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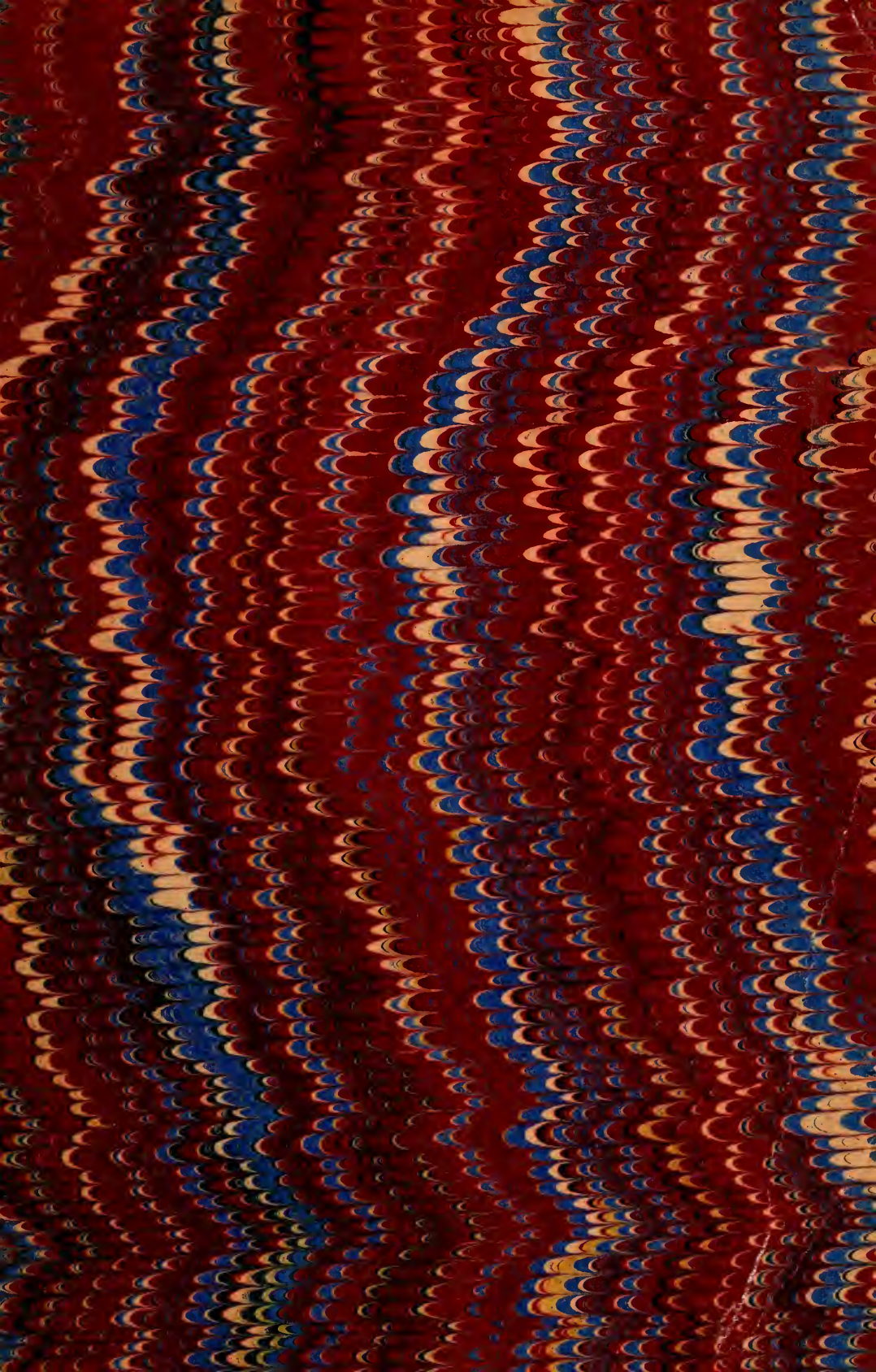
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ONIONS

FOR
PROFIT

AN EXPOSE

OF MODERN METHODS

IN ONION GROWING

BY

T. GREINER

PUBLISHED

BY W. ATLEE BURPEE & Co.

PHILADELPHIA, PA.



ONIONS FOR PROFIT.

BY T. GREINER.



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W. Atlee Burpee & Co.,

Philadelphia, Pa.

ONIONS FOR PROFIT.

AN EXPOSE OF MODERN
METHODS IN ONION GROWING.

Wisco. ✓
BY T. GREINER,

AUTHOR OF "HOW TO MAKE THE GARDEN PAY," "THE NEW ONION
CULTURE," "PRACTICAL FARM CHEMISTRY," ETC.

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W. ATLEE BURPEE & CO., SEEDSMEN,
PHILADELPHIA, PA.

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Onions for Profit.

I.

WHY THIS BOOK?

THE AUTHOR EXPLAINS.

This is not meant for an introduction. I trust that I need none to the reader. But he may feel like asking me why I write this treatise, when only a short while ago I wrote and published "The New Onion Culture."

The explanation is easy. "The New Onion Culture" was intended mostly to present a new phase of the business, and to encourage further researches in an entirely new direction. As a "handbook of onion growing" it has shortcomings, and is far from being complete. It leaves too much room for further personal inquiries. I have looked the field of horticultural literature in America over pretty closely, and am unable to find a handbook for the onion grower the teachings of which are based on modern methods, and embody (as they should in order to justify any claims of being "up to times") the two systems, the old and the new, in profitable combination.

Such a handbook or guide to successful onion growing is needed. I know it from the numerous inquiries on the subject which are all the while being addressed to me. I know it from observing the methods in vogue among the great mass of our onion producers. Yes, friends, if you

desire to make this onion business pay—I mean, make it pay anywhere near the profits that it can be made to pay—you will have to leave the old ruts, and adjust your methods to fit modern conditions. If you are plodding along, and just manage to get poor pay, or even a moderate one, for the actual work done in the onion field, I do not concede that the business pays you. The onion grower has to invest money,—in land, in manures, in seed, in labor. He ought to get some dividends over and above his outlay. He ought to get big pay for his experience and skill, if he brings any to bear on his enterprise, and something for his thought and study. Of course, if he does only mechanical work, and has neither experience nor skill; if he follows the same methods that his father did many years ago, and makes no effort whatever to improve his ways,—he is not entitled to any reward save the ordinary price of unskilled labor, and is not likely to get more.

The premium—and a big one at that—is always on superior skill. Thought and study pay a hundred per cent. where mechanical labor pays ten. If you would be an onion grower, by all means be a good one. Study the business as you would a trade. By reading all the good books written on onion growing in America (there are not many such treatises, and they cost but little) you can make the experience of others your own at a much smaller expense than if you gathered it in the field yourself.

On the other hand, I am going to lay particular stress upon it that you must verify this experience of others in your own field practice. Only don't attempt to reap practical experience by the acre or acres. This is the most expensive method of getting experience. Glean it in a little patch at first, and as you get strong in knowledge and skill and confidence, enlarge your area as you deem safe.

As I have already stated, there is room for, and need of, a hand-book like this for the general onion grower. But I would probably not have thought of writing it if my friends, the publishers, had not asked me to undertake the work. Then I was quite ready and willing to do so. I really like to talk and write on matters that I think I understand about as well as anybody, and more especially, if I see a chance to tell some "trade secrets" to my less experienced fellow gardeners.

The result of the publishers' suggestion, and of their co-operation, is the book as it now lies before the reader. May it fulfill its mission, which is to diffuse a better understanding of improved methods of onion growing among those willing and anxious to learn, and to aid them in securing more satisfactory returns from the business than it afforded them heretofore.

T. GREINER.

La Salle, N. Y., Autumn, 1892.

II.

THE LEADING QUESTION.

DOES ONION GROWING PAY?

Like a long hair in a roll of butter, or a forgotten basting thread in a newly-made dress, the question, "Does it pay?" or, "How does it pay?" strings itself along, seemingly without end, and just as annoyingly, through the stacks of letters received by me from people in need of horticultural advice. It is the question of all questions, and before I go further, I will try to give an intelligent answer to it. I hope it will save me the necessity of writing some personal letters on the same question in future.

"Does onion growing pay?"

Here one has a fine chance of doing some plausible figuring on paper. "A thousand bushels per acre is not an extraordinary crop; one dollar per bushel not an extraordinary price. One thousand bushels, at \$1 each, make \$1000.

This, however, tempting as the prospect may be, is dealing with possibilities, not with probabilities. The skilled grower, under favorable circumstances, can grow 1000 bushels per acre. I propose to show that even twice that number of bushels is within our reach, and has actually been obtained on limited areas; but I would not guarantee half that yield to the new beginner, especially not if he be one of those young fellows that "know it all." The average yield vacillates between 200 and 300 bushels per acre.

Thus it is with the price. We often get \$1 a bushel, and sometimes two and three times that amount; yet, while I again propose to point out how you can manage to

obtain a somewhat larger price for your crop, or part of your crop, than the average grower usually receives, I am sure it would be folly to build your estimates of profit on any such uncertain basis.

Onion-growing must not be looked upon as a speculation, nor as a means of acquiring sudden wealth. If this is what you have in mind, failure will be pretty well assured.

In this respect, the business resembles similar enterprises, such as fruit-growing, general gardening, poultry-keeping, etc. Some of our smart young people often see "golden opportunities" in the hen business. They figure, quite plausibly, as follows: "It costs about \$1 to keep one hen a year. She will lay in that time 150 eggs, which at the low average price of 16 cents a dozen bring \$2, or a clear profit of \$1. Now, keep a thousand hens, and you have a sure yearly income of \$1000." Perhaps this figuring is faultless; but if the hen of the future is not built materially different from the hen of the past, she will, when thus kept in large numbers, invariably refuse to perform the task assigned to her, but rather content herself with an annual lay of 75 or 80 eggs.

Does onion growing pay?

In reply let me ask: Does it pay to grow wheat, or potatoes, or strawberries? Does dairying, or sheep husbandry, or cattle raising pay?

Some people make these things pay, and others do not. The great majority of those who engage in any one of them, and stick to it, as a life-business, make their living by it, but seldom much more. Those who go in and after the first unsuccessful attempt drop out again, are sure to lose. The few, however, who by accident or selection of their own are working under favorable conditions, who keep abreast of the times, and manage with skill and good

judgment, not only make enterprises of this kind pay, but make them pay *well*.

Is it your idea to plant a big field in onions, to try to make a big haul, and then perhaps turn your attention to something else? If so I say: Don't. Your chances of success are one in a million. But if you intend to start moderately and with deliberation, having chosen onion culture as a legitimate calling, then I say: Go ahead. Try to select the most favorable conditions as to soil and market. Learn, and make use of, the best methods of growing and marketing the crop, and stick to your business without allowing yourself to become discouraged by a failure which is possible even under quite favorable conditions. The chances are that you will succeed in the end. Well-directed efforts are usually crowned with success.

Study the following pages and profit by the suggestions. I can do little more than give general directions. It remains for you to do the right thing at the right time.

Does onion growing pay?

It will pay in exact proportion to your ability to select the most favorable combination of circumstances, to your own good judgment, to the thought and study you bring to bear upon the question of management, to your perseverance, and to some extent, perhaps, to your luck. Of the last item, however, I seldom take much account. Good management and perseverance will carry you through, even if luck be against you.

Does onion growing pay?

I have to touch upon one other aspect of the question, and in this respect feel inclined to give a little special encouragement to onion growing. Onions are just the crop for intensive farming. The big item in their production is well-directed labor, not land. Their culture involves some risk of loss to the unskilled or shiftless grower; but it

also affords one of the best of chances to get comparatively large returns from "a little land well tilled." With the exception of celery, I could not name a single crop so promising in this respect as the onion crop.

III.

THE PREPARATIONS.

SELECTION AND ANTECEDENTS OF SOIL.

SANDY LOAM.—CLAY.—MUCK.—RIVER BOTTOM.—IDEAL ONION SOIL.
—PRELIMINARY TREATMENT OF SOIL.—ROTATION.

While it is true that onions can be grown on any soil, from sand to clay, and on muck besides, if otherwise properly managed and prepared, yet a judicious selection, which aims to secure a combination of the most favorable conditions, has as much influence as any other thing upon the question of profit or loss. I know many large grain farms on which you would not find a single half-acre of land suitable to be used for onion growing at short notice.

A REVIEW OF SOILS.

Soil that is stony or gravelly has to be rejected, because of the difficulty of economical cultivation by means of labor-saving devices. Weed seeds also usually abound there.

Then there are pieces of nice, clean loam, inclining to sandy. They would be just the thing, had not a half century's persistent cropping without an adequate return of the plant-foods taken off year after year almost ruined the originally fine fields, and rendered them unfit for the purposes of onion growing, at least for the present. A satisfactory crop cannot be expected on poor land the first season, no matter how lavish the grower might be with his manure applications.

On one farm I noticed a corner lot near the barn, the soil being a fine sandy loam, quite rich from having received

frequent dressings of manure and the washes from the barn-yard. This, with the help of liberal manuring, would prove to be a fine spot whereon to locate an onion patch. If it happens to be in sod, and the sod so old and tough that it is not likely to break up and give the needed smooth, mellow seed bed early enough in spring, it should be broken the year before, either in spring or at least by early autumn. If so treated, it will be all right.

The fields of stiff clay, as we find them on many farms, are often insufficiently drained, and usually lacking in organic (vegetable) matter such as is supplied by applications of stable manure or by turning under clover and other green crops. They are almost always lumpy in spring, liable to crack in the hot season, and therefore unsuitable for our purposes. Otherwise, well-drained clay loams, if only rich enough, often give good yields.

Sandy muck is perhaps an ideal soil for onion growing, especially if it can be arranged for sub-irrigation, as explained later on. Even muck with next to no sand in its make-up is largely used, and can be made to produce good crops. But it must have thorough under-drainage and be freed from all obstructions and rubbish. If such muck soil is almost free from sand, and consequently inclined to be moister than desirable, there is some danger that a large portion of the plants will form thick necks, producing "scallions" or "romps;" and even the well-formed and well-cured bulbs will be lacking the solidity and specific gravity of those grown on clay or sandy loams. An additional disadvantage of many of these mucky onion grounds is their liability to being washed over or flooded in times of heavy rains, to the great injury of the growing crop.

The deep, rich, clean, well-drained brown loams of our river bottoms are usually admirably adapted for onion-

growing, and where such land is at command, there is no need of looking elsewhere for the right location.

Of course, not everybody can have an ideal spot for his onion venture. I have had to be contented with rather inferior soil for some time, and yet have been quite successful. My rule is to take the best at hand, and then try to make the most of it. Soils not in condition to be planted now may be rendered suitable for planting next year or the year after. If they are not perfectly underdrained, the laying of a few lines of tile will make them so; if not rich enough, heavy dressings of barnyard manure for a few years will supply the deficiency in humus and fertility; if too weedy, a few seasons' thorough cultivation will render them reasonably clean.

To tell the whole story in a few words, I would say, use any kind of rich, clean soil, provided it is thoroughly underdrained, either by nature or by man's agency, and reasonably free from weed seeds, and in such mechanical condition that it will allow you to prepare a seed bed "fine and mellow as an ash heap."

SOIL ANTECEDENTS.

It is always well to know the antecedents of a piece of ground in order to reach a just conclusion concerning the degree in which it is suitable for onion growing. As a rule, its desirability for the purpose increases in the same ratio as the intensity of culture that it has received for some time back.

A few days ago a friend showed me a piece of land which he intends to plant to onions, and which seems to me ideal, not only in soil but in preparation also. It is a deep brown loam on the flats.

"You should have seen the crop of clover that grew on this field three years ago. Simply immense!" said he.

“ It was cut early, and the aftermath, another heavy growth, left on the ground to rot, although the neighbors laughed at me for letting so much good hay go to waste. A fair dressing of half-rotted stable manure was put on in autumn, and the field plowed in early spring. It would have done your eyes good to see the crop of potatoes I took off that piece that season—more than 350 bushels to the acre, I guess—and the nicest and smoothest potatoes I ever laid my eyes on! In fall or winter following the land received another light dressing of half-decayed sheep manure, and in spring it was planted to beets and carrots. Well, such a crop as that was again! The neighbors haven’t had a word to say for a year or two about my ‘foolishness in letting so much good hay go to waste.’ It has tickled me, too, to see some of them try the same method of raising potatoes, and apparently with good success. Now, I assure you, there have not many weeds been given a chance to ripen and scatter seed on this lot for several years.”

This is indeed a most excellent preliminary treatment of a piece of land to be used for onion growing. I do not know how it could be improved upon. That the rotation may be varied more or less, should go without saying; but I like to have clover as one of the fore-crops. It cleans the field and supplies the soil with the decaying vegetable matter which is of such great importance. Following it, you may grow crops, for a year or two, which require high manuring and high cultivation, such as carrots, beets, radishes, celery, spinach, or other garden vegetables. A rotation of this kind fits the land nicely for onion growing.

ONIONS IN SUCCESSION.

If we believe orthodox teachings, onions can be grown successfully on land where onions have been grown for many years in succession. Our old onion growers always

state that with proper manuring the last crop thus grown in succession on the same ground will usually be found better than any preceding one. This may still be true in some cases; but there are dangers lurking in the practice.

Fungous diseases of cultivated plants have multiplied at a terrible rate in recent years. The onion blight is quite apt to interfere if onions are grown in succession on the same soil, and when it once has taken a foothold, it is quite sure to attack and cut short the next onion crop. As we have no means to fight and conquer it, the only safety lies in running away from it by changing the location of the onion patch at least every other year, and still better every year. My experience has made me a firm believer in the wisdom of strict rotation.

IV.

THE WORK BEGINS.

MANURING, PLOWING, HARROWING.

STABLE MANURE.—AMOUNT REQUIRED.—ITS VALUE.—COMPOSTING IT.—APPLICATION AND PLOWING IN.—WOOD ASHES.—COMPLETE FERTILIZERS.—NITRATE OF SODA.—POULTRY DROPPINGS.—SALT AND LIME.—OTHER MANURIAL SUBSTANCES.—HOW APPLIED.—PULVERIZERS AND SMOOTHING HARROWS, ETC.

With a properly-selected piece of ground, and an abundance of old barnyard manure to begin with, we will have pretty plain sailing. On ground that has been heavily manured with stable manure, year after year, or which has been treated pretty freely with clover, and which in consequence is full of organic matter, also on rich muck and other soils abundantly provided with humus, we may sometimes entirely, or more often partially, dispense with manures originating in the barnyard, but I seldom feel safe without them. When we desire to raise crops that approach the great capabilities of the soil, we must give, not only full, but also varied rations. I have learned to appreciate, and know the full value of, commercial concentrated fertilizers, and under some circumstances would not hesitate to operate with them to the exclusion of coarser manures; but, as an onion grower, I put my first reliance on good, old, stable manure. This should be well rotted, free from weed-seeds, and free from other infection. Onion growers, for instance, often throw their onion refuse—tops and trimmings generally, decayed or otherwise unsalable bulbs, etc.—upon the manure heap. I would be afraid of such compost, as it may carry the germs of the blight.

STABLE MANURE.

Always pick out the very oldest, most nearly rotted manure in the yards, and reject all that is coarse, freshly made, and full of weed-seeds. We cannot be too careful in regard to the last-named item, especially when growing the crop directly from seed (in the old way). Weedy land and weedy manure render the crop a pretty costly one, and usually eat up all the profits.

Any kind of fine and clean manure will do. It matters little whether it comes from the horse and cow stables, the sheep sheds, or the pig sty. A mixture is as good as anything. Poultry droppings and night-soil are also especially useful as an addition to the compost heap.

But let us make no mistake concerning the quantity needed. A 1000 bushels of onions cannot be manufactured out of half a dozen or a dozen loads of such manure. Unless the land is already well provided with humus, nothing less than sixty loads, each load containing a plump ton or more, will answer, and soils that are poor in organic matter may require considerably more to give best results. By all means be liberal. People accustomed to the methods employed by the average farmer in feeding (or rather starving) the ordinary crops are apt to be afraid of hurting onions by excessive manure applications. Put your mind at ease. The more you fill the soil with good compost, the more will the proceeds from the crop fill your pocket.

Market gardeners seldom get from their own stock what manure they need; but often they can purchase it at reasonable rates, either at the livery stables in the nearest city, from dairymen, or other farmers who have not yet learned the real value of good manure, or from railroad stock yards. A ton of ordinary good mixed manure that is neither fire-fanged nor leached out is worth at the established values

of plant foods at least \$2. Frequently it can be bought at one quarter of that amount.

You can haul this manure, probably rather fresh, during summer and autumn, and pile it up in great, square heaps, if possible under a shed, to rot down. If it heats rapidly and violently, pour water upon it, or better, if you have it, liquid from the barnyard, and fork the heaps over several times. During winter or early spring, haul this compost to the field and spread it thickly and evenly.

No matter how fine and well rotted this manure may be, heavy dressings of it should always be plowed under and mixed as thoroughly as possible with the surface soil. Fertilizers of a more concentrated character, such as wood-ashes, bone-meal, phosphates, potash, and nitrate salts, I invariably apply after plowing. Remember that the aim is simply to prepare a fine, mellow seed bed, and that there is no necessity, usually, to run the plow deeper than required for that purpose. Good judgment alone can and should be the guide in this. On somewhat tenacious soil a depth of eight inches is about right; on deep, mellow soil less will do.

PREPARING THE SOIL.

Ordinarily, I prefer spring plowing. Clean loams filled with humus, especially muck lands, which, after having given a crop of celery, or carrots, or beets, or a similar crop, were manured and plowed in the fall, however, may be prepared in spring by means of deep-cutting harrows or cultivators without reploting; or plowing may even be omitted altogether if the dressing of compost was a light one, or if the more concentrated manures alone are to be used.

While admitting that a large crop can be produced with barnyard manure exclusively, I confess I hardly ever feel safe without additional rations of concentrated manures.

CONCENTRATED MANURES.

When I can get good wood ashes, leached or unleached, at a reasonable cost, say \$3 or \$4 per ton for the former and \$8 or \$10 per ton for the latter, I use them freely, even where a heavy dressing of compost was applied. Wood ashes are especially serviceable in preventing the ill effects of a protracted drouth. Two tons of the unleached article per acre are not too much, while three or four times that quantity of leached ashes may be put on with the expectation of good results. Unleached ashes, however, are a strong, but rather one-sided manure, and it will be well to add 300 to 500 pounds of bone meal or acid phosphate per acre.

If ashes are not to be had, or not at reasonable cost, I usually apply about one ton of some high-grade, complete, special vegetable or potato manure, costing \$40 or more. In the place of it we might use a ton of superphosphate (acid phosphate, or perhaps Thomas' slag or phosphate meal) and 300 pounds or more of sulphate of potash. If kainit or muriate of potash is to be used in place of the sulphate, it should be applied in the autumn before, at the rate of say 1000 pounds of the one, or 250 pounds of the other.

I never omit the application of nitrate of soda in small but repeated doses, using about 75 pounds per acre each time, and perhaps 225 or 300 pounds per acre in the aggregate. It can be sown broadcast like wheat, and the first application should be made shortly after the seed is sown or the plants are set out. Sulphate of ammonia might be used as a substitute for nitrate of soda, and may be put on all at once at the proper time for the first application of the nitrate, sowing about 250 pounds per acre. In the majority of cases the use of these chemicals gives good results.

I make it a practice to apply even the poultry droppings after plowing. They are a most valuable and effective fertilizer for onions. Of course, they should be dry and fine, not a pasty mass. To get them in good condition for use and preserve all their strength, I allow them to accumulate during the winter under the perches, upon a layer of dry muck, and scatter sifted coal-ashes thickly over them once a week or oftener. You can spread this mixture, even at the rate of ten tons or more per acre, over the plowed surface, as evenly as possible, and mix it with the soil in the subsequent process of harrowing.

Of course, there are many more manurial substances that individual onion-growers may have at command, or within reach, such as dried blood and dried fish, cotton-seed meal, cotton-seed hull ashes, tobacco refuse, bone-meal, etc. All these and many others may be applied to the onion field in the same manner as used for other crops, only in greatly increased quantities.

Salt and lime are hardly ever of much benefit on these highly-manured grounds, except, perhaps, when the grower operates exclusively with stable manures. In that case, light dressings (100 pounds salt, 500 pounds lime) may be of advantage.

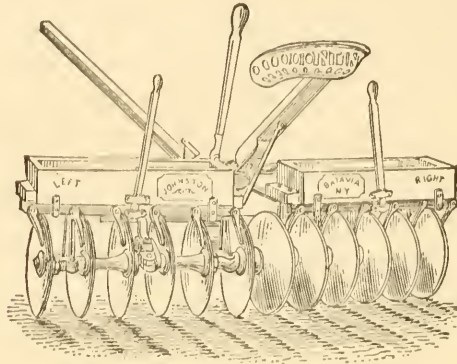
The most convenient method of applying all dry and fine manures after plowing, but before seed sowing or plant setting, is by means of a fertilizer drill, which not only distributes those plant-foods evenly, but also aids in mixing them with the ground and in smoothing the surface. If a fertilizer drill is not at hand, the manures have to be broadcasted as well as you can do it.

HARROWING AND ROLLING.

In order to get the desired mellow seed or plant bed, harrows, and perhaps a roller, have to be used freely and

thoroughly as soon as the last handful of fertilizer is put on. On nice mellow soil, ordinary smoothing harrows alone may be relied on for doing the work properly. For more tenacious soils, or on mucky soils that were not

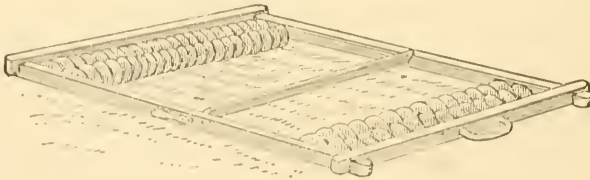
FIG. 1.



DISK HARROW, OR PULVERIZER.

plowed or replowed in spring, a pulverizer or disk harrow (similar to the one here illustrated) will be required, or at least desirable. This cuts the surface up deeply, and mixes soil and manure together quite thoroughly. The ordinary

FIG. 2.



MEEKER HARROW.

smoothing harrow, or "drag," may be used next, and, if the surface is then still lumpy, the roller should follow, and after this the fertilizer drill. Don't let up with harrows and roller, however, before the surface is entirely fine and

smooth. A great help in this work, especially for putting on the finishing touches, is the small disk or "Mecker" harrow, here illustrated. It is rather expensive, but extremely useful, and almost indispensable on the truck farm. Since the advent of this implement we have little use for the steel rake in preparing land for the garden seed drill.

Whatever implements we use, however, it is of the utmost importance that the surface is made smooth and even. If we cannot secure this condition otherwise, we must finish off with the hand rake, and we are then ready for sowing the seed or setting the plants.

V.

THE OLD AND THE NEW.

TWO WAYS OF PLANTING.

THE REGULAR OLD WAY.—TESTING THE SEED VARIETIES.—SOAKING SEED.—GARDEN DRILLS.—QUANTITY OF SEED PER ACRE.—SOWING.—SOWING BY HAND.—THE NEW WAY.—ITS ADVANTAGES.—VARIETIES SUITED FOR IT.—GROWING THE PLANTS.—HOTBEDS.—GREENHOUSES.—HARDENING THE PLANTS.—TRANSPLANTING.—COST OF SETTING PLANTS.—THE OLD AND THE NEW.—MARKERS.—DIBBER.—TRIMMING THE PLANTS.

Until 1889, when I accidentally stumbled on the method now appropriately called "The new onion culture," the plan of sowing seed directly in open ground where the crop is to come to maturity was the regular method, and supposed to be the only one practicable and profitable. I have now almost entirely abandoned it, except in growing small pickling onions and sets, simply because I can do better when growing them in the new way. Still, the old one often gives excellent results, and is yet generally practiced. Last year I saw a crop of Danvers Yellow onions on rich, sandy muck that yielded nearly a thousand bushels per acre. Under especially favorable conditions the bulbs often grow in great heaps or rolls, we might say in tiers, along in the rows, crowding each other sideways and up and down, and when pulled nearly cover the ground.

This system requires no extra preparation in the way of raising plants under glass, and will undoubtedly remain in favor with the rank and file of truckers for producing the main crop of the ordinary long-keeping onion varieties,

like Yellow Danvers, Yellow Globe, Yellow Dutch, Red Wethersfield, etc. Professional onion growers seldom plant a second crop, although they often might do so to good advantage. They harvest the crop when ready, no matter whether this is a few weeks earlier or later, and sell it whenever they think best, often holding a considerable part of the crop for spring sales.

THE REGULAR OR OLD WAY.

The first aim of the grower must be to produce a large crop of perfect bulbs. To insure success in this, early planting is one of the chief and indispensable conditions. Plowing, harrowing, etc., as described in preceding chapter, must be done just as early in spring as the soil has dried out enough to be easily pulverized. Delay in preparing the land, and in planting after this, always means additional labor, decrease of crop, and consequently risk and loss.

The required amount of seed should have been procured in the meantime. This is another important matter. I always purchase my supply along in January, and at once proceed to plant a few pinches of seed in a box or pot filled with moist earth and kept in the kitchen window. I then know exactly what I have long before the time of planting. Of course, I buy directly of a reliable seed-dealer, and I will say that in all my experience seed thus procured has never been deficient in freshness (power of germination), and rarely in purity. Selection of variety for this purpose should be made to suit the particular purpose or particular market of the grower. Yellow Danvers (Round Yellow Danvers, Yellow Globe Danvers) is yet the leading market onion, a good yielder, and one of the most reliable of all sorts to bottom well and to produce sound and handsome bulbs. Yellow Globe (Southport Yellow

Globe) and Yellow Strasburg, or Dutch, are also good and reliable varieties, and favorites with some planters and in some markets.

To fill the demand for a red onion, select Early Red and Wethersfield; to satisfy that for a white sort, raise White Globe, White Victoria—Silverskin (White Portugal).

All the sorts here named are standard market varieties, and good keepers. For mucky soils, however, I would restrict the list to Yellow Danvers and Early Round Red.

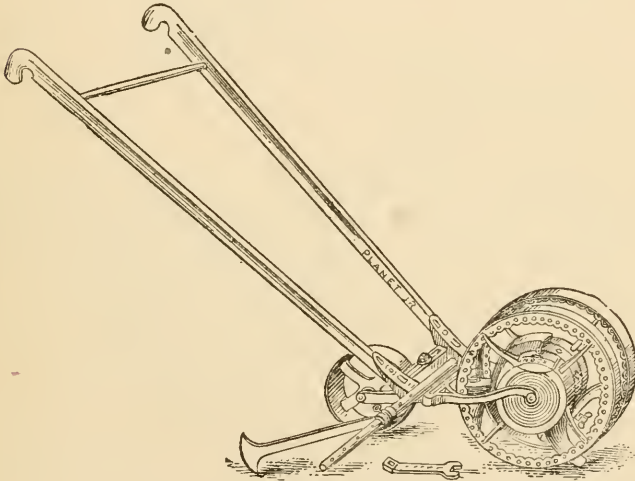
Some people soak the seed in tepid water for from twelve to twenty-four hours, and then again partially dry it by "rolling" in plaster, just previous to sowing. Years ago I sometimes practiced this myself, but I soon found that this special treatment of the seed is by no means necessary, nor always convenient. Good seed sown in freshly-stirred ground and properly firmed has, in my experience, never failed to germinate promptly. Be sure to start the garden-seed drill the minute that you have the ground in proper shape, namely, smooth and level as a floor. The seed bed then is fresh, moist, and inviting, and success will be assured.

First, a word about seed drills. There are now a number of them in existence, and all have their good points, and find their friends. People are not all constituted alike. Every one has his peculiarities, and what suits one may not suit another. Even for the accomplishment of the same purpose it will be found necessary to have different ways, and means and tools, in order to suit all tastes and views, and individual peculiarities, if not even oddities. Every gardener should carefully examine the different seed drills before buying, and then select the one which seems to fit his case. I, for my part, like the Planet Jr., and I think the majority of people will agree with me that it is a good and serviceable tool. If you have much use for a drill, the separate implement will be the better one to buy, while the

combined drill and-wheel hoe will answer well enough for the purposes of the home-grower and small gardener.

When ready to sow, stretch a line across one end of the patch to act as a guide for running the drill. I like to have the rows as straight as a string. It looks better, and gives better satisfaction. Adjust the marker attachment to mark twelve or fourteen inches apart, set the opening as directed for onion seed, fill the hopper, and proceed to sow. If the

FIG. 3.



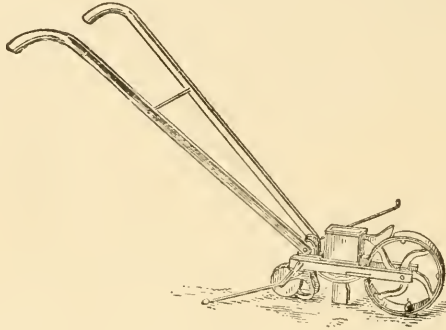
PLANET, JR., GARDEN-SEED DRILL.

seed runs out too freely, readjust the discharge opening. There is quite a difference in the size of the kernels in different samples of seed, as also in weight, and consequently some seed runs out faster than other samples. It is by no means easy to sow just so many pounds per acre with any of the drills now in use. The task always calls for the exercise of good judgment in each particular case.

Four pounds of good seed, if sown evenly, would be fully

enough for an acre of good onion ground. The trouble is, our drills are not perfect, and we cannot adjust them to insure the sowing of the exact amount desired. Above all

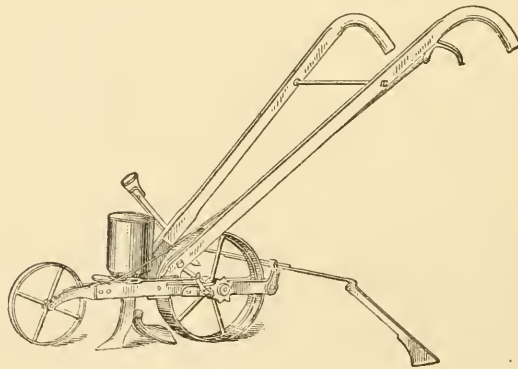
FIG. 4.



LITTLE GEM GARDEN-SEED DRILL.

things, I fear gaps in the rows. They reduce the yield and the profits. I rather sow six or even more pounds

FIG. 5.



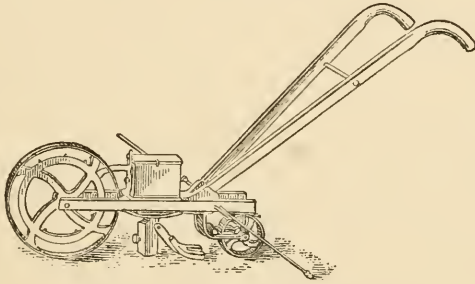
DEERE GARDEN-SEED DRILL.

to the acre, do a little (and sometimes a good deal) of thinning, and thus make sure of a full stand, a full crop,

and full returns. I usually, after setting my drill as I think from the looks of the seed is about right, put a quarter or half pound of seed into the hopper, and sow this. Then I make a careful estimate of the ground gone over, and of the rate per acre that the seed was sown, and change the discharge hole accordingly. Experience and good judgment will soon teach you how to do this thing just right.

It is quite likely that the rows, as the sower proceeds in his task, begin to get somewhat crooked. In such a case I invariably stretch the garden line once, and if the patch is large, perhaps two or three times more, to guide

FIG. 6.



MATHEW'S GARDEN-SEED DRILL.

the drill and correct the deviations from the straight course.

All good garden seed drills are provided with a small roller back of the seed discharge tube. This firms the ground over the seed sufficiently for all purposes. At least I have never had to complain about good seed failing to germinate promptly; so I consider all additional efforts toward firming the soil entirely superfluous.

Seed may also be sown without the use of a seed drill. In that case I would mark out rows with an ordinary garden marker, twelve inches apart and one inch deep; then

scatter the seed in them thinly but evenly, or drop a pinch of five to eight kernels every six inches in the row, cover by drawing a steel rake lengthwise of the row, and at last firm the soil by walking heel-to-toe fashion over each row, or by means of any ordinary roller. The use of the seed drill, however, is by far the most convenient and satisfactory way.

People who grow onions and other vegetables for their own use only, usually are not in the position to possess or use a garden drill. Many have not even a hand wheel-hoe, which I consider much more indispensable for them. I myself seldom use a seed drill in the home garden, as I find that hand sowing is much more convenient and expedient for the comparatively short rows and the great variety of small seed lots. The majority of home gardeners usually prefer to buy rather than grow what dry onions they may need. If they can once be induced to give the new way, hereafter described, a thorough trial, I am sure they will find it easier and more convenient than the old method, and too satisfactory in every way to be again abandoned.

THE NEW ONION CULTURE.

In my experiments with the Prizetaker and Spanish King onions, then yet novelties, in 1888 and 1889, and while trying to make every seed count, I discovered several things new to me. One is that few vegetable plants stand the transplanting process with greater ease than onion seedlings; another, that the crop can be made to mature several weeks earlier by starting the plants under glass and setting them out in the open in early spring; a third, that not only the size of the individual bulbs, but also the number of bushels per acre can be largely increased by these means; a fourth, that the dreaded task of weeding is reduced to a minimum; and a fifth, that the crop is made

generally more valuable and profitable than when grown in the old way.

A full-fledged new system has been evolved from these first trials and accidental discoveries, and is now quite generally known as "The New Onion Culture," a name under which I introduced it in 1890.

While the idea is not new, its application is. Gardeners in Old England have for many years practiced a similar system in growing extra large and fine bulbs for exhibition purposes, and in some parts of the United States onions for bunching have also been grown in the same way. There is no record, however, showing that anybody before me has ever thought of applying the system to field culture on an extensive scale. Now it is being practiced by many progressive growers with eminent success, and continues to grow in favor with all who have tested it.

For myself, I have little use for the older plan, simply because the new system secures me several times the net proceeds that I can get by following the other. But I do not grow Danvers, nor Wethersfield, nor any of the old standard kinds, and never attempt to keep my crop over winter for spring sales. Quite the contrary. I always aim to throw my whole crop into the market as early in fall as I can get it ready, and thus avoid risk and losses.

I can grow a selected, large variety of the Yellow Dutch type (which, by the way, is a most excellent keeper, and even if grown thus early is well suited for wintering over if desired) and sell it in August at the good prices then usually ruling, long before the old-school onion grower has a ripe bulb.

For main crop, however, I grow the large new varieties of the Yellow Spanish type, Prizetaker, Spanish King, etc., especially the former, and for a white sort the newer White Victoria. The new onion culture is particularly suited to

all large foreign sorts, and the trouble is only that we find so few long-keepers among them. The Prizetaker, however, keeps fairly well, and when properly grown and cured can be wintered over successfully. I often grow them to weigh a pound and a half apiece, and find no difficulty to sell them at a good price.

Selection and preparation of the land are the same, whether onions are to be grown after the one or the other plan, and earliness also is a chief point of importance in either case. The plants should be ready for setting out in the open ground just as soon as the latter can be prepared according to directions given in preceding chapter.

GROWING THE PLANTS.

The first and chief thing—and really the only difficulty to be met in practicing the new way—is to grow the plants. Perhaps we might buy them. Mr. A. J. Root, of Ohio, one of the first men who saw the advantages of the new system and helped to develop it, was also the person who first hit upon the idea of growing onion plants for sale. Quite a business was done in this line the past season. Probably it will not be long before Prizetaker and White Victoria onion seedlings will be quoted by the thousand and hundred thousand in all seed catalogues.

Most growers, however, will prefer to raise their own plants. I do, because I save money by so doing. Of course, they must be grown under glass and in artificial heat. In this locality the plants should be ready to go out into the open air not much later than first week of May, and consequently seed should be sown from middle of February to middle of March at the latest. This is a very important point if we grow Prizetaker or other large, late sorts. Poor plants, set late, I find, are more liable to produce worthless, thick-necked romps than to produce

fine, sound, well-finished bulbs. With the ordinary earlier sorts there is less risk from this cause, but an early start is important just the same, for without it we will lose our chances of securing the high prices of the crop ruling the markets previous to the advent of the main crop.

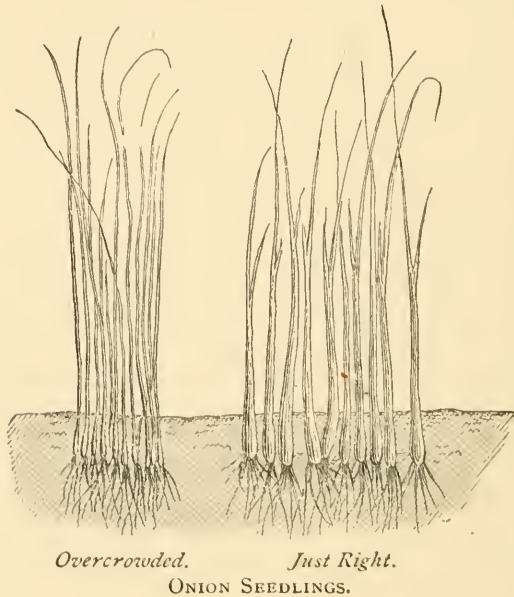
For the purposes of the home-grower a box filled with nice, clean sandy loam and set in a kitchen window will answer. Buy an ordinary paper of the desired onion variety and sow the seed thinly, either in rows two or three inches apart or broadcast, cover with fine soil or sand to the depth of a half or three-quarters of an inch, and firm well. Apply water as needed to keep the soil moist (not wet), and after the plants make their appearance pull up all weeds that may start. If the onion seedlings are "as thick as hair on a dog," they will require thinning, and, at any rate, if in the least crowded, the tops should be shortened by shearing or clipping for the purpose of making the young plants short and stocky. One good plant is worth more than a dozen poor, spindling things. A good plant is easily transplanted and sure to pass through the operation uninjured, no matter how dry the weather may be. The crowded, spindling plant, however, is liable to lose its life under unfavorable conditions, and, at any rate, will require an unreasonably long time to get established in its new quarters, and to begin a new, strong growth.

Heretofore I have grown my plants in hot-beds, sometimes even in cold frames. For the colder Northern States artificial heat is indispensable to secure all the advantages of the new method. Cold frames may do in the South. I also prefer glass sash, while in milder climates muslin-covered frames may give all the protection needed.

The hot-bed should have a mild, lasting heat, which can be secured by an eighteen-inch layer of well-tempered,

closely-packed horse manure, or a mixture of horse and sheep manure. It is not necessary, nor even desirable, to use extremely rich soil. An ordinary rich, sandy loam or sandy muck, freshly drawn and spread over the manure about six inches deep, is better and safer than old hot-bed compost, which is liable to be infected with fungus spores, and perhaps full of animal life. A mixture of clean sand

FIG. 7.



and rich, clean loam is all right. A little lime may be added to the hot-bed soil as a precaution against the multiplication of earthworms.

Frequently the young seedlings, after having taken a good start, suddenly lose their bright, healthy color; the ends of the tops dry up, and many of the plants die down entirely—all without apparent cause. I think if soil is prepared according to my directions, not made excessively

rich by adding great quantities of manure and ashes, the seedlings will grow all right.

For the future, I shall prefer to grow my plants in the greenhouse, either in flats or in bench beds. Here February is often our coldest month, and hot-bed making at that time not always an easy or pleasant task. In the greenhouse we can start our plants just at the proper time, no matter how the weather may be. Manure heat, also, is not always reliable, and the grower goes much safer when he trusts in one of Hitchings & Co.'s boilers, and a system of hot-water pipes.

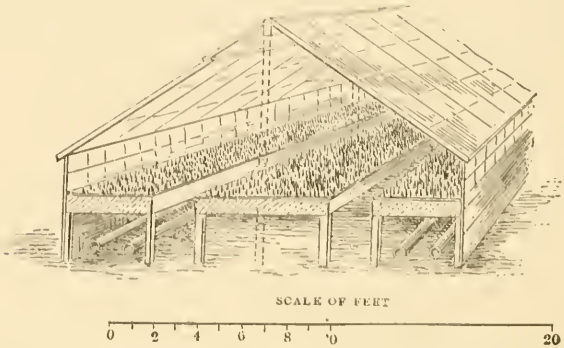
I believe that most home gardeners could afford to run a simple, cheap, small greenhouse, for the conveniences in table delicacies, in flowers, in plants for spring setting, etc., which it can be made to furnish during the season when out-door gardening is out of the question. Certainly, the "onion grower for profit" should have a house of this kind, and really I cannot see how he can well afford to get along without it. Its possession practically insures success from the start, while the onion-plant crop in it may be preceded by a crop of forced vegetables, or flowering plants, etc., and followed by a crop of tomato, pepper, egg, and other plants. In fact, such a house need not be idle many months of the year.

In Figs. 8 and 9 the reader will find plans of two simple and cheap greenhouses suited to this purpose. The single span may be 18 feet wide, or the double-span house 20 feet wide. To give bench space sufficient for raising the first-class plants required to plant an acre of ground, make the narrower house 25 feet, and the wider one 22 feet long. This will be about right. Either house, including boiler, heating-pipes, and all other fixings, should not cost much over \$300. Their demands for coal and attendance will be

very moderate. To raise plants for larger areas, make the house correspondingly longer.

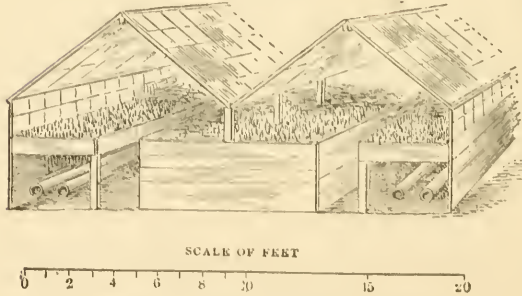
Many growers are not in the position or humor to put so much money in a greenhouse. With plenty of hot-bed sashes at one's disposal, it is easy enough to erect a struc-

FIG. 8.



CHEAP GREENHOUSE FOR RAISING ONION PLANTS.

FIG. 9.



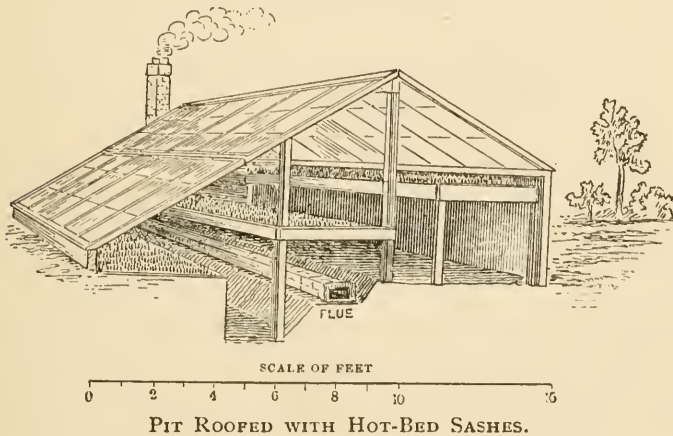
CHEAP DOUBLE SPAN GREENHOUSES.

ture, such as illustrated in Fig. 10. A simple framework, a few boards, the benches, the sashes for a roof, and a flue running through the center of house, connected at lower end with the fire-place and at the upper end with a chim-

ney—include about everything that is needed. The actual cash outlay need not exceed \$50. The illustration makes the management plain and further description unnecessary.

Right here, however, I wish to say that the frequent renewal of the bench soil is not only desirable, but dictated by prudence. Germs of plant diseases and insects soon accumulate in old soil under the congenial conditions of uniform warmth and moisture. The safest way is to remove every bit of soil out of the houses every fall, and

FIG. 10.

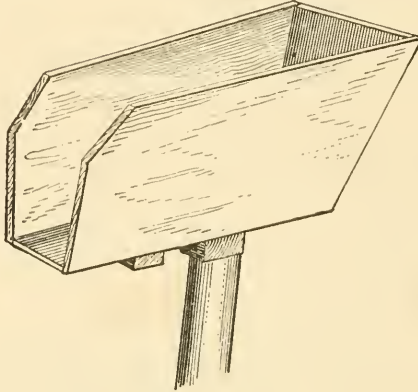


put in a new supply. Devices such as shown in Fig. 11, which represents a one-man hod, and Fig. 12, which represents a box to be carried between two persons, come very handy in carrying soil into and out of the greenhouses.

Our first aim in raising plants must be to get the beds, benches, or flats well occupied with plants, and yet avoid overcrowding, which would lead to crippling the plants. If we make furrows three inches apart and about one-half to three-quarter inches deep, and can manage to get an even average of 12 to 15 plants to the inch of row, we will have about 500 plants on a square foot; and this will be

just about right. There will be no undue crowding. Drop 25 to 30 seeds to the inch of row (making allowances for losses or failure of germination), cover, and firm well. In the right kind of soil and the proper temperature, such seeding will give plants enough to come up to our standard.

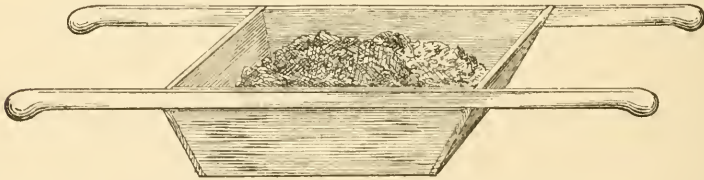
FIG. 11.



ONE-MAN HOD.

When bottom heat fails, as it occasionally does in so-called hot-beds, a large portion of the seed is liable to lie dormant in the ground for a long while, perhaps until the time that

FIG. 12.



BOX FOR CARRYING SOIL BY TWO PERSONS.

the plants should be set. To provide against such accident, I always sow seed in manure-heated beds much more thickly than required under favorable conditions, using one and a half to two ounces per ordinary three by six

sash. Should the greater portion of the seed germinate promptly, the plants would soon stand too thickly, and must be thinned out. By all means use all reasonable means to obtain strong, stocky plants, not weakly, spindling things. On success in this hinges the final success. I like to have my onion plants, when to be set out, not less than three-sixteenths and, better, fully one-eighth inch in diameter at the bottom.

For a week or two prior to transplanting plenty of air and exposure should be given. I usually remove the sashes entirely from the hot-beds. That this cannot be done with the greenhouse is its only disadvantage. If you cannot harden the plants properly otherwise, and when grown in flats, the latter may be removed to cold frames for some days or weeks, and here subjected to the important hardening process. True, the onion is considered hardy, and able to endure considerable frost without injury. Pampered, coddled greenhouse plants, grown quickly in congenial environments, have to be gradually accustomed to hardships, or they will suffer. A single light frost would kill them if set out in open ground without previous hardening off.

When the young plants are of proper size and condition, and the soil in good working order and prepared according to directions, no time should be lost to begin the job of transplanting, and to push it to completion as rapidly as possible.

To set the 150,000 or more plants required to plant an acre is no child's play, although mere children may be trained to perform the labor. The miscellaneous lot of youngsters that I usually engage for this work are doing well, I think, if they set out 2000 plants each per day. As I pay them about fifty cents a day, to plant an acre would cost, therefore, in labor of transplanting alone, not less than \$45.

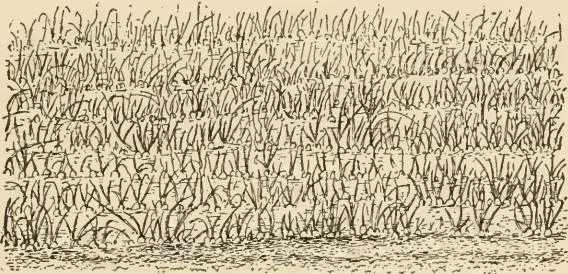
The regular hands employed by professional gardeners and truckers, however, are accustomed to handle and set all kinds of plants, and among these hands we will find some capable of putting out from 6000 to 8000 plants a day. The onion grower who controls that kind of labor will not be scared by the task of planting onions in this way by the acre, or acres. Mr. A. J. Root, of Ohio, estimates the cost of setting the plants at \$25 per acre. Mr. John F. White, of Mount Morris, N. Y., who grew three acres by the new method this year, and intends to more than treble that area next season, tells me that twelve of his men—all used to handling celery and cabbage plants—will plant an acre of onions in a day. The cost of the job, therefore, depends altogether on the kind of labor you can get.

I always aim for the largest yield, and for this reason crowd my plants all I dare to. I find that twelve inches distance between the rows is just about right. Mr. White thinks of making them ten inches apart in future, but I would advise against it.

One of the greatest mistakes, however, that we are apt to make, and that all who have tried the new method, myself included, have heretofore invariably fallen into, is to set the plants too far apart in the rows. In growing onions by the old method, we thought nothing of leaving from one to three plants to the inch of row, and we expected to see the bulbs crowd each other sideways, and grow in heaps and tiers. Just take a look at the illustration of part of a field showing the old way of growing onions, and see how thickly they stand in the rows. Then, look at the next picture, which shows onions grown by the new plan, and note how far apart the bulbs are. The mistake here made is quite apparent. There are great gaps in the rows, and only here and there are the onions close enough together to give a

full crop. Now and then somebody claims that the old method gives him nearly as big a yield as the new one. I only wonder that it does not often give a much larger one. When we set onions from four to six inches apart in the

FIG. 13.



GLIMPSE OF ONION FIELD.—THE OLD WAY.

rows (and it seems hard work to make boys—and men, too,—who wish to get over the ground at a good rate, set their plants as close as desired and ordered) we should not

FIG. 14.



GLIMPSE OF ONION FIELD.—THE NEW WAY.

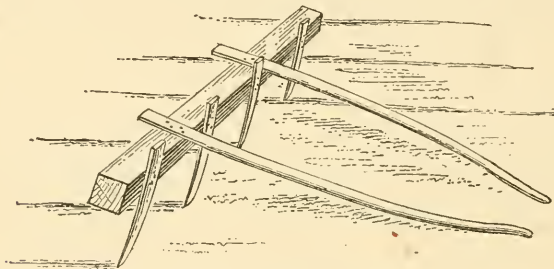
look for more than half a crop. Even the largest varieties (Prizetaker, Victoria, etc.) require not over three inches space in the row, and ordinary kinds should not be planted more than two inches apart. This point is of

greatest importance. If we neglect to set all the plants that we have room for, we must not complain if the crop falls short of our expectations, and far short of what the land is able to produce.

SETTING THE PLANTS.

The first step in the operation of setting the plants is to mark out the rows. A garden marker, such as is shown in Fig. 15, is quickly and easily made, and will do well enough when you have nothing better. You have to pull it over the

FIG. 15.



SIMPLE HAND MARKER.

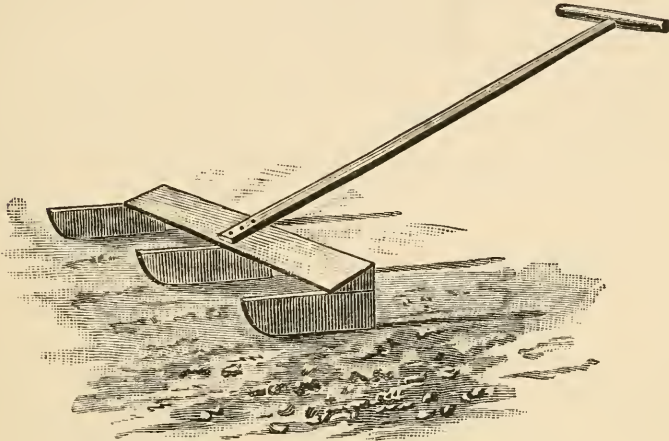
ground, and when you want to see what the marker is doing you have to walk backward, like a river-crab, and in the meantime perhaps get out of the right direction yourself.

I like a marker that is to be pushed ahead, not pulled after you, and that will enable the operator to keep the direction, and see whether he makes straight marks or crooked ones.

Fig. 16 illustrates an extremely simple device. To make this marker, take three pieces of board, say fifteen or eighteen inches long, rounded off sleigh-runner fashion; have them twelve inches apart, nail a piece across the top on the straight side, and fasten a handle, as shown.

A barrow marker is shown in Fig. 17. Have the teeth slanting slightly backward. The illustration makes a further description unnecessary.

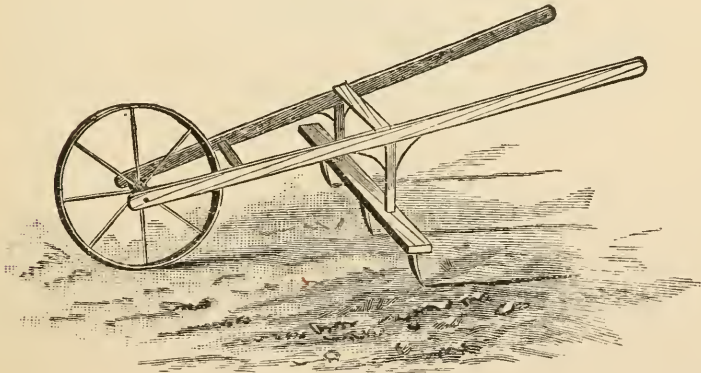
FIG. 16.



SIMPLE PUSH MARKER.

I prefer the roller marker, illustrated in Fig. 18, to all other similar devices. Any light garden roller will

FIG. 17.

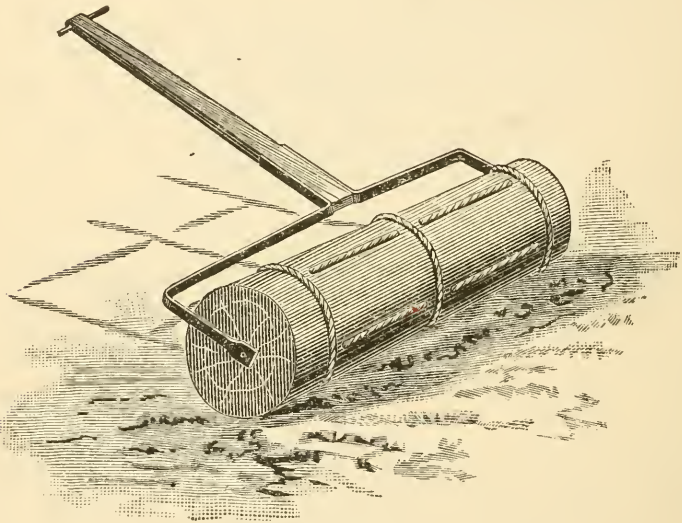


BARROW MARKER.

do, even if made rather roughly out of a piece of oak or chestnut log, say three or four feet long and a foot or so in diameter. A plain roller could be made to answer, if you

will stretch two clothes lines across, and then roll the machine along over them. This makes good marks for setting plants, and one can get them perfectly straight in this manner, a task not quite so easy with the ordinary marker. It is more convenient, however, to fasten pieces of rope around the roller, one foot apart, one for each mark. But the greatest advantage of this device is that cross-marks can be made at the same time. Simply nail pieces of rope or clothes-line lengthwise of the roller between the ropes

FIG. 18.



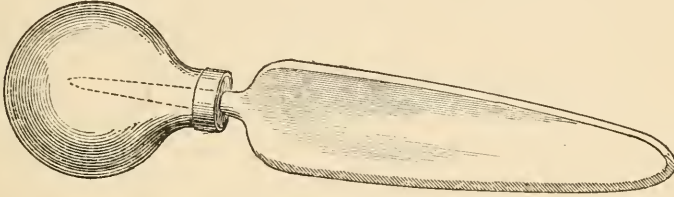
ROLLER MARKER.

encircling it. The cross-marks will serve as a kind of guide to the planters, and, if they are careful, or are held strictly to the mark, they can easily set the plants at a uniform distance of each other. If the cross-marks are, say, one foot apart, set three Prizetaker plants between each two marks, and one right in it.

In clean, mellow loam or muck, and with good plants, the task of setting the plants is an easy one. Some of my planters prefer to do the job with the fingers alone, without

using a dibber. But it is hard on a tender finger, especially on the index finger, that has to punch the holes. Usually, it is more convenient to make the holes with a dibber, which may be simply a sharpened stick of hard wood, with or without handle, or a dibber as illustrated in Fig. 19.

FIG. 19.



STEEL DIBBER.

This is made of a piece of thin steel, seven and one-half inches long and one and one-half inches wide, shaped and supplied with handle or knob, as shown. The surface should be finished off on an emery wheel.

FIG. 20.

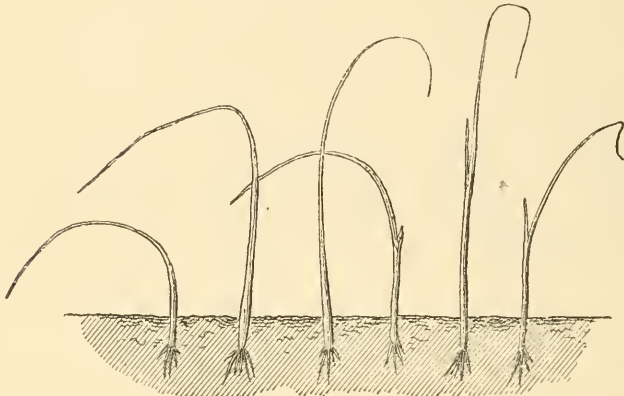
TRIMMING THE
PLANTS.

Carefully pull the plants from the seed-bed or flat. Straighten them out in bundles; if the fibrous roots are excessively long clip off the ends, and also twist or cut off part of the tops if they are rather long and weak. You can get an idea about the way this should be done by examining Fig. 20. The untrimmed plants, if they are at all long and unwieldy, are apt to lean or fall over, as illustrated in Fig. 21, especially if the weather and soil should be dry at the time of setting. The tops also are liable to be in the way of the wheel-hoe for some time,

and the patch has not that appearance of neatness found where the plants were properly trimmed. As shown in

Fig. 22, they should stand up stiff and strong, like rows of soldiers. The plants thus prepared may be distributed along the rows just ahead of the planters, or the latter may each

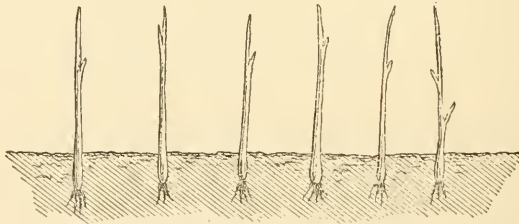
FIG. 21.



PLANTS UNTRIMMED.

carry a bundle of them as they move along. If you have a number of hands at this work, the better plan is to have a boy attend to the plants and their proper distribution, so

FIG. 22.



PLANTS TRIMMED BEFORE SETTING.

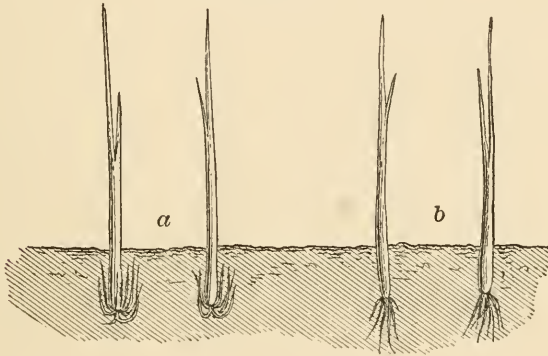
that the planters are always well provided, and will not be compelled to break into the regular job for the sake of getting the needed plants.

As I have already stated, onion plants are easy things to transplant, and will live if the job is half done. But we

desire to have them regain their firm footing and begin a new, vigorous growth as soon as possible after the transfer, and for this reason the planter should not fail to pack the soil firmly about the roots. Every planter, of course, should learn to perform the whole operation quickly and expeditiously, and every individual can go at it in his own way, according to his own peculiarities, provided he has nimble fingers and makes quick moves.

How deep should the plants be set? I think that we should aim to get the lower end of the bulb one inch below

FIG. 23.



SETTING THE PLANTS.

a, the wrong way.
b, the right way.

the surface of the ground ; but if it gets a little deeper no harm will result from it.

Youngsters, if employed to set out plants, will bear watching until they have learned how to do the work just right. Sometimes they get into the habit of crowding the plants into the soil in such a manner that the roots are pushed upward, and the plants appear as shown at *a*, in Fig. 23, while the roots should be inserted as far as possible downward, as shown at *b*.

A word more in regard to growing onions on the new

plan in the Southern States. Let me quote from a recent bulletin of the North Carolina Agricultural Experiment Station (by Prof. W. F. Massey), as follows:—

“There are two ways in which the transplanting method may be practiced in the South: (1) by sowing the seed in a plant-bed in October and transplanting to their permanent place in February; (2) by sowing the seed in a cold frame under glass in January and transplanting in February, after gradually hardening them to the air. The Italian and Spanish varieties we consider the best for our purposes. The transplanting of onions in a young, growing state always results in a great increase in size. Why it does so we cannot explain, but the fact is evident. We think it probable that the practice of sowing the seed early in October, on well-prepared beds of light soil, and then transplanting them in February or March to the land from which the celery crop has just been taken, will finally be the rule with us, as the sowing under glass in January involves more skill, trouble, and expense.”

VI.

THE WORK THICKENS.

A HARD FIGHT WITH WEEDS.

WAR TO THE KNIFE.—PROMPTNESS REQUIRED.—HAND-WHEEL HOES.—
HAND-WEEDING THE CHIEF EXPENSE.—WEEDING IMPLEMENTS—
THINNING.—HOES AND HOEING.—BREAKING DOWN THE TOPS.

Whatever method of growing onions you employ, the fight against weeds should be begun promptly and carried to a finish. This means war to the knife. The frequent stirring of the surface soil between the rows and about the plants which it involves incidentally furnishes one of the best means of protection against drought.

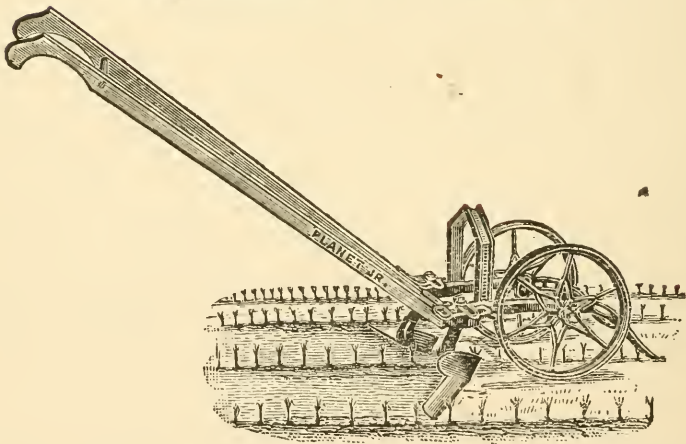
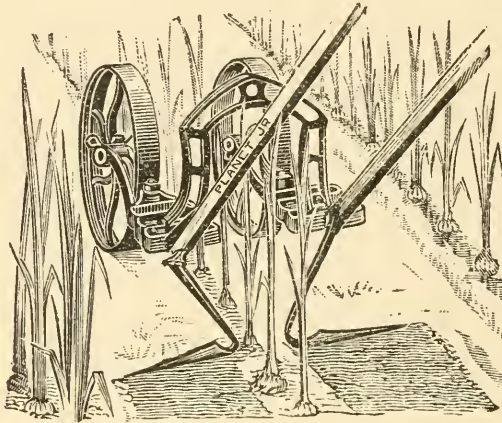
Hand-weeding is a tedious and expensive job. We do not desire to have more of it to do than is absolutely necessary. Promptness in the use of the wheel hoe, and in that of the hand-weeder, will take the sting out of the task. Neglect a patch once, and let it grow up in weeds, and the best thing you can do is to give it up as a bad job. To redeem such a patch would probably cost more than the whole crop would be worth in the end. Under no consideration should an onion field ever be allowed to assume a weedy appearance.

WHEEL HOES.

The first thing we need is a good hand-wheel hoe. There are a number of them in the market that do first-rate work, and may be relied upon. I like the Planet, Jr. as well as any other, and for a large field the double-wheel hoe is the most necessary and convenient, although it is well to have a single-wheel hoe, too. Some people like the Gem of the

Garden. For cultivating among onions and other closely planted stuff in the earlier part of the season I ordinarily use a Gregory's finger-weeder, which, with a little practice, does excellent work. It has four knives, or weeding blades,

FIG. 24.



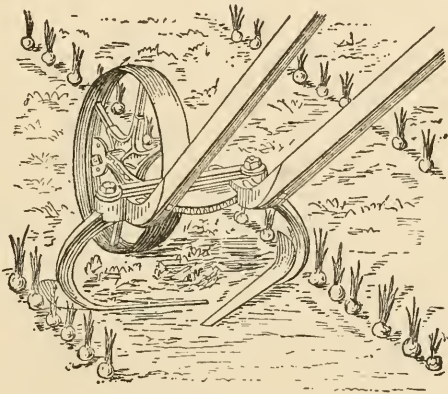
DOUBLE-WHEEL HOE.

two in front, which can be set narrower or wider, at will, instantaneously by a simple twist of the operator's hands, and made to cut close to the row, or even into it, to remove a stray weed, and two stationary blades a little further back.

For the earlier cultivatings we want one or the other of these double-wheel hoes. They straddle the row, and allow the operator to direct all his attention upon a single row. The single-wheel hoes, among them the Planet, Jr., and Ruhlman's, which latter is also a serviceable implement, come handy after the onions are half grown.

No man can hope to be successful in commercial onion-growing without being well equipped with these implements, or without using them, less as weed *slayers*, as they have sometimes been called, but rather as *preventives* against weeds.

FIG. 25.



SINGLE-WHEEL HOE.

The fight should begin before weeds can be seen. The drill roller, which firms the soil after the seed has been deposited in the ground, leaves a mark indicating the exact location of the row as plainly as can be desired. There is no need of waiting until the plants are up. A week or ten days after the seed is sown by the old method, or immediately after the plants have been set by the new system, the wheel hoe should be started. Do the work thoroughly, letting the cutting blades go as close to the rows as is safe,

This is easy and quick work. Any strong, half-grown boy can go over an acre in a day in this way, and we can therefore well afford to thus stir the soil between the rows pretty frequently.

In fact, this is necessary. We have frequent rains thus early in the season which pack the soil and result in the formation of a crust over it. This must be broken as often as it forms, in order to admit air to the roots of the plants, and also to form a sort of soil mulch over the surface, which is very serviceable in preserving soil moisture should a dry spell follow. The rule is, therefore, to start the wheel hoe just as soon after a rain as the surface of the ground is dry enough to be easily pulverized. Besides this, repeat the operation as often as possible in dry spells. I do not believe that you can overdo the matter.

HAND WEEDING.

Next comes hand weeding. This usually involves the greatest expense in the production of an onion crop, and is the chief trouble we meet in the undertaking. The new method, however, requires a great deal less of this expensive and tedious labor on hands and knees. This is an advantage that offsets more than fully the labor required in transplanting.

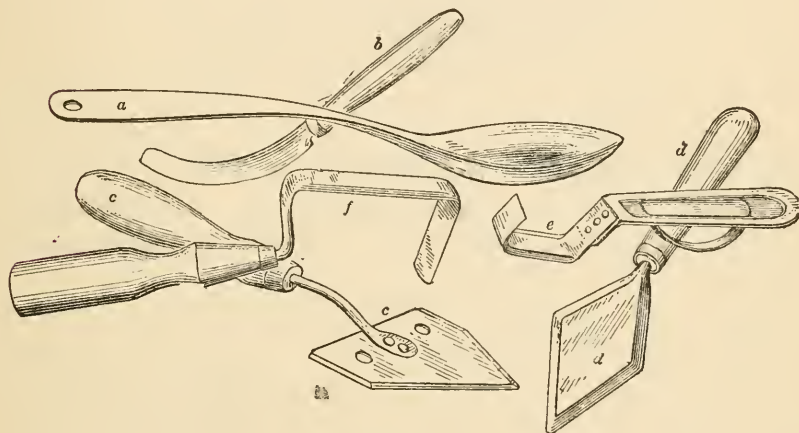
Half-grown boys are well suited to do the work of hand weeding, if you can keep them under strict surveillance and steadily at work. Each one is provided with some sort of weeding implement, and works on hands and knees while straddling his row. Teach them to keep their feet nicely between the rows.

In loose, mucky, or sandy soil the work can be done entirely with the fingers, but I should prefer a Lang hand-weeder even then. There are quite a number of tools that may be used for this purpose. I show some of them in Fig.

26. An ordinary iron spoon, shown at *a*, such as you can buy at the nearest hardware store for five cents, does very well. If you have a metal-handled table knife, with point broken off, bend the blade in a curve and sharpen both sides (see *b*), and you can use it as a weeder. Or you may take a section of an old mowing-machine knife (see *c*) or a piece of iron hoop (see *d*), and fasten it to a short handle. At *e* you see the Lang weeder, and at *f* the Hazeltine, either of which can be purchased at small cost at any seed store.

Whatever tool you have, use it to scrape the surface of the

FIG. 26.



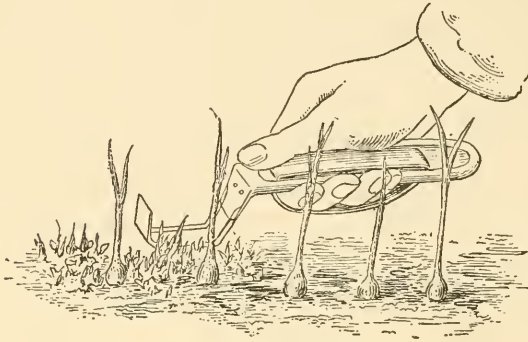
WEEDERS.

ground, with all the tiny weeds or sprouting weed seeds it may contain, away from the onion rows. Hilling is not required or allowable. Always let the wheel hoe do its work just ahead of the weeders. It will lighten the job. In Fig. 27 I show the use of Lang's hand-weeder, and in Fig. 28 that of a table knife, fixed as already stated. These are my favorite tools for this work. Other growers may follow their own preferences.

If the grower has used seed enough to secure a full stand some of the plants will most likely grow pretty thickly in

the rows. It is true, as said before, that onions bear considerable crowding. Yet this should not be overdone. I believe in judicious thinning; and there are often so many

FIG. 27.



LANG'S WEEDER IN USE.

plants that thinning is absolutely needed to prevent an unreasonably large number of the onions being too small to sell well. At the second weeding, therefore, I have plants

FIG. 28.

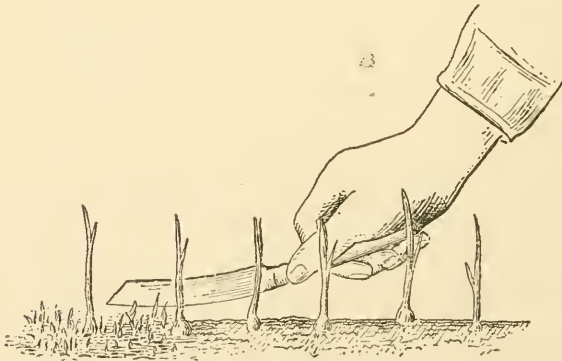
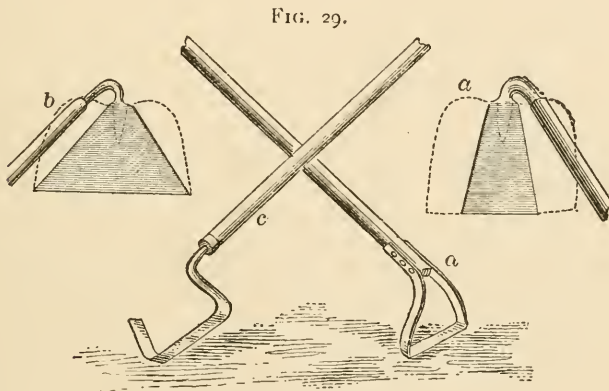


TABLE KNIFE AS WEEDER.

pulled up where they stand closer together than one to the inch of row. Better do this, and secure a more uniform and good size of the bulbs.

Hand weeding among onions grown by the new method is not quite so formidable. The transplanted onions have the start of the weeds from the very beginning, and they stand so uniformly, and comparatively wide apart, that a good share of the weeding can be done in a standing position, and by the use of specially prepared hoes, instead of on hands and knees. In Fig. 29 may be seen the kind of hoes I use and like. The one shown at *a* I find most serviceable in working among the onions in the row. It is made by cutting off the sides of the blade of a worn-out



HOES FOR ONION WEEDING.

ordinary hoe, such as may be found on almost any place. At *b* you see another way of making a really good and serviceable tool out of a useless thing, such as these dull old hoes usually prove to be. At *c* is shown a weeding tool made by fastening the blade of a Hazeltine weeder to a hoe handle. The hoe, *a*, is simply a piece of iron hoop bent as shown, and fastened to a handle.

Whatever tools of this kind you may have, use them persistently enough to keep down all weed growth. As the onions are nearing their full size, they may form such a mat over the ground that wheel hoes cannot be used any

longer. Yet weed growth will not stop. The small weeds are not apt to give much trouble at that time, but the coarser kinds, and those favored by hot weather, like purslane, will now try to take possession of the ground. Purslane in these rich grounds grows rapidly, and may completely hide the soil before you are hardly aware of it. This is the time for fighting weeds with hand hoes. Just walk through the onions carefully backward and draw the hoe along over the ground between the rows, cutting off the weeds or pulling them out. Purslane should, if possible, be gathered up and taken out of the patch. By all means, keep the ground clean.

ROLLING DOWN THE TOPS.

I have never seen any good resulting from the practice of breaking down the tops of onions for the sake of hastening their ripening. Well-grown onions will ripen up all right in due season, and if some specimens, owing to mismanagement, or for reasons of their own, are bound to make scallions, they will do so, even if you roll down the tops.

VII.

IRRIGATION AND CULTIVATION.

AS MEANS OF FIGHTING DROUGHT.

A SOIL MULCH.—MUCKY COMPOST AND WOOD-ASHES.—SUB-EARTH SOAKING.—SURFACE IRRIGATION.—BOX-DITCH.—SUB-IRRIGATION BY TILE.—IRRIGATION BY WATER PUMPED INTO TANKS.

It is a mistake to think that cultivation is merely a means of checking or destroying weeds. In reality this is only an incidental benefit. We stir the soil chiefly for the purpose of (1) helping plant growth by admitting air to the soil, thus promoting chemical changes which fit plant foods for ready assimilation by plant roots, and (2) preventing the rapid evaporation of the soil water. Cultivation gives us an easy way of providing a soil-mulch through which the water does not readily pass upward. Weeds are simply a manifestation of Nature's kindness to man. They force him to stir the soil when, otherwise, he would be apt to neglect it, letting his plants suffer for want of food and water, and suffering pecuniary loss himself. I cannot, therefore, consider weeds a curse. They do their share of good as a reminder and spur to the flagging grower, and perhaps as much as they do harm. At least they are a necessary evil.

PREVENTING INJURY BY DROUGHT.

In localities with fairly regular rainfall the grower can usually succeed in growing good onion crops without artificial irrigation, if he plants on retentive soil which rests on porous sub-soil, and practices the thorough cultivation

recommended in preceding chapter, as means of carrying his crop unharmed through the dry spells of longer or shorter duration liable to occur in any year. The heavy applications of compost, especially if muck (used as absorbing material) is one of its constituents, and perhaps of wood-ashes, also aid in the retention of moisture.

MEANS OF IRRIGATION.

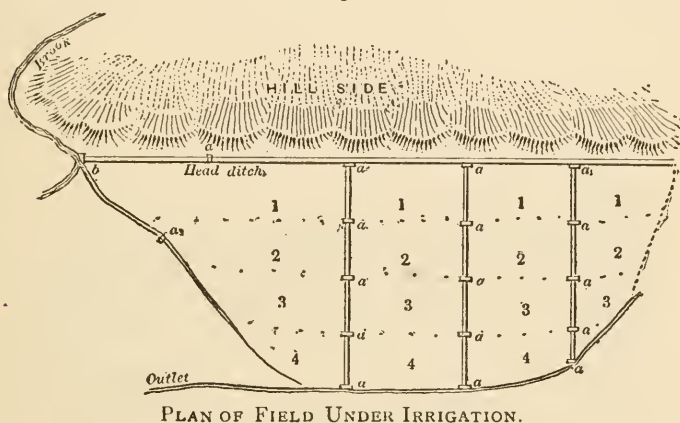
In some localities, however, artificial irrigation is absolutely required to insure success; and almost anywhere it is a good thing to have as an additional safeguard against possible failure.

Wherever there is a never-failing supply of water—a stream, a pond, a canal—near the field and higher than its level, or one that can be easily raised to the ground level, it will pay the grower well to utilize it for irrigation, even if the first expense of plant, piping, etc., should be considerable. In the selection of onion ground I would always prefer a piece that could be easily brought under irrigation. Soil of a sandy character, sandy loam, or sandy muck is best fitted for the purpose. Clay soils are suitable only when they contain, and are made porous by, an abundance of humus.

A simple and effective method of irrigation is the one in use on Mr. John F. White's place near Morris, N. Y. At the foot of a hill, and slightly sloping away from it, is a tract of deep, rich, sandy muck. A little brook, flowing down the hillside, furnishes a small but never-failing water supply. This can be turned into a deep ditch, dug just at the foot of the hill on a dead level, and forming the head of the lowlands. Another ditch, parallel with the other, forms the boundary on the lower side, and the two ditches are connected by a number of parallel cross-ditches as shown in Fig. 30. All these ditches are provided with

flood-gates to dam up the water when required. Ordinarily these flood-gates, except the one at *b*, are raised, and the water flows along in its natural course unobstructed. But when the soil begins to get dry, and shows the need of water, the mountain brook is turned into the head ditch at *b*, and the latter filled to overflowing. This alone will give the whole strip next to the head ditch (1111), a number of rods in width, a pretty good soaking in a comparatively short

FIG. 30.



time. Then by opening the flood-gates at the head of the cross-ditches the water is turned into the latter, allowed to rise to the top at the next set of flood-gates, and by overflow and by soaking in, well distributed over another strip parallel with the head ditch (2222). Then these flood-gates are again raised, and the water allowed to flow into the next section of the ditches, and so forth, until the entire area has been well soaked. Just as soon as the surface has again become dry enough for cultivation, the ground should at once be stirred by means of the wheel-hoe.

The opportunities and soil conditions are not often so

favorable for irrigation as in this case. When the soil does not let the water pass through readily, we have to employ other methods of distributing it over the surface. The simplest way, probably, is to conduct the water to the highest part of the patch, and then let it run down a slight slope, in little depressions made with a hand-plow at regular distances of 6, 8, or more feet apart, according to the porosity of the soil. A vacant row must be left for the water course.

The water supply may be brought to the highest part of the patch in a kind of box-ditch, as illustrated in Fig. 31.

FIG. 31.



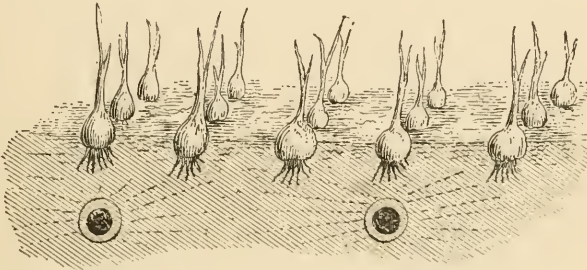
IRRIGATION FROM BOX-DITCH.

Another good way of distributing the water from a higher source of supply is by means of lines of two-inch tile laid on a slight slope, ten or twelve inches deep. There is no need of providing an outlet, except it be for the sake of drainage in case of heavy rains. Place the tiles in each line closely together. The water will find its way out at the joints, and penetrate the soil on each side to a greater or lesser distance according to the porosity of the soil. This latter point also determines the question of what is the proper width between the lines of tile. In

some soils, like sandy loam or muck, they may be ten or twelve, or even more, feet apart; in clayey soils it may be necessary to place them as near as four or five feet apart.

Whenever a water supply, such as mentioned, is not at command, it may perhaps be obtained by letting a wind-mill or steam pump raise it from a pond, stream, or well into large tanks, from which it is to be distributed over the field by means of hose alone, or by a combination of iron pipe and hose, or in other ways that may suggest themselves to the intelligent grower.

FIG. 32.



SUB IRRIGATION BY TILE.

Now a word of warning. With an unlimited amount of water available for irrigating purposes there is great danger that a good thing will be overdone. Onions are easily and often permanently injured by an over-supply of water. The latter causes an excessively rank growth and thick clumsy tops, which will not permit the bulb to mature and cap over well. Do not let the water into the patch oftener than when absolutely needed, and then only enough to moisten, not to soak, the soil. Great caution and the exercise of good judgment are required to keep to the proper medium.

VIII.

ENEMIES OF THE CROP.

INSECTS AND DISEASES, AND HOW TO FIGHT THEM.

ONION MAGGOTS.—WHITE GRUB.—WIRE-WORM.—ONION RUST.—ONION SMUT.

I have been growing onions for many years, but I do not believe I have ever lost one half of one per cent. of the crop by the interference of the onion maggot, which proves so destructive to onions in many localities. It was only now and then that I found a single solitary maggot. Whether this is due to the fact that the maggots which attack the onions, cabbage, radish, and similar vegetables, are the larvæ of one and the same species of fly, which for oviposition takes radishes as first choice, cabbages next, and onions only when the other plants are not to be had close by, and that I invariably plant radishes and cabbages in closest proximity to the onion patch, I am unable to say. I may state, however, that I cannot discover distinctive differences between the maggots or flies which affect the onion, radish, and cabbage respectively, and that there are always plenty of these unwelcome visitors on my radishes and cabbages. Fig. 33 shows the eggs (*a*), the larva at work (*b*), and the adult considerably magnified (*c*).

Prevention is much better and easier than cure. The best thing that can be done is to remove the plantation to a new plot, as far away as possible, each year, or at least every other year. It is also recommended to puddle the plants, when transplanting in the new way, in a puddle to which sulphur has been added, and to sprinkle sulphur about the plants after they are set.

All affected plants should be removed and burned as soon as discovered. Caustic lime water, especially if made with liquid manure instead of clear water, seems to be a safe remedy, but it will require too large a quantity to be of much practical usefulness on an extensive scale. Slake a peck of fresh lime in one hundred gallons of liquid, let settle, draw off, leaving the settlings undisturbed,

FIG. 33.



ONION MAGGOT.

and pour the liquid about the plants freely enough so that it will soak down to the place where the maggot is feeding. Every larva touched by this lime water will die. Instead of this remedy we can use solutions of muriate of potash, one tablespoonful to the gallon of water, or of kainit, two tablespoonfuls to the gallon. Plants once eaten into usually rot and die, and for this reason the remedy is not as satisfactory as might be desired. H. A. March of Washington sprinkles crude sulphur, which smells very strong, over his cauliflower plants, and says it seems to

drive the fly away. This simple precaution might be tried also in the onion patch. If it drives the fly away from the one crop, it will undoubtedly do the same service to the other.

At various times I have observed white grubs, as also wire-worms, etc., feeding at the roots of the onion plants when approaching maturity. I think they must do considerable damage by checking growth, and thus decreasing the yield. Try to get ground that is free from these pests, or to get rid of them by fall plowing. Earth-worms, wherever troublesome, may be disposed of by free applications of lime or lime water as used for the maggot. Potash salts will probably have a good effect in ridding the soil of earth-worms, etc., also.

There may be other insect enemies, mostly very minute—lice, thrips, or mites; at least I have heard many complaints about them, without ever being able to find any such insects on my onions. Rotation, as for the onion maggot, is probably the surest means of prevention. I can suggest no cure.

DISEASES.

Among fungous diseases affecting the crop we have two, the onion rust (*Peronospera Schleideniana*, Unger), and the smut (*Urocystis cepulæ*, Frost). The former affects the leaves when the onion is beginning to bottom, or later, making them turn yellow, and ending in their decay. It checks the further growth of the bulb. Pull the crop when seriously affected; cure the bulbs thoroughly, and put them on the market at once. As this can be done quite early in the season, good prices are often obtained.

I have tried spraying with various fungicides, but without being able to check the progress of the disease after it

had once made its appearance. Changing the location of the patch to a new plot is probably the safest plan of fighting the rust. By practicing the "new onion culture," however, we have it in our power to prevent this disease altogether, or at least a serious attack by it. The earlier varieties, White Victoria, Yellow Dutch, and other ordinary standard sorts reach their full size and maturity long before the advent of the rust, and even the later foreign onions usually are too far advanced to be much harmed by it.

The smut, according to Prof. Bailey, attacks the first leaf or leaves of seedling onions, producing dark, irregular spots, and killing or weakening the plants. Drill a mixture of sulphur and lime, equal parts, into the ground with the seed ; about an ounce of the mixture to 50 feet of drill, as a preventive.

IX.

THE HARVEST.

GATHERING AND TAKING CARE OF THE CROP.

PULLING IN TIME.—CURING OUTDOORS.—KEEP DRY.—CURING ON BARN FLOOR OR UNDER SHEDS.—ONION CURING SHED.

When the tops turn yellow and begin to die, the crop is ready to be harvested. Be prompt. It is usually safer to pull the onions a few days too early, than too late. Do not wait until every onion in the patch is dead and all the tops have died down. Onions always ripen up unevenly, and many specimens, at the proper time of harvesting, will be quite green. This should give the grower no concern. If the bulb is good, the green top will soon dry and dwindle away. The danger lies in the tendency of the ripe bulbs to commence a second growth, if left too long in the ground, especially in a wet season. The onion should be kept perfectly dormant. New growth soon spoils it. One of the greatest advantages of the "new onion culture" is the early ripening of the crop, which brings the time of harvesting and curing into midsummer or early fall, when warm, dry days favor the proper curing. To get a part of the crop into an extra early and willing market, we may even begin pulling the onions before they are fully matured. Sometimes we can make more money thereby than by waiting for more growth and maturity.

PULLING THE CROP.

The work itself offers no difficulties. The smallest boys may be employed in "pulling" the crop. It is quick work,

too, especially when the onions were grown on the new plan, and are all uniformly large and regular. Each boy (or grown person) may take three or four rows, pulling the onions up by taking hold of each bulb itself, pushing or pulling it over (not by the top unless that happens to be large and strong), and then leaving all the onions pretty much in a windrow along one side.

Here they are left until fully cured, which in warm and dry weather may require a week's time or longer. If wanted for immediate use, or to meet a present lively demand at extra prices, there would be no need of waiting for them to cure perfectly. Each grower must be guided by circumstances, and his own good judgment in this matter. Under ordinary atmospheric conditions it is perfectly safe to cure the onions outdoors. It is the cheapest and least laborious method. The short rains which we are liable to have occasionally, during summer and early autumn, will do no harm. The bulbs soon dry again. If there should be a long rainy spell, you may turn the onions occasionally, either by hand, or better, with a wooden rake or fork.

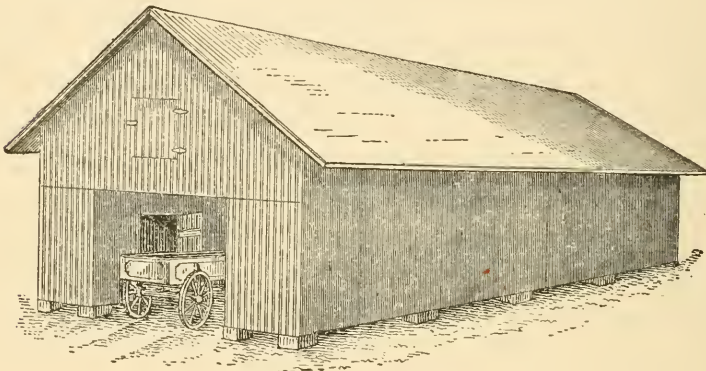
GATHERING FOR STORAGE.

Be sure that the onions are perfectly dry on the outside, when you gather them for storage. Pick them up into bushel crates or baskets, and spread them upon the barn floor or a dry loft. Do not let them stand for days together in barrels, or even in crates and baskets. The bulbs may appear entirely dry, and yet they will sweat and sprout, causing loss and trouble to the grower. If well cured and dry, you can put them upon a dry, airy floor a foot or more deep without danger. But the sooner you go at them, and twist or cut off the remnants of top and root, the better it will be. Then you are safe in storing the onions in slatted crates or ventilated barrels on the barn floor or under a dry shed.

People who grow onions by acres will need considerable storage room, and may find it necessary to put up special curing sheds or cribs. These can be arranged somewhat on the plan of the curing shed shown in Fig. 34.

This is built like a double corn-crib. Ordinary rough posts, firmly set into the ground, may serve as frame. Divide the storage rooms on each side into shelves, so that you can get the largest possible quantity spread out in layers not over twelve or eighteen inches deep, with plenty of air circulating through and between the layers. There

FIG. 34.



ONION CURING SHED.

should be a driveway clear through the centre of the shed lengthwise. This will facilitate unloading, and loading again when required.

To be on the safe side, the crop should be gathered and housed just as soon as it is in proper condition. Not a day should be lost after the bulbs are well cured and dry. When it gets to be late in the season, and a long wet spell is threatening, we had better house the crop anyway, and depend on its curing in thin layers on a dry barn or shed floor.

X.

THE REWARD:

MARKETING AND STORING.

THE EARLY MARKET.—VENTILATED BARRELS.—HOME-MADE ONION SORTER.—ONION CRATES.—DOMESTIC SPANISH ONIONS.—WINTERING ONIONS FOR SPRING SALE.—STORAGE HOUSES.—PITS.—ESTIMATES OF COST AND PROFIT.

My own inflexible rule is to sell the crop, after it is ready, at the first opportunity I have to get a fair price for it. In fact I aim to have it early, in order to sell it early. I find less competition, and therefore better prices, in market during August than I do during September, and less competition with better prices during September than during October or November. Besides the crop is a perishable one, and there is constant shrinkage, waste, and loss. The sooner you are rid of it and have the money for it safely in your pockets, the sooner you are relieved of the troublesome task of caring for a perishable article, and the better you are off. This advice is meant especially for the less experienced onion grower.

In the great onion districts of the east the crop is a staple article, and sells readily to regular wholesale buyers in the same way as potatoes are being sold in the great potato districts—by the car load. Buyers always go to the centres of production, and there we usually find the best, because most willing and ready market.

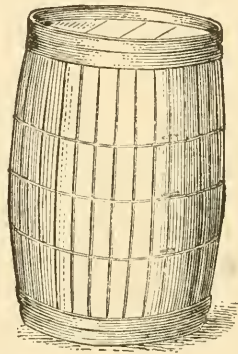
LOCAL AND GENERAL MARKETS.

The isolated grower away from these centres, no matter whether he grows on a large scale or a small one, has to

hunt up buyers for his onion crop. In the first place he should try to satisfy the local demand. Inferior, imperfectly ripened, or thick-necked bulbs may often be disposed of to the neighbors for immediate use at half price or less. Get *something* for them; they are of no use otherwise.

I have never found any difficulty in selling my earliest onions at a fair price, no matter in what packages they were put up. Sometimes I have sold them from the wagon to grocymen in Niagara Falls; ordinarily I ship to Buffalo. A few extra-early white onions I often ship in ten-quart

FIG. 35.



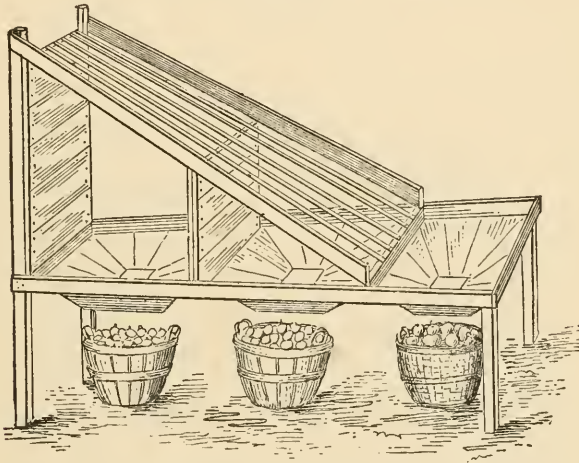
VENTILATED BARREL.

or half-bushel (peach) baskets. These baskets are cheap, and make a handy and popular package. Ordinary standard onions are shipped in barrels. The ventilated barrels, of various styles, such as illustrated in Fig. 35 and commonly used for shipping vegetables, would be excellent for shipping onions. Of course, we cannot afford to buy new barrels for this purpose. I get my supply of barrels from my grocers, who sell their old cracker and sugar barrels at ten cents apiece. In place of the regular head I use a piece of old canvas.

Uniformity of size greatly improves a lot of onions,

and I believe that careful sorting will pay well. Each size or grade should be put in a package by itself. A device for sorting, such as is illustrated in Fig. 36, is easily made out of a few scantlings, slats, and boards. The picture makes the arrangement plain enough, and further description will not be needed.

FIG. 36.



HOME-MADE ONION SORTER.

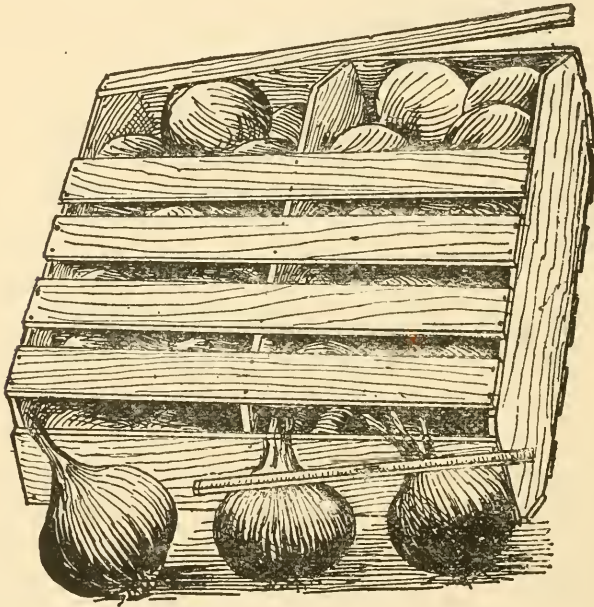
The larger sizes of the Prizetaker onion I have for several seasons put up and marketed in the manner shown in Fig. 37. The crate is patterned after the crate in which the Spanish and Bermuda onions are imported to our markets. The slats are $19\frac{1}{2}$ inches long, and the end pieces $19\frac{1}{2}$ by 7 inches. The crate holds plump three pecks. In the earlier part of the season they have sold well at from \$1.00 to \$1.25 each. These crates can be had, in the flat, at 12 to 15 cents apiece.

THE SPANISH ONION IN MARKET.

In some local markets, or among rural consumers, these fine, large bulbs sell well in smaller quantities, especially

after people become acquainted with their superior quality and the absence of excessively strong flavor. In other markets the sale is slow, as buyers sometimes seem to be afraid of these large bulbs, and to prefer for a sweet onion the imported ones, at a much higher figure. In reality there is little or no difference as regards flavor between the Prizetaker and the imported Spanish, and as we can grow the former, by the "New Onion Culture," to as large

FIG. 37.



ONIONS CRATED FOR MARKET.

size as the imported bulb, and at the rate of 1000 to 2000 bushels per acre, we should try to make American onion consumers learn the true value of this "Domestic Spanish" onion, and induce them to lay prejudice aside and use the domestic bulb in place of the imported article.

It has been proposed to use the designation "Domestic Spanish" uniformly as a kind of trade-mark, and thus label

all crates containing Prizetaker onions. Whether this will have practical results, and insure the grower a financial success, the future alone can tell. People are always slow to drop fixed notions and to change tastes once acquired. But it is worth the trial. Certainly such fine, large onions as well-grown Prizetakers are, ought to find favor with the consumer, and sell well.

CRATING ONIONS.

The crate, as shown, makes a light, airy package, well calculated to keep onions dry and sound. Its cost alone is against it. For the first early crop, however, which can be expected to bring a good price, and which will sell best in small packages, crates may be employed to good advantage. They might be made one-third larger, and "warranted to hold one bushel."

FEELING THE PULSE OF THE MARKET.

In selling a large crop, the methods of the good business man should be adopted. The supply, and consequently the prices, in various parts of the country are by no means uniform. Onions may be plentiful in New York, or Philadelphia, or Buffalo, and scarce in St. Louis, or Chicago, or Columbus. It will pay the grower who has carloads of onions to dispose of, to be informed about the condition of the various markets which he might find available. Direct sales can often be made to houses in one or the other of the larger cities. Get the addresses of one or more good commission merchants in all of the larger cities within reasonable distance from you, and thus be in the situation to feel the pulse of the market.

WINTER STORAGE.

Prices usually rule highest, and often reach almost fancy figures, in spring. Year after year I have known white onions

to sell for from \$6 to \$10 a barrel in the New York markets in March and April. Whoever has proper facilities for wintering onions, and thoroughly understands how to carry them safely through until spring, can do so with a fair prospect of largely increased returns from his crop. Of course, there is in this an element of speculation, and consequently some risk for even the expert, and danger for the novice.

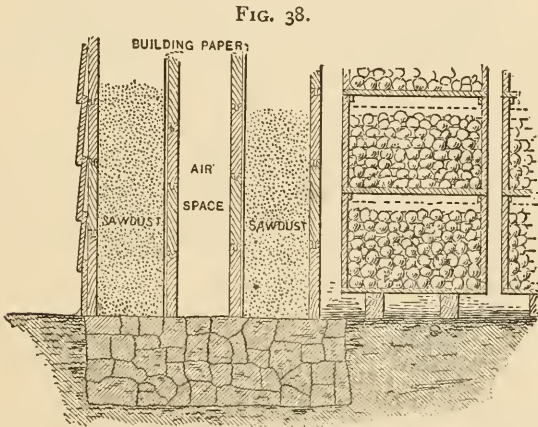
The task, however, does not offer great difficulties. The first thing to do is to sort the onions over carefully, and to select for winter storage none but sound, well-ripened bulbs. They should be perfectly "capped over," and entirely dormant both at root and top. If there is the least trace of growth, a green point at the heart, a rudiment of live root—reject that onion.

Next be sure that every onion to be wintered over is dust-dry on the outside. Such bulbs may be stored in layers, or, better, in slatted bushel boxes, in a cool, dry room, where safe from freezing, and they are pretty sure to keep well until spring.

A grower on the Canadian side of the Niagara River, who annually winters over thousands of bushels, has arranged part of a large barn as an onion storage-room. This is almost frost-proof in the coldest weather. All the walls have a dead air space, with building paper tacked on in the inside of each boarding that forms the hollow space. There are double windows at each end, which are kept constantly open except in the coldest weather. For storage-rooms above ground, in cold localities, however, the walls may be made like the one shown in Fig. 37. Set two by four joists, of the desired height, two feet apart upon the foundation walls. Line up each side of the joists with good matched boards, and paper the same with building paper. This will leave a dead air space four inches wide in the center of the wall. On each side of this nail ordinary

rough boards or planks, and cover them with siding on the outside, but with matched boards on the inside, filling the six-inch spaces with sawdust slightly packed. Walls thus built are recommended by Mr. J. Heagerty, of this State, for a fruit storage-room. For onion storage the space may be considerably narrower; but a room thus enclosed, and with doors and windows made tight, will be as near frost-proof as can be desired.

Onions must not be stored in these rooms in bulk, but in layers on shelves, or in slatted bushel-boxes or crates, filled



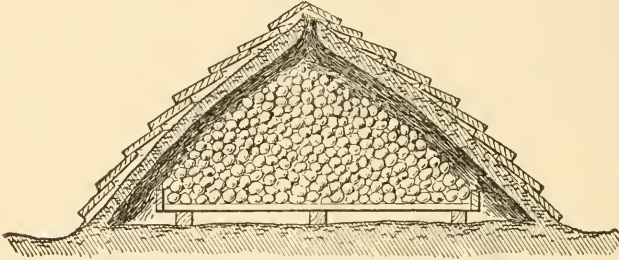
only to within a few inches of the top, so that there will be a free circulation of air all around, under, and above each box, when they are set one above the other.

WINTERING IN PITS.

Onions can also be wintered in pits, in same way as potatoes, roots, or apples are pitted for winter keeping. Be sure

that the spot selected for the pit is well drained. If water is allowed to get inside, either from the top or bottom, it will surely spoil the onions. Have them dry, and place them upon a dry foundation in a long, conical heap. Cover with clean straw ; then with a layer of earth and a roofing

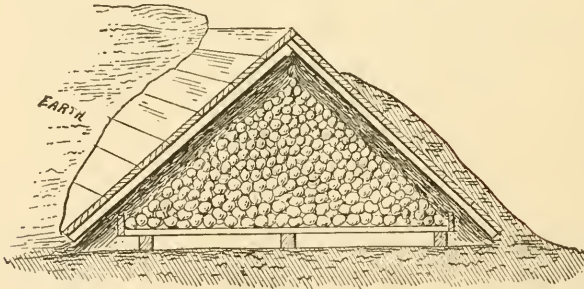
FIG. 39.



ONIONS IN PIT.

of boards. A wisp of straw reaching from the onions through the top outside will provide the needed ventilation. Fig. 39 will give an idea of the whole arrangement. Let

FIG. 40.



ONIONS IN PIT.

the onions freeze ; it is an advantage rather than an injury. Consequently, there is no need of covering them with as deep layers of straw and earth, as would be necessary in pitting potatoes, or even mangels and carrots.

Perhaps it would do as well, if not better, to reverse the order of things somewhat and arrange the covering as shown in Fig. 40, namely, first a layer of straw, then a board resting on rafters, and finally a coat of earth well patted down.

Another very simple and convenient way is to put them in a dry place, say a barn or shed floor, upon a layer of straw or hay, and let them freeze. Then cover with a two-foot layer of the same material, or with mats and blankets, and leave them untouched until they have thawed out again in spring. The onions must not be put nearer than about two feet from the wall, and the space between them and the latter should be filled with litter. The freezing method is pretty safe in uniformly cold winters, but a little risky in warm, open winters with frequent violent changes of temperature. Never handle bulbs when frozen, and always allow them to thaw out gradually.

THE PROFITS.

Now for an estimate of cost of the crop and the profits that are in it. In the very nature of things you will expect this estimate to be a somewhat rough one. The conditions, in regard to cost of labor, of manure, of land, as well as the demand for the crop and the prices that can be obtained for it, vary so greatly in different localities and seasons that I can give no figures which would be a safe guide everywhere.

The following I submit as a rather conservative estimate. I do not desire to paint the business of growing "onions for profit" in unduly rosy colors. The yield (600 bushels) is no more than a good grower should produce under fairly favorable conditions:—

I.—ESTIMATE OF COST, AND RETURNS FROM THE OLD METHOD.

EXPENSES OF CROP PER ACRE.

Rent of land,	\$ 6 00
Manure, 3 carloads, at \$16,	48 00
Fertilizers,	20 00
Hauling, applying manure,	12 00
Plowing and harrowing,	3 00
Seed, 6 lbs. at \$2.25,	13 50
Sowing,	1 00
Cultivation and weeding, first time,	15 00
“ “ “ second “	10 00
“ “ “ third “	5 00
Pulling crop,	3 00
Gathering, hauling, barreling,	35 00
Barrels, or packages,	20 00
Total,	<u>\$191 50</u>

RECEIPTS.

By 600 bushels of onions, at 60 cents,	\$ 360 00
Deducting expenses,	191 50
Net profit,	<u>\$168 50</u>

If reality corresponds with this estimate, the grower is doing pretty well. Even if the price obtained for the crop should be only fifty cents a bushel, the net profits, with \$300 realized from the crop, would still be about \$110 after all outlays and all labor at fair rates are paid for.

The average crop, it is true, is far below 600 bushels; but we are not aiming for average crops. Our liberality in applying manures, our thoroughness in selecting and preparing just the right soil conditions, our good management generally, should count for something. The *average* crop can and should by these means be doubled or trebled. A yield of 600 bushels of sound onions to the acre is the very least that the wide-awake grower can expect under

such selected favorable conditions. Indeed, the chances are that the yield will go above the figure named, 800 bushels being within easy reach, and 1000 bushels by no means beyond possibility. Every one can easily make his own calculations as to the profits resulting from such a crop.

II.—ESTIMATE OF COST AND PROFITS FROM THE NEW METHOD.

EXPENSES OF CROP PER ACRE.

Rent of land,	\$	6	00
Manure, 3 carloads, at \$16,		48	00
Fertilizers,		25	00
Hauling and applying manure,		12	00
Plowing and harrowing,		3	00
Marking,		1	00
Raising 180,000 plants,		30	00
Seed,		7	00
Transplanting,		45	00
Cultivation and weeding,		20	00
Pulling crop,		3	00
Gathering, hauling, packing,		35	00
Barrels and crates,		60	00
		<hr/>	
Total,	\$	295	00

RECEIPTS.

By 1000 bushels, at \$1.00, less freight, commission, etc.,	\$	800	00
Deducting the expenses with		295	00
		<hr/>	
Net profits,	\$	505	00

This is in favorable contrast with the results obtained by the old method. The total expenses per acre are greater—in fact, they must increase with the increase in yield. But for reasons already stated, we usually can sell the crop at a higher price per bushel than we could get for onions raised in the old fashion. This makes a vast difference in the net profits.

I can see nothing to prevent the grower, who has used

good judgment in the selection of favorable conditions for his undertaking, to raise 1000 bushels per acre on this new plan. It takes 180,000 plants per acre. The average weight per bulb should be not less than four ounces, if you grow some good strain of the Yellow Dutch, and exceed eight ounces if you grow the Prizetaker.

I have had many specimens of the latter variety which tipped the scales at twenty-four ounces, and whole rows with every bulb weighing no less than one pound. The 180,000 Prizetaker onions on one acre, each weighing only one-half of a pound, would give 90,000 pounds, or from 1400 to 1500 bushels. These, if sold at even a moderate price, leave a big margin of profit for the grower.

All these calculations and estimates are based upon my own surroundings and local conditions. Each grower must modify them according to his particular surroundings and conditions and ruling prices. Good management and good judgment, especially in respect to selection of most favorable conditions, cannot fail to lead to a satisfactory outcome.

XI.

SIDE ISSUES.

GROWING PICKLING ONIONS, ONION SETS, BUNCHING ONIONS, ETC.

THE BARLETTA.—GROWING THE CROP.—ONION SET HARVESTERS.—ONION SET CLEANER.—PROFITS IN PICKLING ONIONS.—GROWING SETS.—WINTERING SETS.—GROWING BUNCHING ONIONS.—GREEN ONIONS FROM BARLETTA SEEDLINGS.—EGYPTIAN WINTER ONIONS.

Since the introduction of the Barletta (Adriatic Barletta) onion, a few years ago, I have taken quite a fancy to growing pickling onions.

Does it pay?

It pays—and pays well. It gives us a chance to utilize the labor of quite young boys with good profit. It allows of double cropping, which is not practical to any great extent in growing ordinary onions by the old method. It gives us a product that meets with ready sale, and brings in ready money long before we can get cash returns from the regular onion crop.

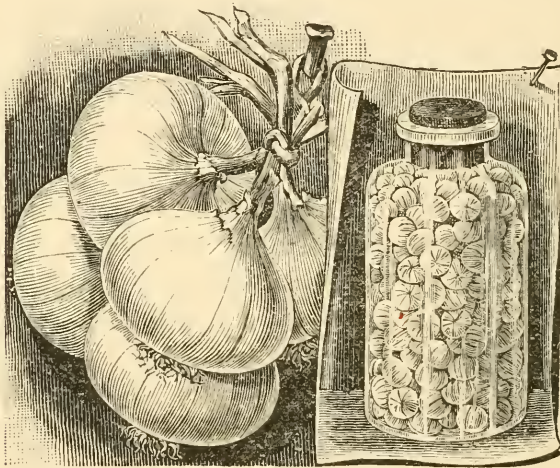
The New Queen, yet quite generally grown as a pickling onion, has always given fairly satisfactory results. It is a nice, small, white variety, somewhat flat in shape, and early enough to catch the demand for pickling onions. Many specimens, however, unless much crowded, are apt to grow larger than desirable.

The Barletta is just the thing in size. It is handsome, round, of pearly whiteness, and altogether the pickling onion *par excellence*. Its advent has made the production of these onions a pleasure. If well-grown, well-cured, and well-sorted, they cannot help tempting even an unwilling

buyer, but especially the housewife in need of pickling material. The Barletta sells on sight.

While these pickling onions will grow on any kind of soil suitable for other onions, I would not plant them on those of a clayey character under any circumstances. Why? Labor, in the production of this crop, is a most important factor. One of our first aims must be to make use of every means within our reach that may serve to avoid all pre-

FIG. 41.



THE BARLETTA ONION.

ventable waste in this large item of expense. Up to the time of harvesting, all seems easy and plain sailing. Then comes the real work, that of gathering and cleaning the crop. If the soil is sandy, or otherwise loose and crumbly, our youngsters will find the task now before them light and pleasant, but long and wearisome if the small bulbs have to be dug out of stiff clay, and separated from large and small lumps of earth by hand.

In the first place, and as a prime condition of financial success, we must understand that the only choice of soil

left to us is between sandy loam, sandy muck, and sand, all of which must be free from rubbish, gravel, large stones, and lumps. In other words, any soil that when fairly dry and unfrozen will at any season readily pass through an ordinary coal-ash sifter without leaving a residue, is suitable for growing pickling onions.

The soil should be well enriched in somewhat the same fashion as minutely described for growing ordinary onions, although there is no need of being quite so liberal in manure applications. If the land is already quite rich and well filled with organic matter, we might safely dispense with organic manures, and put our reliance solely on applications of commercial fertilizers, ashes, dried blood, etc. Land that is not rich nor well supplied with organic matter (humus) should have a good coat of compost. Absence of weed seeds, both in the soil and compost, is also an important point.

In regard to the preparation of the soil I have nothing to add to the instructions already given in chapter IV. For sowing the seed, at the rate of about thirty pounds per acre, use the seed drill. Crowd the rows pretty closely together. There is no need of having them wider than ten inches apart. But for the greater ease of cultivation secured by a greater distance, I would put only six inches between the rows. An ounce of fresh seed is enough to plant one hundred feet of row or a little over. I usually set the drill to sow about one-half this quantity, and then go twice in each row. I do this for the purpose of spreading the seeds in a wide row, rather than crowding them together in a single narrow line; yet I confess that I am not sure whether this is of any material benefit or not. Although the Barletta crop is made in three months' time or less, it is always advisable to put the seed into the ground at the North as soon in spring as soil and weather will permit.

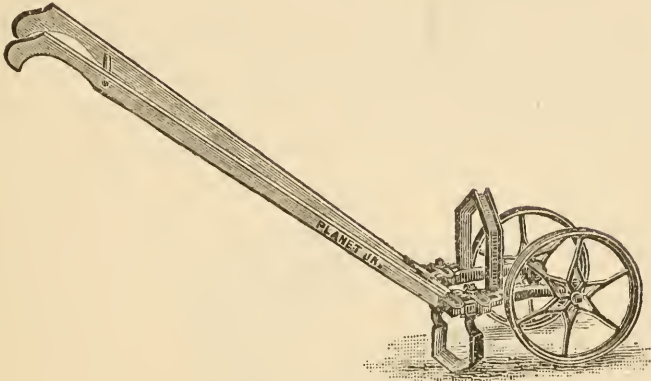
With the advantage which we secure to the onion plants over weed growth by early sowing, and by a crowding which leaves little room for weeds to start later, the task of hand weeding will not be formidable. The wheel hoe should be brought early and promptly into use, and the weeds in the rows pulled up by hand whenever and as often as required until the crop is well on its way toward maturity.

When the majority of the tops have died down, which here is usually at the beginning of July, the time for harvesting the crop has come. If the area is small, pulling by hand may answer, and very small boys even can be employed to do this work satisfactorily. A better and quicker way, however, is to run a common, good-sized garden trowel under the onions, lengthwise of the row, lifting up trowelful after trowelful, and throwing them into a sieve with meshes just small enough to hold the smallest of the bulbs. An ordinary coal-ash sifter is good enough. Sift out the sand and dirt, then empty the cleaned onions into baskets or boxes, and strew thinly on a dry floor to cure.

If the grower prefers to cure the crop outdoors, which, at that season of hot and dry weather, is a perfectly safe proceeding, the bulbs should be dug up in the simplest and most convenient manner, and left right on the ground until the tops and roots have completely dried away. We ordinarily have used our narrow-bladed, home-made onion hoes for digging out the bulbs. The blade should be inserted and drawn along in the row just under the bulbs. The Planet Jr. wheel hoe is provided with an attachment—the onion-set harvester, here illustrated (Fig. 42)—which does the work with neatness and dispatch. Any grower of ordinary intelligence and mechanical skill, however, can easily construct a serviceable tool for harvesting pickling onions and onion sets from a set of old cultivator wheels, a few pieces of board, and a piece of an old saw-blade. The illus-

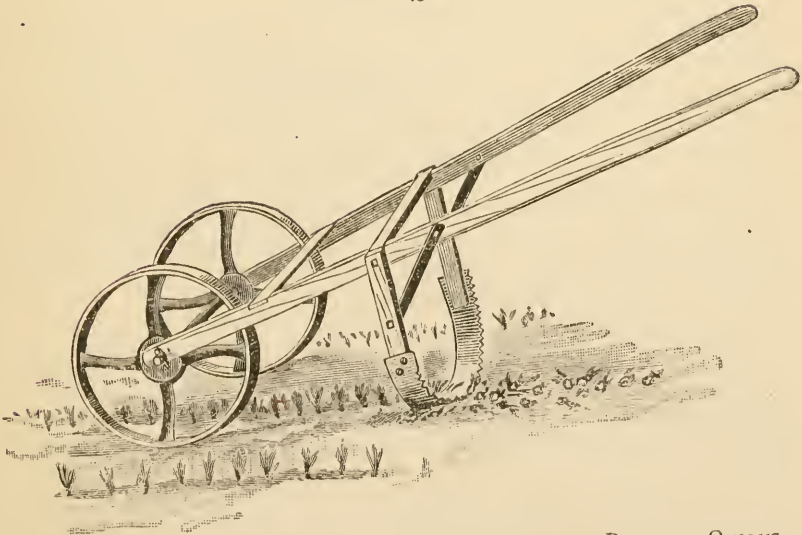
tration, Fig. 43, will give some idea of the appearance of the tool.

FIG. 42.



ONION-SET HARVESTER, PLANET JR.

FIG. 43.



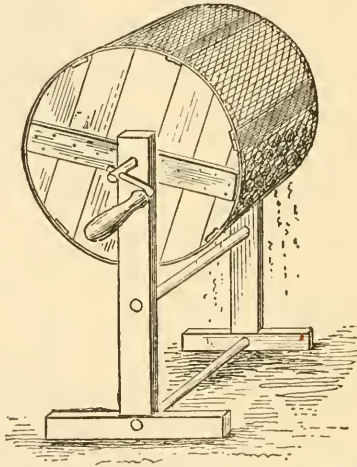
HOME-MADE DEVICE FOR HARVESTING ONION SETS AND PICKLING ONIONS.

Leave the bulbs on the ground until they are perfectly cured, and let them be gathered up when not a particle of

moisture is on them. They may then be stored—not in boxes, baskets, crates, or barrels, but spread out thinly on a dry floor or on airy shelves, then cleaned and prepared for market at leisure.

Children can do the job of cleaning the bulbs quite well. By rolling and rubbing the dry bulbs about in sieves, or in a drum made for the purpose (such as illustrated in Fig. 44), they are easily separated from tops and roots. Finally,

FIG. 44.



SIEVE DRUM FOR CLEANING ONION SETS AND PICKLING ONIONS.

run them once or twice through a fanning-mill to free them from dried skins, tops, and other light rubbish.

When preparing them for market, the largest bulbs should be sorted out, and each grade put up by itself. Uniformity in size adds greatly to the attractiveness of the lot and perhaps to its money value. The demand in our markets usually begins with September and lasts into October. Gardeners who sell vegetables to consumers on a regular route from the wagon will find that Barletta onions "take well" in early autumn, and readily sell at from 10 to 15 cents per quart.

A small town, of course, is soon overstocked. I usually ship my crop to Buffalo. I put them into ten-quart (peach) baskets, lining the latter inside with paper, to prevent small onions from working out through the cracks. A cover of cheese cloth or stiff paper is fastened over the top. My commission merchants manage to get 75 cents to \$1.00 per basket, so that the average returns usually amount to about 80 cents per basket.

What is the yield?

I have no difficulty to raise at the rate of 600 to 800 baskets per acre, and the possibilities are probably far above this amount. On the basis of a 600-basket yield, we have the following

ESTIMATE OF COST AND RETURNS.

EXPENSES OF CROP PER ACRE.

Rent of land,	\$ 6 00
Manure and fertilizers,	40 00
Hauling and applying manures,	10 00
Plowing and harrowing,	3 00
Seed, 30 lbs., at \$2.25,	67 50
Sowing,	1 50
Cultivating and weeding,	25 00
Harvesting,	3 00
Gathering and cleaning,	48 50
Baskets, 600, at 3 cents,	18 00
	<hr/>
Total.	\$222 50

RECEIPTS.

By 600 baskets, at 80 cents,	\$480 00
Deducting expenses,	222 50
	<hr/>
Net profit,	\$257 50

Tempting as this outcome may appear, I cannot advise any one to attempt growing pickling onions thus largely until after repeated trials on a gradually increased scale.

Thorough work in the matter of curing pickling onions, and onion sets as well, cannot be urged too strongly. If the weather is not favorable for our purpose, a kiln or dry-house, if available, may be utilized to best advantage. High heat is not required, nor wanted.

GROWING ONION SETS.

Onion sets are also a profitable crop, but their successful management requires rather more skill and experience than that of pickling onions. Perhaps it is not more difficult to produce the one than the other; but the pickling onions are disposed of in the fall, while the sets have to be wintered over. The land should be of the same general character as needed for pickling onions, but not more than of medium fertility. Yellow and White sets are in best demand. Select Yellow Dutch and Silverskin or Pearl (Extra Early Pearl, American Pearl), respectively, and, if you want red sets, Early Red. Prepare the soil, and sow seed as directed for pickling onions, using from 40 to 60 pounds of seed per acre. Use the wheel hoe promptly, and keep the patch scrupulously clean of weeds. When the tops are partially dry, shear them off, or cut them off with a sickle; then harvest them in the same manner as you would pickling onions. All bulbs that will not readily pass through a sieve with $\frac{3}{4}$ -inch meshes are too large for sets, and should be used for pickling, or in other ways.

Sets not perfectly capped over will not keep well. They should be dead ripe in August or September. "A good set is a perfectly-formed onion in miniature, a round, plump, little onion with the top all withered up to nothing." Gather them on a hot day while perfectly dry, and at once clean them by running through a fanning mill. Spread them out thinly to dry, and keep them dry until winter sets in. Then store them, in baskets, or on shelves, in a

cool, dry room, or freeze them as advised for wintering ordinary onions. Never handle them while yet partially frozen, nor keep them long in bulk after cold weather is past.

BUNCHING ONIONS.

Bunching onions form one of the most important crops of the market gardener, and about the earliest outdoor crop of the season to bring in money. In all except the extreme northern States, I believe sets could be safely planted late in the fall, rather than in the spring, as now generally practiced. I have thus planted sets of the Early Pearl, and they wintered well without protection, and made good bulbs for bunching. In our trying winters, however, it may be safer to cover the patch lightly with marsh hay or other litter, or defer planting until early spring. Place the sets two inches apart and about as deep, into rows, which may be from eight to twelve inches apart. The soil should be a rich, mellow garden loam. Begin pulling and bunching the green onions when about half grown, and market them as fast as they are wanted. At first, take twelve plants for a bunch, reducing this number gradually as the bulbs grow larger, and until five or six constitute a bunch.

Sometimes it pays well to grow bunching onions in the green or forcing house. Of course the sets should be planted quite close, say two by four inches, in order to fully occupy the space. In February and March they will bring a good price. For both glass and outdoor culture, seedling plants of the Barletta, started early under glass, may be used in place of sets. Of course the onions will be small, but, as on account of the extreme earliness of the variety they can be produced before other bunching onions come into market, they seem to bring the money.

Then there is the winter or Egyptian Tree onion. Personally I do not consider it worth much. It does not produce bulbs in the ground, but only thick stalks like the leek or a scallion onion, and propagates itself both by division, and by top sets. The plant is of ironclad hardiness, and grows luxuriantly whenever the ground is not frozen. Here we can pull and bunch them in April and May, when other green onions are conspicuous by their absence, and for this reason they often sell well, and at a good price, notwithstanding the fact that they do not possess the true onion flavor.

XII.

ODDS AND ENDS.

ONION SEED RAISING.—WEIGHTS PER BUSHEL.— HISTORY AND VARIETIES.

To produce onion seed, first grow the onions, and select perfect, well ripened bulbs for wintering over in a cool, dry, airy room. Select moderately rich soil; plow and harrow it well in early spring; then open furrows six inches deep, and not less than three feet apart. In these set the onions four or five inches apart, and cover with the foot, plow, or a hoe. Where the winters are not excessively severe, the planting may also be done in August, in the same manner as here described. The onions will make a strong growth before winter, and come out all right in the spring without protection of any kind.

The great hollow seed stalks are quite liable to be broken over and seriously damaged by heavy winds when the ripening seeds make them top-heavy. If support is given to the plants by little stakes, or by wires or twine stretched on both sides of each row, much loss will be prevented.

The seed ripens quite unevenly. Each pod must be cut at the proper stage of ripeness, as indicated by the yellowish color of the upper part of the stalk and the seed pods. Continue cutting at intervals until all pods are gathered. Spread them thinly in a dry loft, and when thoroughly dry thresh them with the flail, and clean the seed by running it repeatedly through a fanning-mill.

Then comes the washing. Place a quantity into a tub or barrel of water, stir thoroughly for a few minutes, then gently pour the water off, together with all the pods and light seeds floating on top, leaving the heavy seed in the bottom. This washing may be repeated once or twice, and the seed should at once be spread out thinly on sheets or boards to dry, in the sun or a dry, warm room. Be sure that it is thoroughly dry before being stored in bulk.

WEIGHT OF ONIONS.

I am frequently asked about the legal weight of a bushel of onions. This is not easily answered, simply because some States, as New York, Pennsylvania, Delaware, etc., have not thought it worth while to establish a legal weight for onions, while other States have seemed to entertain somewhat differing ideas as to what weight it properly should have. The following is the weight recognized as legal by the States named:—

	Pounds.		Pounds.
Arkansas,	57	Nebraska,	57
California,		Nevada,	
Colorado,	57	New Hampshire,	
Connecticut,	50	New Jersey,	57
Delaware,		New York,	
Georgia,	57	North Carolina,	
Illinois,	57	North Dakota,	
Indiana,	48	Ohio,	50
Idaho,		Oregon,	
Iowa,	57	Pennsylvania,	
Kansas,	57	Rhode Island,	52
Kentucky,	57	South Dakota,	
Louisiana,		Tennessee,	56
Maine,	52	Texas,	57
Maryland,	56	Vermont,	52
Massachusetts,	52	Virginia,	57
Michigan,	54	West Virginia,	
Minnesota,		Wisconsin,	50
Missouri,	57	Washington,	
Montana,		Wyoming,	

HISTORY.

Little enough is to be said about the early history of the onion, although the fragrant bulb has been known and cultivated as an article of food from olden times. Probably the plant came originally from the East. It is mentioned in the Scriptures as one of the things for which the Israelites longed when in the wilderness. These people seemed to have become quite fond of the "leeks, onions, and garlies" of Egypt, and their love for these vegetables is almost proverbial to this day. Herodotus, long before the Christian era, tells of an inscription on the great pyramid stating that a certain sum (1600 talents) had been paid for the onions, radishes, and garlic consumed by the workmen during the erection of that massive, awkward, but famous, stone heap.

The present production of the onion in the United States has reached enormous proportions, and yet hundreds of thousands of bushels are annually imported. These come mostly from Bermuda (the old crop) during January, from Cuba (new crop) during the same month; from France and Spain, during February and March. It seems to me that California and some of our southern States can grow just as good onions as any of the countries named, and they should try to catch a little of this trade in mild foreign sorts.

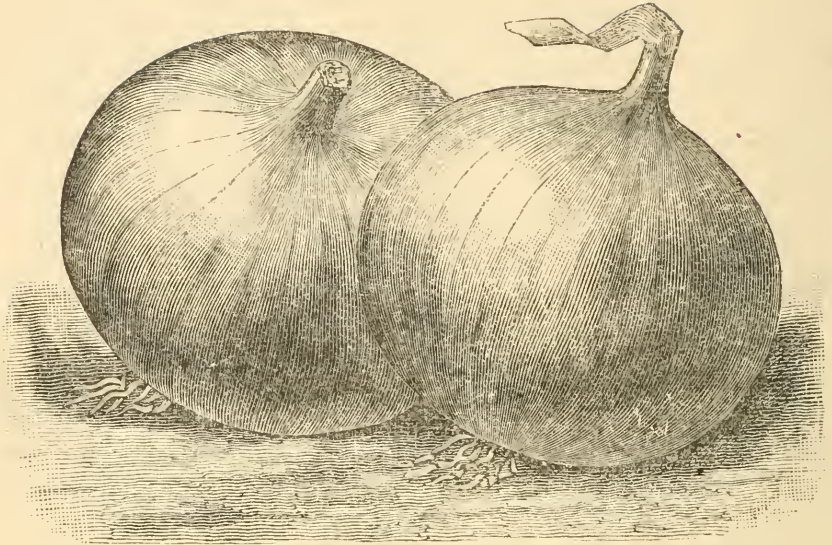
VARIETIES.

Botanically the onion is known as *Allium cepa*. The generic name is of Celtic origin ("all" meaning hot, or burning). The plant belongs to the Natural Order *Liliaceæ*.

Hundreds of garden varieties have been introduced, but we have little positive knowledge concerning their origin.

ONIONS FOR PROFIT.

FIG. 45.



YELLOW GLOBE DANVERS.

FIG. 46.



RED WETHERSFIELD.

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WATER BURGER CO. PHILA

The sorts most useful to the commercial grower have already been mentioned. The following is a list of the leading varieties:—

Wethersfield (Wethersfield Red).—The leading red market variety; large, flat, coarse, reliable and prolific. Skin deep purplish red; flesh white; flavor strong. A good keeper.

Danvers (Danvers Yellow, Round Danvers, Yellow Globe Danvers).—This is undoubtedly the most reliable market sort, very prolific; sure to form good bulbs; early,

FIG. 47.

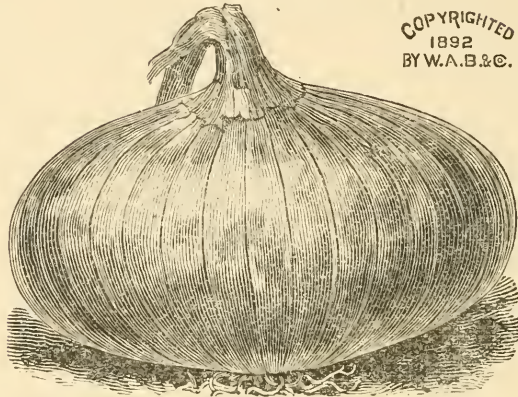


good-sized, round, smooth. Neck very small, flesh solid, fine grained. A good keeper.

White Globe (Southport White Globe).—This is the best of the white market varieties. It is of fine white color, and of perfect globe shape. Large, prolific, reliable. Cure it in the shade if practicable, as this will prevent discoloration of the skin. A good keeper.

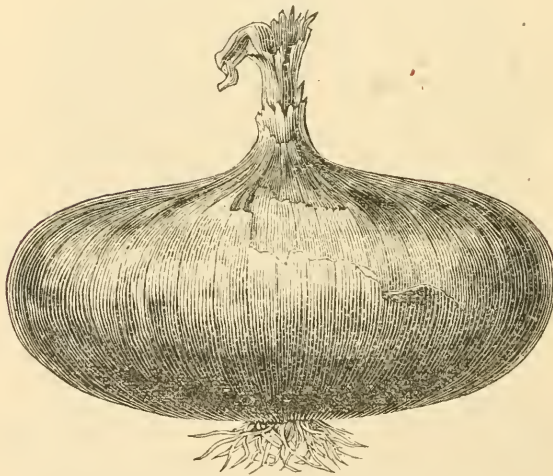
Red Globe and *Yellow Globe (Southport)* resemble the *White Globe* quite closely except in color.

FIG. 48.



YELLOW DUTCH.

FIG. 49.



EXTRA EARLY RED.

Yellow Dutch (Yellow Strasburg).—This variety is prolific, producing solid and fine flavored bulbs. Shape somewhat flat. Largely grown for market, and for sets. An excellent keeper.

Extra Early Red.—Hardy, reliable, growing quickly to fair size. A favorite sort for mucky soils, and much grown for red sets. It keeps well.

Silver Skin (White Portugal, Philadelphia White).—An onion of medium size, handsome appearance, and mild flavor. Largely grown for pickling and for white sets.

Spanish King.—A very large, yellow, mild foreign sort, well adapted for the new onion culture.

FIG. 50.



PRIZETAKER.

Prizetaker.—The best of the very large, mild onions, and most suitable for the new system of onion growing. It resembles the imported bulbs sold in our markets as “Spanish onions.”

Silver King.—A very large, white, mild-flavored variety of the Italian type. Like all others of that class, it is not a good keeper.

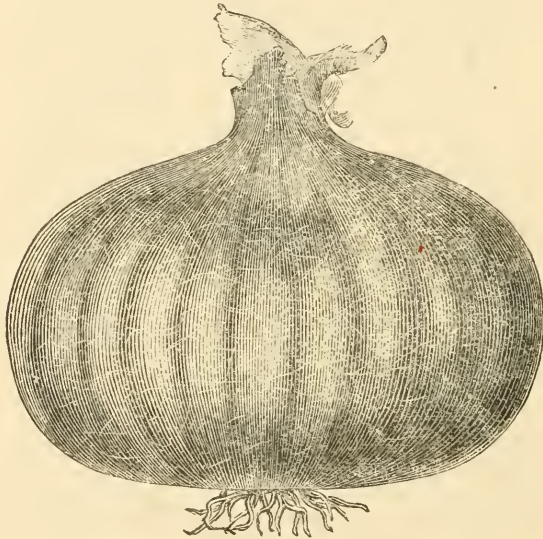
White Victoria.—A large, white, handsome, mild-flavored variety, well suited for the new onion culture.

Red Victoria.—Resembles the White Victoria in every respect except color.

Bermuda.—There are two kinds of Bermuda onions, a pink and a white one. They make large, flat onions, but are less reliable than the Italian sorts.

New Queen (Pearl of the Southern States).—A flat white onion of small size and quick growth. In the South (according to Prof. Massey) a good crop of fall onions can be raised from seed of this variety sown in August, and it will be found very salable for pickling onions.

FIG. 51.



NEW MAMMOTH POMPEII.

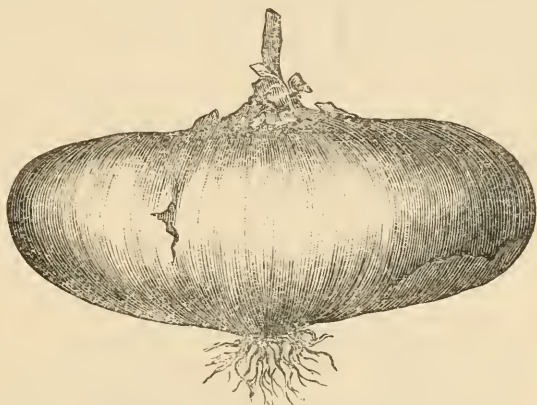
New Mammoth Pompeii.—A very large onion, of red color and mild flavor. Valuable for transplanting in the South.

Maggiajola.—An early, flat, white onion, of small size; good for pickles.

Barletta.—The earliest of all; very small; useful for bunching, and especially for pickling.

Giant Rocca.—A large onion, of dark-red color and round shape ; valuable for transplanting in the South.

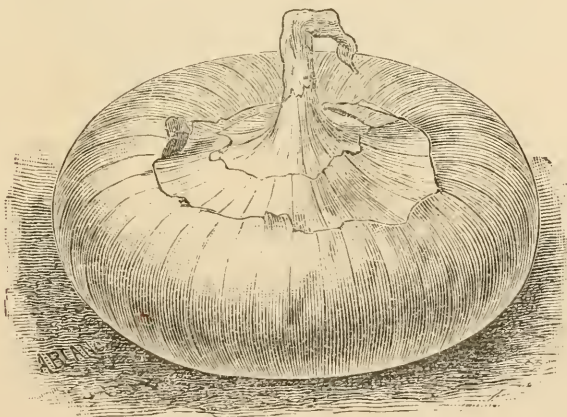
FIG. 52.



LARGE WHITE ITALIAN TRIPOLI.

Large White Italian Tripoli.—A very large, white onion, of fine flavor. One of the best white market onions for the Southern States.

FIG. 53.



WHITE PEARL.

White Pearl (*Extra Early Pearl, American Pearl, Bloomsdale Pearl*).—A fine white, early onion ; good for sets, and pickling.

Mammoth Red Tripoli.—Resembles White Tripoli in every way, except color.

Potato Onions (Multipliers).—These produce neither seed nor top-sets, but increase by division of the original bulb. They are early, and valuable for market, especially in more southern localities, but do not keep well. Their color is brownish-yellow. According to reports, a pure white variety of superior merit has recently been introduced.

FIG. 54.



WHITE MULTIPLIER ONION SETS.

Winter Onion (Egyptian, Perennial or Tree Onion).—Does not form bulbs. The stalks are used for bunching in March, April and May, and the crop is often quite profitable. Increased by top sets.

Top Onion.—This, like the preceding, forms little bulbs on the top of the stem in the place of flowers and seeds. These bulbs grow in clusters, and are of about the size of hazelnuts. Break the clusters apart, and plant in spring, in the manner advised for sets. Color red.

HOW TO BE RICH WITH A LITTLE LAND.

I am going to tell about Caleb Jones.

He has the best-paying garden within a day's journey, and Mrs. Jones has the prettiest flowers. The farm is a good one, well tilled and kept up; but so are a good many others. His land, if you see it after the crops are off, is about the same as that of other prosperous farmers; but he always takes the first prize at the County Fair for pumpkins and cabbages—Mrs. Jones for pansies and marigolds.

They live within four miles of the village, where several hundred people buy their everyday fruits and vegetables. One taste of Jones' sweet corn is enough to secure a customer—beans and peas the same. You see what a hold he has on the market.

At home they live like lords. American farmers have good things to eat, compared with the rest of the world; but not one in a hundred lives like Caleb and Mrs. Jones and the little Joneses.

When two men set out to do the same thing, and one succeeds while the other fails, there is apt to be a reason for it. So, when most of our people have plenty of wants and some have money to lend, there's a reason for that. What is it?

HOW TO BE RICH WITH A LITTLE LAND.

Caleb has two or three acres of garden and forty times as much in farm ; but his garden grows larger every year, and his farm grows smaller. He keeps more help than anybody else along that road ; he has more work. His horses are round and sleek ; they seem to enjoy life. Caleb says the only difference is, between him and his neighbors, they are farmers and he is a gardener. I say, he grows what he can sell to advantage, and grows it so that he can. And this is my notion of How to be Rich with a Little Land.

They are all poor farmers ; but five or six acres of vegetables are worth a hundred of wheat. — depends on the vegetables. What do they depend on ?

Caleb buys his seeds of a seedsman. He would no more plant poor seeds than raise a colt from a scrawny mare. This accounts for his taking those prizes. His tomatoes, whether a cherry-size, plum-size, pear-size, or apple, are solid and rich in the pulp, of thin, tough skin, rotund, and prolific. Tomatoes of ten years ago were tough and watery, awkward to peel, and not nearly so clear and fair as Caleb's. He buys his seeds of a seedsman.

There are, however, two sorts of seeds and seedsmen. Take cabbage, for instance. You

HOW TO BE RICH WITH A LITTLE LAND.

can't tell turnip from cabbage. A common practice of seedsmen is to mix them; and, to prevent your finding it out, the turnips are killed before mixing. Cargoes of poor cabbage seed come from Europe at 30 cents a pound; it is grown from stalks—they sell the heads. The best cabbage seed is grown on Long Island and in Bucks County, Pa., from selected stalks with the heads on. The seedsmen who mix of course have an eye to cost. They put in a little good seed, to avoid a total failure, which would injure the business. The bulk of the cabbage sold in this country is mixed. But most of the farmers and gardeners do not suspect it. They sow pretty thick. If a third come up, it's enough; and, if half of the plants make heads, they are satisfied. While of Long Island and Bucks County cabbage ninety-six or ninety-seven in a hundred seeds come up, and nine out of ten of the plants make full, round heads. The difference due to the seed is half or two-thirds of the crop, besides the quality. Take, for another example, tomato seed. The canners save the seed in the waste; it is average seed and costs nothing. Melon-growers sell their best melons and, late in the season, save seed from the culls—to sell, not to plant. There are tons on tons of seeds that

HOW TO BE RICH WITH A LITTLE LAND.

are true to name but of common quality—honest but poor. They came from poor plants and will grow poor plants.

Do you know what a first-rate seed is? It is bred up, just as a horse or cow or dog or hen is. Vegetables and flowers are poor in their natural state; they are fair in their usual state; they are rich in the proper seedsman's proving ground. And the richer they are the more unstable they are; they tend back, as water runs down hill.

A first-rate vegetable or flower seed goes back to a lower grade as soon as it ceases to feel the seedsman's care. This care is not cultivation; it is sorting out and breeding up.

Caleb trusts no seedsman's seeds in the next generation. He gathers no seeds himself; he buys of his seedsman every year; and so does Mrs. Jones.

You see, the farmer's and gardener's first anxiety is, not plows and harrows, but seeds. Any plow will plow; any harrow will harrow; but first-rate seeds he must have, or fail in his crops. Most gardeners fail and don't know it.

How did Caleb and Mrs. Jones pick out their seedsman? They saw an advertisement—here it is:—

HOW TO BE RICH WITH A LITTLE LAND.

BURPEE'S FARM ANNUAL FREE.

W. Atlee Burpee & Co., 475 N. Fifth St., Philadelphia,

to get acquainted with you, will send you for 25 cents four packets of named Sweet Peas and one packet of Eckford's "All the New Sweet Peas" mixed, with a book, "All About Sweet Peas," how to grow and trellis them so as to have flowers every day, with illustrations.

Bush Lima Beans: the only true large Lima—probably you don't know what a good Lima is—10 cents, to make acquaintance.

Burpee's Surehead Cabbage, 10 cents; and Burpee's Melrose Melon, 15 cents.

Every seed we sell is to make acquaintance.

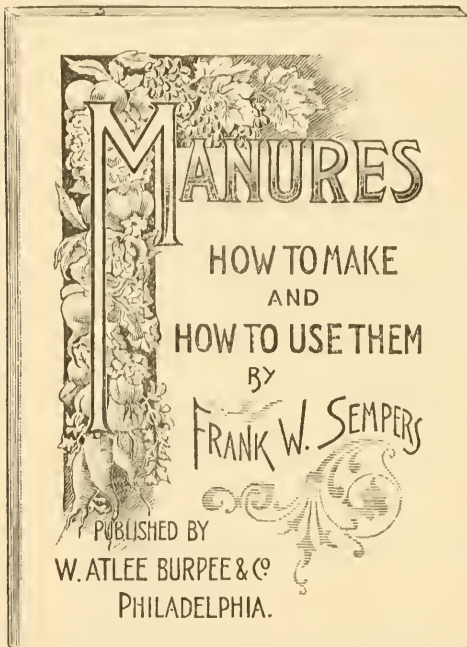
Caleb said to Mrs. Jones: "Let's have that Farm Annual." That's how they are rich with a little land; and you can.

MANURES:

How to Make and How to Use Them.

A PRACTICAL TREATISE ON THE CHEMISTRY OF
MANURES AND MANURE MAKING.

This new book on the chemistry of manures and manure making is a complete and really important work, written specially for the use of farmers, horticulturists, and market gardeners, by FRANK W. SEMPERS, Director of the Fordhook Chemical Laboratory.



It clearly explains the principles underlying soil fertilization and gives the best known scientific methods for preparing and applying natural and artificial manures on the farm. It has been demonstrated by several of the State Agricultural Experiment Stations and by scores of progressive farmers that chemical manures equal to the best ready-made mixtures can be made on the farm, without the aid of machinery and at great saving in cost. The different raw materials entering into the composition of fertilizers are plainly described, and the best commercial sources of supply given. Considerable space is devoted to tried and proved formulas, drawn from the latest scientific researches in America, England, France, and Germany.

Simple explanations are also given of some terms in chemical technology used in the State Agricultural Reports and in the general agricultural and horticultural literature of the day. The arrangement and classification are in accordance with the best scientific usage, and every formula is the result of actual field experiment. The preparation of this book has involved a large amount of careful work.

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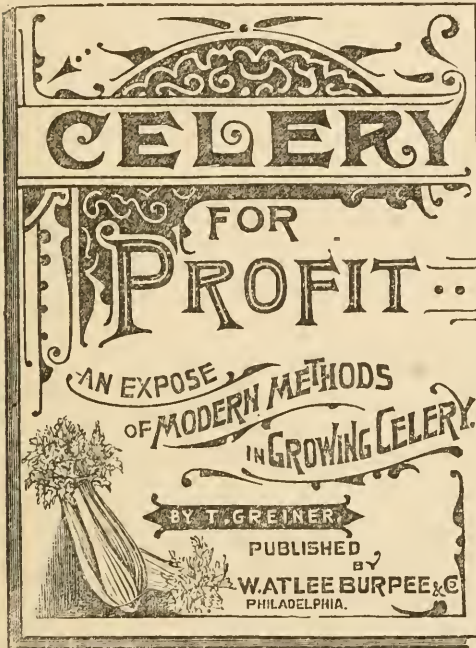
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CELERY FOR PROFIT.

All agree that Celery offers greater chances for making money than any other garden crop. The difficulties encountered by the old methods of growing, however, made success uncertain, and sure only with comparatively few expert growers. Modern methods make all this uncertainty a thing of the past. From the same area which would give \$100.00 in any other vegetable, you

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complete in every detail, and is embellished with many helpful and original illustrations. Here is a glimpse of the table of contents :—

Generalities—An Introduction—The Early Celery—The New Celery Culture—The Irrigation Problem—The Fall and Winter Crop—Winter Storage—Marketing Problems—Varieties, etc., etc.

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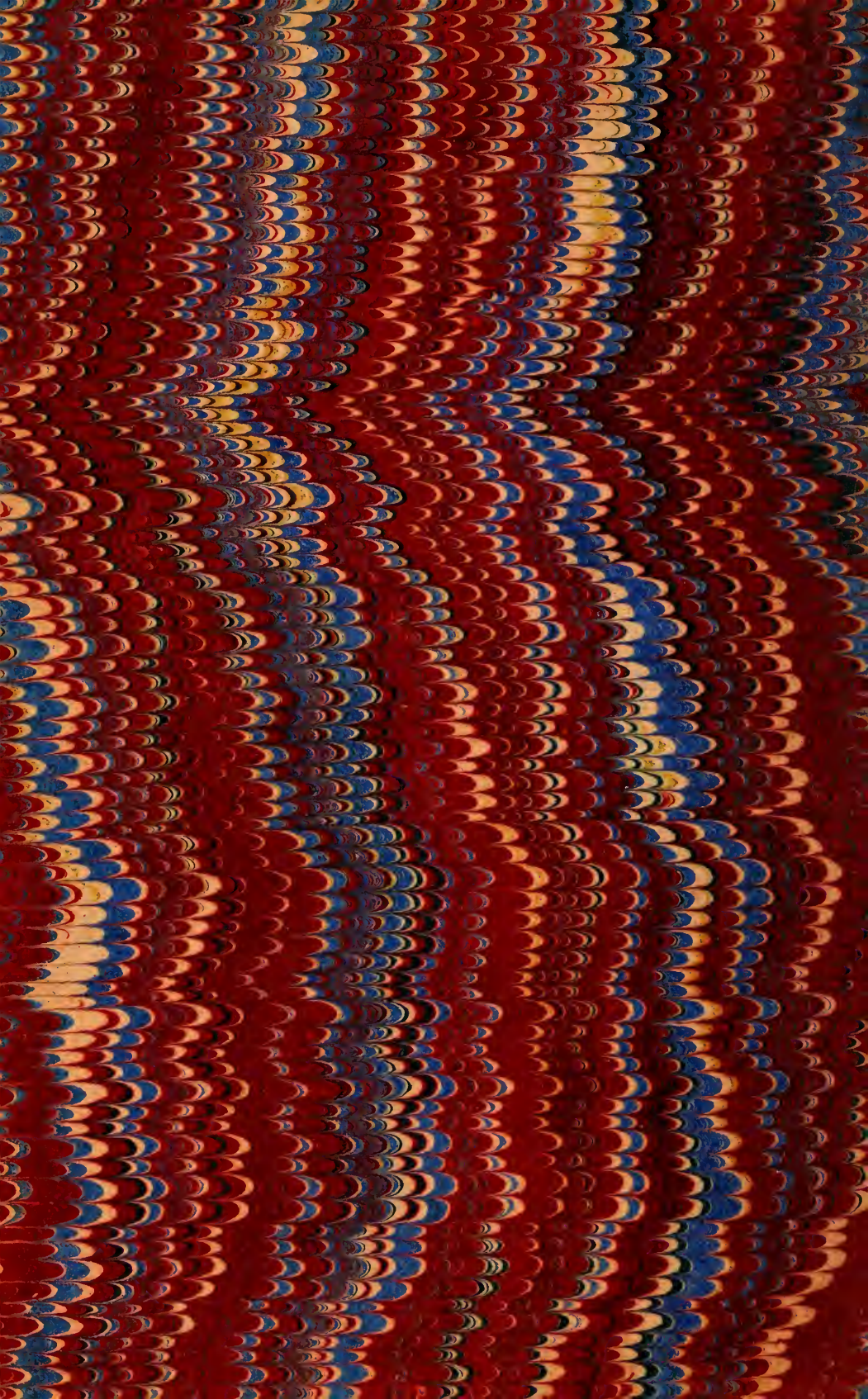
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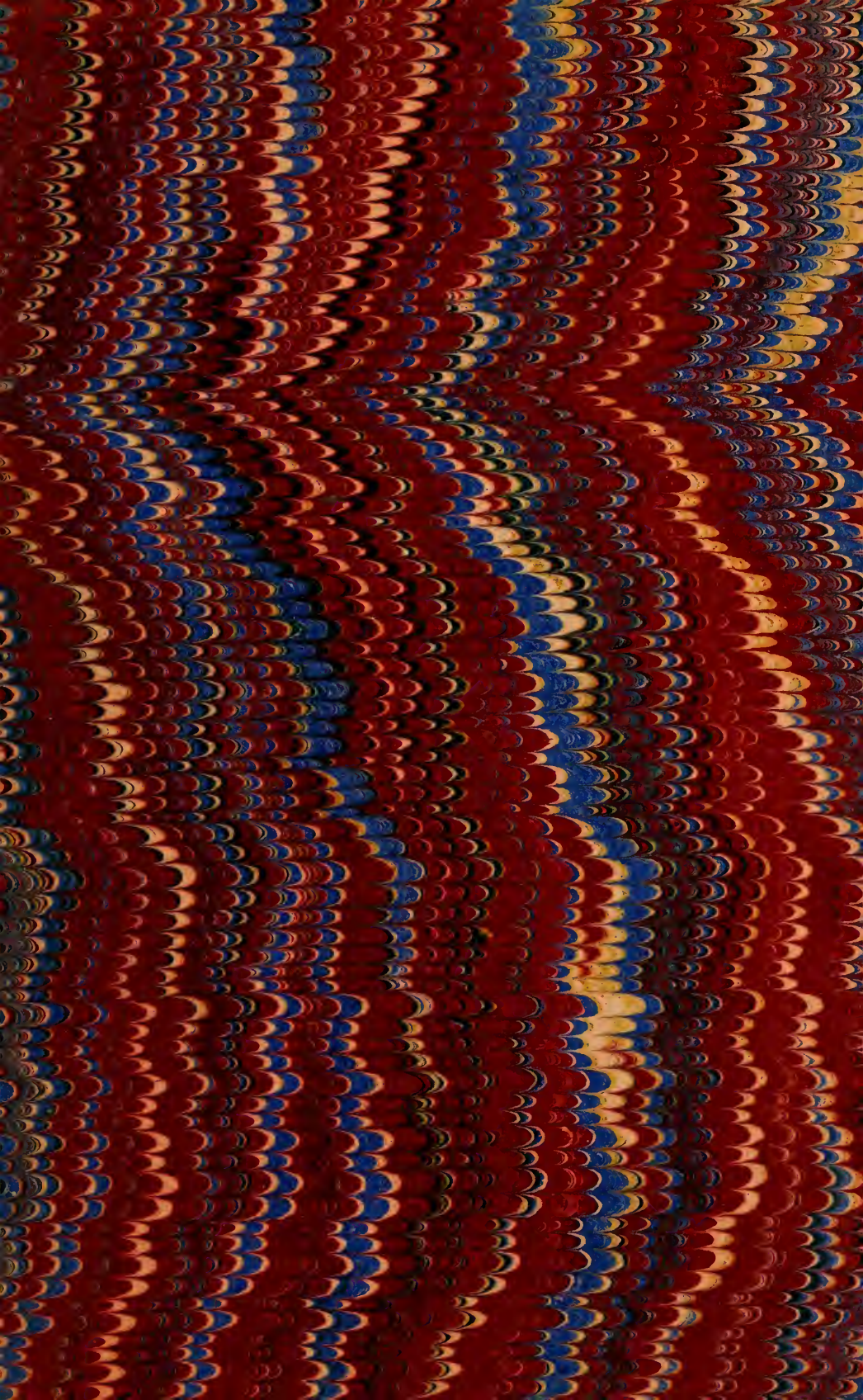
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