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GARDEN TILLAGE AND IMPLEMENTS.



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GARDEN TILLAGE.

SAMUEL B. GREEN.

By the proper cultivation of the garden we accomplish three things: (1) The weeds are kept out so that they do not shade or take away valuable plant food and moisture from the plants which we desire to perfect. (2) The surface soil is brought into the best condition to resist drouth; that is, into the best condition for availing itself to the utmost of the stores of water in the subsoil and to prevent the evaporation of this water from the surface soil. (3) The stores of insoluble plant food are made soluble by the chemical action and fermentation, which are increased by loosening the soil, thereby letting in the air.

Keeping Out the Weeds.—The methods best adapted for keeping the weeds out of the garden are many and varied, and depend much upon the condition and kind of soil in which the weeds grow; upon the kind of crop and upon the habits of the weeds themselves. The most important step in making easy the prevention of weeds in the garden is the harrowing or other thorough cultivation of the land just before the planting of the seed, to kill the young weeds. If this is done thoroughly, the weeds do not have a better chance than the crop. If this is not done, the weeds will be ahead of the crop in growth, and if started even ever so little when the crop is planted, the result generally is that the crop is seriously overgrown by them before it is large enough to be cultivated. This is a common mistake, and is, perhaps, responsible for more failures in the garden than any other factor which enters into the consideration of this subject; and it is a very simple matter to prevent any trouble from this source if a little foresight is exercised.

Early Cultivation to Kill Weeds.—The next most important factor in the prevention of weeds in the garden is early cultivation. In the case of seeds that require a long time to germinate, it is an excellent plan to lightly rake over the land with an ordinary fine-toothed rake, even before the crop appears above the ground, providing the work is so carefully done as not to disturb the seeds.

When the seed is sown with a drill, the line of the row may be plainly seen even before the plants come up, thus making it easy to commence cultivating it in advance of the weeds. In case of such crops as carrots, onions, parsnips and beets, which are quite delicate when young, cultivation should begin with some hand garden cultivator, even if it is intended later on to cultivate with a horse, and the crop is planted with this purpose in view. Such close and careful work cannot be done with any horse implement now in use as with the best hand implements. With proper tools, the work may be done nearly as quickly by hand as by horse power, and far more perfectly when the plants are small. Careful early cultivation is of the utmost importance, since, if the weeds are removed when they are young, the work of weeding is very small. If allowed to remain until well rooted, their removal is often a very serious matter, and frequently, if neglected at this early stage, the weeds become so firmly established as to make it a question whether to remove them or plow under the whole crop; and often it is the part of wisdom to adopt the latter alternative. Aside from its effect in the prevention of weeds, early cultivation is of great value in breaking up the crust that packs firmly around the tender growing stems of plants, and which seriously interferes with their growth. It is also, like all surface cultivation, of aid in the conservation of moisture in the soil. The effects of cultivation from this standpoint will be found referred to on page 186.

Importance of Not Allowing Weeds to Go to Seed.—A common source of weed infection is often found in the few weeds that are allowed to go to seed toward the end of the growing season in the maturing crop or after the crop has been gathered. To some farmers it often seems a small matter to allow a few plants of pig-weed, purslane, tumble weed and weeds of other kinds to go to seed in the garden, but absolute cleanliness should be the only rule in this particular, and it is by far the most economical in practice in the long run. It requires but little labor and saves much useless expense to destroy weeds that are going to seed. If the preventives for weeds here suggested are closely followed, hand weeding will be reduced to a minimum and will often be unnecessary with any crop.

Weed Seeds in Manure for the Garden.—While the discussion of the subject of manures for the garden is not the special object of this bulletin, yet some reference to the subject is quite necessary in considering the subject of weed eradication. The people of this state have not yet learned the great value of barnyard manure and

its proper preparation for best results in the soil. This is a subject of vast importance, and one that in the future will receive far more thought than at present. The manure applied to the garden is often coarse and contains many weed seeds, and is a fruitful source of weed infection. The manure intended for the garden that contains the seeds of weeds should be piled up and allowed to ferment until the whole mass is thoroughly rotted. By this means the seeds in it will be killed. But in order to rot manure to best advantage, it should be forked over occasionally when well warmed up by fermentation, and the whole turned over, with the outside of the pile thrown into the center. If dry, it should be watered enough to enable fermentation to continue, and to prevent "fire-fanging." It is seldom advisable to use fresh manure in the garden, and manure should only be applied in this condition when free from weeds, and then only for some late-maturing crops, in which case there will be time for it to rot before the crops need it. All early crops need well rotted manure, and require it in much larger quantities than do the late-maturing crops.

Plowing.—In Minnesota, where the summers are generally dry, the garden should always be plowed in the fall. It is seldom advisable to leave the plowing until spring in this climate, and if ever plowing is done in the spring, the plow should be run shallow. Deep spring plowing leaves too much of the upper soil loose and not sufficiently compact to enable the subsoil water to reach the surface roots.

Ridging the Land.—If the land is likely to be too wet in early spring for planting, sometimes it is good practice to turn several furrows back to back, and thus leave the land in ridges over winter.



FIG. 1. Section showing ridged land in the winter.

If these ridges or "lands" are made fifteen to twenty feet wide, they may be dragged and planted in the spring without further plowing. For some crops it is often best to back-furrow out again in the spring, and thus leave the land level. This method of treatment

permits of working the land much earlier in the spring than it otherwise could be worked, if plowed flat. It leaves the soil in very good shape for the action of the frost on its particles during winter. For early crops on flat or heavy soils, it is a most desirable treatment. The objection to it is that if not turned back in the spring the dead furrows interfere with cultivation. If the land is plowed in the spring, it may be left too loose; but admitting these objections, even then there are often cases where this treatment would be very desirable. The soil for the garden should be worked to the depth of at least eight inches in order to be in the best condition for crops. On soils which have subsoil too compact, the subsoil plow may be used to advantage. It should be borne in mind in cultivating the garden that while the soil in it may be too loose, it cannot be too rich or too deep, nor can the subsoil, if not of too impervious a nature, be too compact.

General Cultivation of Garden Crops.—The methods to be pursued in the general cultivation of garden crops will vary somewhat, according to the soil, season and crop. However, it is very important to remember that the destruction of weeds is but a small part of the work of cultivation. The most important part is to so fit the soil that it may best withstand drouth. This is accomplished by frequent shallow cultivation during the period of growth. The first implements to use in the care of such crops as are generally cultivated by hand are those that work the soil to only a very slight depth, close to the plants. Such implements may be used just as the seedlings are breaking ground. As soon as the plants have gained some little strength, implements should be used that will go deeper, until a depth of two or three inches can be easily worked without endangering the safety of the crop by covering the plants with dirt. It is doubtful if any of our garden crops should ever be cultivated more than three inches deep, and it is very certain that many crops are injured by cultivating deeply very close to the plants, in which case the roots are cut off near their upper ends and thus wholly destroyed. Cultivation in a period of drouth results in forming a mulch or blanket of dry earth on the surface of the land, which prevents the moisture from passing into the atmosphere, and a rather shallow blanket, say two inches deep, accomplishes this purpose. A compact subsoil readily transmits the water upwards to the surface soil, in the same manner that a lamp wick carries the oil to the flame. At the surface the soil water

is prevented from evaporating by a blanket of loose earth, and is thus saved in the upper subsoil and lower and middle parts of the furrow slice for the roots of the crop; loose surface soil is a good non-conductor of water. During the growth of a crop, the surface of the ground should never be left long with a crust on it, but should be stirred after each rain or after artificially watering.

Cultivation to Develop Plant Food.—Nearly all land in the state contains immense quantities of plant food. Professor Snyder has shown that our average wheat-producing soils contain enough nitrogen to raise one hundred and twenty-five successive crops of wheat. But only a very little of this material is ever at one time in a condition in which the plant can take it up. Nearly all of it is insoluble. By chemical action and fermentation in the soil plant food is set free. This is increased and made more complete by admitting air into the soil; hence the reason for deep plowing in the fall, which allows the air and water to enter and thus develop the plant food. This, also, is an important fact to be kept in mind in cultivating land. Where the soil can be kept moist through the summer, deep spring plowing is an advantage, as it opens the soil to the air; but on account of the liability to drouth, the practice is a poor one for this state.

Garden Implements and Their Use.—It is very evident that mixed husbandry is to replace exclusive grain farming and cattle raising in Minnesota in the near future. With this change will come greater attention to the amenities of life. There will then be more demand for a variety of food, and consequently for the products of the garden. The importance of doing garden work by horsepower is so evident that it goes without saying. On every garden large enough to admit of it, horse labor should be used in preference to hand labor. As a rule, our farm gardens are too small to permit of this. One of the greatest hindrances to the successful cultivation of the garden is the common practice of so laying it out that a large amount of hand labor is necessarily involved in cultivating it. The farmers of Minnesota are justly proud of their achievement of almost entirely doing away with hand labor in the field, but in garden methods they still have very much to learn in this particular. The garden is a part of the farm that is often very unpopular, and I believe it is so largely from the fact that comparatively little effort is made to adapt modern methods to its management. Many of our vegetable crops can be grown without any hand labor whatever,

providing the soil is in good order to begin with, and free from weeds. The most important tool for the average horticulturist or gardener is a first-class horse cultivator. No pains should be spared to have the best implements, and then the most intelligent man in such matters on the place should run it. Too often the running of the cultivator is given to some young hand who has much more muscle than judgment, and his work is judged by the number of rows he goes over rather than by the care and completeness with which the work is done. It is best to go slow with the horse cultivator, for this means the saving of much hand labor. The best cultivators in use to-day are adjustable to various kinds of work, each of which they are capable of doing in an admirable manner. But, to get the best results from their use, they must be carefully studied and their attachments adapted to each special use. I want especially to insist that in order to get good work done by modern garden tools, they and the directions sent with them must be carefully studied. But even when horse labor is used as much as possible, there will always be a necessity for some hand work in such garden crops as onions, table beets and table carrots. These can probably be grown most cheaply in rows about fourteen inches apart, where the cultivation must be done largely by hand implements. These implements have reached a rare degree of perfection, and are wonderfully adapted for their purposes. The use of some of them has become a necessity in every well regulated garden. It is safe to say, that no one who cultivates a garden can afford to be without good hand and horse cultivators, with the modern attachments, and their more general use would make the farm garden more common and relieve it from being looked upon, as it often is, as being the most troublesome part of the farm. Hand seed sowers have also become necessary in gardens, and are so well made that they will sow almost any kind of garden seeds quickly and accurately as to quantity and depth of planting.

In order to use these hand and horse garden tools to the best advantage, the rows should be straight and long and the land cultivated flat. The rows to be cultivated by hand implements should be by themselves. It is important, also, to use short whiffletrees. The whiffletrees generally used for farm purposes are much too long for the best work, and their use prevents the proper use of modern cultivators. For ordinary garden purposes, these should not be over fourteen inches long, and when working in very narrow rows, one

may be used not over twelve inches long, providing the traces are protected from wearing the hair off the horse.

GARDEN IMPLEMENTS.

So many garden implements have been introduced within a few years that the Horticultural Division of the Experiment Station has made quite a collection, in order to study them. On the following pages will be found notes on such implements tried at the station as seemed to be particularly desirable.

The "*Combination Drill and Cultivator*," manufactured by Ames Plow Co., Boston, Mass., is arranged to use either one or two wheels, as may be preferred. (See Fig. 2.) The indicator is very simple in construction and is easily handled. The agitator is sure to keep the seed moving through constantly, unless clogged with some foreign material. The depth of sowing can be easily regulated. The wheel and coverer are simple and do the work required, viz: cover seeds

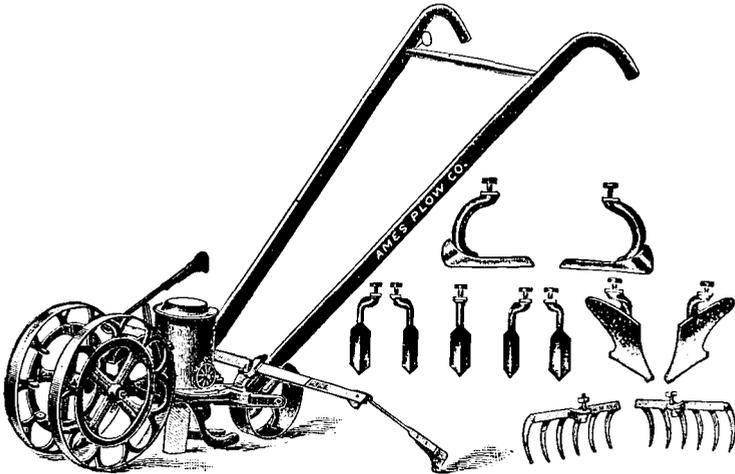


FIG. 2. Combination Drill and Cultivator.

and firm the soil over them. The marker is well adapted for giving a clean track for successive rows, and is easily changed to different widths. A convenient cut-off is provided to use when turning at the ends of the rows to prevent loss of seed. The change from the drill to cultivator, or vice versa, can be made very quickly. For working the soil it has hoes, plows, rakes and cultivator teeth of good shape and size. Being arranged to use either one or two wheels, the efficiency of the work that it can do is greatly increased. It can be

used successfully to open and close furrows. This feature is useful in planting seeds or plants two or four inches below the surface. The whole machine is put together in a workmanlike manner, and is made of good material. It is a very desirable implement for those who have a vegetable garden to cultivate. The machine is adapted to working on both sides of a single row with two wheels, or between the rows. This is also a convenient arrangement when sowing seed. The introducers, however, recommend for market gardeners, instead of this combined implement, separate implements, to

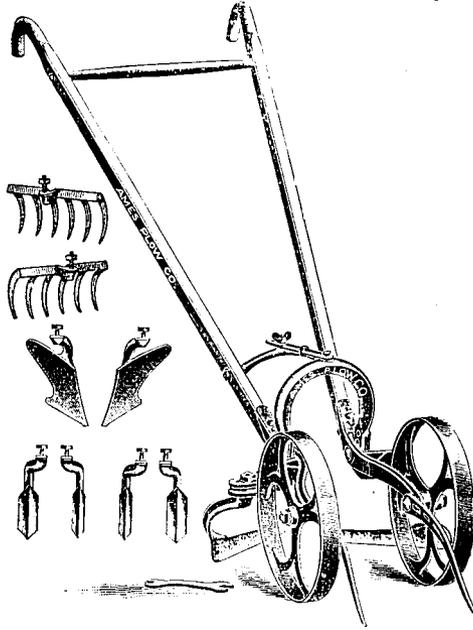


FIG. 3. New Universal Double-Wheel Hoe, Cultivator and Plow.

save the time of changes. They make the separate drill and separate cultivator, embodying the above features and others that cannot be included in a combination implement. This machine is shown closing furrows at (b) in the cover illustration. For further notice see page 23. List price, \$13.50.

The "New Universal Hand Double-Wheel Hoe, Cultivator and Plow," shown in Fig. 3, is also made by the Ames Plow Co., Boston. This implement is of recent introduction and has all the latest improvements in this line. It is furnished with the usual tools, such as scuffle-hoes, cultivator plates, plows and leaf guards. A feature that

is very handy is the adjustable arch, by which the depth or angle of the cultivator teeth may be regulated. It can be used to work between rows or to straddle one row. The construction is excellent. A one-wheel cultivator closely resembling this, and which is very light and useful for cultivating between rows, is made by this same company. List price of double-wheel machine is \$7.50, and single-wheel \$6.

The A. H. Matthews Seed Drill has been used for many years at the University Farm and by many market gardeners. It has given good satisfaction as a safe and reliable seed sower. It is shown at No. 1 in Fig. 4.

New Model Seed Drill, made by the Bateman Manufacturing Co., Grenlock, N. J., is a very compact, light and strong machine. The forward wheel is of extra width, thus making it very easy to push through light soil. The agitator is an excellent arrangement and

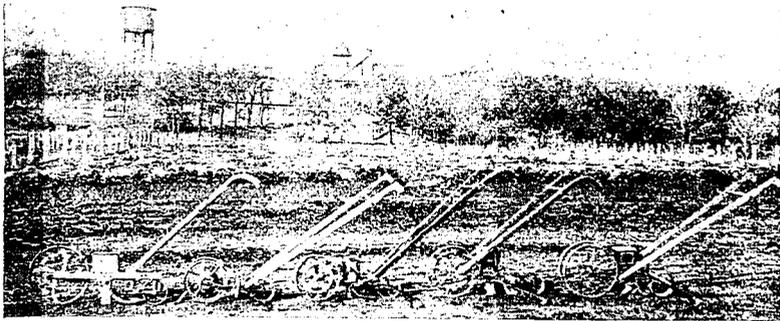


FIG. 4. 1—A. H. Matthews' Drill. 2—Planet Jr. Combined Drill. 3—Matthews' Combined Drill. 4—New Model Drill. 5—Planet Jr. Hill Dropping Garden Drill.

sure to keep the seed moving through the feed-hole in a regular stream. There is one feed-hole, the size of which is quickly changed by a simple and convenient device that permits of its being increased or diminished in size at pleasure. The coverer and the press-wheel are well adapted for covering seeds evenly and pressing the surface soil over them. The marker attachment for tracing lines for succeeding rows is well made and easily handled. This is an excellent garden drill, in every respect; list price, \$9. This drill is shown at No. 4 in Fig. 4.

The Iron Age Horse Hoe (see Fig. 5), made by the Bateman Manufacturing Co., wherever tried has given good satisfaction. It is simple in construction and strong, and in every way a good imple-

ment for general work. The frame is of steel, and the standards and plates well suited for their purposes. The regular form has only five plates or shovels of medium width. A set of sweeps is provided for hilling. Two extra standards are provided, which may be used with narrow plates, forming a fine seven-tooth cultivator.

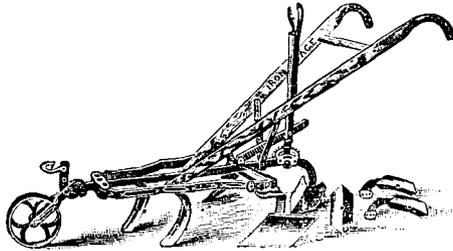


FIG. 5. Iron Age Horse Hoe.

It also has attachments for opening and closing furrows and all the requisites of a first-class horse hoe and cultivator. A lever controls the change of width, thus making it easy to work with it close up to the rows, even if they are not always parallel. List price, \$9.50.

The Iron Age Combined Cultivator and Harrow. made by the Bateman Manufacturing Co., is a horse implement that is very efficient in forming a dust blanket in the garden during the dry summer months. It will also do admirable work when plants are small. It can be used very close to plants and to destroy any small weeds

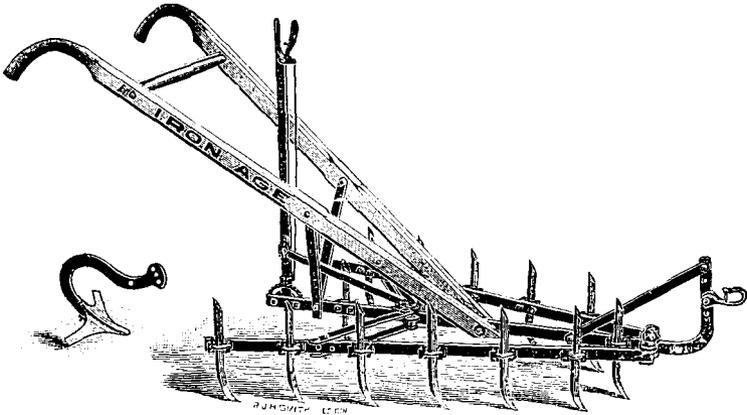


FIG. 6. Iron Age Combined Harrow and Cultivator.

that are near them. It has a lever expanding arrangement that works easily and quickly. The teeth are easily reversed, making either a straight or slanting tooth implement. The material and

construction is of the best. This is a favorite implement with many market gardeners. List price, \$8.75. Fig. 6.

Gem of the Garden Hand Cultivator.—The Gem of the Garden Hand Cultivator is a very light but strong cultivator, made by the Bateman Manufacturing Co. It is furnished with cultivator teeth, scuffle-hoes and plows. Two wheels are provided, allowing it to be

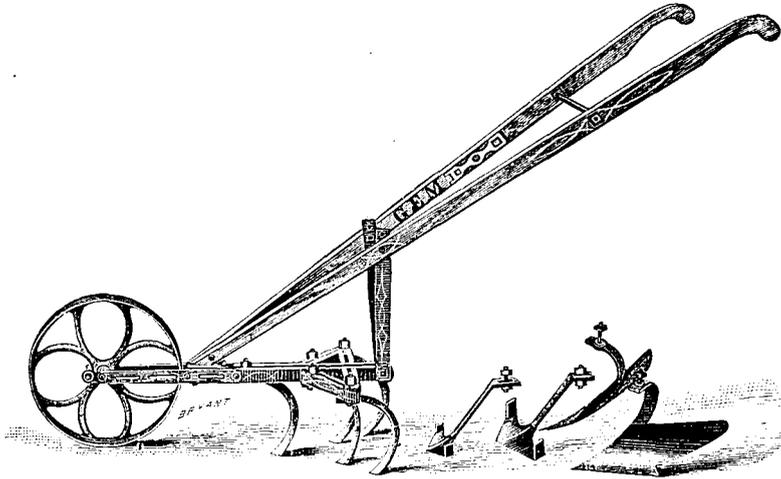


FIG. 7. Gem of the Garden Hand Cultivator.

used either as a straddle cultivator or simply as a one-wheel cultivator. The material and construction are of the best. All parts are made of steel. The extra parts furnished consist of a small landside plow and an onion harvester. List price, \$6.50. Fig. 7.

The Jewel Double-Wheel Hoe is a very desirable hand implement for close cultivation of garden crops. It is made to be used as a straddle hoe or between the rows only. It is well adapted for the light, close cultivation that is necessary when plants are young and just starting into growth, or for the deeper and more thorough cultivation during the summer months. It is of light construction, but strong and well made and compares favorably with the implements of other makers designed for the same purpose. List price, \$6. Made by Bateman Manufacturing Co. Fig. 8.

The Cover Illustration is reproduced from a photograph of work done in opening and closing furrows by the Planet Jr. and Matthews' combined garden cultivators. At (a) is shown the Planet

NOTE. The Bateman Manufacturing Co. refers correspondents to their Northwestern agents, Lindsay Bros., Minneapolis, Minn.

Jr. implement, which has a one-moldboard plow at work opening furrows. At (b) is shown the Matthews combined garden cultivator at work closing furrows, for which purpose it has two one-moldboard plows, which may be reversed when used for opening furrows.

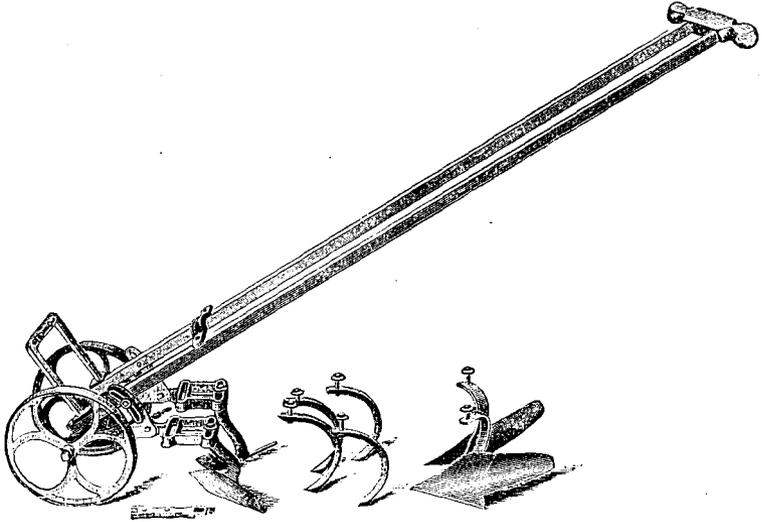


FIG. 8. Jewel Double Wheel Hoe.

The Buckley Cultivator manufactured by R. C. Buckley, Peoria, Ill., is designed to give extra leverage by having the wheel thirty inches in diameter. This also gives a steadiness not possible in a machine with smaller wheels. The various attachments are placed

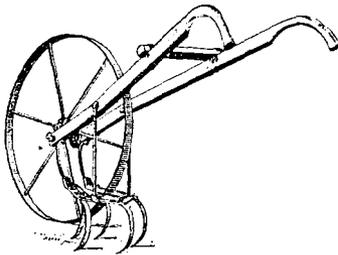


FIG. 9. Buckley Cultivator.

in holes arranged around the frame, almost under the axle of the wheel. The material used in its construction is good. It is especially useful in heavy land for loosening the soil when it bakes hard in summer. It is the most powerful hand garden implement known. Market gardeners will find it very desirable. List price, \$8. Fig. 9.

The Universal No. 3 Straddle Hoe is a very light and simple hoe, capable of doing good work when weeds are small and land moderately fine. The blades are nicely adapted for cutting weeds under the surface of the land and to scour well. The manufacturers recommend this implement for use when onions are small and afterwards the use of the Sherwood No. 3 Union Hoe. List price \$5. It is shown at No. 3 in Fig. 10, and is manufactured by C. O. Jelliff & Co., Southport, Conn.

The Sherwood No. 3 Union Hoe is designed to be used as a general hand cultivator for garden crops. It is light and strong, and the ma-

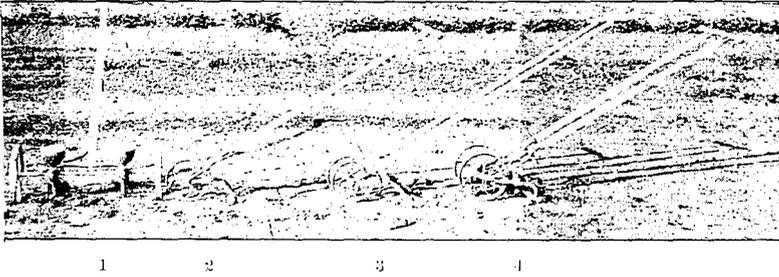


FIG 10. Hand Garden Implements' Manufactured by C. O. Jelliff & Co. 1—Universal Onion Drill. 2—Universal One Blade Hoe. 3—Universal No. 3. Straddle Hoe. 4—Sherwood No. 3 Union Hoe

terial is of the best. Hoes of good shape, designed to cut under the surface of the soil. A novel feature is the addition of two small disks which can be set at any angle so as to loosen the soil in the rows, like the disks of a disk-harrow. An onion puller attachment is manufactured for this implement. It has a curved hoe running under the onions and a mold-board behind, which rolls the onions to one side and thus turns two rows together. It does its work very well. List price, \$7. Shown at No. 4, Fig. 10. Manufactured by C. O. Jelliff & Co.

Universal One-Blade Hoe is a very useful and efficient one-blade hoe for close work in the garden. The blades may be of any length. Its special use is to keep the surface of the land free from weeds. It does not work the soil except on the surface. List price \$2.75. Shown at No. 2 in Fig. 10. Manufactured by C. O. Jelliff & Co.

The Universal Onion Drill is very simple in construction, of excellent workmanship and light in weight but strong enough for general work. It is designed to sow two rows at a time. Two styles of this machine are manufactured, one sowing twelve inches apart and the other fourteen inches. Two seed hoppers are on the axle, and the seed is forced out by small wheels which turn on the

axles, thus making it sure to drop the seeds very accurately and evenly. The track of the outer wheel is the mark for the inside wheel to follow in returning. With land in reasonably good condition, this machine will do rapid and excellent work. Large onion growers will find this seeder a very desirable implement. It is designed especially to sow onion seed, and is not intended for general purposes. List price for the twelve-inch machine is \$8; fourteen-inch, \$10. This drill is shown at No. 1 in Fig. 10, and is manufactured by C. O. Jelliff & Co.

The McGee Cultivator is a light, strong and efficient hand cultivator. The handles are held apart with a spring, which makes it very convenient to go close to plants, or to keep away from the row, as may be desired, without any change of bolt or other appliance. The arch is very high, so as to allow it to pass over tall plants without breaking the tops. The tools accompanying the machine are well adapted to cut out small weeds, to keep soil well stirred, etc. It is also provided with an onion puller, which passes under the row, lifting the onions and dropping them again in the rear. The materials used in its construction are very good. It is manufactured by Deere & Mausur Co., Moline, Ill. List price, \$5.

The Planet Jr. Hill-Dropping Garden Drill differs from any other drill on the market in its arrangement for sowing the seed in hills. It is of excellent workmanship, and will do everything that the manufacturers claim for it. We quote from their catalogue as follows: "Until recently there was no such thing as a hill-dropping seeder, most modern drills sowing seed only in a continuous row. The demand for a machine that could be adjusted to plant in hills has been urgent. If seed is drilled and the plants thinned out, it is often hard to find a strong plant at the right point, even with thick sowing; but with hill-planted seed you are almost sure to find two or three good plants at the exact spot where one is wanted. This is accomplished, too, with far less seed. Thus, with great saving of labor, time and seed, a far more regular crop is produced. This is often of great importance, as in sugar beet culture. This drill will sow in a continuous row, in the ordinary way, with the greatest regularity; but its distinctive feature is that it will also drop neatly in hills, either four, six, eight, twelve or twenty-four inches apart. It opens the furrow, plants, covers, rolls down and makes a mark for

NOTE. Northrup, Braslan & Goodwin Co., Minneapolis, Minnesota, are Northwestern agents for C. O. Jelliff & Co.'s implements.

the next row, all at one operation. The hopper holds two quarts. The wheels are fifteen inches high. It is changed in a moment from hill-dropping to drill work by simply hooking up the 'cut-off,' and is changed back again instantly by releasing the cut-off. The flow of seed is stopped or started instantly by a single movement of the fore-finger, without stopping or taking the hand from the handle. This is so easily done that not one hill need be missed in starting or stopping. The drill has a force feed; a peculiarly formed rubber double screw works over a diamond-shaped opening in the bottom of the hopper. While it sows with perfect regularity, the rubber feed wheel, revolving within a brass cylindrical shield, cannot injure delicate seeds, such as radish, cabbage, etc. It sows equally well, whether the hopper is full or contains only a paper of seed. The setting is quickly and accurately done for the different seeds by a simple thumb-screw. An index plate, with the names of the principal seeds, is placed at the top of the right handle, and the screw is turned until the indicator stands opposite the name of the one to be sown." List price, \$12.

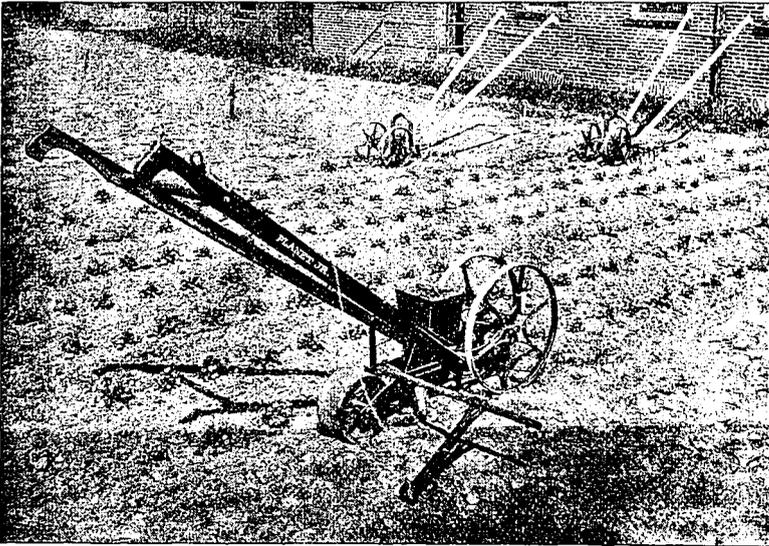


FIG. 11. Plants Growing as Sown by the Planet Jr., Hill Dropping Garden Drill.

The Planet Jr., Combined Drill and Cultivator has for many years been very popular and is certainly an excellent combination for the home garden and for small vegetable gardens generally. The

manufacturers do not offer it as the most desirable implement for market gardeners, but recommend to those cultivating any considerable amount of land the use of separate drills and cultivators. It is well made, low in price, and does excellent work. This implement has all the attachments for the most successful cultivation of garden plants that are commonly grown in narrow rows. It may be

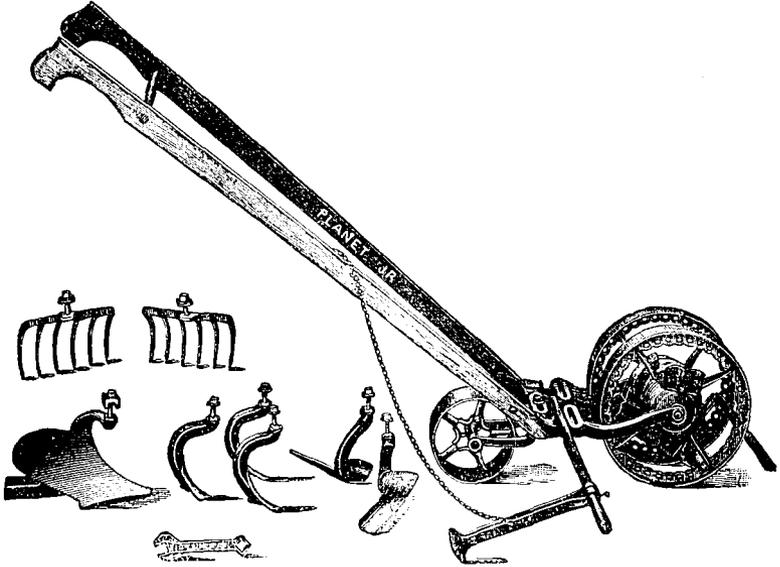


FIG. 12. Planet Jr. Combined Drill and Cultivator.

used when the plants are under six inches high to work the soil on both sides of the row at one operation. It also does the best of work when used between the rows. It will sow any of our common garden seeds evenly and well, covering at an even depth, and will cultivate the plants as perfectly as any garden cultivator. It may also be used to open or cover furrows. The changes from drill to cultivator, or vice versa, are quickly and easily made. List price \$12. This machine is shown at (a) in cover illustration, and in Fig. 12.

The Planet Jr. Double Wheel Cultivator is made for the cultivation of the soil between two rows, or on both sides of a single row at one operation. The attachments are very complete and include a set of curved-point hoes, rakes for leveling land, plows, wide and narrow cultivator teeth and leaf guards. The attachments are made to fit in long slots behind the wheels, thus making it easy to change width between them. The changes in attachments are

easily and quickly made. It can be used as a cultivator on both sides of the row until plants are about eighteen inches high. This is the style of tool most desirable for general use by market gardeners. The materials and construction are of the very best. These machines are also furnished with an onion-puller attachment. List price, \$8. Fig. 13.

The Planet Jr. Single Wheel Hoe, Cultivator, Rake and Plow combined is designed to work between the rows, and will do admirable work. It has the same attachments as the Double-Wheel Culti-

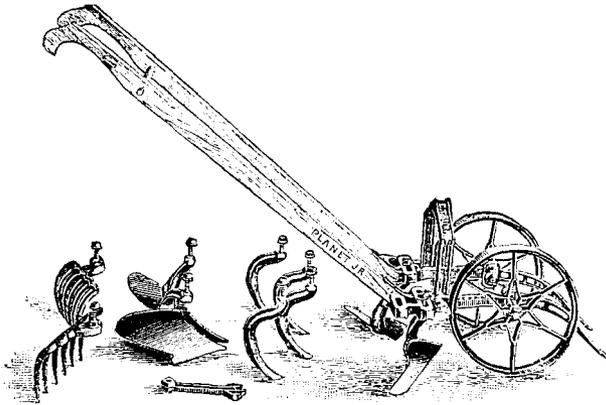


FIG. 13. Planet Jr. Double-Wheel Cultivator.

vator. It can be used on both sides of the row, but is not as desirable for such a purpose. It is strong in construction and a very desirable implement. List price, \$5.

The Planet Jr. Horse Hoe has made a very favorable record wherever it has been tried. The construction is so complete that it can be used for almost all kinds of horse work in the garden. It will open and close furrows for potatoes, will do good work as a cultivator, and will draw the soil from or throw it toward plants. The attachments comprise sets of narrow cultivator teeth, wings for pushing the soil to one side or to carry it to the center between the rows, and sweeps for shallow cultivation. A useful attachment is a pulverizer or rake to level the surface in the rear. Two extra side-bars are provided, which allow the use of nine narrow plates instead of five. Two levers are attached, one of which regulates the depth and the other the width. The list price is \$12. Fig. 14.

The Planet Jr. Twelve-Tooth Cultivator and Pulverizer is intended for fine horse cultivation, either deep or shallow, and for

working among small plants. In the hands of a careful man, this cultivator will work the soil in a field of small cabbages or other

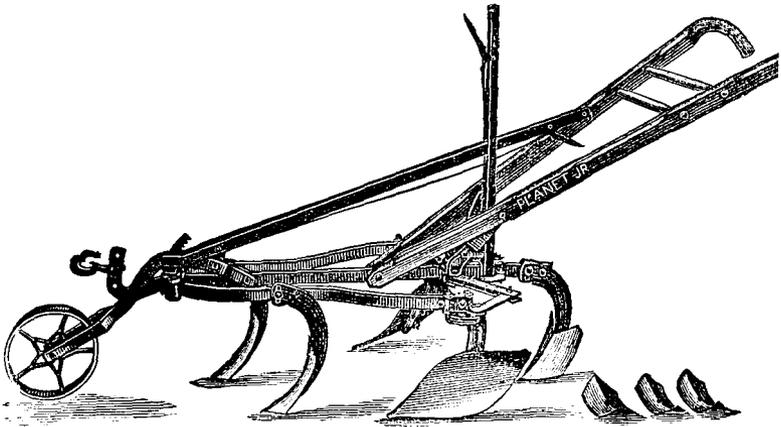


FIG. 14. Planet Jr., Horse Hoe.

small plants so that no land will be seen that has not been stirred, and yet the plants will not be injured. The teeth plates are about one inch in width, and are set so as not to clog easily. The depth and the width of cultivation are easily and quickly controlled by

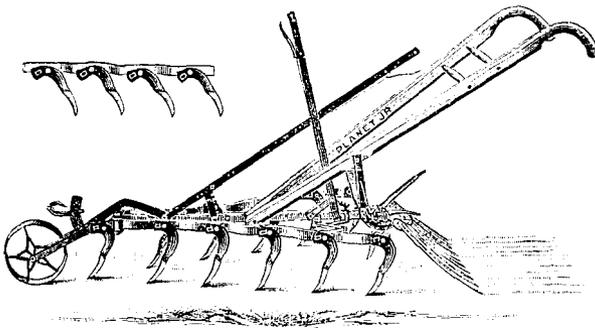


FIG. 15. Planet Jr. Twelve-Tooth Cultivator and Pulverizer.

levers. The pulverizer attachment is readily put on, and leaves the surface of the soil fine and smooth. The teeth can be changed so as to work as a slant-tooth cultivator. I consider this an especially valuable tool for keeping a dust blanket on the surface of the land during the dry weather of summer. List price, \$12.50. Fig. 15.

The Planet Jr. Implements are manufactured by S. L. Allen & Co., Philadelphia, Pa., who refer correspondents to their agents, Lindsay Bros., Minneapolis, Minn.

Scuffle Attachments for Hand Garden Cultivators—Fig. 16 shows two sets of implements designed to be attached to the ordinary wheel cultivators, which will work close up to young plants so as to cut off the weeds just under the surface of the soil. They were de-

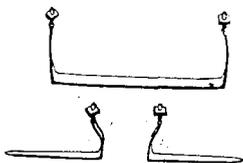


FIG. 16. Home-Made Attachments for Garden Cultivator.

signed by Mr. William Mackintosh, a market gardener of Langdon, Minn., and will be found very useful in many places. They can be made out of tool steel by any good blacksmith. The length of blades may be made to suit work.

The Scuffle Hoe, shown in Fig. 17, is an excellent old-fashioned implement for shallow cultivation, such as is needed in spring in the garden. Besides, it is so very cheap and simple that it can be made by any handy blacksmith. It cannot be recommended to take



FIG. 17. Scuffle Hoe.

the place of the improved wheel hoes for large gardens, but in a small garden it may be used for the work of shallow cultivation to good advantage. It does not work the soil deep enough for the best summer cultivation.