plants grown from single eye (or two or three eyes), the resources of which are exhausted in the very first growth; yet it has little or no power to seriously harm plantations resulting from whole tubers, which have a considerable amount of reserve force left, and as a dernier resort can fall back on the development of an altogether new set of sprouts.

Should earliness, however, be of less consideration than certainty of crop and large yield, the planting had better be postponed until that period when we can expect to have the crop safe from late frosts. This is from one to two weeks in advance of corn planting time; and also the proper time for planting late varieties.

LESSON 21.—*Plant potatoes before you plant corn.*

Many farmers practice planting corn first and potatoes afterwards. This order should be reversed. In an average season, earlier plantings do better than late ones; and as long as we are unable to foretell the weather for the whole season with something of the same certainty that our National Weather Makers predict it for twenty-four hours, we must rely on probabilities.

Many are the jokes let loose in regard to the question of "planting in the moon." We will not waste our breath or space by repeating any of them or trying new ones. The advocates of "moon planting" would not be convinced of their error by anything we could say. If you do as we tell you in all other things, you may have your own way about planting in whatever phase of the moon you prefer.

LESSON 22.—*Dwarf varieties need closer planting, as well as heavier seeding, than tall sorts.*

The constitutional vigor of the variety planted should settle the question as to distance between the plants. Early Ohio, with its low tops, Alpha and others, may be planted with

advantage, as close as 12 inches apart in the rows; Early Rose and the majority of other early kinds, 15 inches, later sorts, 18 to 20 inches, and sometimes more. *

The field is ready for planting, and the seed prepared. Now put it in sacks, barrels, crates or boxes, and scatter these over the field, enabling the droppers to refill their receptacles with the least practicable trouble and delay. The seed is then dropped, one piece in a place, and at the proper distance.

LESSON 23.—*Careful hands should drop the seed, to have it at the proper distance; a horse can do the covering.*

If no drill manuring is to be done, you will at once proceed to cover the seed, which can be done nicely and quickly with a common one horse cult vator. Remove every tooth, with the exception of the two outer ones, which should be set to throw the soil toward one another (wide or hilling blades). Let the horse walk right in the bottom of the furrows. The covering can also be done very quickly with a heavy harrow (drag), going with the furrows, repeatedly if necessary, or with tools made especially for the purpose, at the option of the grower. At any rate, this work is done a great deal easier by horse power than with hands and hoes.

If you intend to manure in the drills, let the field be lightly harrowed in the direction of the furrows, which are thereby partly filled. Then strew the special potato fertilizer upon the safely covered seed, and harrow again thoroughly. If green manure is to be used, put the desired (not excessive) quantity of coarse stuff, even corn-stalks, sorghum bagasse, or whatever it may be, in the half covered furrows and use the cultivator as above described. No rolling is necessary after planting.

* It should not be inferred that the yield increases or decreases in the same ratio as the number of hills on the same area; in other words, that each hill would yield the same, whether planted closer or further apart. In one of our tests with Gems planted 18 and 30 inches apart, respectively, (number of hills in the proportion of 100 to 60 on the same ground), the yield of the closer planting was at the rate of 475.93 bushels per acre, of the wider planting 362.99 bushels, or 76.27 per centum. While a hill, having 30 inches space in the row, yielded 27.10 per cent. more than a hill having but 18 inches, the yield was materially more with closer planting. Yet, it were folly to expect, under the same conditions, a crop of 571.12 bushels from 15 inch, or 609.74 from 12 inch plantings.

CHAPTER VII.

CULTIVATING.

Harrow and Cultivator. Shovel Plow. Hoe. Level Cultivation vs. Hilling.

The object of the cultivation given to the potato field is threefold:—1. To keep down every sign of weed growth; 2. To keep the soil well pulverized, fine and mellow; 3. To prune the roots; and all this restricted to the earlier period of growth.

LESSON 24.—*A light harrow is the best cultivator.*

For the first two or three weeks after planting and up to the time when the vines are three or four inches high, a common light harrow or drag is the only tool required. It answers all three purposes perfectly; and, indeed, with an insignificant amount of labor. One harrowing actually does more good and shows more lasting effects than three cultivatings. It is better than hand hoeing. The cultivator, like Saul, slew thousands (of weeds). The harrow is the David, who slays his ten thousands. The harrow makes the ground mellow in and around every hill, and leaves not a weed.

The slight root-pruning caused by the drag teeth, seems to be a decided benefit in this early stage of growth, and to result in an increased development of the rootlets, which act as feeders and supporters. The plants respond to this treatment with astonishing quickness. They seem to grow visibly.

Some farmers understand this principle very well and, not contented with a light pruning, tear the roots to pieces quite thoroughly with a home-made iron hook, fastened to an old hoe handle. (See Figure 6).

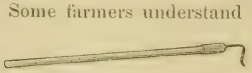


Figure 6.

The drag performs its work to our perfect satisfaction, and we do not recommend the use of supplementary tools, in particular, if it involves a great deal of hand labor. Enough is a feast.

Harrow the field thoroughly, first in the direction of the rows, then crossways, every five or six days, and stop only when the plants get so large that injury to them must be feared. If a sufficiency of seed is used, this will be soon enough.

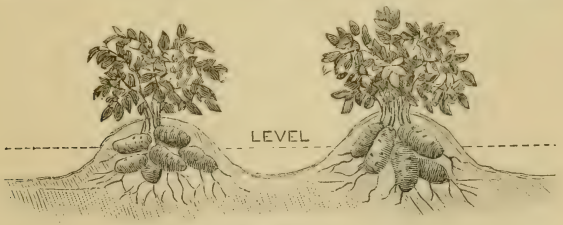
LESSON 25.—*When the size of tops forbid the further use of the harrow, cultivate as often as necessary, with a common, light cultivator.*

Then the cultivator should take the place of the harrow. Cultivate shallow, and repeat at short intervals, until the tops cover the ground and forbid further working among them.

Level.

The shovel plow is not needed for cultivation purposes. The practice of piling up great mountains around each plant, will soon be a thing of the past. Soils on which this hilling is necessary, are not desirable for potato growing.

The Editor of the *Rural New Yorker* claims for himself the priority of the level culture idea. He has been an enthusiastic



Hilled.

advocate of the new method, and his phenomenal yields have given strong testimoney in its favor.*

* A test, made by us in 1884, for the purpose of ascertaining the relative yields resulting from the old and the new method, was, for certain reasons, not as reliable as we could wish; still, we will give the figures:—Hilled, Early Gem, quartered lengthwise, land rich, moist, plenty of rain; yield per acre, 201.46 bushels. Level, under same conditions, yield per acre, 294.61 bushels. The tubers under level cultivation, were much larger than with hilling.

In a very wet season the hilling system may, perhaps, give better results. In a dry one, however, the large hills and dug-outs between them, allowing what rain does come, to run off rapidly, and presenting a much larger surface to the drying influence of sun and winds, deprive the plants of the necessary moisture much too quickly.

Here is another disadvantage connected with excessive hilling. The roots and rootlets seek their food mainly between the rows. In hilling, you take it away from where it is needed and pile it up around the stems, where it will do no good. You offer a stone, when bread is asked for, and mutilation (by the deep cutting shovel plow), and hard pan instead of nourishing soil. Common sense, sound theory, and practical results, are all against the popular way of hilling. Yet, there are objections to perfectly level cultivation. The most potato sorts grow so near the surface, that some of the tubers will turn green and become injured by exposure to the light. And then, what would indicate the location of tubers after they are ripe and the tops dead?

LESSON 26.—*Hill very lightly: not with the shovel plow or common plow, but with the hilling teeth of the cultivator.*

The golden mean is our method, and by far the safest. A slight hilling (see figure 9), serves to keep the tubers covered

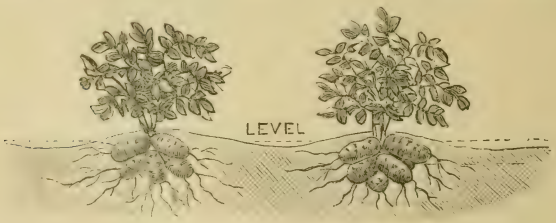


Figure 9. The Golden Mean.

up, and to facilitate the labor of digging them in the fall. The hilling (outside), teeth of the cultivator will do the work just about right.

We have no use for the hand hoe in the potato field at this time, unless Canada thistles, milk weed, burdock and other weeds of that character should be growing in it. These must be cut off below the surface of the ground with the sharp blade of a hoe, a task that requires but little time. Repeat if necessary. Soon the tops will cover the ground, when no more cultivation is needed.

CHAPTER VIII.

BUGS AND WORMS.

The White Grub. The Wire Worm. The Colorado Potato Bug.

A white grub, the larva of the common May beetle (Melontha vulgaris), which feeds on the tender roots of plants, occasionally eats off a potato stalk below the surface of the ground. We have never suffered serious damage from this pest, and can suggest only one remedy, that is, not to plant on soils known to be infested by these grubs in such numbers as to endanger the crop. The grub is found generally in sod or new ground, rarely in soils that have been in cultivation the previous season. The remedy is obvious.

The wire worm, which name belongs collectively to the larvae of different species of beetle (julus), is a pest much more to be dreaded. Its ravages are the cause of an unsightly scabby appearance of the tubers. No soil or condition is a sure protection against them. Potatoes grown on light soils, or on soils fertilized with commercial manures, chemicals, kainit, &c., are more apt to escape the attacks of this pest, and to come out smooth and handsome in appearance than those grown on heavy clay soils, particularly if fertilized with stable manure. The latter always seems to attract the wire worms.

Still more dangerous than the preceding is the Colorado Potato Bug (*Doryphora decemlineata*), known and hated by every potato grower. The larvae of this real pest, at their first appearance in the Eastern States, were much more destructive than at the present time, as their natural enemies (the soldier bug and other insects, which feed on the eggs and larvae of the

doryphora) have multiplied nearly as fast as their prey. There are, however, instances even at this day, of whole crops being destroyed or sadly damaged by this insect.

Our mode of planting is the simplest and most potent remedy for the Doryphora.

LESSON 27.—*Luxuriance of vines is repulsive to the bugs.*

Rankness of tops drives the bugs off. The few that stay, are lost in this forest of foliage, but the large majority take to our neighbor's fields, where, in slow and weak-growing plants they find food better suited to bug taste.

We don't find it necessary to dose the bugs after full seeding. If the vines are not quite so thrifty, it may be necessary to go over the field, pan or pail in hand, and knocking the larvae off into the receptacle with a stick or paddle, to gather and kill them.

It is always advisable to pick off the old "hard-shells," when the plants are first breaking ground, or to poison them with slices of potato, soaked in a weak solution of Paris Green in water. More care is necessary with early than with strong-growing late varieties, and more after light than heavy seeding.

A field planted in the single eye or two-eyes-to-a-piece fashion needs close watching.

LESSON 28.—*If the bugs come in considerable numbers, Paris Green is the proper remedy, cheap, effective, and harmless, if rightly applied.*

Everything about the potato bug is disgusting. No animal except a few insects can be induced to eat it. We would not like our children to get into a hand-to-hand fight with the pest. And if the business is too nauseous for our children, we do not expect that other people's children will enjoy it. Use Paris Green, if the bugs stand fight.

We greatly prefer the dry mode of application. The poison is mixed with plaster or flour (wheat, rye, or buckwheat) at the rate of one pound of the former to from 100 to 200 pounds of the latter. The mixing requires thoroughness.

Spread a thin layer of flour or plaster in the bottom of a large tight box, sprinkle a part of the poison evenly over this, then

put on another layer of the former and so on until finished. With hoe and shovel mix this mass over; too much mixing is no fault, a trifle too little mixing puts its effectiveness in question. The poison should be evenly distributed all through the material which lends to it volume and adhesiveness. Then the remedy is infallible and, in its diluted condition, not very dangerous to handle.

The mixture is now to be sifted over the vines, preferably when they are covered with dew. A mere atom of Paris Green is sure death to the bug, and it is only necessary to protect each part of the foliage by the thinnest imaginable coat of the mixture.

A home-made sifter like figure 10, consisting of a large tin box, with perforated bottom and attachment for adjusting handle, is the simplest instrument for applying the poison.

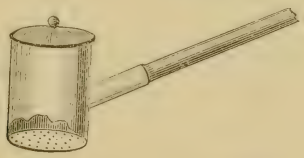


Figure 10. Paris Green Sifter,

There are a number of other contrivances in the market, the advertisments of which appear in the agricultural papers in due season. The most of these atomizers and sifters answer their purpose admirably. Particular attention, however, we wish to call to the Potato Bug Exterminator manufactured by J. S. Eddy & Sons, in Eagle Mills, New York. It is a very handy poison distributor. The cut shows the machine.

When the poison is to be applied in liquid form, it should be diluted in the proportion of one teaspoonful to a large pail of water. Keep it well stirred while applying.

Do not put your reliance in any of the many advertised patent insecticides.

CHAPTER IX.

HARVESTING.

Time of Digging. Potato Diggers. Hand Implements. Plow. Sorting. Handy Crates.

As soon as the tops die, showing that the tubers have come to maturity, it is time to harvest the crop.

LESSON 29.—*Dig during the first dry spell after the potatoes have become ripe.*

Never dig potatoes when the soil is very wet; they will not keep so well. The task of digging is much easier in clean ground than in ground over-run with weeds, as long as the half dead stems indicate the location of hills. Nature does not like a vacancy. When the dying tops make room, the weeds, repelled during a short period, but not discouraged, renew their struggle for existence, and the new undesirable vegetation, favored by a hot sun and occasional showers, makes rapid

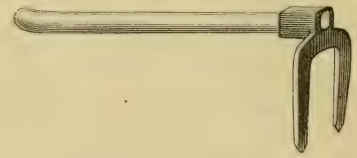


Figure 11. Grape Hoe.

progress. Before you are hardly aware of it, you may be forced to start the mower and men with forks to clear the potato ground from weeds, before digging can be thought of.

LESSON 30.—*A common plow is just as good a tool for digging the crop, as any of the high-priced patented potato-diggers.*

We cannot conscientiously advise you to invest largely in potato-diggers. Mr. Terry claims to be the possessor of the only machine of real merit. We fear that his specimen cannot be duplicated, otherwise a few cargoes would come handy for our potato men. This living machine is a certain Mr. Ross, recently arrived from Germany, and the almost incredible digging capacity of 150 to 250 bushels per day, is claimed for him.

In light sandy soils, free from large stones and pebbles, the crop can be dug by hand as well, or better, and nearly as fast as in any other way. The common hoe, spading fork, potato fork or potato digging hook may be used, according to preference. In hard or gravelly soil, a grape hoe will often do excellent service.

We prefer a common plow to any other implement for digging. A shovel plow does nearly as well. Let the horse walk right on the row and turn the potato roots bottom side up, thus exposing the tubers to view. Before gathering, let the tubers get fully dry and free from the moist soil adhering to them.

LESSON 31.—*Sort the crop in the field.*

The merchantable (table) potatoes are now picked up and kept by themselves; afterwards go over the same ground again and pick up the small ones, to be stored and utilized for feeding purposes.

It is also of the greatest importance to select at this same time, the seed needed for next spring's planting. The characteristic marks of the variety can now be readily distinguished.

Store each variety by itself, in separate barrels, boxes, crates, bins or pits, and do not forget to label them correctly and legibly.

LESSON 32.—*The potatoes, as fast as picked up, should be emptied into sacks, barrels or crates, and thus made ready for transportation.*

Boxes, barrels or sacks (old phosphate or hop sacks), filled with potatoes, can be quickly loaded upon the wagon, and as readily taken off. The old practice of drawing potatoes in bulk, in a wagon-box, must yield to better methods.

Light boxes or crates make, perhaps, the handiest packages imaginable for the transportation of potatoes. A crate of this kind (Figure 12) is described on page 826 (December 13th, 1884), of the *Rural New Yorker*, as follows:—

"It is simply a slatted crate, the ends being cut out of one inch stuff, planed on both sides, 10½ inches wide and 15 inches long. The bottom and sides are made of stuff 18 inches long

and one-half inch thick, and for the sides 2½ inches wide. The bottom slats can be of the same width, or wide enough so that with suitable space three will form the bottom; in each there should be cut suitable places, as shown in cut, to serve as handles in carrying.

"These crates are taken to the field and filled with potatoes, corn or other produce, and when filled, set directly into the wagon; two will stand endwise across the box, and if the box is, as it should be, for farm work, 15 feet long inside, being made of 16 foot lumber, 11 will easily rest side by side in its length, making 22 boxes in a tier, and as the box will be 12

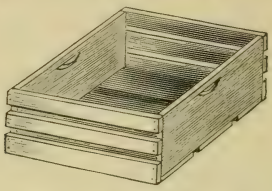


Figure 12. Potato Crate.

inches high, two tiers, or 44 crates can be carried at a single load, and this will be as much as any team should draw over the farm. When the load is driven to the cellar or crib, the crates are picked up, carried to the bins, emptied and returned to the wagon, thus saving once picking or scooping up the produce and much time.

"Every farmer should have enough of these crates for two full loads, and thus he can be filling one lot while another is being emptied. * * * * * They are also very handy for storing potatoes in the cellar, as they can be placed in tiers the full height of cellar, and are a great convenience when it is necessary to pick over or sort the produce. The material for making them should cost from 12 to 20 cents each, according to the price of lumber."

We have to add but one suggestion. Let the farmer's name and weight of package also, be put on each crate with rubber stamp or stencil.

CHAPTER X.

MARKETING AND STORING.

Fall or Spring Sale. Sorting for Market. Cellar. Root Houses. Pits.

The advice to sell as soon as a fair price can be obtained, has lost nothing of its virtue by age or frequent repetition, and is especially recommendable for potatoes.

LESSON 33.—*Do not put off marketing the crop longer than necessary.*

The loss from shrinkage and rotting, sometimes from freezing, is much greater than generally supposed, and the labor caused by repeated handling, sorting, sprouting and storing is considerable. In short, we would rather take fifty cents for a bushel right from the field at digging time, than a *probable* seventy-five cents at the beginning or in the midst of winter, or one dollar in the spring.

The proper sorting of the potato crop, is just as important as that of apples or other produce. A few small specimens, say one bushel or two in a load, spoil the appearance of the whole. While they add to it in weight, they do but little in bulk, and detract from the whole load.

LESSON 34.—*Small potatoes should be fed out, not marketed.*

Every morning at day-break, give to your fowls a warm mess of boiled small potatoes, mashed and mixed with meal. They will pay you in eggs, much more than you could obtain in market for the potatoes.

Excessive supply, or other unfavorable conditions in the fall market, sometimes compel the grower to store the bulk of his produce. If you have a large cellar or root-house, which is frost-proof and can be kept dark, the simplest way to store potatoes, either for home use, for seed or for spring market, is to put them in dry bins, raised not less than six inches from the ground. It is advisable not to heap them up over 20 or 24 inches high, Potatoes stored in crates, as described in the preceeding chapter, or in barrels and boxes, generally keep well.

LESSON 35.—*All potatoes when put into winter quarters, must be perfectly dry.*

A steady temperature, as low as possible without actual freezing, is the best.

LESSON 36.—*Potatoes intended for food, should be kept in the dark.*

A sprinkling of air-slacked lime over the tubers is a preventative of rot.

Another good method of keeping potatoes until spring, is the storage in pits. It may not be quite as handy, nor as safe, as the cellar storage, but the tubers generally come out of their winter quarters much fresher and of better taste than when cellar kept. The annexed figure gives a correct idea of the pit as it should be.

The pits may be made right in the field where the crop is dug. Select a location–with *perfect natural drainage*, and excavate a place of corresponding size, and not deeper than necessary to

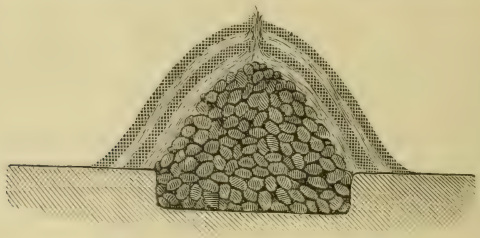


Figure 13. Potato Pit.

obtain a solid and dry foundation (8 or 9 inches). For a pile of 50 bushels, the excavation should be round, and about 4 feet in diameter; for a larger quantity, it has to be enlarged *in one direction only*, and thus made oblong.

Now put a little straw in the bottom, and empty the potatoes as fast as picked up, upon it, making a conical pile. Cover it with straw eight inches deep, and after the lapse of a few hours,

cover with soil to the depth of three or four inches. A twisted band of straw, reaching down to the potato heap and through the dirt covering on top, serves as ventilator.

At the approach of severe cold weather, this heap is once more covered with 5 or 6 inches of straw, held in place by a light coat of soil.

LESSON 37.—*A dead air space (straw) between two light coats of soil, protects potatoes from freezing much more effectually than the generally applied heavy outside coat of manure.*

It must be our aim to keep the potatoes as near as possible to the freezing point without actual freezing, and in a warm winter, the ventilator should be kept in good working order.

Further south, of course, this heavy and anxious protection is not necessary; the difficulty there is in keeping the potatoes from rotting and sprouting.

CHAPTER XI.

SEED POTATOES.

Production of New Varieties. Their Dissemination, Local vs. Shipping Trade. High Breeding.

To the faithful experimenters who propagate from the seed of the seed balls, as they come across them accidentally in selected varieties, or from seed which is the result of artificial fecundation of pistils of one superior sort with pollen taken from another, we owe the existence of many improved new varieties.

There is no stand-still. Either we go onward or we must fall back. Should we neglect to improve on the varieties now existing, we would soon have none worth cultivating. We can only wish that the effort of those experimenters may be continued untiringly. Their work is not to be derided. It is necessary to create about 2,000 new varieties, in order to find one as good as those already in existence, and perhaps 10,000, or more, to find a better one.

It seems to us, however, that by far too many of the new seedlings are retained by the growers. They should offer to

the public only such varieties, which, by the severest tests, prove that they are really superior to existing kinds. It is but natural, though, that the originator of a promising variety should wish to make it pay him for his labor and trouble in calling into life so many which are of no value.

The disseminators of new varieties generally reap the reward of the originator's work, and the business of growing and selling seed potatoes is sometimes, as in years of boom, like 1881 to 1883, exceedingly profitable for those who have the judgment to select the "coming" varieties, or who know them by intuition.

W. E. W., a prominent potato grower near———, bought of us in the spring of 1881, sixty-four pounds of the now justly celebrated White Elephant potato, then introduced by Thorburn & Co. From this quantity of seed, which cost him something over $8.00, he raised 110 bushels. A quantity of these were retailed at $5.00 per bushel in spring 1882; we bought 50 or 60 bushels at $7.00 per barrel of 150 pounds, and the rest he planted, growing from them in 1882, nearly 1500 bushels, which were sold for $1.00 per bushel in spring 1883.

The original investment has paid him exceedingly well, but the same thing cannot be done every year, nor with every new variety. Sorts which gain universal popularity and grow into demand at fancy figures, are few and far between.

Still, in many thousands of villages and neighborhoods in localities where potatoes are grown extensively, there are fine opportunities for enterprising and competent men to increase their farm profits by growing potatoes for seed. Many farmers and village people neglect to save any of their early garden potatoes for seed, and when spring comes are looking for a few "real early ones," and are willing to play a good price. We generally sold *Early Ohio* in the local market at $2.00 a bushel.

Local demand is the only safe foundation for a start in the business of growing seed potatoes, and it would be folly to speculate altogether on the mailing and shipping trade, obtained by advertising.

That branch seems to be well filled, if not crowded, by very enterprising firms and individuals. Grow up with the local market, and gradually try to reach out beyond it.

LESSON 38.—*Potatoes intended for seed should be grown from carefully selected tubers, and carefully sorted at harvest.*

High breeding is just as necessary in the case of potatoes as in that of cattle or sheep. To lessen the risk of mixing the seed, different varieties should be planted a little ways apart, divided for instance by a few rows of corn or beans, and carefully labeled. Store in pits or cellar. Never depend on your memory as to the varieties. If you have but six different ones, label each package or bin correctly.

LESSON 39.—*Seed potatoes rather improve, are not damaged, by exposure to the light.*

Requiring more labor and care in planting, in selection of seed stock, in growing apart, in storing separately until spring, in labeling, and otherwise involving risks, the crop is naturally more expensive than potatoes grown for food. The grower cannot afford to sell them at common market rates, and the buyer must expect to pay accordingly.

CHAPTER XII.

COST AND PROFITS.

The expense of growing one acre of potatoes is about as follows:—

Rent (1 acre in new clover, worth $100), . .	$ 6.00
Manure, 15 loads or its equivalent, . . .	15.00
Plowing and harrowing, ...	2.00
Marking, plowing, furrows, covering, . . .	1.50
Dropping seed by hand, ...	1.50
Seed, 25 bushels at 60 cents, ...	15.00
Cultivating, etc., ...	5.00
Harvesting and marketing, ...	5.00
Total,	$51.00
Receipts—250 bushels at 25 cents per bushel,	62.50
Net profit per acre,	$11.50

The above yield of 250 bushels, is the very lowest we would expect in an *unfavorable* season, and the probable price then nearer the average, say at least 50 cents. The receipts in that case will be doubled, or $125, leaving a net profit of $74 per acre.

In a favorable season the crop would be 300 or 400 bushels, and the net profits correspondingly larger. Often, also, potatoes are sold for 60, 75 and even 100 cents and above per bushel.

The average price during the five years from 1876 to 1880, inclusive, is estimated by the Agricultural Department at 53.3 cents per bushel. The average for the future can hardly be expected to be much less. Half of this price pays liberally for labor, manure, rent, seed, and leaves a profit besides. What more can you ask?

CHAPTER XIII.

SUCCESSIVE CROPS.

Paying successive crops can often be grown without trouble, as it is not one which particularly impoverishes the soil. The potash and phosphoric acid, however, which the crop removes, should be replaced either by fine manure applied in the fall, or by the required chemical fertilizers in the spring. We have raised potatoes year after year on the same soil, or alternated with corn, without seeding to clover or applying manure, except very little ashes, kainit, and superphosphate; and sometimes (in a favorable season) the last crop was the best.

Those repeated crops of from two to 400 bushels to the acre seem to show that there is an enormous quantity of the raw material for the manufacture of potatoes in common soil, if you but know how to make it available.

CHAPTER XIV.

TREATMENT OF THE FIELD AFTER DIGGING.

It is not profitable to allow the field to remain through the winter in the rough condition caused by the digging operation.

Some sort of covering through fall and winter is beneficial to the land. Weeds, with their seed maturing propensities, are not a profitable or satisfactory covering.

LESSON 40.—*Soon after digging harrow the field thoroughly and sow to rye.*

The field can be got in very fine condition for rye (or wheat, either, if early enough) with little labor; plowing is not necessary; thorough harrowing is sufficient, unless the land is very rough and hard, when the cultivator may precede the harrow. The rye will come handy for early spring pasture, or for use as green feed, or for the grain (with seeding to clover in spring, at the grower's pleasure). If potatoes are to be followed with potatoes, the rye may be plowed under for manure.

CHAPTER XV.

PRICE AND FOOD VALUE.

In some springs—generally after a good potato season following a boom—the supply is largely in excess of the demand, and prices rule low. Often a market can hardly be found at at all, and farmers are asking: "Shall we sell our potatoes at twenty-five cents a bushel or feed them?"

Potatoes contain only about one-quarter as much solid nutriment as corn, weight for weight. With corn at sixty cents a bushel, or wheat at seventy-five cents, the actual feeding value of one bushel of potatoes is less than twenty cents, perhaps hardly fifteen cents. In small quantities, merely as a stimulant for the digestive functions of horses and cows, or boiled as a variety for laying and fattening hens, they may be worth much more. With the above price for grain we would sell potatoes at twenty cents per bushel and buy corn, much rather than feed them. For human food wheat is about as cheap at seventy-five cents as potatoes at fifteen cents per bushel.

CHAPTER XVI.

RECAPITULATION.

In the preceding pages we have given you our system of growing potatoes on the common soils which are found on almost every farm. After much thought and study, and years of experimenting, we had selected it as the *safest for us as for the general farmer.* We have often failed with other systems, but had always good success with this. We hope you will at least give it a trial. We are willing to guarantee success, provided you comply with the following indispensible conditions:

1. That the naturally drained soil, in which neither sand nor clay should have too great a preponderance one over the other, be thoroughly pulverized way down below the seed.

2. That there be present in the soil, and available for immediate use, a fair quantity of all the essential elements of plant food, or if not, that the deficient element or elements be supplied, either in the shape of fine stable manure or of commercial fertilizers.

3. That a *sufficiency of well selected* seed be planted (not less than three inches deep) in drills, at a distance regulated according to the condition of soil, and the vigor of variety planted.

4. That the ground be well cultivated, and but slightly hilled, and

5. That the bugs be repelled by luxuriance of foliage.

CHAPTER XVII

CONCLUSIVE REMARKS.

The Terry One Eye System. The "Rural" Trenching Method.

On several occasions in our little work we have mentioned prominent features of the Terry (Dr. Sturtevant's) one eye and the *Rural* trenching systems. Our method differs in very material points from either.

Terry emphasizes the cutting to one eye, in the manner he calls "from North-east to South-west." The more plant food

there is in his soil the less space he allows to each plant, fo the purpose of making use of all *the available substance* in his land. We believe that the principle is altogether wrong The richer the soil the fewer plants should grow on it. One strong, well tillered wheat plant bears more grain than a dozen spindling, single stalks on a space three or four inches square. Terry creates dwarfs and weaklings, and assigns to them the work of collecting and assimulating plant food. We have giants in structure and digestion. A strong plant can often use the plant food (which is present in almost every soil) in a shape in which it is utterly unavailable for a weak one, just as some people will thrive on pork and beans, whilst others would not dare to take anything heavier than beef tea and toast. (A weak plant *does not* utilize all the available plant food within its reach, and here is the *proof of the pudding*: In one of our tests a number of Dakota Red single eyes, cut from North-east to South-west, were planted in medium rich loam. A part or these single eyes were inserted each into a whole Gem potato, which had all the eyes cut off and a hole dug out for the reception of a Dakota Red-eye. In spite of this procedure with the Gems, some of their own eyes started into life. A number of the Dakota Red single eyes planted without Gems did not germinate, or perished after germinating. *The hills planted with Gems averaged more and larger Dakota Reds than the others, and yielded a considerable quantity of Gems besides.* The fallacy of Mr. Terry's theory is here exposed with almost mathematical accuracy.) On soil in as fine a state of cultivation as Mr. Terry claims his land to be, we would not be satisfied with a potato crop of less than four or five hundred bushels to the acre. His yields are by no means remarkable or excessively large.

The Rural system is similar to the Terry in regard to close planting and dwarfing the plants, though Mr. Carman uses two eye pieces, planted 12 inches apart. The greatest importance is attached, first, to the thorough pulverization of the soil *in the bottom of wide trenches* (into which the seed is to be planted);

second, to drill manuring with commercial fertilizers (The *Rural* disclaims all merit for stable manure on the *Rural* grounds); third, to perfectly level cultivation.

Having one common end in view, that is, the increase of yield on common (not rich) farm soils, we are strongly in sympathy with the *Rural*. But we cannot travel the same road.

Our method is entirely original in many of its main features. In the first place, we make a general and decided distinction, clear through, between early (dwarf), and late (tall), varieties, treating them differently in regard to soil, manuring, time and manner of planting, amount of seed, distance in the rows, etc.

We do not despise commercial fertilizers and chemicals, like Terry, nor reject stable dung, like the *Rural*. Each is good in its place. But potato pulp is a manure that *we must have*, if it be the most expensive. We have not found anything that will take its place.

Terry weans his potato babies when they are a day or so old, and feeds them flour soup and rice with the spoon; the *Rural* nurses them a few days longer, then uses patented "food for infants." We bring ours up solely on their mother's milk, until they are vigorous and strong enough to digest the heartiest kind of food.

Here you have the three systems. "You pays your money and you takes your choice."

APPENDIX.

THE NEWER VARIETIES. THEIR MERITS AND FAULTS.

While descriptive lists of the newer potato sorts can be found in all the annual seed catalogues which are scattered over the country by millions, the reader will desire to see such a list made out from the stand point of the planter, not in the interest of the dealer in seed potatoes. This chapter is an attempt to supply it. We will mention merely the most popular and the most promising varieties.

There are a number of varieties so nearly alike in every respect, that their dissemination under different and often high-sounding names, can hardly be justified. The number of Rose seedlings in particular is legion. Others are praised up beyond actual merit by their originators or introducers, and the disseminators just copy the extravagant statements.

These gentlemen desire to create a brisk demand at a dollar or so a pound, and they know how to do it, though it require seventy-five cents worth of puffing and blowing and of colored plates, to sell the one pound. The good qualities of a new seedling are generally greatly magnified, while the faults are entirely ignored.

The reader, who intends to buy new kinds, is earnestly advised to examine our list and description carefully before buying. He may thereby save money.

EXTRA EARLY SORTS.

EARLY OHIO.

Our favorite. Seedling of Early Rose. With us, the earliest of all that are worthy of cultivation. Smooth, round-oblong,

rose colored. Quality first rate, cooking dry and mealy even before fully matured. Needs particularly heavy seeding on account of particularly low growing tops; otherwise little susceptible to indifferent treatment. Prefers heavy, rich and rather moist soils. Handsome. Indispensible in the family garden and as early market variety. The Ohio is the kind for rich bottom lands, the true "Queen of the Valley," but not worth much for thin, dry uplands.

LEE'S FAVORITE.

Seedling of the Early Rose; resembling it in form and general appearance. Light flesh-colored; pink about the eyes. Quality unexcelled. A very promising variety.

EARLY MAINE.

Another seedling of the same parent, and a very promising sort.

EARLY SORTS.

EARLY SUNRISE, EARLY GEM, CHICAGO MARKET, EARLY VERMONT, ROSY MORN, AND OTHERS.

All these are seedlings of the Early Rose and resemble each other and their parent, varying but little in shade of color, (lighter or darker red), or in time of ripening. We will call them collectively, the

NEW ROSE,

and prefer either of them to the old Early Rose, for the same reason that the reader, if he had the choice between two horses alike in every respect except age, would take the five-year old colt in preference to the fifteen-year old mare. But if you have one of these varieties, you have all.

BEAUTY OF HEBRON.

A leading market variety, seedling of Peachblow and Garnet Chili, spotted white and pink; oblong; quality first-rate; yielding well in rich, not too heavy soils.

EARLY MAYFLOWER

May be called a rejuvenated Snowflake, but is earlier and a better yielder. Like the Snowflake it requires *light seeding*, otherwise a large number of small tubers will be the result.

EARLY TELEPHONE

Resembles the preceding, but makes a more vigorous growth.

INTERMEDIATE SORTS.

RURAL BLUSH.

A fine variety indeed. Very productive. Tubers flattish-round, very uniform in size and shape, and of excellent quality The eyes are deeper than we should like to see them.

BAKER'S IMPERIAL AND CORLESS MATCHLESS

Are two more seedlings of the Early Rose; large, long, red, prolific, and altogether promising sorts.

MAGNUM BONUM (American).

Large, good yielder, deep-eyed. We have better varieties than this.

ONTARIO.

White, productive, of fair quality and shape. A very good late keeping sort.

BIG BENEFIT (Pickering's).

Large, long, smooth, red. Valuable for the propagator on account of its free blooming and seeding (seed-ball producing) faculties.

LATE SORTS.

DUNMORE SEEDLING, MAMMOTH PEARL AND O. K. MAMMOTH PROLIFIC

Belong to the Peerless type of potatoes. The farmers in Northumberland County, Pa., the home of the introducer of Mammoth Pearl and O. K. Mammoth Prolific, speak very highly of these varieties. The O. K. is the best of the three,

and should be planted by people who can grow the Peerless to advantage. We find fault with the quality mostly.

BELLE AND QUEEN OF THE VALLEY

Are nearly alike, yield well, but are deficient in quality. We cannot recommend them.

WALL'S ORANGE

Is reported to be a splendid potato in a few localities, but the majority of planters will soon discard it. The tubers are spreading in the hill. The quality is good, though not the best. Liable to rot. Valuable as a late keeping sort and a free bloomer and seeder. Tops extremely vigorous. It has greatly disappointed us.

WHITE STAR.

Tubers resemble Burbank, but are still more regular and handsome in appearance; white, great yielder, and of fine quality. Is claimed to be a better yielder than even White Elephant with some growers. We do not find it so.

WHITE ELEPHANT.

This is our standard of excellence as to quality and yield. Tubers are apt to grow prongy, and liable to rot in heavy or very rich soils. Otherwise smooth and fair shaped. Resembles Beauty of Hebron, its twin brother, in shape and color. Top growth very thrifty. Plants commence to bloom when quite young, and produce blossoms so freely during the greater part of the growing season, that the variety can be distinguished from afar by the abundance of the white clusters. The Elephant is not a good variety for late spring use, nor is it proof against rot or disease. A perfectly white sort of this variety is *Weld's Jumbo* (Ingleside, N. Y.), though perhaps not superior to it in other respects.

JORDAN'S PROLIFIC AND NEW CHAMPION

Resemble White Elephant somewhat in color and shape, and though very fine potatoes, can hardly be said to be superior to it.

JONES' PRIZE TAKER

Is a trifle earlier, and perhaps mealier than White Elephant—if that be possible, otherwise exactly like it.

AMERICAN GIANT.

Tubers are giants indeed, of fair shape, but only of medium quality. Yield very large.

ADIRONDACK.

Roundish, with few eyes; red. Produces very many uniform, medium sized tubers of fair quality. Keeps very late without sprouting, and the tubers are sound and solid in early summer, long after other sorts have become unfit for food.

RUBICUND

Resembles Adirondack, perhaps more oblong and eyes not so deep. Very smooth.

HOME COMFORT.

A potato of the rose family, very smooth and handsome, very large and very late, a vigorous grower. Quality of the very best.

DUCHESS.

Much ado for nothing. Produces an immense amount of foliage and but few tubers. The few specimens, however, will often reach gigantic proportions. Good for exhibition purposes, but for no other.

EL PASO

Has been a complete failure with us.

DAKOTA RED.

Is a very promising variety. Tops, tubers and yield extra large. Quality good. Eyes too deep and shape not of the best.

In the following Schedule, the varieties are compared with each other in regard to size of tops (column 1), size of tuber (2), yield (3), quality (4), shape (5), resistance to rot, etc. (6), and keeping quality (7). Ten is the standard of excellence. As far as yield is concerned, it is supposed that all these varieties are treated according to our system, *i. e.*, differently for early and late sorts:

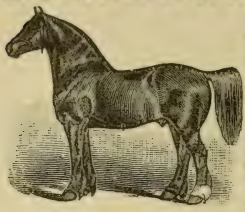
Name of Variety.	Relative Size of Top.	Size of Tuber.	Yield.	Quality.	Shape.	Resistance to Disease & Rot.	Keeping.
EXTRA EARLY.							
Early Ohio	5	7	9½	10	10	10	10
Lee's Favorite	6	8	9	10	9½	...†	.....
EARLY.							
Early Sunrise	6	8	9	9	9½	10	7
Early Gem	6	8	9	9	9½	10	7
Chicago Market	6	8	9	9	9½	10	7
Early Vermont	6	8	9	9	9½	10	7
Early Rose	6	8	9	9	9½	10	7
Rosy Morn	6	8	9	9	9½	10	7
Beauty of Hebron	7	8	9	10	10	10	8
Early Mayflower	7	6	8	10	10	.....	.....
Early Telephone	7½	6	8	10	10	..	.....
INTERMEDIATE.							
Rural Blush	10	9	10	10	9	9	9
Big Benefit (Pickering's)	8	9	8	.....	.....	.....	.....
Magnum Bonum	8	9	8	8	9	9	9
Ontario	8	9	9	9	9	9	9½
LATE.							
Dunmore seedling	9	10	10	9	9	9	9
Mammoth Pearl	9	9	9	8½	9	9	9
O. K. Mammoth Prolific	10	10	10	9	9	9	9
Peerless	8½	10	10	8	9	9	9
Belle	9	9½	8	8	9	9	9
Queen of the Valley	9	9½	8	8	9	9	9
Wall's orange	10	8	8	9	9	9	9
White Star	8½	9	9½	9½	10	10	9
Burbank	9	9½	9½	9	9½	9	9
White Elephant	10	10	10	10	9½	9	9
Weld's Jumbo	10	10	10	10	9½	9	9
Jordan's Prolific	10	10	10	10	9½	9	9
Jones' Prize Taker	10	10	10	10	9½	.....	.....
American Giant	10	10	10	9	9½	.....	.....
Adirondack	8	8	10	9½	9½	10	10
Rubicund	8	8	10	9½	10	10	10
Home Comfort	10	9	.....	10	10	.....	.....
Duchess	10*	10*	5	.....	.....	.....	.....
El Paso	8	4	4	Failure.		Failure.	
Dakota Red	10*	10	10	9½	9	.....	.....

† Where no figures are given, we cannot fix the grade from our own knowledge. * Extra.

Our schedule will show you that there is not a single variety which is perfect in all respects. And we doubt that such a one will be found very soon. The schedule will need more or less modification in different localities. If we were restricted to three varieties, we would select Early Ohio for early use; White Elephant for main crop; Adirondack for late use in spring. Next we would add Lee's Favorite or Beauty of Hebron for early, Dakota Red for main crop.

THE END.

DO YOU OWN A HORSE?



Then send 25c. for Dr. Kendall's Treatise on **"The Horse and his Diseases."** Fully illustrated. Containing an **"index of diseases"** which gives the **symptoms, cause,** and **best treatment** of each. A table giving all the **principal drugs** used for the horse, with **the ordinary dose, effects,** and **antidote** when a poison; a table with an **engraving** of the **horse's teeth** at **different ages,** with rules for **telling** the **age of the horse,** a **valuable** collection of **receipts,** and much other **useful information.** Thousands who have seen the book commend it, and many **good horsemen** say they **prefer it to books costing $5.00.** It contains nothing which should exclude it from the most refined family, but it **should be read by all,** as it teaches humane principles, and elevates the morals by reminding us that **"the merciful man is merciful to his beast."** Order now and send 25 cents in stamps or postal-note, and receive book, post-paid, by return mail. Address,

---

POULTRY FOR PLEASURE

—AND—

POULTRY FOR PROFIT.

We are called upon now-a-days to give just the best possible goods for the least possible money. A **Poultry Book** is wanted for **25 cents,** which will be complete in itself. To supply this want we submit this little book,

"POULTRY FOR PLEASURE AND POULTRY FOR PROFIT."

It is intended to give the reader a good understanding of the different varieties of fowls; show up the good qualities of each, and let him see which are best adapted to special wants.

It is intended to show how best to house them and care for them, that a person may derive profit from them and enjoy them; also to arm the poultryman against diseases which threaten his fowls.

All of the important features of the business that are attracting special attention at the present time, **Incubators** and **Capons** are discussed with intended fairness to all.

In PART IV.—Subject:

"KEEPING POULTRY ON A LARGE SCALE."

Is the only solution of the question **"How can it be done and pay?"**

There are good illustrations of some of the principal varieties of fowls, also of the best **Poultry Houses** for the fancier or extensive poultry keeper.

Sent on receipt of **25 cents,** or **5 books** for **$1.00.** Postal Notes preferred.

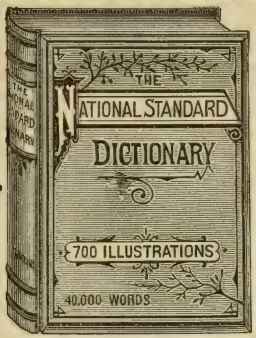
FRANKLIN NEWS COMPANY,
PHILADELPHIA, PENNA.

FRANKLIN NEWS CO.,

PUBLISHERS OF BOOKS.

NATIONAL STANDARD DICTIONARY

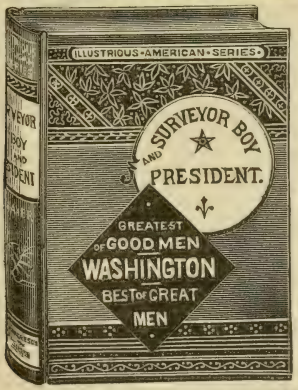
By mail, post-paid,



$1.00.

THAYER'S LIFE OF WASHINGTON.

By mail, post-paid,



$1.00

Address FRANKLIN NEWS CO.,

Box 329. PHILADELPHIA, PA.

LIBRARY OF CONGRESS
0 002 685 474 A