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PICTORIAL PRACTICAL VEGETABLE GROWING

A PRACTICAL MANUAL

GIVING DIRECTIONS FOR LAYING OUT KITCHEN GARDENS
AND ALLOTMENTS, DESCRIBING THE VALUE AND USE
OF MANURES, ADVISING AS TO THE DESTRUCTION
OF PESTS, DEALING WITH THE PRINCIPAL
TOOLS AND APPLIANCES

AND

TREATING ON THE CULTURE AND BEST VARIETIES OF EVERY
IMPORTANT VEGETABLE

BY

WALTER P. WRIGHT

Horticultural Superintendent under the Kent County Council

WITH NEARLY ONE HUNDRED ILLUSTRATIONS

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PREFACE.

It is unnecessary to say more, in introducing the present volume, than that it is of the same style and character as those from my pen which have preceded it.

That is to say, practical illustration is a great feature of it.

Its sister volumes were welcomed, I believe, because an effort was made to render their teaching clear without being wordy. I have saved the reader's time and my own by following the same lines in this.

The series represents gardening instruction in tabloid form.

WALTER P. WRIGHT

May, 1902.

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PICTORIAL PRACTICAL VEGETABLE GROWING.

Chapter I.—A Kitchen Garden, and the Wonders it Works.

THE victorious vegetable grower is a person who drinks deeply of the joy of life.

Artists have their moments of happiness and their moments of despair ; poets look on the world by turns cheerfully and hopelessly ; but the vegetable grower follows a path of perennial pleasure.

When a man has taken up by turns literature, art, and the drama, and has proved a failure with them all, he usually resorts to gambling, drinking, suicide, or something equally pusillanimous and wasteful. Yet if he took to vegetable culture he would become morally and physically regenerated, and would know what it is to feel a completely happy man.

In a fairly wide experience of the world in general, and of horticulture in particular, I can truthfully say that I have encountered only one class of people who are thoroughly contented with the world—contented with what they do in it, contented with what they make out of it, and, above all, contented beyond all ordinary contentment with themselves. These are the vegetable growers. How better could perfect happiness be expressed than in what is here said ?

Let me set down, as nearly as I can recall them, the beautiful lines from an old lyric :—

Art thou poor, yet hast thou golden slumbers ?

Oh ! sweet content !

Art thou rich, yet is thy mind perplexed ?

Oh ! punishment !

Dost thou laugh, when fools are vexed,

To add to golden numbers golden numbers ?

Oh ! sweet content ! Oh ! sweet content !

Now for a paraphrase of it, which I hope that lovers of the poet will forgive :—

Art thou sick, and hast thou broken slumbers ?

Oh ! time ill-spent !

Hast thou a barrow and a spade annexed ?

Oh ! wise intent !

Dost thou dig, when fools are vexed

To add to golden numbers golden numbers ?

Oh ! sweet content ! Oh ! sweet content !

Vegetable growers have their failures as well as their successes. Why, therefore, do they not suffer the depressions of other men? Ah! there's the crux! Any ass can be happy when the sun shines and the thistles are thick, but it wants a philosophical ass to be able to bray cheerfully when food is scarce and beatings fall thick and fast. Without claiming that this is a particularly complimentary metaphor, I yet proceed to extract the kernel from it. The vegetable grower is the superior member of society which he is simply and solely because he is able, through good and through evil report, to retain his equanimity.

It is not easy to say why vegetable growers are, as a class, so contented, but the fact is beyond dispute. If I myself were asked to define that fascination which makes my Potato patch more enjoyable to me than an art gallery, or a theatre, or a Parliament house, or a museum, I should very likely be at a loss to answer. Even in the inner ring—the garden itself, with its rockery, its Rose beds, its fruit quarters, its greenhouse—the kitchen garden is the centre of interest. Yes! there is no possible doubt about it, vegetable culture is of all things on this earth the most completely seductive and satisfying.

In the few chapters on vegetables which I propose to give, I want my readers to agree with me in putting the subject on this higher plane. I want them to go into it as I do, with an enthusiastic and whole-hearted joy. There is, in some quarters, a craven fear of acknowledging the fascination of Pea growing; we will have none of it here. I once heard the words *infra dig.* murmured in connection with manual labour in a kitchen garden. I responded with the one pun of my life, and here it is: "Yes, and I am IN FOR A DIG!"

The pun was execrable, but the spirit of the response I unflinchingly support. Let "*Infra dig.*" be the watchword of the lily-fingered, and "In for a dig" be the battle-cry of you and I.

Is there a person reading these lines who is hovering on the brink of kitchen gardening? His plot is small, mayhap, and he has had no training; perhaps his purse is shallow. Let me link his arm in mine, and tell him, in words of earnestness if not of eloquence, to fear not, neither to despair; rather to take his courage in both hands, and send his seed order off by the very next post.

I have said that the person who hesitates may have a very small plot; but then, on the other hand, he may have a very large one. Here, straight away, we run up against a practical point—one that is well worth an argument.

What is an adequate sized piece of ground for a kitchen garden? How large a piece can one man manage? How many people will a given area of ground supply with vegetables? These are questions which call for a little consideration. All of them could be disposed of (and are frequently disposed of) in one abstract proposition—"It all depends." A convenient proposition, this, for the man in a hurry, or for the man who does not know! Convenient, yet not, when analysed, altogether exhilarating to the man who wants to know.

Obviously, the question of what area is adequate can only be

FIG. 1.—AN ALLOTMENT OR VEGETABLE PLOT OF 20 SQUARE RODS.

KEY TO THE PLAN.

1. Herbs.
2. Rhubarb.
3. Horseradish.
4. Jerusalem Artichokes.
5. 2 rows dwarf early Peas, Celery to follow
6. 1 row succession Peas.
7. 1 row dwarf French Beans. } Spinach between.
8. 2 rows Broad Beans.
9. 4 rows spring Cabbage.
10. Seed bed for Greens, etc.
11. Marrow bed.
- 11a. $\frac{1}{2}$ row Pickling Cabbage.
12. 8 rows first early Potatoes 24 inches apart, winter Greens to follow.
13. 12 rows second early Potatoes 30 inches apart, intercropped with winter Greens.
14. 1 row Tomatoes.
15. 6 rows Carrots.
16. 9 rows Onions.
17. 4 rows Parsnips.
18. 3 rows Beet.
19. 3 rows Shallots.
20. 4 rows Turnips.
21. 2 rows Celery.
22. Salads.
23. Cucumbers.
24. 2 rows Autumn Cauliflower.
25. 17 rows main crop Potatoes 36 inches apart.
26. 1 row Leeks.
27. 2 rows Brussels Sprouts.
28. 1 row Scarlet Runners.

decided from a knowledge of the size of the family, and its tastes and requirements. There are only two people in some families, there are twenty in others. Again, in some households vegetables are served at two meals a day; in others only at one, which makes just all the difference. I might add (and it is very much to the point in my own particular case) that another very important consideration is this: Is the culture intended merely to furnish a certain quantity of vegetables for a certain number of people every day in the year, or is it to do this and satisfy the owner's love of experiment as well—which again makes just all the difference?

A few plain figures may be helpful.

1. Twenty square rods, poles, or perches of ground, each square rod, pole, or perch being, of course, $30\frac{1}{4}$ square yards, will, if well cropped, supply a family of at least four people with vegetables at one meal a day every day in the year. (See page 9 for a plan.)

Some may be inclined to doubt the accuracy of this, yet it has been done, to my personal knowledge, and will be again. Let us see what may be grown on 20 square rods of ground:

Ten square rods of Potatoes, which should yield eight sacks of $1\frac{1}{2}$ cwt. each, equal to 1,344 lb., or approximately $3\frac{1}{4}$ lb. a day throughout the year.

Eight sacks from 10 rods is a good yield, but not in any way an impossible one. It is merely a question of culture.

Twenty rows of winter Greens, part of these following early Potatoes, or autumn Onions, or Peas, others coming between Potatoes.

Three rows of Peas, early, midseason, and late, so as to yield a succession.

Two rows of broad Beans, sown successionally.

One row of Scarlet Runners, which, if grown as I shall presently advise, will yield pods for three or four months.

One row of dwarf French Beans, which will give a few nice

REFERENCES TO FIG. 2.—PRECEDING PAGE.

A, fence; B, paths; C, D, E, F, entrances.

References to borders round the fence: *a*, Vegetable Marrows; *b*, spring Cabbages; *c*, summer Cabbages; *d*, Broccoli for winter and spring; *e*, Brussels Sprouts; *f*, Cauliflowers; *g*, Asparagus; *h*, Rhubarb; *i*, Jerusalem Artichokes; *j*, Horseradish; *k*, Seakale; *kl*, Globe Artichokes; *l*, Shallots; *m*, Garlic; *n*, Sweet Marjoram, Basil, and Summer Savory; *o*, Sorrel; *p*, Tarragon; *q*, Chervil; *r*, Thyme; *s*, Mint; *t*, Sage; *u*, Lettuce; *v*, Endive; *w*, Dwarf Kidney or French Beans; *x*, early Turnips; *y*, main crop Turnips; *z*, Winter Spinach.

References to the inner quarters: *a*, Tripoli Onions; *b*, Spring Onions; *c*, Carrots; *d*, Beet; *e*, Salsify; *f*, Scorzonera; *g*, Chicory; *h*, Leeks; *i*, Parsley; *j*, early Potatoes; *k*, second early Potatoes; *l*, main crop Potatoes; *m*, Runner Beans; *n*, Parsnips; *o*, first early Peas, in three sowings (1, 2, 3); *p*, second early Peas, in two sowings (1, 2); *q*, main crop Peas; *r*, late Peas; *s*, Broad Beans, early and succession.

FIG. 3.—A PLOT OF ABOUT ONE ACRE CROPPED WITH FRUIT AND VEGETABLES.

(Size of plot: 75 by 65 yards. Scale 1 inch = 60 feet.)

- A, the entrance to the garden from the south.
- B, the entrance to the garden from the north.
- C, the central walk and cross-paths.
- D, the end and side paths.
- E, a cinder path.
- F, a south wall with the south aspect occupied by Apricots, Cherries, Plums, and Pears; the north aspect with culinary Plums and Apples.
- G, a north wall: the south aspect accommodating Peaches, Nectarines, and Figs, and the north aspect Morello Cherries and late Currants.
- H, an east wall: on the east aspect, Cherries and dessert Plums; on the west aspect, Pears.
- I, a west wall: the west aspect with Pears and choice Apples, the east aspect with Plums and Pears.

(Continued on page 13.)

pickings until the Runners are ready, and then very likely be allowed to languish in the shadow of neglect, according to bad but well-established rule.

Nine rows of Onions, which may or may not include some autumn (or rather summer) sown, but certainly should include two or three rows of early, box-raised plants.

Six rows of Cabbages, summer sown, to yield hearts in spring.

Six rows of Carrots, four of Parsnips, four of Beet, four of Turnips, and three of Shallots.

Two rows of autumn Cauliflowers, two of Celery, and two of Leeks.

One row of Tomatoes, although in many cases space can be found for these on a wall.

This does not actually exhaust all the space, which has been carefully worked out; indeed, room can be found for a row each of red pickling Cabbages, Jerusalem Artichokes, Salsify, Scorzonera, and Turnip-rooted Celery, if wanted, with patches for Salads, Cucumbers, Vegetable Marrows, Rhubarb, and Herbs. Spinach could be grown between the Peas.

Of course, I am not contending that everything could be grown on the ground at the same time. The question of successions comes in, and that is to engage our early attention.

In connection with the above figures, it may be asked: What is meant by a "row"? The reply is that, for the sake of establishing a standard on which to work, I have proceeded on the assumption that the 20-rod plot is 10 rods (55 yards) long by 2 rods (11 yards) wide, but if a piece of ground of the same area is shorter and wider, or

CROPPING A ONE-ACRE PLOT.

(Continued from page 12.)

J, the bush fruit quarter: *a*, Raspberries; *b*, Black Currants; *c*, Red Currants; *d*, White Currants; *e*, Gooseberries; *f*, Strawberries; *g*, (on the outside border) Rhubarb.

K, dessert and culinary Apple trees, bushes or pyramids, 9 feet apart.

Permanent vegetable and other crops: *h*, Horseradish; *i*, Jerusalem Artichokes; *j*, Globe Artichokes; *k*, Seakale; *l*, herbs, etc.

General vegetable crops: *m*, autumn Onions; *n*, winter Spinach; *o*, spring Lettuces; *p*, early Strawberries; *q*, early, dwarf, or French Beans; *r*, early Broad Beans; *s*, seed beds for Brassicas and Celery; *t*, early Carrots and Turnips; *u*, new bed of herbs; *v*, summer Turnips; *w*, late Broccoli; *x*, Vegetable Marrows; *y*, early Potatoes; *z*, early Peas; *a*, ridge Cucumbers; *b*, second early Potatoes; *c*, Broccoli; *d*, late Strawberries; *e*, late Celery; *f*, the main crop of Broccoli; *g*, Brussels Sprouts; *h*, second early Peas; *i*, main crop Peas; *j*, late Peas; *k*, Runner Beans; *l*, main crop Celery; *m*, main crop Potatoes; *n*, spring Onions; *o*, Carrots; *p*, Beet; *q*, Salsify; *r*, Leeks; *s*, Parsnips; *t*, Parsley; *u*, Asparagus; *v*, early succession Cauliflowers.

longer and narrower, the multiplication table will adjust matters to a nicety. Thus, six rows of Carrots, each row 11 yards long, mean 66 yards run of Carrots, and that quantity can be calculated for in a piece of ground of any shape.

The foregoing will show that a very large quantity of vegetables can be grown on 20 square rods. As a matter of fact, a 20-rod slice of land is very much bigger than most people calculate. When they have worked it thoroughly for a season they realise its extent much better than they did before.

Ten rods of ground will supply a very nice lot of vegetables if judgment is exercised in cropping.

A square rood (40 square rods) of ground will meet the wants of a small gentleman's house with eight or ten in the family, including servants.

For large houses, with twenty or more to feed, a town house to supply, and a head gardener's family to be provided for, not to speak of occasional contributions to the labourers, 2 acres at least will be wanted, and even with that the Potatoes must be grown outside.

The plans on pages 9, 10, and 12 offer suggestions for cropping plots of 20 rods, $\frac{1}{2}$ acre, and 1 acre respectively.

I turn to the other aspect of this question—the labour. How much ground can an active man manage, (1) in his spare time, (2) with his whole time?

1. To a certain extent it depends, naturally, on the amount of his spare time, but, speaking broadly, 20 rods is as much as can be properly managed. A man must be exceptionally energetic, and have a considerable amount of leisure, to do $\frac{1}{4}$ acre well.

2. With help on special occasions, a man who gave his whole time to 1 acre of ground ought to keep it well cropped and perfectly clean.

Chapter 2.—Successional Cropping.

IN the science of agriculture the cropping of the land proceeds, like a banquet, by "courses." There is, however, this significant difference, that while in the feast each successive "course" leads on by steady and cheerful stages to the state of physical beatitude which to some people is represented by repletion, many cultivators make their "courses" items in the process of impoverishment.

"Rotation of crops" is a phrase that is supposed to contain a well

of hidden meaning. Learn the theory of rotation, and you become a farmer (of a sort) straight away. You just move your crops about like pieces on a chess-board, and——

But before we see what happens, let us follow the fate of some beautiful chess theory that we have worked up. On the board of our brain the pieces move with automatic precision to our theory's triumphant end. The enemy obligingly moves his pieces just as he is wanted to, and becomes hopelessly entangled in the meshes which we have spread for him.

In actual play things are exasperatingly different. The enemy makes a lot of moves which we never anticipated, and by amazing luck (we are sure he does not really see our trap) keeps out of danger.

The automatic, theory-ridden farmer has an opponent to reckon with when he sits down to the board, whose name is Nature. This player (we generally allude to it as of the feminine gender) has her own particular moves, and they are generally ones that he never expected. So many are the surprises sprung upon him by this subtle strategist that he is often driven to his wits' end for expedients to hold his own, and, perhaps, at last has to throw all his lovely problems to the winds, and trust to his native wit to save the situation.

The rotation of crops in the garden, like that on the farm, is subject to influences which are not under the grower's control. A good system is a grand thing, and we should all do well to get a sound theory into our minds, for at the worst it gives us a standard to work to, but at its best it is not everything.

My chief objection to the theory of rotation of crops is that, set up to stand alone, it often leads to failure. There is a sort of suggestion that, as long as you shift your crops about from one year to another, you have done everything that need or can be done, and are sure of a satisfactory yield. It is a mischievous doctrine, and the man who follows it, whether he be farmer or gardener, has trouble ahead.

If rotation of crops is preached in conjunction with high cultivation, it becomes less objectionable, but at the same time less necessary, for highly cultivated ground will produce crops of the same kind continuously for many years. One of the greatest Potato growers who ever lived has stated that he has grown Potatoes on the same ground for many consecutive years, and the crop has not deteriorated in the slightest. I have grown Onions on the same piece of ground for five consecutive years, and the crop has improved annually. The same may be said of Scarlet Runners. Broad Beans and Peas thrive well on the same ground year after year, always providing the soil is properly cultivated.

Thick-and-thin supporters of change-cropping have a very awkward obstacle to get over in Asparagus. Here we have a plant which produces a great mass of fibrous roots, and is therefore a gross feeder, yet no one would dream of shifting an Asparagus bed every

year. As a matter of fact, top-dressings will keep a bed going for periods varying from twenty to fifty years.

The object of these remarks is not to disparage change-cropping, which is right enough as a theory ; it is to establish the fact that it is not the real key to success. You could do away with the change-course system altogether if your culture was good enough, but no amount of changing about would bring success if the culture was bad.

It is my desire to give encouragement to those who, having small plots of vegetable ground, are unable to bring into play those principles of rotation-cropping which some people advocate so eloquently. The theorist would aver that the principle is equally applicable to a piece of 10 rods and to one of as many acres ; but in this he would only prove that he is a theorist, and nothing better. Practical experience proves that with very small plots of ground it is impossible to effect the changes that are easily effected on large ones. There is an overlapping that the utmost ingenuity cannot smooth away.

The value of rotation-cropping is claimed to be established in two directions—(1) avoiding soil exhaustion, (2) averting insect or fungoid attacks.

1. Given ordinary farm culture, it is likely enough that there is a certain advantage from rotation-cropping, for at all times the food supply is limited ; but, given good garden culture, which is a very different thing, there is little or none, because the food supply is abundant. As much manure may be put on the farm as on the garden land, yet the former will not be so fertile as the latter. An attempt may be made to prove, by the ash of a plant, that it abstracts a certain ingredient from the soil, and that if another class of crop, which does not extract the same ingredient, is not put upon the soil in place of the first, exhaustion must follow. The answer to this is (*a*) that the ash of a plant is no guide to its requirements ; and (*b*) even if it were, the matter would be of trifling consequence, inasmuch as a thoroughly tilled soil can never be exhausted.

2. Change of ground is of far less value than is supposed in averting the attacks of insects and fungi. The majority approach the plant by means of the air, and not of the soil, and even in the case of the latter a change to a considerable distance is required to be of much use, and that is not possible in small vegetable gardens. The Carrot fly, the Celery fly, the Onion fly, the Cabbage butterfly—these and numerous other enemies come on the wing. Some pests, such as the club-root, certainly make their home in the soil, and attack the root, but shifting the crop which they attack to another part of a garden will not, as a rule, keep them away. Something else besides that is necessary, of which more later.

The small cultivator cannot, as I say, secure the perfect rotation which is possible to the man with many fields. The nearest that he can get is as follows : He can divide his ground into three sections, a half and two quarters. The half he can devote to Potatoes, the two quarters respectively to tap roots (Beet, Carrots, Parsnips, and others)

and fibrous crops (Peas, Beans, Cabbages, Cauliflowers, Celery, and the rest). The second year he could plant his Potatoes on the two quarters, and transfer his tap and fibrous rooted plants to the half, thus securing a change.

I should like to add that in some of its aspects succession cropping is well worth studying. If ground is in first-rate mechanical condition it can be cropped up very closely and made to yield an enormous amount of produce. I herewith indicate a few examples.

1. A piece of ground, planted with early Potatoes and cleared of them in June, may be sown with an early variety of Pea for a late crop, and this in turn followed by a sowing of Turnips. When cleared of the Turnips it will have a short fallow, and be ready for Carrots and Parsnips, without manuring, the following spring.

2. A piece of ground under Onions, and cleared of them in August or September, may be planted with summer sown Cabbages in October. These, giving hearts in spring, may be cut and cleared off, to be succeeded by late sown Carrots, which, sown even as late as July, give delicious little roots. Or the Cabbages may be left to yield greens until November.

3. Ground under early Peas may be cleared of them in June, and planted with late Celery and Leeks.

4. Ground sown with autumn Onions, or planted with Shallots in late winter, may be cleared of them in June and sown with Rosette Colewort.

5. Ground sown with Turnips in February or March may be cleared of them by June, and Celery planted, to be followed by Peas.

Intercropping is frequently practised. The intercropping of Potatoes and winter Greens is a very common proceeding, but it often throws out elaborate schemes of rotations, as the Greens remain on the ground longer in spring than it is calculated that they will do. I am of opinion that the intercropping of Potatoes and Greens is best confined to dwarf varieties of the one and hardy kinds of the other. I do not approve of putting Broccoli between late Potatoes. The shade and coolness of the Potato rows, no doubt, help to give the Broccoli a good start, but it is very apt to become drawn, in which state it will not be in good condition for enduring the rigours of a hard winter.

Sowing Turnips and Spinach between Peas, and planting Lettuces on Celery ridges, are thoroughly legitimate examples of intercropping.

Chapter 3.—How to Till the Soil.

How to get double pay without doing double work is a problem which has harassed many a working man.

It has likewise exercised the minds of a great many people who are not working men.

It has never worried the gardener, because with him work always comes first, and pay is a detail of entirely secondary importance. He loves the work for its own sake. That is how it is that when you think of any operation which brings a good deal of hard work in its train you do not ask yourself whether you dare discuss such a subject amongst horticulturists or not—you only bethink you of methods of getting it to assume the aspect of a really stiff and solid proceeding, as only then is it worthy of their attention.

After many years' experience, I have come to the conclusion that the visible signs and tokens of interest which gardeners display in operations connected with the cultivation of the soil may be summed up as follow: Plain digging—a sniff; digging with fork *versus* spade—a slight air of attention; trenching—one ear and one eye wide open; double trenching—both ears and eyes wide open; double trenching with fork *versus* spade—fierce and excited interest. If it were possible to trench 20 feet deep, the meeting discussing the operation would never break up, but would argue strenuously all night.

The various methods of preparing soil form a theme that never grows old. Political questions, theological polemics, economic theories, have their rise and fall as topics of interest, but tools and the uses of tools remain perennially fresh. Gardeners talked about them in the early days of the last century, when the man in the street was finding fault with the steps that the Government were taking to repel the projected visit of the turbulent Boney. They talked about it when Sebastopol was being hammered. They examined it in all its bearings while Roberts was marching to Cabul; and still the subject is being thrashed out as ardently as ever.

All experienced horticulturists are, I think, agreed as to the benefits of trenching ground; the points of dispute, or perhaps I had better say of discussion, are the best ways of doing it and the best tools to do it with. By deepening the soil we let more air in than was able to penetrate before, and we thereby sweeten it, and enable the nitrifying organisms, without which plant food is of no value, to extend their sphere of influence. Thus the saying, not uncommon in some districts, that a good digging is equal to a coat of manure, is strictly true. In a well-dug soil there are far more nitrifying organisms than in a ploughed soil, and in a trenched soil there are more than in a dug soil. Thus digging would be better than ploughing, even if more manure were put into the ground under plough than

under spade culture, because a more extended area of operations would be opened up for the bacteria.

Is trenching equally as good for light as for heavy soil? It is better. You must trench a heavy soil to render it more pervious to air, and you must trench a light soil in order to enable it to hold more moisture.

In trenching, is it wasteful to put the manure underneath the top spit? Decidedly it is not. In light-land districts people are often afraid to put their manure down "because it will all be washed into the subsoil." That is the very best place for it. Manure is not wanted near the surface of soil that has been under tillage for some years; it is wanted down below, where, from want of tillage, the soil is lacking in fertility.

Manure should not be worked into the top soil for two prime reasons: (1) The upper layer of earth is already relatively fertile, and may be made too fat; (2) because it renders the upper soil drier than it would otherwise be. The great thing for the top layer of soil is tillage—trenching in autumn, followed by a light digging in spring. Tillage means pulverisation, pulverisation means plenty of air-cells, plenty of air-cells means food and moisture for the plant.

When should ground be trenched? Decidedly in autumn if it be

PICTORIAL PRACTICE—
PLAIN HINTS IN FEW WORDS.

FIG. 4.—TWO WAYS OF
DIGGING.

There are two ways of starting to dig a piece of ground: (1) To take out a spit of soil along the whole piece, wheel it to the other end, and there deposit it, *c*, so that it may be ready to fill in the last space when the plot, begun from the other end, is finished; (2) to divide the plot through the centre, *A*, take out a trench half-way across, *a, e*, and deposit it at *d*, then work up to *f*, fill the last trench there with soil from the opposite side, *g*, work back to *h*, and fill in with soil *d*. This is a very good plan, and will apply to trenching also.

fallow then. There is nothing gained, but there may easily be something lost, by leaving a considerable task like trenching till spring. In the first place, autumn trenching gives the soil time to settle down before it is cropped: freshly trenched soil is too loose for many crops. In the second place, the soil is usually drier and more workable in autumn than in spring. In the third place, there is generally more labour available. When many urgent jobs are waiting in spring, a stiff one often gets shelved.

What is the best tool for trenching? Is the fork or the spade the more useful? If trenching *is* trenching—if the trenches are really trenches—if the work is done not only thoroughly but cleanly, every trench being emptied before another is begun, both tools are wanted, but in soil with real body about it the better tool is the fork. It is the better, in my opinion, because with it the average man can shift more soil with a given expenditure of energy than he can with a spade. A man may be able to get through a specified area in a given time, and do his work conscientiously and well; but if another man is able to do the same area equally well in the same time with a slighter expenditure of energy he is working on sounder principles.

I have heard the fork spoken of as the lazy man's tool. Is it laziness to economise energy? Why should a man waste his muscular

PICTORIAL PRACTICE—PLAIN
HINTS IN FEW WORDS.

FIG. 5.—HOW TO DIG HEAVY
AND LIGHT SOIL.

- B, heavy, tenacious soil ridged in autumn with a fork.
- C, the same not dug till spring; its lumpy condition then.
- D, light soil dug with a spade.
- E, heavy soil (B) in spring after being pulverised by frost and forked over.

power and vitality, when he would deem it foolish to waste his money? The everyday political economist believes in getting the value of twelve pennies for every shilling that he spends; why, therefore, should he only get the value of ten pennies for every shilling's worth of his bodily strength that he expends?

It is because I am a believer in the application of sound economical principles to every affair of workaday life that I believe in the fork for trenching, but I am not going to quarrel with the person who disagrees with me.

No tool, perhaps, is the best on all classes of soil. You do not see the labourer digging with a fork on the sand-dunes of Holland. You do not even see him digging with a spade. He uses a shovel. The moral is perhaps sufficiently obvious, that circumstances alter cases; that some soils want one tool, and some another, if they are to be dealt with in the most practical and economical way. This is certainly true in my experience.

PICTORIAL PRACTICE.—PLAIN HINTS IN FEW WORDS.

FIG. 6.—HOW TO DIG SLOPING GROUND.

F, a sharp slope: *i*, starting with a trench running from top to bottom—the right way; *j*, starting with a trench along the bottom—the wrong way.

It is a somewhat peculiar fact that every man who has a stiff soil to deal with always thinks that it is stiffer than anyone else's; much on the same principle, I suppose, that each person considers that his particular class of cold in the head is of a far more acute form than other people's cold in the head. After experience with various samples, I am disposed to think that the clays of Knockholt in Kent, of Capel in Surrey, and of Crawley in Sussex, are capable of holding their own with most. The men of Capel will tell you that the fork will not shift their paste, but break up under the strain, and that nothing short of the strongest spade made is of any use to them.

Soil tillage is not completed with the operation of trenching. It is thoroughly well begun, that is all. The soil should be left rough for the winter, and at odd times, when material offers, burnt stuff from the garden fires, or soot, or mortar rubbish, should be thrown on it. Under this treatment the upper spit will break down beautifully in spring with nothing more than an easy forking.

Supposing that trenching cannot be done in autumn, is spring altogether too late? It is never too late to trench. I have done it in April, with the ground so wet that gullies had to be cut to get the water out of the trenches, and failure deep and dire was prognosti-

cated by everybody except the labourers who were hired for the job. Good results followed. There are drawbacks, to be sure, with spring as compared with autumn trenching, but they do not outweigh the advantages.

It goes without saying, I hope, that the system adopted should be one that shifts at least two spits, and yet keeps them in their relative positions. No turning the top spit down, if you please, and nothing less than 20 inches of soil to be thoroughly moved; 30 inches preferred. As a principle, remember that the lighter the soil the deeper the trenching should be.

There is a fine gusto about the business that proves infectious. Trenching yields the enjoyment of rude health, and the mental exhilaration of a perfect digestive process.

If the reader wants to start a topic of interest at his next "mutual," let him raise the question of left or right-handed digging—I mean, digging with the left or the right hand at the bottom of the tool. The model digger is he who can dig easily and rapidly either way, but how many are there of him? Not many, I fear. It is not to be expected, perhaps. There are great left-handed and great right-handed bowlers, but, in my experience of the summer game, which extends from the days of Jupp and Morley, I have never yet seen a man disporting himself on the cricket sward in first-class matches who could bowl well with either hand. Yet ambidexterity with the spade is an accomplishment well worth learning.

FIG. 7.—A DIGGER'S BOOT PROTECTOR.

It is made out of an old spade; *a*, the outline; *b*, the remaining piece made into a scraper (see 3). 2, straps fixed to the raised edges of the piece after cutting out.

Chapter 4.—Thoughts about Manuring.

THE reduction of manuring to an exact science proceeds apace, but a good deal of water will run under the Forth Bridge before the average cultivator has made up his mind that it is worth while to look twice at a manure heap.

There is no class more difficult to influence than that which has secured a certain result by a certain course of procedure. "Leave well alone" is its motto. It is not a bad one, I admit, but I should not agree to leave well alone when, by giving it up, better could be done. The cry is on all-fours with such old and crusted ones as "Slow and sure" (as if swift and sure were not far better); "A bird in the hand's worth two in the bush" (is not a bird in each hand superior to either ?), and so forth.

Admitting that the man who takes refuge behind a series of old saws is difficult to dislodge, it by no means follows that it is not worth while to make the attempt. If we cannot catch him, we can at all events build blockhouses of hard, well-proven fact around him, so that his movements may be hampered, and he may work less direct mischief.

Of the two errors, it is easier to give too much manure than too little, consequently there is an appalling waste of good material going on in our gardens year by year. Moreover, as it is easier to give manure at the wrong time than the right, it follows as a natural sequence that most of our manuring is done at the wrong time.

The majority of people get into a way of thinking that the truth about manuring lies in the comparative merits of artificials *versus* dung. That is the point which would rise to the minds of most if they were asked to state the most important ground of debate. It is a consideration, to be sure, but since a harmonious and economical manuring system must inevitably bring into use both classes of fertiliser, it follows that the problem of finding it cannot be solved by setting up one against the other, and seeing which can be the more quickly demolished by hard pummelling.

I have said that it is not only common to use too much manure, but to apply it at the wrong time. To take the case of Peas, as an example, the average cultivator would, if he used only one class of manure (and that dung), use three or four times as much of it as is wanted. On the other hand, if he used both dung and artificials, he would put the former on in spring, and the latter in late spring or early summer, whereas the former should be used in autumn and the latter in late winter.

In tackling a big, practical problem I must, of course, guard against enunciating a cultural fallacy for the sake of securing a literary antithesis. Let me, therefore, examine the position. We manure land, not for the purpose of putting out of sight a certain quantity of dung, but for securing a crop; therefore, the primary consideration is not what we put into the ground, but what we take out of it. We might bury one load of dung in a square rod of ground, or we might bury two, but the measure of our wisdom would not be estimated by that: it would be calculated according to the excellence of the crop. This is premiss No. 1.

A plant is supported by the food which its roots take up in a liquid form, and that food is prepared for it by a very remarkable culinary staff, termed nitrifying organisms. The process of "cooking" is called nitrification. If the kitchen staff is large and efficient the plant is well fed; if weak, the plant is badly nourished. The nourishment of the plant, therefore, does not depend upon the amount of raw food material which is put into the soil, but in the strength of the cooking staff. That is premiss No. 2.

As the cooking staff is of at least equal importance to raw food, measures must not only be taken to increase the food supply, but to strengthen the staff of cooks. That is premiss No. 3.

Now we come to ways and means. The method of putting food into the soil—one method, any way—we all know; but methods of adding to the staff of cooks we do not always know.

The practical cultivator long ago found himself face to face with a rather curious phenomenon. He manured his soil, and improved his crop. He manured his soil more, and got a still better crop. He manured even more heavily, and then, instead of getting a heavier crop in the same proportion as he had before, he got a smaller crop, and one not so healthy. He fell into a way of speaking of ground which had got into the condition of refusing to yield better crops after a certain point as "manure sick."

What had happened was this: He had crammed the larder with food, but had not increased his staff of cooks, who were overworked in consequence. Under the unwholesome conditions present in the soil they dwindled instead of increasing, and so things went from bad to worse.

The cooking staff in the soil can be increased by the provision of warmth and air. An inert, hard-grained, brick-in-summer-and-paste-in-winter soil contains little warmth and little air, consequently few cooks. Break it up, turn it, expose it, and both warmth and air penetrate; then the cooks troop in, tie on their aprons, and set to work. In many soils there is abundance of raw material for them already existing, and more need not be added. I have observed with much interest how readily a soil, neglected for years, half-tilled, unmanured, and altogether impoverished, has responded to tillage alone, giving excellent crops with very little manure. To attempt to renovate neglected soil by simply cramming in manure is wasteful and unscientific.

The plan which the cultivator adopts to cure manure-sick soil

is to add lime. It is an old plan. The lime acts on the manure, and sets free its food constituents, so that it really feeds the crop. Yes, liming is good, but it always strikes me as a very cumbersome and roundabout way of keeping healthy to first of all ignore the rules of health and then swallow medicine to remedy the ill effects of neglect. Why not learn the rules of good health first, and observe them?

To give too much manure, and then have to add lime to put matters right, is surely a very clumsy way of going to work.

The application of the ideas of manuring herewith thrown out could, doubtless, be made with satisfactory results by many intelligent cultivators, but it will, perhaps, be most satisfactory to point them by practical details, followed by hints on each particular crop.

I have said that the manuring problem is not merely the issue between natural and artificial manures. As a matter of fact, both provide the same constituents. Good crops of vegetables can be obtained with either or both. The man who declares that only natural manure is of any use, and he who says the same of artificials, are both in the wrong. Some crops do particularly well with natural manures, others seem to thrive admirably with artificials, but many crops do best with a judicious blend of both. What is wanted is exact knowledge.

We ought, I think, to put our vegetables into groups in order to get into a proper position for suiting their requirements.

Group No. 1 might be that class of vegetables which develop by swelling rapidly underground, and the roots of which are exceedingly susceptible to external influences. This is a very important group, because it includes Potatoes, Carrots, Parsnips, and Beets. Coarse,

FIG. 8.—AN EXPERIMENTAL PLOT.

							1 ROWS
							CANADIAN
							WONDER BEAN.
							PEA SHARPES
							QUEEN
							ONIONS
							AILSA CRAIG
							5 ROWS
							LEEKS
							CAULIFLOWERS
							WINTER GREENS
							POTATOES
A	B	II	III	IV	V	VI	

Here is a plot divided into six differently manured sections: I., II., III., IV., V., VI. Plot I. is subdivided, A, B. Have the crops running in rows across each section, so that it can be seen at a glance which manure suits best. I.A

might be dung alone; I.B dung with artificials; II. might contain an artificial mixture with potash omitted; III. with phosphates omitted; IV., with nitrates omitted; V. might contain a complete mixture; VI., no manure at all. See remarks on manuring.

rank manure, or gritty, inorganic particles, such as stones and cinders, are bad for these crops, leading to scab, forking, and canker.

Group No. 2 might comprise those which swell up a great deal of fleshy, succulent matter at or near the surface, such as Celery, Leeks, Turnips, and Onions.

Group No. 3 could be composed of vegetables which make a good deal of growth in the air, and expose a considerable amount of leaf surface to the atmosphere, such as Beans and Peas.

Group No. 4 is made up of vegetables with very coarse leaf growth, such as Cabbages, Cauliflowers, and Winter Greens.

Group No. 5 might be composed of fruit-bearing crops, such as Cucumbers, Tomatoes, and Vegetable Marrows.

I cannot imagine any one system of manuring suiting such diverse crops as these equally well, nor, to be brief, is there one. Group No. 1 is suited by very little dung, and that only well decayed, friable, and dry. Finely ground artificials are the best. Groups Nos. 2 and 4 will take dung, rich, and plenty of it. Group No. 3, contrary to general belief, will thrive splendidly without dung, and needs, as a matter of fact, very little of any sort. Group No. 5 wants abundance of potash—far more than dung yields—and, therefore, artificials may be turned to with advantage.

These, it will be understood, are generalisations. An intelligent cultivator who took them as a guide, and worked out the details for himself, would doubtless get satisfactory returns, but it may be interesting to particularise a little.

Artichokes.—The Chinese, the Jerusalem, and the Globe Artichokes present us with considerable differences. The first two certainly approximate, but the gulf between them and the Globe is wide. Chinese and Jerusalem Artichokes do not need heavily dunged ground. A well-tilled soil will yield a full crop of sound, finely flavoured tubers if dressed with decayed stuff once in three years. Heavy applications of dung may increase the crop, but the tubers are coarse in appearance and rank in taste: Globe Artichokes enjoy liberal dressings of dung.

Asparagus.—We have here a somewhat uncommon vegetable—one difficult to group. It has the sort of fibrous, matted rootstock which generally takes up large stores of food from the soil, and might, therefore, be expected to be quite at home with good dressings of dung. But there is something more than dung required by Asparagus. The fact that it will thrive without dung in some places, and will resolutely refuse to thrive with it in others, is a proof of this. The crop has some resemblance to Peas in its general characters. It dislikes a heavy, cold bottom; and it very much appreciates a moisture-laden atmosphere. Success hardly turns on manuring, therefore, but rather on drainage and atmospheric humidity. However, manuring is our subject just now. Other things being right, Asparagus will do well if dressed every autumn with a mixture of short, dry, crumbly manure (not rank stuff) and burnt rubbish, followed in spring by a dressing of salt and

nitrate of soda, 2 oz. of the former and 1 oz. of the latter per square yard, but salt should not be used on wet land.

Beans.—In the main, the manurial treatment that suits Peas will suit Beans, and they may, therefore, be considered together.

Beetroot.—A grossly over-manured crop. In my opinion, a man, tilling his soil well, who kept manure away from his Beet altogether for ten years, would get 50 per cent. more usable, saleable, and show roots than another who manured his ground every season. Beet, Carrots, and Parsnips want a deep, finely pulverised soil, and

FIG. 9.—AN EASY WAY OF MAKING LIQUID MANURE.

This consists of a perforated tin A containing sheep droppings or other manure, fixed over a wooden bucket B and under a tap.

The weak liquid manure resulting is safe for nearly all plants.

nothing else. People sometimes think that they put a formidable poser when they ask about barren, hungry, neglected land. They do nothing of the sort. True, I recommend a little manure in such cases, but I always advise them to put it at least 15 inches below the surface. I know, do you see, that if they shift the soil deep enough to get the manure buried more than 1 foot deep, they must till the soil pretty well; and I also know that if I did not give them an object in shifting so much soil they would not do it. As a matter of fact, a mixture of superphosphate, sulphate of potash, nitrate of soda, and bone flour, in the proportions of 3, 2, 1, 1

respectively, applied at the rate of 3 oz. per square yard, would do equally as well; but if I mentioned this alone, it would be scuffled in about 6 inches deep, and little good done.

Cabbages and Greens Generally.—Borecole, Broccoli, Brussels Sprouts, Cabbages, Cauliflowers, and Savoys constitute a group of the highest value. Collectively they come next to the Potato in importance, for they give us an all-the-year-round supply of delicious and wholesome food. The judge at the flower show cuts open the Cabbages on view, sees one pair with a considerable amount of close, white "grain," and another that is largely composed of stalk, and gives first prize to the former; it is hard to disagree with him, for the white-grained Cabbage is the better cultural example. But—such is my vicious taste—it is the tender, melting, marrowy stalk which, on the table, affords me the real temptation. The mellow pulp in the very heel of the stem is to me what I suppose the G bone (or is it the H bone?) is to the beef lover. Rich yard dung will give you very fine Greens, because the nitrogenous elements foster leaf growth. So, however, will nitrates in concentrated artificial form, such as nitrate of soda and sulphate of ammonia. I am a great believer in the latter for Cabbages. It is a splendid fertiliser for Greens, encouraging the plants to make vigorous growth, and imparting a fine burnished hue to the leaves. But if, like myself, you love pith in your Cabbages, think of potash. By increasing it and reducing nitrates, you get less foliage, but more "bone." In a well-tilled soil 3 parts of kainit and 1 part of sulphate of ammonia, 3 oz. per square yard, give good Cabbages, not large, but remarkably nice in flavour.

Carrots.—The remarks as to Beet apply, and need not be repeated. I shall, however, have some fresh points about Carrots to discuss when I come to general culture.

Celery.—I am at hopeless war with the manure cart champions in connection with this vegetable. They would not eat an oyster if they knew that the succulent bivalve came from a bed within a hundred miles of a town drain, but they will eat Celery out of a trench which they themselves have packed with dung and drenched with sewage! Visions of typhoid fever appal them in the first case, but have no terrors at all in the second. It is all very odd to me. Now, Celery happens to be a crop which I grow in quantities quite out of proportion to the amount in the average garden, largely because in my household it is esteemed as a cooked vegetable; but even cooked I cannot appreciate dung-grown Celery. It is rank and coarse, to my taste, and entirely lacks the tender sweetness of artificial-fed produce. As to eating Celery raw that has come out of a richly manured trench, and, highly fed with sewage, has grown to huge and bloated proportions—faugh! I want very badly to fight the hoary and antiquated belief that respectable Celery cannot be grown without loads upon loads of dung. It can, it has been, it will be again. I grant that Celery, from its nature and its extremely fibrous root action, revels in manure, especially of a liquid nature. I

agree that the finest-looking produce is got from the deep, dung-lined trench, into which, through a hose, the industrious grower can pour black sewage from his drainage tank. I know it well, because I have seen it all done, and watched that self-same grower receive his prize afterwards. But I do most emphatically deny that good Celery can only be grown in that way. I have never won a prize with Celery (I could not very well, because I have never shown it), but in a soil much too dry to suit the plants naturally I have grown stuff that would, I think, be regarded as satisfactory in respect to size, and as beyond all comparison from the dung-grown stuff as to flavour. There is the true Kentish Filbert taste about it—none of your out-of-season, mouldy Brazils. If you get your Celery along early (more about this later) and, in the absence of rains, can give a good soaking occasionally, never fear but that creditable Celery can be produced with nothing more elaborate than steamed bone flour and nitrate of soda in equal parts, one handful to each yard of trench.

Cucumbers.—A little well-decayed manure may be mixed with the compost for Cucumbers, but if some coarse, rough, lumpy loam can be got for those under glass, and sulphate of potash at the rate of one pint per bushel is thoroughly incorporated with it by repeated turnings, no fat, greasy mixture which can be concocted will grow such crops. Cucumber soil should always be lumpy, never finely

FIG. 10.—ANOTHER WAY OF MAKING LIQUID MANURE.

Get a paraffin cask, char the interior, fit the lower half A with a tap and mount it on a stand, attach a piece of perforated zinc to the interior by means of a couple of blocks C, C, and place in some manure B. If the upper half is fed with water there will be a constant supply of liquid manure ready.

pulverised, as in the latter case it is apt to settle too close round the stem, and lead to canker. Give a top-dressing of the same mixture when the roots show at the surface of the mound, and the plants will fruit abundantly if the general culture is right. The latter is a theme on which I hope to discourse soon.

Leeks.—I need not repeat the remarks made under Celery. They apply, substantially.

Onions.—The Onion is a plant which loves to send its roots far below the surface. When it gets its toes well braced into sound British soil it is a happy plant, and the man who owns the ground is happy too when he sees a forest of huge leaves spreading before his eyes, and plump bulbs swelling beneath them. If he makes the plant its deep bed in autumn or winter, it matters little what sort of manure he puts into it, or if he stands with his hands in his pockets all the following summer. Whatever happens, those Onions are going to grow! I have just said that I never in my life exhibited Celery. On reflection, I believe I am wrong, but it was long ago, and not for competition anyway. I have exhibited Onions—two pounders, two-and-a-half pounders, yes, and bigger even than these. On the same deep bed Onions on dung and Onions on artificials came about of a size—an ounce lost here, an ounce gained there, is about the measure of it. I give here my favourite Onion mixture, with a regret that it is a little complicated: $1\frac{1}{2}$ part of superphosphate of lime, 1 part of saltpetre (nitrate of potash), $\frac{1}{2}$ a part each of steamed bone flour, nitrate of soda, and gypsum (sulphate of lime), the whole mixed and applied at the rate of 7 lb. per square rod, under the top spit, at trenching time.

Parsnips.—The remarks made under Beet have a good general application. The unwholesome-looking brown blotches on the shoulders of Parsnips, known as canker, are always the worst in freshly dunged ground. Moreover, forking of the roots, expressively termed “spronkiness” by our cottagers, is directly due to dung.

Peas.—I cannot believe that the general system of manuring Peas is based on true principles of garden economy. I believe three parts of the manure used to be unnecessary, and therefore wasteful. The fact that fine crops of Peas may be, and are, grown with the use of dung, proves nothing at all. The thick-and-thin supporters of the manure cart erroneously think that it proves everything. In common, doubtless, with many others, I am constantly hearing or reading of Pea growers who have trenched or double trenched for their Peas, and have worked in a heavy dressing of dung. As a result, they are able to point to some very fine pods, and they do so, often with triumph. There is nothing whatever strange in this, nor does it influence me in the slightest degree. If it comes to that, I have done the same thing myself in the past. I do not question the merits of the gentlemen in question as Pea growers, but as garden economists. Equally as fine Peas may be grown without the dung as with it, and equally as many may be grown. In short, it is not the dung that does the work. It may be argued by some: “If we

do not use dung for the Peas we must use artificials: we can get dung for nothing, but artificials we should have to buy: how now, Sir Critic?" The answer is easy. Even if dung may be got without purchase, it is still wasteful to use it when a better purpose can be found for it, and, as to artificials, they are no more a necessity than dung. The great want of the Pea plant is moisture. If a man with unlimited dung to work into his ground were to apply it in the top spit, without trenching, and a very dry spring and summer were to follow, he would have no guarantee whatever of a good crop. The probability is that it would be a very poor one. If another man used no dung at all, but trenched his ground, and when early summer came soaked his trenches and mulched his plants with loose soil, he would most likely have a very good crop. The man who can keep his Peas growing when dry weather comes is the man whose

FIG. 11. — A LIQUID MANURE LADLE.

This handy little dipper is useful for ladling liquid manure out of buckets or tubs. It is made of an old tin, fitted with a handle in the form of a piece of stick.

plants ward off thrips, red spider, and mildew. No solids will keep them growing, but liquids will. A Pea plant that has moisture can afford to laugh at manure. The successful Pea grower's routine generally comprises three things—trenches or trenching, dung, liquid manure. When he succeeds, he almost invariably, by some mysterious process of reasoning, works it out that dung has done the work. In reality, it is the other two. I have proved, by repeated and careful experiments, that the finest of both garden and Sweet Peas may be grown by the following simple plan: First trench the ground, doing this in autumn; in February line out the rows where the Peas are to come, and take out 9 inches of soil, laying it along the side of the trench; sprinkle along the bottom of the trench superphosphate at the rate of one handful to the yard. Leave the super to become precipitated, and the soil on the edge of the trench to sweeten for about three weeks; then put back half the soil, sow the seeds on it, and cover them not less than 2 inches deep. Leave the remainder of the soil where it is until a spell of dry

weather sets in, then soak the trenches and mulch with the spare soil. If the Peas are thinly grown, and the shoots are topped, immense pods will swell up, and if liquid manure, whether natural or artificial, is supplied from time to time, the plants will go on growing and bearing. As regards the abstract comparative merits of natural and artificial manures for Peas, I am inclined to favour the former for early and the latter for late produce. I am aware that the general opinion is to the contrary, but I believe it to be wrong. On rows of Sweet Peas manured half their length with dung and half with artificials, I have noticed that the former are flowering first and the latter last. And this has been very clearly and distinctly marked, too. Soil in which dung is decaying is probably warmer and drier than soil without it. The warmth would be in favour of early development, but the drought would militate against continuance. In speaking of artificials as being slower in action than dung, and therefore suiting late Peas better, earlier not quite so well, I must take care to make it clear that I allude to such fertilisers as superphosphate, bone flour, and kainit. Nitrogenous manures, like nitrate of soda and sulphate of ammonia, would act more quickly, but their use ought to be limited to coaxing a plant along through the medium of liquid manure when, in the midst of a hard struggle with drought, it is inclined to languish.

Potatoes.—One never realises the absurdity of indiscriminate manuring more fully than when he observes the difference between the development of a Potato and, say, a Brussels Sprout. In the former case we have a vegetable which forms its crop underground, developing from tiny, tender tubercles on thin, stoloniferous stems; in the latter a plant which forms its crop aboveground on a strong, fleshy stem. The Potato tubercles come into actual contact with the manure in the soil unless it be buried to a good depth; the Brussels Sprout does not do so. The method of development of the Potato crop—the lateral expansion, so to say, of the tubers—should teach that the soil favourable to it is one of a very friable, yielding nature, and that a stiff, stubborn, clinging soil is unsuitable. On the other hand, a firmer medium is necessary for Brussels Sprouts. The tenderness of the Potato tubercle should teach another thing, namely, that sharp particles in the soil, such as cinders, are bad, because the soft skin is liable to be scratched, and admission afforded to the growth of the scab fungus. The more we study the Potato the more clearly we realise that the first essential to success is a well-drained and finely pulverised medium. With respect to manure, it is not unreasonable to demur to the practice of applying rank, wet dung so late, and at so shallow a depth, that it comes into actual contact with the tubers. Dung may be used for Potatoes with good results, but it should be well decayed, and trenched in a foot below the surface several weeks in advance of cropping. It should never be used in the drills unless very short, dry enough to handle without unpleasantness, and quite crumbly. In such a state it will, if mixed with burnt rubbish from the garden fire, and sweepings from a

FIG. 12.—THIS FINE
BEETROOT WAS
PRODUCED BY
TRENCHING, NOT
BY DUNGING.

potting shed, be suitable for applying when the drills are drawn. In any state, however, I believe that manure for Potatoes is best trenched in. Artificial manures yield crops of fine quantity and quality when the ground is thoroughly cultivated, and so well have I been satisfied with the result of applying carefully blended mixtures, and so convenient are these where yard manure of the right quality is difficult to get, that I have had no hesitation in trusting to them absolutely. I could name several mixtures that have given admirable yields of produce, but the following are perhaps the pick :—

No. 1.

3½	parts of superphosphate of lime
2	„ kainit
1½	„ sulphate of ammonia

No. 2.

3	parts of superphosphate
1½	„ sulphate of potash
1½	„ nitrate of soda
1	„ steamed bone flour

In each case they should be well mixed and applied at the rate of 7 lb. to 10 lb. per square rod (30½ square yards), preferably in winter, but I have applied them in the drills at planting time with satisfactory results, and this is a very convenient plan. I have more than once been told, in each case by gentlemen who grow all their Potatoes in the study, with a pen for a spade, and an inkpot for a trench, that the quantities recommended are too great, and that 3 lb. per square rod will give equally good results. In inkpots it may do; in the garden it does not. There are two main reasons why people fail with artificials—the first and greatest is that owing to the facility with which these fertilisers can be got into the ground, the soil is only half cultivated; the second is that not half enough is used. To succeed, the same good spade-work must be brought into play that yields success when dung is the manurial factor, and fair quantities must be used. One point more: We are often advised to use our phosphatic and potassic fertilisers in winter, and our nitrogenous ones at the time of the first earthing. I leaned to the plan

myself once, but I have abandoned it, for reasons that seem to me to be sound and sufficient: (1) The application is very liable to be forgotten when the right moment comes; (2) it is not in any way superior to dressing at planting time.

Tomatoes.—The majority of cultivators have got pretty near to the truth on the manuring question with one crop alone, and that happens to be the Tomato. It is generally recognised that very little manure is advisable, otherwise the plants will be leafy and prone to disease. This is a true view. What puzzles me is that people never seem to think of applying it to other crops as well. A plethoric, dung-pampered plant is rarely better, as a cultivated specimen, than one which has to develop under a more modest regimen, and it is far more liable to disease. Tomatoes certainly do not want dung; in fact, they require very little manure of any sort, especially when grown out of doors. The ordinary soil of a well-tilled kitchen garden will give splendid crops, even if the plants be grown on the same ground several years running. This I have proved in my own culture. Plants in pots may have a little stimulant when they are swelling up their crop, but it should be rather of a potassic than a nitrogenous nature. Tomatoes like potash, and it may be given to them in one of several forms, *e.g.* kainit, sulphate of potash, and muriate of potash. The sulphate suits them admirably, and may be mixed with superphosphate of lime in equal parts, and 1 pint of the mixture incorporated with each bushel of compost. Good loam alone will grow excellent Tomatoes, and in this case a little liquid manure may be given when the crop is swelling.

Vegetable Marrows.—Through some unwritten and inscrutable law, it has come to be believed that the dung bed is the natural home of the Vegetable Marrow. I pointed out the fallacy of it all years ago, and I do so again now. In a hot, dry season a dung bed is about the worst place possible for Vegetable Marrows. They are thirsty plants, and when in free growth and bearing they must be able to suck large quantities of moisture into their strong stems, or they will shrivel, or cast the young fruit. A cubic yard of litter will not hold a fraction of the moisture held by a cubic yard of properly tilled soil, therefore it is not so good for Vegetable Marrows. I denounce the dung bed as an ideal Marrow home. The idea is wrong, and full of mischief. The production of two or three huge, bloated Marrows proves nothing. A few fat monsters do not make a crop. What constitutes a crop is an incessant supply of tender, high-flavoured Marrows from July till the plants are killed by frost in October or November. You cannot get this in a dry district in a dry season from a dung bed; you can without it. With the dung bed you may be able to force the plants along early. You may be able to show an ugly brute the size of a boarhound's body at a July exhibition, but you will not thereafter be cutting Marrows in abundance daily for three consecutive months. The plants will be dried up, their energies exhausted, long before. I do not object to a

little dung being dug into the soil for Marrows if anyone likes to do it, but it is not necessary.

In reference to this point, I had the best Marrow bed of my life in 1901. It was established on well-dug but unmanured soil. The plants were a little slow in starting, and we only cut one or two odd fruits in July, but when they fairly got going they never stopped until a sharp frost blackened them about the middle of October. They grew incessantly and vigorously, sending out great, strong, sprawling shoots in all directions. One plant covered a square rod of ground, and would have covered a good deal more if it had not been checked; while as to crop, it never stopped bearing while it lived, and on one occasion I counted a dozen fruits on an area of less than a square yard.

The remarks herewith made on the manuring question may be summarised as follows:—

(1) Manuring (*i.e.* the application of dung and chemical fertilisers) is not the real secret of fertility.

(2) Manure will not compensate for the absence of thorough cultivation.

(3) Manuring is a useful adjunct to tillage.

(4) In general, the present system of manuring is wasteful and unscientific.

(5) Vegetable crops may usefully be sectionised for feeding purposes.

(6) With good tillage equally satisfactory results may be secured with “artificial” as with dung.

Notes on Chemical Fertilisers.

The knowledge that chemical manures have been used with highly successful results in vegetable growing, and may be in other cases if a proper system is adopted, cannot fail to prove of interest to large numbers of people. Except to those who keep stock, or are in a position to make a contract for a large supply of yard or stable manure, the article is difficult to get of good quality at a reasonable price; moreover, it is bulky, and awkward and expensive to handle. There is an idea that country gardeners have no trouble in the matter, but this is erroneous. Farmers and stockkeepers have manure, professional gardeners can often command a supply, but the majority of other cultivators are often driven to extremities from the want of the wherewithal to fertilise the ground.

Chemical manures are inferior to yard manure in some respects, and superior in others. In some soils yard manure is valuable from its mechanical action, and because in its decay warmth is given out. On the other hand, chemicals are easily accessible, cheap, portable, cleanly, and of concentrated power.

Nitrogenous Fertilisers.—The two great nitrogenous manures are nitrate of soda and sulphate of ammonia. After several years of

experimenting I have come to the conclusion that all others may be dispensed with. It is troublesome to stock many kinds. Taking one year with another, these fertilisers cost me ten shillings per hundredweight. The average quantity used (generally in conjunction with other fertilisers) is $1\frac{1}{2}$ lb. per square rod.

Phosphatic Fertilisers.—The most generally useful all-round manure in this section is superphosphate of lime ; average price per hundredweight, five shillings ; average quantity per square rod, 3 to 4 lb. Steamed bone flour is valuable to use in conjunction with superphosphate, for the reason that sulphuric acid is used in the manufacture of superphosphate, and at times a modicum of free acid is left, which acts injuriously, unless absorbed by a little bone flour. Steamed bone flour is insoluble in water, and therefore it cannot be turned to account, as superphosphate can be, for liquid manure ; moreover, owing to the very fine state to which it is reduced, it requires to be handled with great care, otherwise clouds of disagreeable dust will arise ; but it is quick-acting, and altogether an exceedingly valuable manure. The average price is six to seven shillings per hundredweight, and the average quantity to use per rod (in conjunction with other manures) is 1 lb. Basic slag is another phosphatic manure which may be mentioned. It is not so valuable as superphosphate for most vegetables, and being rather slower in its action requires to be applied earlier, but it is very good for Grass. Average price, three to four shillings per hundredweight. Average quantity to apply, 4 lb. per square rod.

Potash Fertilisers.—The most common of these is kainit ; average price, three to four shillings per hundredweight ; average quantity to use, 2 to 3 lb. per square rod. It is a good fertiliser. Sulphate of potash and muriate of potash ; average price of each, seven to nine shillings per hundredweight ; average quantity, $1\frac{1}{2}$ lb. per square rod ; are both much superior to kainit, the former for vegetables, the latter for fruit, but they are not so easy to get.

There are several other fertilisers besides those mentioned, and perhaps the best of them is nitrate of potash (saltpetre). It is, however, expensive, often costing fifteen to eighteen shillings per hundredweight. A large quantity is not required, $1\frac{1}{2}$ lb. per square rod sufficing. Like superphosphate, it is valuable for making liquid manure. Half an ounce of each to 2 gallons of water will make a good fertiliser for most things.

With the fertilisers here named, any vegetable grower who knows how to till his soil, and is not afraid to do it, may grow good crops of all vegetables ; indeed, he may do exceedingly well with four only, namely superphosphate, kainit, steamed bone flour, and nitrate of soda. The prices quoted are the prices I have myself paid for hundredweights and half-hundredweights. The quantities advised are those which I have found to be the best in a fairly considerable practical experience.

Speaking broadly, they are best applied two or three months prior to cropping. In the case of Potatoes and green vegetables, I have

found applying at cropping quite suitable. In the case of Kidney Beans I have found it do great harm.

The following is the most generally useful chemical mixture that I know, and may be taken as a standard :—

4 superphosphate of lime	}	The figures give the proportions of each to make up the perfect mixture ; 10 lb. may be used per square rod.
3 kainit		
2 nitrate of soda		
1 steamed bone flour

FIG. 13.—TILL WELL, MANURE INTELLIGENTLY, AND YOUR POTATOES WILL BE SOUND AND CLEAN.

Chapter 5.—A Chat about Seeds.

THE man who wanders into a seed shop in spring to buy an ounce of Parsnip seed rarely realises what a mine of interest is packed away in the drawers, bags, and pigeon-holes. The seed shop is a store-house of beautiful and wonderful treasures, more brilliant, to the imaginative man, than any bazaar. To most people it is a rather untidy place with a curious, dry, paper-and-canvas smell ; to him it is a garden of beautiful sights and sweet odours.

There is some seed the scent of which, singularly enough, is more agreeable than that of its flowers. I love to bury my face in a bag of *Nemophila insignis*—it is so piquant and delicious. *Mignonette* seed, on the other hand, has little perfume, and that not altogether suggestive of the garden.

Amongst vegetables, Onion seed carries with it more than a suspicion of the characteristic smell of this pungent esculent. Parsley is unmistakable, and so is Carrot, though I do not mean to convey that they smell exactly like the growing crops.

Seeds are very pleasant things to be associated with. It is true that there are occasional disagreeable tasks connected with them. For instance, Radish seed when stored in bulk becomes attacked by a disease which shows itself in a fine pinkish powder, and a week of sifting to get rid of this pest is not the nicest business in the world. But in the main seeds are agreeable to handle, and over and above that there is the interest inseparably associated with them as potential plants. It is absorbing to reflect on the mass of stem, leaves, flowers, and possibly fruits packed away in these tiny spheres. You packet up, let us say, Sweet Peas, and straightway your imagination tells you of the beautiful gardens these tough little balls will help to adorn. It is winter in the seed shop, a little inclined to be dreary, perhaps cold ; but the packet in your hand takes you away a-wheel into a Somersetshire lane, and between tall trees you catch a glimpse of a lovely garden ; and then, as packet after packet falls from your busy fingers, you flit from county to county, with gardens, gardens everywhere. You are in fruitful Kent, in sunny Norfolk, in a Cumberland dale, in a Highland glen, in sweet Killarney. And all this magic is worked by the seeds.

Of the early days of my horticultural training, one of the happiest memories is an association, lasting for several pleasant years, with seeds, and if I could write eloquently enough of the wondrous interest and charm which seeds possess, fewer of them would be flung into the soil as so many are now—like stones out of a cart.

A seed is a marvellous organism, and should be handled with a care almost approaching to reverence.

It is to be feared that the interest of most cultivators in seeds is of a somewhat narrow nature. Will old seeds grow, and so save the expense of buying fresh? Can seeds be saved at home? These are the main points with many. Well, they are practical matters, and so we will give a little examination to them. There is a great difference in the longevity of the different sorts of vegetable seeds. Some will retain their vitality for many years, although I might remark, in passing, that the mummy Pea is regarded in well-informed circles as an impostor.

Plump seeds of Cucumbers will grow after a lapse of several years, as will Beetroot, Cabbages, and other Greens, Celery, Lettuces, Radishes, and Turnips. On the other hand, Beans, Carrots, Onions, Parsnips, Peas, and Tomatoes are, as a rule, shorter-lived, and should not be relied on after the second year.

As a general principle, old seeds should not be trusted to, but fresh procured every year. Seeds are very cheap in these days,

FIG. 14.—HOW TO MAKE SEED POCKETS.

Take a sheet of paper about 7 by 5 inches, fold it lengthwise, leaving a margin of $\frac{1}{4}$ inch; turn this margin back to overlap the smaller section, and turn it a second time. Turn the end over as at B C in Fig. 1 from A to D. Then turn the corner as at E A in Fig. 2 from B to C, and slip it under. Treat the other end the same, and the pocket will be ready: 3 shows the front, and 4 the back of it.

and it is much the most satisfactory to get a fresh supply each year.

The saving of seed at home might be commendable if cultivators would remember the all-important fact that only the best specimens should be selected, but, as they hardly ever do, duty demands that the practice should be condemned. Stock breeders who relied upon the worst specimens of their stocks and herds for breeding would soon find themselves beaten. Only the best examples of the various crops should be chosen for saving seed from.

I know of one cultivator who has a strain of home-saved Ailsa Craig Onion which he has had for twelve or fifteen years, and which is better now than when he first got it, although it was purchased from one of the very best sources. He has maintained its excellence by saving seed only from the deep bulbs; the flat ones he has otherwise disposed of.

Few growers appreciate the many points in seed growing, saving and harvesting, or the trouble taken by the principal seedsmen in keeping their stocks good and pure; in fact, I do not see how they could possibly do so unless they had been through the mill themselves. Seed doctoring is now a thing of the past. The great seedsmen vie with each other in honourable rivalry as to who can produce the best stocks. To this end, the rows of every variety are carefully scrutinised, and plants differing from the type are noted, to be marked for future use if new and good, to be pulled out and destroyed if inferior. This process is termed "rogueing." Only by

**FIG. 15.—A
HANDY SEED
STORE.**

Get a dozen large match-boxes, glue the frames together, and glue a piece of tape to the bottom of each box. Paste a label on the front of each (see p. 41), and you have a handy set of seed drawers.

such means can the tendency to deterioration which is exhibited by all cultivated plants be counteracted.

The conditions which most affect the germination of seeds are of vital moment to every vegetable grower. There are still some of the old school who look upon the phases of the moon as the ruling power

FIG. 16.—MATCHBOX SEED STORE.

This shows the matchbox seed store (see p. 40), with labels affixed.

in this matter, but most of us are less exalted, and look earthward, leaving the moon to her own duties. There are other growers who have a calendar, and stick to it religiously. A calendar is useful as a guide, but need not be obeyed as a dictator.

The real arbiter as to the proper date of sowing is, of course, the weather. With a crisp December and January, a wet February, and

FIG. 17.—A SIMPLE BIRD SCARER.

Get a piece of tin 6 inches square (Fig. 1), cut from each corner towards the middle. Bore a hole through each corner (1, 2, 3, 4), and one in the middle. Turn each corner towards the middle, pass a long nail through the holes, and drive it into a stake (Fig. 2). This rattles vigorously in the wind.

a mellow March, sowing may go forward apace, for frost has sweetened the soil, rain moistened it, and sun warmed it. There is little gained by sowing when the soil is in bad condition, that is, very dry, or very wet, or very cold. When the soil is in the pleasant intermediate state represented by its clinging lightly, yet not pastily, to the tools, it is in the right state for sowing.

Many vegetables may be regarded as possessing a very wide range of sowing or planting season. Carrots, for example, may be

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sown from March to July, and Potatoes may be planted from February to June. Those who have warm, south borders can afford to commence operations long before those who have not. Making due allowance for this, the following table will be useful :—

Time and Depth of Sowing and Planting.

Vegetable.	Month to sow or plant	Depth, in inches.
Artichokes, Chinese...	March	3
„ Jerusalem	March, April	6
„ Globe ...	March	2
Asparagus (seeds) ...	March, April	1½
„ (crowns)...	„	4
Beans, Broad... ..	February, March, April (sometimes November)	3
„ Dwarf French	April, May	3
„ Runner ...	May, June	3
Beetroot	April, May	2
Borecole or Kale ...	March	½
Broccoli	March, April, May	½
Brussels Sprouts ...	February, March	½
Cabbages	March, July, August	½
Carrots	March, April, May	1
Cauliflow ^{ers}	April (January in boxes)	1½
Celery	February, March	½
Cress	March to August	½
Cucumbers	January, March	1
Endive... ..	March, April	½
Horseradish (thongs)	March	6
Leeks	March	1
Lettuces	March to July	½
Mustard	March to August	4
Onions	March (January in boxes), August	1
Parsley	March, June	½
Parsnips	March	1
Peas	February to May (sometimes November)	2 to 3
Potatoes, early ...	February, March, April	4
„ late... ..	March, April, May	6
Radishes	February to May	1
Rhubarb (crowns) ...	March	4
„ (seeds)	March	1
Salsify	March, April	1
Savoy... ..	March	½
Scorzonera	March, April	1
Seakale (crowns) ...	March	Just level with the surface
„ (seeds)	March	2
Shallots	February, March	Half bury the bulb
Spinach	March, August	1
Tomatoes	February, March	½
Turnips	February, March, September	1
Vegetable Marrows...	February, March	1

Four Handy Appliances for Seed Beds.

FIG. 18.—A BED MARKER.

In planting out seedlings, a piece of wood set with stout nails at the right distance apart is useful, as a number of spaces can be marked at once.

FIG. 19.—A TRANSFORMED HAY FORK.

This shows an old hay fork with the prongs turned over to form a drill maker or soil loosener.

FIG. 20.—A 3-PRONGED DRILL MAKER.

This handy drill maker is composed of a hoe socket and shaft, to the former of which is welded a piece of 1 by $\frac{1}{4}$ inch iron 2 feet long. Three holes are drilled in, and to these the three cutters are fitted.

FIG. 21.—A TRANSFORMED MANURE FORK.

This shows an old manure fork turned into a drill maker or soil loosener.

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Distance Apart and Time of Maturing.

[NOTE.—The first figure in the middle column indicates the distance from plant to plant in the rows, the second figure the proper distance between the rows.]

Vegetable.	Distance apart to allow, in inches.	Time to allow for maturing from sowing or planting.
Artichokes, Chinese ..	9 by 24	20 weeks
„ Jerusalem	12 by 36	36 weeks
„ Globe ...	48 by 48	6 to 12 months
Asparagus	15 by 24	from seed, 3 years; from 3 year old crowns, 1 year
Beans, Broad... ..	6 by 24	13 or 14 weeks
„ Dwarf French	6 by 24	11 or 12 weeks
„ Runners	12 by 72	12 weeks
Beetroot	9 by 12	15 to 20 weeks
Borecole	24 by 30	7 to 9 months
Broccoli	24 by 24	5 to 9 months
Brussels Sprouts ...	24 by 30	6 to 8 months
Cabbages, small sorts	12 by 15	15 to 18 weeks
„ large sorts	18 by 24	18 to 20 weeks
Carrots	9 by 15	18 to 24 weeks
Cauliflowers, small sorts	18 by 24	15 weeks
Cauliflowers, large sorts	24 by 30	20 to 24 weeks
Celery	9 by 48	5 to 6 months
Cress	—	2 to 3 weeks
Cucumbers	24 by 24	9 weeks indoors, 18 weeks outdoors
Endive	9 by 12	10 to 12 weeks
Leeks	12 by 24	6 to 8 months
Lettuce	6 by 12	10 weeks
Mustard	—	2 to 3 weeks
Onions, outdoor sown	6 by 9	16 to 18 weeks
„ box sown for specimens	12 by 18	24 to 30 weeks
Parsley	—	12 weeks
Parsnips	12 by 15	18 to 20 weeks
Peas, dwarf	2 by 24	12 to 15 weeks
„ medium	3 by 48	12 to 15 weeks
„ tall	4 by 72	12 to 15 weeks
Potatoes, dwarf sorts	9 by 24	14 to 15 weeks
„ medium „	12 by 30	16 to 18 weeks
„ large „	15 by 36	18 to 20 weeks
Radishes	—	5 to 6 weeks
Rhubarb	36 by 36	from seed, 3 years
Salsify	9 by 15	6 months
Savoy, small sorts ...	12 by 12	6 months
„ large „	15 by 18	6 months
Scorzonera	9 by 15	6 months
Seakale	18 by 24	from seed, 3 years
Shallots	9 by 12	15 to 16 weeks
Spinach	6 by 18	10 to 14 weeks
Tomatoes	12 by 36	16 to 18 weeks
Turnips	9 by 12	8 to 9 weeks
Vegetable Marrows ...	15 square yds. per plant	15 to 18 weeks

FIG. 22.—A GOOD DRILL RAKE.

Get a piece of oak 2 inches square, fit it to a hoe or rake handle, have four or more V-shaped cutters made and attached to the shaft by means of bolts, and you will be able to draw several drills at once.

FIG. 23.—SLUG SCISSORS.

If you have any delicacy about handling slugs when they are at work among the seedlings, have a pair of old scissors fitted with small plates as shown.

Quantities of Seed Required.

In giving a table with the object of affording a guide to sowers and planters, I would premise that a difficulty in calculating arises from the fact that it is the custom to sow some seeds broadcast and others in drills.

Cabbages, Cauliflowers, and Winter Greens generally, Celery, Cress, Endive, Lettuce, Mustard, Radishes, and Turnips are generally sown broadcast, either in boxes or out of doors, and in most of these cases I have thought it best to state the approximate number of plants that should be produced by a given quantity of seed.

Kind.	Quantity of seed to yield a given number of plants, or sow a specified length of drill.	Quantity to order of each variety for a small garden.
Artichokes, Jerusalem	90 sets per square rod	1 peck,
„ Globe ...	17 suckers per square rod	$\frac{1}{2}$ oz.
Asparagus ...	1 oz. to 50 feet of drill	$\frac{1}{2}$ oz.
Beans, Broad ..	1 quart to 80 feet	1 pint
„ Dwarf French	$1\frac{1}{2}$ pints to 80 feet	1 pint
„ Runner ...	1 pint to 80 feet	1 pint
Beet ...	1 oz. to 30 feet	1 oz.
Borecole ...		$\frac{1}{2}$ oz.
Broccoli ...		1 packet
Brussels Sprouts ...	} 1 oz. should produce 1,500 plants	$\frac{1}{2}$ oz.
Cabbages ...		$\frac{1}{2}$ oz.
Cauliflowers ...		1 packet
Carrots ...	1 oz. to 80 feet	1 oz.
Celery ...	1 oz. should produce 5,000 plants	$\frac{1}{2}$ oz.
Cucumbers ...	1 oz. should give 800 plants	1 packet
Endive ..	1 oz. should give 2,000 plants	$\frac{1}{2}$ oz.
Leeks ...	1 oz. should give 1,000 plants	$\frac{1}{2}$ oz.
Lettuce ...	1 oz. should give 2,000 plants	1 packet
Onions ...	1 oz. to 200 feet	$\frac{1}{2}$ oz.
Parsley ...	1 oz. to 80 feet	$\frac{1}{2}$ oz.
Parsnips ...	1 oz. to 100 feet	$\frac{1}{2}$ oz.
Peas, early ...	1 quart to 120 feet	1 pint
„ late ...	1 quart to 150 feet	1 pint
Potatoes, dwarf ...	} quantities by weight vary according as large, whole, or small cut sets are used.	$\frac{1}{2}$ bushel
„ medium ...		1 bushel
„ large ...		1 bushel
Radishes ...	1 oz. to 100 feet	1 oz.
Salsify and Scorzonera	1 oz. to 80 feet	$\frac{1}{2}$ oz.
Savoy... ..	see Borecole	$\frac{1}{2}$ oz.
Shallots ...	363 sets per square rod	2 lb.
Spinach ...	1 oz. to 80 feet	1 oz.
Tomatoes ...	1 oz. should give 2,000 plants	1 packet
Turnips ...	see Borecole	2 oz.
Vegetable Marrows ...	Every firm, plump seed should germinate	1 packet

FIG. 24.—A SYSTEM OF WATER STORAGE.

FIG. 25.—A BRICK FURNACE FOR BURNING GARDEN RUBBISH.

FIG. 26.—A DIBBLER MADE OUT OF AN OLD SPADE HANDLE.

REFERENCES.

- A, ground plan : *a*, frame area (24 square feet) ;
b, bed, 18 inches larger all ways than the frame
(area, 63 square feet) ; *c*, stakes at the corners.
- B, section of hotbed and single light frame : *e*,
hotbed ; *f*, linings of manure ; *g*, corner bricks,
h, material to raise plants near the glass ; *i*,
pots of cuttings or seedlings.

PICTORIAL PRACTICE.—PLAIN HINTS IN FEW WORDS.
FIG. 27.—HOW TO MAKE A HOTBED FOR A SINGLE
LIGHT FRAME.

REFERENCES.

C, ground plan: *k*, outline of frame (48 square feet); *l*, bed (area 63 square feet), 6 inches larger than the frame all round; *m*, corner stakes; *n*, area for linings of manure (including bed, 120 square feet); *p*, hedge.

D, section of hotbed and two-light frame; *q*, hotbed; *r*, faggots (only to be used on a wet site); *s*, Pea sticks; *t*, lining; *u*, corner bricks; *w*, Cucumber plants; *x*, pots of cuttings or seedlings.

PICTORIAL PRACTICE.—PLAIN HINTS IN FEW WORDS.

FIG. 28.—HOW TO MAKE A HOTBED FOR A DOUBLE-LIGHT FRAME.

FIG. 29.—A VERY SIMPLE HOTBED.

A, trench in the garden 2 feet 6 inches deep and 2 feet wide.
B, manure trodden in firmly, 1, to within 9 inches of the top.

FIG. 30.—THE TRENCH HOTBED IN USE.

C, the hotbed at work: 1, manure; 2, cuttings and seedlings in pots and boxes on Cocoanut fibre refuse; 3, light.

D: 1, manure; 2, fine soil; 3, young plants put out; 4, light.

Chapter 6.—Diseases and Insect Pests.

THE lecturer on horticultural subjects soon finds that the joint in his armour which is tested the most frequently is that bearing on his knowledge of the enemies of crops, and the means of extirpating them. He may be able to describe in minutest detail every phase in the great art of making a hole with a crowbar to grow a big Carrot, but unless he is able to present an anxious inquirer with an infallible remedy for getting rid of the Carrot's natural enemy, he will be regarded as found wanting.

Of course, the lecturer discovers this sooner or later, and then proceeds to distribute recipes broadcast. He has been doing this for some years now, and the same thing was done by horticultural editors in years gone by; but there seem to be just as many wails over the depredations of plant pests as ever there were. Either the recipes are not what they ought to be, or else the anxious inquirer forgets all about them when the time comes to put the information to the test.

There may be some vegetables that are not attacked by injurious fungi or insects, but they are very few. I have never known Artichokes affected during all the years that I have grown them, and the same may be said of Leeks. On the other hand, Potatoes, Cabbages and other Greens, Onions, Carrots, Celery, Parsnips, Beetroot, Peas, Beans, Cucumbers, Salsify, Tomatoes, and Turnips are all troubled.

In offering a few hints on the subject of combating vegetable enemies, it may be convenient if I take the several crops alphabetically.

Asparagus:—

Grubs of a slaty colour, and about $\frac{1}{2}$ inch long, may often be seen infesting Asparagus shoots in summer. They come from the eggs of a bluish black beetle named *Crioceris Asparagi*, and often do much damage. Prepare the following mixture, and dip the infested shoots in it, afterwards syringing with clear water:—

$\frac{1}{2}$ lb. soft soap.	} Mix well in a pail of warm water.
$\frac{1}{4}$ lb. flowers of sulphur.	
$\frac{1}{4}$ lb. soot.	

Beans:—

There are two enemies of Beans which surpass in mischief all others, namely the black dolphin and the red spider.

Black Dolphin.—This is the great pest of Broad Beans such as Windsors and Longpods. It establishes itself in the growing tips, and speedily multiplies itself to the extent of several thousands, or even millions. There is no earthly reason why it should do the damage it does, for if the tips of the plants are nipped out and destroyed directly the first fly is seen the enemy is completely baffled. If you do not think one insect worth killing, and wait for a few more to gather, anything may happen. A pinch in time saves nine. It might be thought (1) that the stopping would injure the plant, (2) that the dolphin would strike the plant again. The stopping does no harm whatever, rather good, by helping the plant to swell up its pods; and I have never seen a stopped plant attacked a second time, although I have watched many. In this case the cultivator has the remedy literally at his finger ends.

Red Spider.—This is the terror of the suburban back gardener, who sows his Scarlet Runners in 6 inches of gravel and trains them up a sun-baked fence. No matter what the sun or the fence may be like, Scarlet Runners will never have red spider if the soil has been properly prepared for them by trenching. So long as the roots of the plants are luxuriating in a cool bottom the plants are safe. I have never spent a halfpenny on washes for my Scarlet Runners, although the plants are not mulched, except with soil, and never have either water or liquid manure. Red spider is a result of bad culture, and nothing else.

Beetroot:—

Birds.—We cannot very well class birds as either insects or fungi, but they make themselves felt all the same. Irate gardeners are apt to declare that the sparrow is beyond classification: he is an outcast, a pariah. There are millions of sparrows around my garden, and newcomers of this feather view the place with a lively intelligence and satisfaction, as something specially prepared for their benefit. Old stagers are rather less chirpy. Sometimes a hot impulse of anger surges in my breast when I see a batch of seedlings cleared off, but no man can be cross with a sparrow long; the little bird is too cheerfully impudent in his dishonesty. Beetroot growers raise harrowing moans over the depredations of the birds. Certainly thousands of plants are pulled out every spring, and often two, and even three, sowings are made. I recommend all sufferers to invest in a few square yards of old tanned fish netting. A big piece can be got for half a crown, and with care it lasts at least three seasons. It is because I use fish netting over my Beetroot bed that the old hands (or should I say feathers?) in the select sparrow circles of the neighbourhood are more subdued than the young bloods. They have learnt something by bitter experience. Green-leaved varieties of Beet are not, as a rule, so badly punished by birds as dark-leaved sorts.

Borecole, Broccoli, Brussels Sprouts, Cabbages, and Cauliflowers:—

The three valuable Winter Greens, with their useful companion

the Savoy, also Cabbages and Cauliflowers, suffer in common from several troublesome enemies, on which I will make a few remarks.

Club-root.—This is a fungus, and its name is *Plasmodiophora Brassicæ*. It causes rough, gnarled, unwholesome swellings on the underground stem and roots, quite different from the white, ball-like growths caused by the gall weevil. It is usually very bad in light land districts, but far less troublesome where the soil is heavy. Obviously one step is to choose the heaviest soil at command, but often there is no choice, and the grower must make the best of what he has. A dressing of gas lime at the rate of 2 lb. per square yard, given in autumn or winter, left to lie on the surface for six or eight weeks, and then pointed in, is very good. Another plan is to earth up the stems when the crop is half grown, and so encourage fresh, healthy roots from the stems. Sowing in wood ashes is good. In sandy soil, where it is almost impossible to get a crop, it is often advisable to raise the plants under glass, and get them very strong before putting them out.

Gall Weevil.—I have indicated that this and the club-root are totally different things. The gall weevil, *Ceutorrhynchus sulcicollis*, is a weevil that pierces the stems of green vegetables, and may also attack the roots, while in the case of Turnips it sometimes affects the whole bulb. Eggs are deposited, and grubs hatch, which feed and form galls varying in size from that of a Pea to a marble. The swellings are usually smooth, even, and whitish. Dressing with gas lime is good as a general remedy, as advised for club-root. In the case of all Greens it is wise to look over the plants when transplanting. It is an easy matter to slice the galls off into a box or pail, and draw the stems and roots through a puddle of soot and lime.

The Caterpillar.—Late in summer large white butterflies are to be seen hovering over the Greens, and a few days afterwards a greenish grey caterpillar is seen feeding on the plants. The butterfly has laid eggs on the leaves, and the caterpillar has hatched from them. The small boy who is so fond of bringing down butterflies with his cap has a field for the exercise of his talents amongst the Greens if he can only be persuaded to interest himself in the matter. A few heavy showers do more than anything else to keep down the caterpillar. If they do not come opportunely, hand picking should be resorted to, backed up by dusting the plants with soot while they are wet with dew, or swilling them with brine. The ichneumon, a four-winged fly about $\frac{1}{2}$ inch across, is the natural enemy of this Cabbage pest. Its maggots make yellow cocoons, which should never be destroyed.

White and other Flies.—Green vegetables are often infested by aphides of one colour or another, and sometimes by the small white fly *Aleyrodes proletella*, which is called the Snowy Fly. It is almost a hopeless business to attack aphides in large breadths of Greens, and, happily, a soaking rain sooner or later comes to the rescue. The Snowy Fly is more difficult to get rid of, and I have found that

REFERENCES.

A, examples of club root in young plants of Broccoli: *a*, junction of plants with soil; *b*, sound portion of stem above ground; *c*, club or swollen portion of root-stem; *d*, tap root; *e*, fibres.

B, portion of healthy tissue from stem, showing cells with nuclei: *f*, cell wall; *g*, intercellular spaces.

C, section of a diseased part of root: *h*, destroyed tissue, usually dark coloured or blackish; *i*, exploited or swollen tissue.

D, piece of swollen tissue: *j*, cell completely filled with protoplasm of parasite; *k*, cell with protoplasm of slime fungus advancing.

E, cell of Cabbage root occupied by spores, or resting stage of slime fungus: *l*, spores discharged by rupture of cell wall.

PICTORIAL PRACTICE.—PLAIN HINTS IN FEW WORDS.
FIG. 31.—CLUB ROOT IN GREENS.

much the best thing is to remove the lower leaves of the infested plants, so as to deprive it of its shelter, and destroy them.

Carrots:—

The only enemy of Carrots which, in my experience, is a perpetual source of serious danger, is the maggot of the Carrot fly, *Psila Rosæ*. This pest almost ruins the Carrot crop in some instances. There is no reason why it should be allowed to destroy so much as a single Carrot, and the method of prevention is purely cultural. The fly lays her eggs in the loose soil round the crowns of the young Carrots, and if the soil is kept close and firm from the first she cannot effect an entrance. I have acted on the principle here involved with perfect and complete success for several years in a garden formerly very badly infested by the Carrot maggot. If Carrots are not thinned until they are half grown there is a considerable disturbance of the soil, and if care is not taken to close up the soil round the plants left in the rows the fly has matters all her own way. A rough thinning of Carrots should be done when they are only 1 inch high, and the soil then patted down along both sides of the rows with the back of a rake. The second thinning should be done when the roots removed are the size of long Radishes, and consequently nice for cooking. The soil should be firmed as before. To make assurance doubly sure, 1 gallon of gas liquor may be bought at the gasworks, diluted with 6 gallons of water, and poured between the rows. This treatment secures splendid Carrots and no maggots.

Celery.—The great Celery enemy is the small fly called *Tephritis onopordinis*, which deposits eggs between the skins of the leaf. The greyish zigzags which are seen on the leaves of Celery in summer and autumn are caused by the burrowings of the maggots which hatch from the eggs in question. The *Tephritis* seems to be an eccentric sort of creature, attacking the Celery by fits and starts. Sometimes it fires a shot or two early in summer, resumes the attack spasmodically a few weeks later, and then either retires altogether or braces its energies for a vigorous onslaught in autumn. In any case, it need do no serious damage, for the watchful cultivator may nip its operations in the bud by pinching the first patches seen between his finger and thumb. If it should escape his vigilance, and threaten to become seriously troublesome, or should he object to the tedium of pinching, let him spray the plants towards evening with "soaparite" (1 lb. of best soft soap boiled in 1 quart of water for an hour, then $\frac{1}{2}$ pint of paraffin stirred in, and the solution well churned with a syringe in 8 gallons of water). This is a much more certain preventive than dusting with soot, and if the solution is properly prepared the Celery is never tainted.

Cucumbers.—Cucumber growers have two rather troublesome foes to deal with, namely red spider and stem-canker. The first will never have a chance to gain a footing if abundance of moisture is provided; therefore, a saturated state of the atmosphere must be maintained. If the plants are allowed to suffer from drought, and the atmosphere to become arid, red spider will appear, and then the

REFERENCES.

Mint is sometimes attacked by a fungus in the manner shown here-with :

A, sprig of common or spear Mint : *a*, part of creeping rootstem, with fungus, which has advanced from below ; *b*, stem and side shoots also affected.

B, sprig at a later stage of the disease : *c*, point of detachment ; *d*, stem quite girdled by the fungus, causing the part above to wither and die.

Mint rust is impossible to cure when it once gets a good hold of the rootstock, and the best thing is to clear the plants quite away and get fresh, healthy stock.

FIG. 32.—MINT DISEASE.

leaves will lose substance, and become curled and reddish. Canker is rarely, if ever, seen attacking the stems of Cucumbers when rough, lumpy soil is used, but it is common enough when finely sifted soil is employed. Here, therefore, as in so many other instances, culture dominates the situation. Should canker show, rub in soot and lime at once.

Onions.—*Maggot.*—The maggot of the Onion fly, *Anthomyia ceparum*, is a terrible thorn in the side of kitchen gardeners. It does not, as a rule, do much damage in wet seasons, because the eggs laid by the fly on the leaves of young Onion plants are washed off and destroyed; but in dry seasons it often decimates the crop, or even ruins it absolutely. Summer sown Onions, and box sown Onions raised in January or February, are never so badly attacked as spring sown plants, and it may be taken as a fact that the stronger the plants the less they are infested. It is a first-rate plan to spray soap-rite (see Celery) over young Onions once a fortnight from the middle of April to June, choosing the evening. Little trouble is involved, and if the foliage is well coated with the mixture the fly will not lodge. All sorts of applications have been recommended, prominent among them being soot and salt, but I have found soap-rite to be the best of all.

Mould.—Onions sometimes come to a standstill quite suddenly in summer owing to being affected by a fungus, which causes greyish patches on the leaves, and makes them look as if they had been scorched. If the plants are seriously attacked they make no more growth, and at the first sign of the fungus the plants should be dusted with freshly slacked lime. I may, however, say that I have never known this disease affect Onions growing in thoroughly cultivated, deep soil.

Parsnips.—Parsnips are sometimes attacked in the foliage similarly to Celery, and the same remedies may be applied. But they are more commonly troubled by canker, which causes foul blotches on the roots. I have already said that this is due to over-manuring. The remedy is a dressing of lime at the rate of 2 lb. per square yard.

Peas.—In wet, growing weather, Peas are tolerably free from insects and fungi, but in dry seasons they are attacked by several. They are always, of course, liable to attack by other enemies.

Birds.—Netting or some sort of guard is very useful for keeping birds off the seeds and young plants. If netting is employed it should be removed before the young plants become entangled in it, and twiggy shoots from the upper part of the Pea sticks placed along the rows. These do much to baffle the birds.

Mice.—Mice will do no harm if the seeds are moistened with quassia water before being sown, or with paraffin, or with red lead after being damped with linseed oil.

Mildew.—This fungus is very bad, as a rule, in dry summers, and it may appear in wet seasons if the plants are growing in heavy, stagnant ground. The great thing is to keep the plants in healthy

FIG. 33.—A PEA PROTECTOR.

This consists of two half-moon shaped pieces of board, one at each end of the row, and black thread strung across from one to the other.

FIG. 34.—ANOTHER BIRD BAFFLER.

This is a framework of laths, 1, 2, 3, on which netting can be stretched.

FIG. 35.—A "CROSS" PROTECTOR.

One of these at each end of a row serves instead of the half-moons shown in Fig. 33 if threaded.

growth from first to last, and to secure this end the soil should be well drained and deeply tilled. Mulchings with soil and manure, and soakings of liquid manure in dry weather, are helpful in light soil. As an application to the plants, sulphide of potassium (liver of sulphur) at the rate of $\frac{1}{2}$ oz. per gallon of water, may be tried.

Thrips.—This lively little insect causes great damage to late Peas in hot, dry seasons. It attacks the leaves and the pods, and the latter curl up instead of filling. I do not believe in any mere wash for this enemy, any more than I do for mildew. Cultural steps are the best, such as deep tillage, feeding and mulching, combined with the choice of a sort that is known to be a vigorous grower and not simply a big podder. Large pods are not of much account if they do not fill. The plants must be kept growing. If they come to a standstill the thrips can be kept in check only at an expense that the value of the crop fails to justify.

Weevil.—Pea growers often complain of small grubs in their pods, especially in a dry season. The pods are pierced by a weevil when quite young, and the grubs that hatch from the eggs laid attack the Peas. The best way to ensure comparative immunity is to produce vigorous, free-growing plants by good culture, supplemented by occasional dustings with soot and lime.

Potatoes.—It would lift a weight off the minds of vegetable growers if some good genius could give us the fine qualities of the best sorts in conjunction with such vigour of constitution as sets disease at defiance. It is a consummation which we shall continue to wish for devoutly, but shall probably never see. A few dry seasons may encourage the grower to believe that his arch-enemy,

REFERENCES TO POTATO DISEASE FIGURE ON PAGE 61.

- A, infested leaf: *a*, leaflets attacked by the parasitic fungus, *Phytophthora infestans*, causing the disease in the early stages, the earliest indications of attack being the appearance of small brownish blotches on the leaves. These gradually increase in size, and are followed by a curling of the leaves. In case of a severe attack the leaves and stems become blackened and decayed in the course of a few days, and emit a disagreeable smell; *b*, brown spots on the under side of the leaves. These on the circumference bear, as seen by a pocket lens, numbers of delicate white threads—the fungal outgrowths; *c*, clean leaflet.
- B, the fungus which causes the disease in fruit: *d*, conidiophores; *e*, conidia; *f*, stomata of Potato leaf.
- C, a fallen conidium showing contents breaking up into zoospores.
- D, the discharge of zoospores: *g*, conidium with four zoospores not yet discharged; *h*, zoospores with cilia, or hairs, by which they move more readily in a drop of water, and finally come to rest; *i*, zoospore become passive and germinated; *j*, germinating or germ tube, which enters the Potato leaf, stem, or tuber, and gives rise to the disease.
- E, a conidium not broken up into zoospores, but pushing a germ tube: *k*, conidium; *l*, germ tube.

FIG. 36.—THE POTATO DISEASE.

For references, see foot of page 60.

Phytophthora infestans, has gone for ever, but a wet one dispels the sweet dream.

Potatoes are subject to several enemies, and the crop is of such importance that a little attention may well be devoted to each.

Blight or Murrain.—This, *Phytophthora*, once called *Peronospora*, infestans, which first made itself formidable in the closing years of the first half of the nineteenth century, is essentially a child of moisture. It is rarely that one sees more than a casual trace or two of it in dry, warm summers, though it is not often completely absent from a large collection of varieties. I usually grow from fifty to seventy sorts, and I cannot remember the season when a plant here and there did not show signs of a slight infestation. This is a small matter, and really it serves a good purpose, for it reminds the grower that his enemy lives on, and that he must not be lulled into a false security. In wet seasons, or during cold, humid spells, the disease is on quite a different footing, and often spoils the crop. The brown patches under the leaf, the musty smell, the collapsing foliage, all tell their story. Potato growers now have a valuable remedy at their command, and if only they will look a little ahead, have their materials ready, and keep an intelligent watch on the weather, they need suffer little loss. I have proved the efficacy of Bordeaux Mixture, and now, with a small addition of my own, am always ready to take the field with confidence. Bordeaux Mixture as made by me consists of:—

1 lb. sulphate of copper (bluestone)	} in 10 gallons of water. (1 lb. of
1 lb. freshly slacked lime	
$\frac{3}{4}$ lb. soft soap	
	cheap treacle is sometimes substituted for the soft soap.)

The bluestone, which may cost about 4d. per lb., is first dissolved in a little hot water in a wooden bucket, then the lime is stirred up into another vessel of water; finally the two are poured together, and the soft soap, churned up in a little hot water, is poured in. The stuff may be put on with a knapsack sprayer, or Abol syringe, and in order to get it well on to the under surface of the leaves, there should be two operators, one to hold back a line of tops with a Bean pole, the other to do the spraying. The grower should be on the watch in July and onwards. If continued heavy rains wash the deposit off the leaves, he must go to work again and repeat the dressing.

The following cultural points are worth observing: (1) Select well-drained soil if possible. (2) Ensure a strong, healthy plant by using good seed and practising sound culture. (3) Plant in wide ranks so as to allow of plenty of soil for earthing. (4) In moulding up, do it thoroughly and finish the ridges sharply, dusting lime on them if the weather turn muggy in July and August. (5) Whatever show sorts may be grown, take care to include one or two tough disease resisters, such as *Magnum Bonum* and *Main Crop*.

Curl in the Leaf.—In the early part of 1900 Potato growers in most parts of Great Britain observed that their plants developed slowly, and that the foliage, which was very scanty, curled, without losing its colour. Large numbers of plants never made progress, but

REFERENCES.

- A, Potato affected
by shallow
scab.
B, Potato affected
by deep scab.
C, Scab fungus,
Oospora sca-
bies.

FIG. 37.- SCAB IN POTATOES.

(See also page 64.)

remained stunted. They yielded very poor crops, and it was noticeable that the seed tubers remained almost unchanged throughout the season. The same state of affairs was observable in 1901. Such a generally reliable variety as Beauty of Hebron was one of the worst affected. Premature ripening of the seed, owing to the hot, dry summers of 1899 and 1900 was suggested as the cause, not without reason, probably. I think, however, that the cold, late springs were contributory, and I am strengthened in this opinion by the fact that in one of my plots that was badly affected a piece of Up-to-Date planted very late (the end of May) was perfectly healthy. If growers have good seed they need be in no hurry to plant in exposed places.

FIG. 38.—TWITCH IN POTATOES.

Here is a curious instance of what twitch or couch, *Triticum repens*, will do if not cleared out of Potato ground before planting. It has gone right through the Potato.

Scab.—I do not know if Potato scab has been exhaustively studied by micro-fungologists. When it does engage their attention, I shall not be surprised to hear that there are several distinct forms. One form of scab is directly due to excess of rank manure. Another (or it may be the same) is just as certainly due to contact with coarse, sharp particles, such as coal ashes or rough stones. Where scab is persistently troublesome in the absence of these conditions a little sulphur should be dusted in the drills, or the seed should be soaked in a solution of corrosive sublimate, 1 oz. to 15 gallons of water. Care should be exercised, as the sublimate is a dangerous poison.

Salsify.—After growing Salsify without trouble for several years, I was harassed by a fungoid disease in 1901. It formed small whitish pustules on the leaves, which were almost covered. Wishing to observe its progress and results, I made no attack on it. The plants appeared to grow out of the disease late in the summer, but the roots never developed to their proper proportions. At the first trace of it in future, I shall try the Bordeaux Mixture.

Tomatoes.—The Tomato as an outdoor crop is, like its relative the Potato, a creature of the weather. Given a dry, warm season, the plant sets and swells abundance of fruit, if the cultural treatment is correct. In wet, chilly years it often falls a prey to *Phytophthora*. It is a great thing to get the plants along early and strong. If the blight show itself, spray with Bordeaux Mixture.

Cladosporium dentriticum.—This disease manifests itself by yellow spots on the leaves, usually accompanied by brown patches on the under side. It is more common on indoor than on outdoor plants, and is very liable to occur when the atmosphere under glass is muggy. Free ventilation in damp weather, with a little warmth in the pipes if chilly, and spraying with Bordeaux Mixture at the first sign of an attack, represent the best preventive measures.

Sleepy disease.—Apparently healthy Tomato plants sometimes wilt suddenly, erstwhile fresh, substantial leaves hanging limp and lifeless. Rich animal manures should be avoided, and burnt refuse added to the soil. Care should be exercised in watering. The soil should be kept just moist, neither sodden nor dust dry. It is important to get seed from a healthy source. Veltha may be applied if an attack threatens to develop.

White fly.—A small, rapidly flitting white fly named *Aleyrodes vaporariorum* sometimes infests Tomatoes under glass. It is a troublesome pest if allowed to spread, and it is well worth while to hunt down and kill the first insects seen. Should it threaten to become master of the situation sulphur-wash the hot-water pipes and turn on the heat.

Turnips.—The remarks under the heading of Borecole, Broccoli, and Brussels Sprouts save me the necessity of referring to club-root

REFERENCES TO TURNIP GALL FIGURE, PAGE 67.

- A, Turnip, natural size: *a*, top, quite clean and healthy; *b*, the "bulb," white, clear in the skin, and sound in the flesh; *c*, the tap or main root, with healthy rootlets; *d*, abnormal growths called "galls"; *e*, a depressed blotch, discoloured at the centre and round the margin, caused by the decay of the flesh of the Turnip.
- B, the top of an excrescence cut off and inverted, natural size: *f*, the skin, or cuticular and epidermal cells; *g*, the flesh; *h*, a cavity or hollow; *i*, a grub—the excrescence or gall maker.
- C, an excrescence or gall from which the top was cut off, enlarged 3 diameters: *j*, the skin; *k*, the flesh; *l*, the cavity; *m*, a grub.
- D, the Turnip gall weevil: *n*, natural size; *o*, enlarged 5 diameters.
- E, the Turnip gall weevil grub, enlarged 5 times.

and gall weevil. I may, however, say a word about the flea beetle, *Haltica nemorum*. This tiny bronze black pest is a complete bar to Turnip cultivation in some districts. Moistening the seed in turpentine before sowing is recommended, but it is not a sure remedy. Vigorous dusting with soot and wood ashes in the early morning, when the enemy is sluggish, is the best cultural step.

FIG. 39.—ACONITE. FIG. 40.—HORSERADISH.

Deaths have occurred through mistaking Aconite roots for Horseradish.
The above figures show the difference between them.

FIG. 41.—TURNIP ATTACKED BY GALL WEEVIL.

For references see page 65. For other remarks see page 54.

Chapter 7.—Lifting and Storing Roots.

FROM time immemorial a feud has raged between gardeners and cooks on the score of vegetables. When placed on the table, an irate master has had to complain bitterly of inferior quality (the comparison generally being made with vegetables of the same kind

FIG. 42.—THE WRONG WAY OF LIFTING ROOTS.

- 1, a Carrot gripped by the leaves without the root being previously loosened; 2, the top breaks off in consequence, or (3) the root breaks.

recently tasted at a neighbour's house), and straightway the head of the garden and the chief of the kitchen have proceeded to lay the blame upon each other.

In all probability this time-honoured quarrel will rage for many years to come, and it is safe to say that the roots will be the bone of contention in many cases. Beetroot, Carrots, and Parsnips are all

very easily spoiled by bad culture, and just as easily by bad cooking. Beetroot is particularly susceptible. If grown in rich soil, it has a coarse, earthy taste that no culinary skill can refine ; and if carelessly dealt with at lifting time it is injured and loses sap, with the inevitable result of bad colour and poor flavour. On the other hand, the best flavoured and most carefully harvested of Beetroot will be ruined if it is punctured and prodded while in the pot.

Between gardeners and cooks, masters sometimes grow bewildered, but occasionally they are equal to the occasion. That one was who, being dissatisfied with the Beetroot served at his own table, stepped

FIG. 43.—THE RIGHT WAY OF LIFTING ROOTS.

B, a Carrot carefully loosened by a fork.

C, the tops marked for cutting (1).

D, ready for storing.

quietly into his gardener's cottage one day after he had seen a garden boy carry some roots thither, and shared his dependant's modest meal. The Beetroot on the cottage board was perfect in colour and flavour, and an erring cook was for once brought to justice.

There should be no hurry in lifting vegetable roots when the season begins to wane. Beetroot is often lifted for August (sometimes even for July) shows, but if there is no summer prize in view,

the end of September is quite early enough. By that time the foliage is generally ripe, and ready to part from the root without violent twisting.

It is often advised to twist the leaves of Beetroot off, instead of to cut them, on the ground that there can then be no loss of sap, and consequently of colour. I question the wisdom of this advice. I have known Beetroot from which the tops have been twisted lose colour very badly, with no mistake in cooking to account for it. On the other hand, I have known Beetroot from which the leaves have been cut to retain its colour perfectly.

These facts cause me to look elsewhere than in the mere difference between twisting and cutting for an explanation of the trouble. If the Beetroot is lifted so early that the leaves can only be removed by violent twisting, injury is likely to accrue. It will also follow, if, in using the knife, the crown of the root is touched. On the other hand, there will be no trouble if the leaves come off quite readily on being twisted, nor will there be if cutting is practised, so long as care is exercised to leave 1 inch of the stumps of the leaves, thus avoiding any risk of injuring the crown.

Carrots may be lifted towards the end of September or early in October, and the leaves cut in to short stumps.

Parsnips should not be lifted in late summer or early autumn unless there is urgent need. Early lifting is fatal to good flavour. There is no comparison between the flavour of roots of the same variety in October and in February. Leave them in the ground all the winter, lifting only as wanted, with a few extra now and then to anticipate a frost.

Salsify is best treated like Beetroot, and Scorzonera like Parsnips.

In using a fork to lift roots, be careful to avoid inserting it quite close to them, otherwise the roots will be pierced before the tool has penetrated very far. It should be inserted at least 6 inches away, nearly perpendicularly, and the roots gently prized or heaved out of their position, so that they can be drawn out safely with the hands. If it is worth while to spend seven or eight months in growing good roots, it is worth while to take care of them when they are produced.

There is no better way of storing roots than to build them up into a wall with layers of sand between, placing them head to tail alternately, in order to get them into as small a compass as possible, and finishing with a roof of Bracken. But sand and Fern are not always at hand, nor procurable without expense. In these circumstances, it is well to know that Beetroot, Carrots, and Salsify will keep perfectly fresh, good, and sweet if "clamped" just like Potatoes. First make a shallow pit, and line it with straw, then lay in the roots, cover them with straw, and roof in with soil a couple of inches thick. I always practise this plan, and find it the simplest and best.

Beetroot and Carrots lose their freshness rapidly if cleansed of soil when lifted and left about exposed to air, whether in the dark or in the light. Even a box of sand is not sufficient. They want to be thoroughly covered.

FIG. 44.—STORING ROOTS.

E, circle on storehouse floor covered with sand ready for first layer of roots.
 F, the first layer of roots; spaces filled with moist sand.
 G, section of a heap of stored Carrots or Beetroots, with sand in between.

Chapter 8.—Artichokes.

IN the Jerusalem and Globe Artichokes we have two vegetables that are comparatively little grown in small gardens. The latter is certainly not worth the amount of space it demands to the cottager or small-garden amateur. It is more or less of a luxury, and there is perhaps a certain amount of justification for the remark that eating Globe Artichokes is with most people merely an excuse for eating butter. The Jerusalem Artichoke is more serviceable, but it also requires space.

The Chinese Artichoke, *Stachys tuberifera*, came into prominence a few years ago. The tubers average 2 to 3 inches in length, and are spirally corrugated. They are agreeable in flavour, and, as the plant crops well, and does not make extravagant demands on space, there is no reason why it should not be grown if fancy dictates. At the same time, it would be idle to aver that this vegetable is of any real garden importance. The tubers may be planted 9 inches apart, in rows 2 feet asunder, in spring, and lifted in autumn.

Tastes differ on the score of the Jerusalem Artichoke (*Helianthus tuberosus*). Some like it, others express no partiality. It is a poor vegetable when badly cooked, but by no means to be despised when well served, and it makes a delicious soup. It contains no starch, and will therefore never boil floury.

The Jerusalem Artichoke resembles the Potato in liking a very freely worked soil. Much dung is unnecessary, in fact disadvantageous, inasmuch as it leads to coarseness, both in appearance and flavour. The best tubers for planting are those about 2 oz. in weight, and even in shape. They may be planted 6 inches deep in March or April. I find the plant serviceable for a screen, with its tall, Sunflower-like growth, and, in utilising it as such, plant the tubers 1 foot apart in a single row, but if weight of crop was the only consideration I should be disposed to give them more room. In bed planting they should have 2 by 2½ feet.

The most common mistake with this vegetable is to lift the tubers early in autumn. The growth should be allowed to die away, or, if heavy winds in autumn break the plants over, as they often will in exposed places, cut the stems through a few inches above the soil, clear away the top hamper, and leave the stools till midwinter or later, lifting a few tubers as wanted for use. A peck to each hole is a satisfactory crop, although ancient practitioners sometimes tell of having lifted a bushel in the good old days!

The seedsman can generally supply planting tubers of Jerusalem Artichokes, or failing him the local greengrocer. It is well, however, to order early, for it is an odd fact that the demand for this little-grown vegetable often exceeds the supply. The old red is a useful sort, and the newer white very good in flavour.

The Globe Artichoke, *Cynara Scolymus*, does not provide us with underground tubers, but with scaly green or purple flower heads, the size of an Orange, or bigger. These balls are cooked and served with melted butter, and the green or purplish scales are tender and agreeable. It was in Berlin that I first tasted Globe Artichokes, and a clever *chef* had served them up very tastily, but I am not going to say that even in the hands of the best of cooks they are anything to go into raptures over.

The Globe Artichoke gives us, however, another dish. It is not uncommon to cut the plants over in summer, and when the young growths which follow have pushed a couple of feet or so, to blanch

FIG. 45.—THE CHINESE ARTICHOKE.

A, top and roots.
B, how to plant.

them with straw and soil. These are called Chards.

A stock of Globe Artichokes may be secured in the first place by sowing seeds in spring, and putting out the resulting plants about 1 yard apart; but when a plantation has been made, the stock can be perpetuated by suckers.

The plants like a deep, richly manured soil, and abundance of liquid manure. If their wants are met in this direction, and they are allowed to stand 4 feet apart all ways, they will make fine clumps.

When they have finished for the year they may be mulched with fine coal ashes or burnt refuse, and litter.

Seedsmen usually offer two or three varieties of Globe Artichokes, from which the Large Green or Giant Purple may be chosen.

Chapter 9.—Asparagus.

ASPARAGUS, often corrupted in country districts to sparrow (or sparrer !) grass, is the old plant *Asparagus officinalis*, which has been known for thousands of years, grows wild in some parts of Britain, and was forced for market in this country upwards of two centuries ago.

It is often looked upon as a rich man's vegetable, and where the natural conditions are against it possibly the production of a crop is not economical. Given fairly favourable circumstances, however, it yields well with very little trouble, and I know of excellent beds on allotments.

Asparagus undoubtedly likes a well-drained, rather light and porous soil. It dislikes clay, and abhors stagnant moisture. It appreciates a saline atmosphere. On deep, sandy loams near the sea it thrives exceedingly well. It may be, and is, well grown inland, but it is not so easy to get a heavy crop on stiff as on light soils. On tenacious, ill-drained land it is almost essential to raise the beds above the surface.

Asparagus may be grown from seed with ease, and the only drawback to the plan is that the plants are not strong enough to cut from under three years, and it is best to allow four. The seed may be sown in April, in a drill 1 inch deep, and the plants thinned. In the following spring they may be transplanted to the beds.

It is a good plan to allow two rows to a bed, planting 1 foot from the edge at each side, and allowing 2 feet in the centre. This means a bed 4 feet wide. The stools may be 18 inches apart in the rows. It is a common and good plan to form a small ridge of soil where the rows are to be, set the stools on it, spread the fibrous roots well out on each side, and cover the crowns 4 inches deep.

Those who want to cut Asparagus a year after planting must procure three or four year old crowns. These are clumps of growing points and fibrous roots, 6 inches or more across. If planted in showery weather in spring, they will soon be established. They may be procured from nurserymen or seedsmen. These crowns are rather expensive, but those who want to have a bed in bearing very quickly do not always let the cost stand in the way.

The life of an Asparagus bed is a very uncertain quantity. I have known beds very elaborately made, with faggots or rubble for drainage, soil well cultivated, and alleys lined out with geometrical accuracy, yet failure has followed. And I have known the plants "thrown in," as gardeners say, and the bed succeed. In these circumstances I will draw attention to a few points which seem to me to have a rather important bearing on the question.

In the first place, rubble and faggots can only be required in wet, sticky soil ; they would be out of place, and harmful, in a soil that was naturally drained.

A young bed should be cut from with restraint. A few of the earliest shoots should be allowed to run up untouched, to encourage root action. Hard cutting, it must be remembered, has a tendency to cripple the rootstocks. No cutting should be practised after the middle of June.

There should be no eagerness to clear off the top growth in autumn. To tear it out before it is thoroughly ripe means injuring the latent buds in the soil. If an objection is raised that leaving the shoots to mature means self seeding and a bed full of young growths, I reply by pointing to the old beds of half a century or more's standing, which often flourish under just such conditions.

It is a regular practice to mulch Asparagus beds in autumn. Often good follows, but sometimes, I think, harm. Rank manure fresh out of the yard is too wet. If manure is used it should be dry and well decayed, so that it can be crumbled up and mixed with burnt refuse, thus forming an ideal top-dressing. Near the sea quantities of seaweed are often heaped on to the beds. Such beds are, however, usually well drained; moreover, the salt in the weed is beneficial.

The spring dressing of salt, which it is orthodox to supply, some-

FIG. 46.—AN ASPARAGUS KNIFE.

times does good and sometimes harm. It does good in light, well-drained soil; it does harm, often if not always, in stiff, wet land. Generally speaking, where salt is beneficial, one-fourth the quantity of nitrate of soda or sulphate of ammonia is more so.

It should be remembered that an Asparagus bed in full bearing is putting a considerable strain on the resources of the soil, therefore weeds should not be tolerated. Moreover, a little liquid manure may be applied occasionally, either from natural sources or made by dissolving $\frac{1}{2}$ oz. each of superphosphate and nitrate of soda in 1 gallon of water. A fortnightly soaking with this works wonders.

The forcing of Asparagus is not a troublesome business, but it is hardly one for the person who has to cut his cloth up carefully, as the forced roots have to be thrown away after the crop is done. Roots to be forced may be lifted in November, packed close together on a 6-inch coating of light, rich soil over a hotbed, covered with soil, and watered.

Most seedsmen offer about four varieties of Asparagus, namely, Conover's Colossal, Early Battersea, Early Purple Argenteuil, and Early White Argenteuil. The first is one of the best. The Asparagus usually thought best in British gardens is that about as thick as one's finger, with a green tip a couple of inches long or so, cut a matter of 3 inches below the surface, the lower part being white and hard.

Chapter 10.—Beans.

By one of those singular chances which set us speculating at times, there has grown up a species of social distinction between the Broad Bean (*Faba vulgaris* or *Vicia Faba*) and the Kidney Bean in its two popular forms, the Dwarf French (*Phaseolus vulgaris*) and the Scarlet Runner (*Phaseolus multiflorus*). The Broad Bean, so please you, is of the masses, the Kidney Bean of the classes. The first is a plebeian, the second an aristocrat. Refined people profess rather a horror of the Broad Bean, as a vulgar and commonplace vegetable, too gross for a delicate palate.

All this is rather stupid. Of course, it sprang from the scornful line of Wordsworth :—

And clowns eat Beans and bacon till they burst.

Had the poet never written that, the thousands of people who, fondly imagining themselves to be marked by a sturdy independence of character, nevertheless dare not for their lives acknowledge a liking for the Beans and bacon combination beloved of Hodge, would be devouring the tasty dish with a hearty gusto.

The Broad Windsor is the typical Broad Bean. The Longpod is an interloper. Of course, the latter is now quite eclipsing the old form in public favour. The Windsor has two or at most three Beans in a pod, the Longpod has six or eight at least. In all probability the Longpod will continue to grow in popularity at the expense of its rival, but it does not beat it in flavour, if it does in productiveness.

The remarks that have been made in previous papers on soil preparation, manuring, seed, sowing, and insect extermination render it unnecessary to say much about Bean culture. The man who knows how to till his land, manure it, and keep down enemies has learnt how to grow Beans. With a little information about varieties he is quite safe.

When autumn sowing was more practised than it is now the Early Mazagan was a popular Broad Bean, and it may still be used for November sowing. It is very hardy, and the sower often has the satisfaction of surveying a sturdy row of plants 3 or 4 inches high in March.

Beck's Dwarf Green Gem is another old Bean. It is dwarf, bushy, and small podded. Although it does not give the weight of crop yielded by a good Longpod, its compactness of growth and delicacy of flavour render it desirable for a sowing early in the year, say in February, if soil and weather be favourable.

Both Longpods and Windsors might be divided into two sections if necessary—white seeded and green seeded. The first section gives

as a rule, the larger pods, the second the better flavour. After growing every variety of any repute that I could get, I have come to the conclusion that there is not a great deal to choose between the selected Longpods of our leading seedsmen. Bunyard's Exhibition, Carters' Leviathan, Suttons' Green Giant, and Veitch's Exhibition are all excellent, and any one of them may be chosen with confidence. Of what may be termed standard types, the Seville is one of the best.

It is much the same with the Windsors. Selected strains are offered by all of the principal seedsmen. Taylor's and the Harlington may be taken as good types.

I have already, in a table, indicated the depth and distance of sowing, and it is unnecessary to do more than emphasise the fact that shallow and thick sowing are both bad. Three to 4 inches is the right depth to cover, and 6 inches would not be too much in very light soils. As respects distance, we are all of us inclined to be

FIG. 47.—A SUBSTITUTE FOR RUNNER BEAN POLES.

nervous about the quality of our seed when sowing time comes, and tempted to sow thickly in consequence. If the seeds be dropped in 3 inches apart, and every other plant thinned out if all grow, things will work out right.

Dwarf French Beans are a much ill-treated crop. There is often much fuss to get them sown when the end of April comes, but if the crop gets sandwiched in as to season between Peas and Scarlet Runners half of it is never eaten.

In large gardens the principal value of the French Bean lies in its value for pot culture. In my salad days Osborn's Forcing and Fulmer's Forcing, with, in a minor degree, Syon House and Sir Joseph Paxton, were the favourite varieties for this purpose. I am afraid that these old stagers have passed out of favour. To be sure they are grown still, Osborn's particularly, but *Ne Plus Ultra* and the Sutton Forcing have given them the go-by. Both are very nice pot Beans.

With a few 8-, 9-, or 10-inch pots, or boxes 4 to 6 inches deep, an early supply of French Beans may be had. If a heated pit is at

command, seed may be sown in November, but if the plants have to come along in a viery or Peach-house started in the new year January is early enough to sow. The seeds may be inserted 3 to 4 inches apart, and the plants supported by twiggy sticks. It is useless to attempt forcing French Beans in a dry, hot place, for they would be ruined by red spider.

Canadian Wonder is not yet surpassed as a general outdoor sort. It has large, pale leafage, and is a coarse grower, but crops heavily, and gives large pods. Negro Longpodded is a black-seeded sort, rather dwarfer than Canadian Wonder, and very good in every way.

The climbing French, a section of which the first representatives were Veitch's Climbing and Sutton's Tender and True, have acquired

some popularity. They do not so quickly cease growth and productiveness as the dwarfs, and are undeniably useful. On the other hand, their flavour is not equal to that of Scarlet Runners, which are in season at the same time. They require sticks.

The Scarlet Runner is without a doubt the most valuable of all Beans. It is a tender plant, and is therefore not suitable for early sowing, but it can be had in July, and under good treatment will last and yield until frost kills it in October or November.

Perhaps the earliest pods are got by lifting the old roots in autumn, storing them through the winter like Dahlias, and planting out in late spring. But I have yet to learn the advantages of the plan. If a few pods are wanted early for a special purpose, well and good, but otherwise there is no gain to a private grower in having Scarlet Runners ready before August. Up to that time he has, or should have, abundance of Peas.

It always seems to me that the period at which the Scarlet

Runner proves its value the most is in late August, in September, and in October. In the South and East Peas are difficult to get at that season, whereas with proper treatment Runners will grow, bloom, and pod incessantly.

Except in warm localities or sheltered positions, the end of May is early enough to sow. I like to drop the seeds in 9 inches apart at least, and cover 4 inches deep. It is a very good practice to sow a double row, or rather to sow two rows about $\frac{1}{2}$ yard apart, incline the poles for each diagonally so as to cross each other about 1 yard above the ground, and then lash them. Or the plants may be trained on upright poles in a single row, on strings, on fences, on arbours, and in a variety of other ways. If poles are used, they should be inserted directly the Runner shows; moreover, they should be well secured, for an 8-foot row of runners in full growth puts no light strain on its supports when swaying under the influence of a summer gale.

FIG. 49. — STORING
ROOTS OF RUN-
NERS.

This shows a bundle of Scarlet Runner roots lifted and suspended in a fairly dry, frost-proof, but cool place for the winter.

The plan adopted in some districts of keeping Scarlet Runners dwarf by pinching out or chopping off the ends of the shoots has something to recommend it. A hedge 2 or 3 feet through and the same high is produced. Poles are not necessary. It would, however, be futile to contend that crops and individual pods equal to those on unstopped plants are produced.

The Old Scarlet is the cheapest Runner, and will do very well for all ordinary purposes, but if large pods are wanted a selected strain must be grown, such as Suttons' Best of All, Neal's Ne Plus Ultra, Carters' Jubilee, or Hill's Prize. The White Dutch or Caseknife has a very large, broad pod, but white Runners are not popular.

Butter Beans are esteemed by some, and there are dwarf and tall forms (Mont d'Or). They are usually served whole, not sliced like

French and Runners.

Haricots may be left out of account as a garden vegetable.

Chapter 11.—Beetroot.

IN the Garden Beet, *Beta vulgaris*, we have a highly developed vegetable, the making of which has given our seedsmen no small amount of trouble. It and the Mangold Wurzel of the fields, *Beta vulgaris macrorhiza*, are closely related; in fact, the latter may be described as simply a large-rooted form, and herein lies the danger.

Get a poor strain of Beetroot seed from your seedsman, sow it a little too early, have the soil too rank, and behold! in your garden plot is a patch of roots that every more fortunate gardener in the neighbourhood sniggers at—roots which certainly ought to be out among the Mangolds in the fields.

In their laudable anxiety to give us good strains the seedsmen have chosen small-rooted types. These they have selected and re-selected with great care. If one hits the right time to sow, and has the ground in proper order, these selections give roots of 9 inches to 1 foot long, about 3 inches through at the shoulder, and tapering evenly down. Such roots are quite large enough for anybody. There is, however, one little difficulty with these small Beets. The grower sows at a period which experience teaches him is about right in the average of years, yet a very dry season may upset his calculations, and leave the roots only half developed.

As showing the force of this point, and the difference in "strain," I may say that with so well known a Beet as Cheltenham Green-top I have had extraordinary variations in quality in different seasons and with different seedsmen, but with the same soil. Thus, one year the roots have been models of shape and refinement, and the next as coarse as any Mangold.

It is not by any means so easy a matter as some armchair-and-inkpot gardeners would have us believe to get a perfect crop of Beet year after year. It is wise to allow for variability of season by sowing long Beet twice, the first at the end of April, the second at the middle of May. Further, it is judicious to sow two varieties, instead of relying upon one only.

As regards seedsmen, the prominent firms are to be relied upon as a rule, and sometimes one gets the best of results from the local man—but not always. If a grower finds a variety and a seedsman reliable he should stick to both.

In my early gardening days the popular Beets were Nutting's Dwarf Red, Pine Apple, and Whyte's Black. At the end of the 'seventies the first-named had a great vogue, and it is by no means played out now. Dell's Crimson appeared on the scene, however, and effected a little revolution. It is still probably the most popular Beetroot grown. Pragnell's Exhibition followed Dell's, and it is a

handsome Beet, of good shape and colour. Some of the most esteemed Beets at the present time are strains associated with the names of various well-known seedsmen. I have grown many of these, and can speak highly of the following :—Cannells' Best of All, Carters' Perfection, Dobbies' Exhibition, Suttons' Blood Red, and Webb's Masterpiece. Any of these might be chosen if one only was wanted. I have never had a better variety in my garden than Best of All.

It is pleasant to see the Turnip or globe-shaped Beets gaining favour. They are early, reliable, and of excellent quality. The Egyptian and Suttons' Globe are of proved worth.

Beetroot seed is somewhat peculiar. What we call a seed is really something more. It is a case containing more than one growing germ, which explains the surprise of a gentleman who heard of 100 "seeds" being sown, and 120 plants resulting!

For soil, management, manuring, sowing tables, enemies, and storing, see previous articles.

Chapter 12. — Borecole, Broccoli, Brussels Sprouts, and Savoy, collectively known as Winter Greens.

NOTHING is more interesting than to speculate on the stages by which garden vegetables of choice strains have been developed. Look at the original Brassica oleracea, and marvel at the processes by which have been evolved the garden Cabbage, the Brussels Sprouts, the Cauliflower and the Savoy. The vegetables named are modest and homely enough, but there is a fascinating study wrapped up in their leaves and flowers.

A person of receptive and inquiring mind can never sow a patch of Sprouts without a sense of gratitude to the patient and far-seeing men who devoted themselves to the task of making apparently worthless plants valuable. It was a long, slow business, and the work is yet unfinished. It may be true that the best types which we have now have reached a point at which it is difficult to effect any improvement, but it must be remembered that they have to be maintained. This is almost as difficult as developing them. All highly bred plants, whether they be Cabbages or Carnations, have a strong tendency to degenerate, and unless closely and persistently watched the stocks deteriorate with alarming rapidity.

The four vegetables named at the head of this chapter are examples, and exceedingly valuable examples, of what has been done. We realise their importance only in those seasons when

cultural neglect and inclement weather have combined to deprive us of them.

Borecole :—

The "Cottager's Kale" is perhaps typical of this useful class, and with its many companions, such as the Dwarf Green and Tall Green Curled, the Asparagus, and the Hearting, it gives us a very valuable group for spring use. We must remember, too, that the Kales are ornamental as well as useful. Once, in the years gone by, I recollect suddenly coming upon a bed of coloured Kales in a village garden in Holland, and having no expectation of seeing any such thing, and being smitten with a lively admiration, I stood and stared longer than good manners would have tolerated in this country. However, Mynheer is a different animal from John Bull. He likes all that he has in the way of worldly things (except his banking account) to be minutely and thoroughly surveyed.

Borecole is so simple a vegetable to grow that remarks on culture seem superfluous, even if brief. A sowing in March or April, a transplantation 30 inches apart in May or June between Potatoes or in the open—this about sums it up.

Pickings from Kale rows may often be got in autumn and winter, but Brussels Sprouts and Savoys ought to supply early Greens; the season when the Borecole proves its value most is late winter and early spring. The young, succulent shoots which begin to push with the strengthening heat are sweeter far than the old leaves.

Of the curly Kales I like Suttons' A1 the best. It is a fine, handsome, upstanding plant. Arctic and Cottager's are both very hardy. Asparagus Kale gives tender little sprouty hearts in spring.

Broccoli :—

People come to grief with Broccoli because they will treat it like Cauliflowers. Botanically the same, the two plants are, culturally, wide asunder. To grow a Cauliflower well you want a deep, rich, loose, moist soil; without it, the plants "button." Now, let a man who wants Broccoli to stand the winter grow his plants through the summer in deep, rich, loose, moist, soil, and he will very likely be left lamenting.

It is because people insist on treating Broccoli like Cauliflowers that so few of these delicious vegetables are seen in gardens and allotments in spring. The order of use for Winter Greens should be: Autumn, Brussels Sprouts; early winter, the same, with Savoys; late winter, Kales; spring, the same, with Broccoli. Generally it works out: Brussels Sprouts, Savoys, Kales, nothing.

There are plenty of varieties of Broccoli which have the elements of hardiness in them. What they want is bringing out. Now, the bringing-out process is not effected by growing the plants as large as possible; rather it is suppressed. To get Broccoli hardy the plants should be raised sturdily and then grown in firm, rather poor, soil.

There is no occasion to raise spring Broccoli in heat; on the contrary, it is a mistake. The very most that should be attempted

A, Green thinned and transplanted, hence sturdy.

B, trowel for lifting.

C, well planted.

D, poor, drawn plant.

E, dibber with which roots are put into a long, narrow hole—not good.

PICTORIAL PRACTICE.—PLAIN HINTS IN FEW WORDS.

FIG. 50.—HOW TO PLANT GREENS.

in the way of nursing is a box and a cold frame, and this should only be tolerated on those dry soils in which, summer planting being out of the question, May or early June planting becomes advisable. Generally, an outdoor sowing in March and another in April settle the question.

Writing, as I do, after a cycle of dry seasons, I am fain to incline a sympathetic ear to those who speak of getting their Broccoli along fairly early. After a series of years, in which a sun-baked, iron-bound soil has rendered summer planting a very unsatisfactory business, it is natural that growers should want to have their plants ready for putting out in May. There is no harm in it, provided the soil is not so loose and rich as to encourage rapid, soft growth—then there is every harm in it.

If Broccoli plants are put between Potatoes, it should be between early, short-topped varieties; and when the Potatoes are removed the soil should be rammed firmly around the Broccoli.

There are now Broccolis to give a supply for eight months in the year, but many do not trouble about autumn sorts, preferring to rely upon Cauliflowers. It is from March to May that Broccolis are most useful. Leamington and Late Queen, with change dishes of Purple and White Sprouting, will cover the period. I may, however, mention a few other varieties which I have grown, principally connected with the names of prominent seedsmen. Cannells' Early Spring White and Cannells' Late Spring White have proved to be valuable stocks, giving, between them, a supply of delicious hearts for many weeks. Carters' Spring Mammoth is a large and good sort. Suttons' Eastertide is a splendid mid-spring Broccoli.

Brussels Sprouts:—

A long, steady season of growth in a firm, not very rich, soil will give firmer and sweeter Sprouts than one violent electric-car rush, although it may not give them so large. I have tried the rush system for experiment's sake, and lived to thank my stars that the other system was in force at the same time. I have pushed giant Sprouts along, and had them 1 yard high in June, only to see them yield loose clusters of leaves in the place of nobs, or serenely run to seed.

There is no objection to sowing Sprouts in February or early March; in fact, early sowing is good. There is no objection to getting Sprouts out in May; on the contrary, that is often good also. But always rather poor soil, well solidified, must be the rule, and if the plants are put between Potatoes, the soil should be thoroughly trodden directly the tuber is cleared away.

All Greens are better sown in lines than broadcast; then, with a little attention to thinning now and again, a quarantining under netting when birds are busy, an occasional soaking and dusting with soot, sturdy, stiff-stemmed, short-jointed plants are secured.

It is a mistake to cut away the tops of Brussels Sprouts until the plants are quite denuded of stem produce.

Of many varieties grown, I am disposed to choose Imported,

FIG. 51.—HOW TO RAISE CABBAGES OR OTHER GREENS FOR WINTER AND SPRING.

A, a bad start, the plants being crowded.

B, a good start, the plants having plenty of room.

(See also page 87.)

President Carnot, or Suttons' Matchless for general use. Suttons' Exhibition is superior to any of them for show, but it is not so good in flavour as Matchless. Aigburth is a large, popular, and useful Sprout.

Savoys :—

The Savoy Cabbage is the early winter Green. The old tradition that it must have a frost on it before it is at its best has truth in it, though many misread it. Savoys sown in March or April, and planted 24 to 30 inches apart, either between Potatoes or in open quarters, in May or June, give useful produce in December and January.

The old Drumhead is too coarse for the modern garden, but the Dwarf Green Curled is just the thing. Early Dwarf Ulm and Suttons' Perfection are also good sorts.

Chapter 13.—Cabbages.

It is a poor kitchen garden that has not its bed of Cabbages in spring.

The Cabbage (*Brassica oleracea*) is a vegetable that can hardly be excelled in usefulness by any other that is grown. Most people make more fuss about the first new Potato than about the first spring Cabbage, but I doubt if they really enjoy it more, and I am quite sure that it does not do them so much good.

The capable vegetable grower schemes things so that his Cabbages just fit in with, or slightly overlap, his Broccolis. I mean he arranges that before the last Broccoli is cut there shall be sweet young Cabbages ready. Sometimes his plans go wrong, and then there is a much-felt gap.

There are lucky people in this world who can sow Cabbages in July or August, and cut them the following February or March. All are not so favoured with soil and climate, and are very well satisfied if they are able to begin cutting in April. In cold soils and bleak, wind-blown districts Cabbages from summer sowings are often not in till May, which is uncomfortably late.

The most irritating thing that befalls the spring Cabbage grower is "bolting," or running to seed. Sometimes one or two plants in a bed go, sometimes nearly the whole of them. Bolting is very liable to occur where a mild, wet autumn and early winter follow a dry summer. The plants first languish through the drought, and are then pushed along at a great pace by the wet, thus making most of their growth at the wrong time. The experienced grower can tell very early in the bolting stage what is going to

FIG. 52.—HOW TO RAISE CABBAGES AND OTHER GREENS FOR WINTER AND SPRING.

C, the result of a bad start; drawn, leggy plants.

D, the early reward of a good start; strong, dwarf plants that will stand the winter.

E, soil drawn up to the stems on approach of winter as a means of protection.

happen, and if he is on the alert he may perhaps be in time to avert the catastrophe by piercing the stem with the point of his knife just beneath the lower leaves, and passing the blade right through, thus forming a slit ; but the plan is not always successful.

It should be remembered, however, that some varieties are always much more liable to bolt than others, and this brings me to an important point—the selection of sorts. Three very fine Cabbages to sow for a spring crop are Ellam's Early, Suttons' April, and Webb's Emperor.

The spring crop of Cabbages may be accelerated in two ways : by commencing to hoe early in the year, and by applying a little nitrogenous fertiliser, such as nitrate of soda or sulphate of ammonia, at the rate of 1 oz. per square yard (*see Manures*). It is necessary to utter a word of warning regarding the use of these stimulants. Be very careful to keep them off the leaves. So very powerful are they that even when the salt has been instantly shaken off the leaves on which a few particles have fallen the foliage has browned.

Cabbages are not held in much esteem as a summer crop, but have their value in autumn. To come in then a sowing may be made in April or early May. The little St. John's Day Drumhead is very nice for this purpose, and a village gardener once remarked to me, with ill-concealed gusto, that it tasted like pickled pork and Cabbage together ! This may or may not recommend it to the reader.

There are many excellent strains of Cabbage for spring sowing. I cannot say that any particular one is better than all the rest, but after testing many I can confidently say that any one of the following may be chosen with the certainty of giving satisfaction : Carters' Heartwell Marrow, Daniels' Defiance (if a large one is wanted), Improved Nonpareil, Mein's No. 1, Suttons' All-heart, and Wheeler's Imperial.

While on the subject of Cabbages, one or two connected crops may be mentioned.

First there are the Coleworts, Hardy Green, and Rosette, the latter for choice. These may be sown in May for giving sweet and useful bunch greens.

Then there is Couve Tronchuda, the Portugal or Braganza Cabbage. We all know that Charles II.'s consort came from Braganza, but we do not all know that a somewhat peculiar Cabbage comes from there. The large leaves have very thick midribs, which form an agreeable dish, and cause this variety to be spoken of as the Seakale Cabbage at times. Seed should be sown under glass early in spring, and the plants put out in rich soil.

Thirdly, there is the pickling Cabbage, of which the Red Dutch is a good variety. This should be sown in August to give massive hearts the following summer.

Chapter 14.—Carrots.

"THE easiest vegetable in the garden to grow," says the man with a deep, light, sandy soil. "About the worst you can have to do decently," grows the one with tenacious clay.

Carrot culture is a much more simple business in friable than in clinging soil, and if the ground is not naturally suited to the crop, the task of making it so is often undertaken with grumbling. Long Carrots of fine "grain" and rich colour are grown on the Surrey and other sands, and on the alluvial soil of the Lea and Medway valleys ; moreover, they are produced without much labour. To get equal

FIG. 53.—GROWING CARROTS ON RIDGES.

The left-hand ridge at the top shows the soil drawn up, the others show drills made ready for sowing.

quality on stiffer stuff the cultivator has to exercise his ingenuity and his muscles.

There are three ways of achieving the object in view. The first is to trench the ground, the second is to make holes with a crowbar and fill them up with fine potting soil, the third is to make ridges.

The trenching system is attended with such excellent results that it may always be safely recommended for general adoption on the lines already laid down in this book, but it may be usefully supplemented by one of the other plans. Long, symmetrical and clean Carrots may be secured by making holes 30 inches deep, filling them up with loam and sand, sowing three or four seeds in each, and thinning the plants down to one.

The ridge system is less familiar, and although it does not yield such fine individual show roots, it gives a heavy and clean crop with trifling trouble. By resorting to it on the Wealden clay I have

doubled my crop and set the maggot at defiance. The following is the way to go to work : Early in spring fork the ground over, so as to give plenty of loose, finely pulverised earth, then set out the line, and with a draw hoe or other handy tool draw the soil up into a mound 1 foot high and as much through at the base. Make it straight and even, and then, holding the tool in a horizontal position, press the handle into the top of the ridge to a depth of about 1 inch ; this forms a drill. Sprinkle the seed in thinly, and cover it by breaking over the top edges of the drill.

When the young Carrots are 1 inch high thin them, and press the soil close round the crowns of the plants which are left. Thus treated, the fly is kept out, and the young plants are given plenty of room to swell. After the next thinning, which should be when they are of the size of a Radish, and when they may be left 6 inches apart, close the soil up as before. By this simple plan grand crops of Carrots may be grown.

I have sometimes been asked if Carrots thus grown do not suffer from the ridges becoming dry. No. I take care to sow when the soil is thoroughly moist, and this gives the plants a good start. Subsequently, the luxuriant leafage which the healthy and vigorous plants throw up shades the ridges. Carrots grown in this way on the same plot, and of the same variety, as others on the flat, have given a far superior crop.

Carrots grown on the flat will yield good roots if the soil is deep and friable, if manure is kept away from them, if they are thinned early, and if the soil is always kept close at the crown. Gas water, at the rate of a gallon to six gallons of water, is splendid stuff to pour between the rows.

The types of Carrot have greatly improved in the last twenty years. Early Nantes, James's Intermediate and Long Red Surrey, the champions of my boyhood, have given place to improved varieties, but the French Forcing is still grown largely in frames. It is difficult to say which is the best in the various sections, as all the great seedsmen have furnished themselves with excellent strains. Amongst early short Carrots I have grown, and been satisfied with, Bunyard's Stump-rooted, Cannells' Improved Guerande, Carters' Summer Favourite, Daniels' Scarlet Perfection, Suttons' Early Gem, Suttons' Champion Horn and Veitch's Model. I should not mind which of these I had if I were obliged to restrict myself to one. Of Intermediates, I have had the best results from Daniels' Telegraph, though Bunyard's Exhibition and Suttons' New Intermediate are grand strains. Of long Carrots, Carters' Red Elephant and Veitch's Matchless are perhaps the pick. The latter is a beautiful root.

REFERENCES.

A, *a*, plants unthinned; *b*, plants thinned.
 B, *c*, *d*, unthinned and thinned plants at a later stage.
 C, developing well. D, ready for the show.

PICTORIAL PRACTICE.—PLAIN HINTS IN FEW WORDS.

FIG. 54.—HOW TO GROW FINE CARROTS.

Chapter 15.—Cauliflowers.

THEORETICALLY, the Cauliflower should be one of the easiest vegetables to grow that the garden contains ; practically, it is one of the most difficult.

A plot of ground, a spade, a heap of manure, a tub of water, a packet of seed—what more is wanted ? In theory, nothing ; in practice, a great deal.

The Cauliflower has very pronounced likes and dislikes with regard to soil, and they often take a somewhat peculiar form. Thus, the famous soil of the Swanley district, which produces splendid Strawberries, becomes Cauliflower sick in a year or two, while on the stony hill at Kingsdown, a few miles away, huge crops of Cauliflowers are cut year after year. What is more, finer heads are harvested in the fields than can be got from the garden.

This goes to prove that all cultivators cannot grow Cauliflowers equally well, yet there are certain points well worth attention. In the first place, the Cauliflower is very fond of moisture. A dry, hungry soil is death to it. In the second place, it enjoys substantial fare, so that there is every encouragement to liberally feed the soil. Thirdly, it likes to go with a swing from start to finish of its career, so that checks should be avoided.

Many people do not care for summer Cauliflowers ; those who do may sow under glass in January, and the plants resulting should head in June or July. Everybody, however, likes Cauliflowers in autumn ; and during October and November, when Peas and Beans are nearly or quite over, they are invariably very welcome. They can be got by sowing in a frame in March, or outdoors in April. It is good to have a few sturdy plants about 6 inches long ready to put out in May, and another batch ready to go out about the middle of June.

All seedsmen now have a strain of small Cauliflowers which they call Extra Early Forcing, or some such name. It varies with the seedsman in some slight degree, but not much, as a rule. Nor do the Cauliflowers vary much either. Nearly all these give heads of similar type—about as large as a cricket ball, fine grained, and milk white.

To come a little later than these, Early London or Snowball may be chosen, then a little later still come Daniels' King, Eclipse, and Suttons' Magnum Bonum, and for the latest crop we have Veitch's Autumn Giant, and others of its type.

See sowing tables for depth and distance, and chapters on insects and manures for other cultural points.

Chapter 16.—Celery.

A TANTALISING vegetable is *Apium graveolens*. It excites the palate of the dyspeptic, and ravages his internal mechanism.

Raw Celery is not for all the world, yet for those who can digest it the nut-flavoured sticks have a charm all their own. The rest must make shift with it as a cooked vegetable, and most delicious and wholesome it is. Nor must the Turnip-rooted Celery, *Celeriac*, be forgotten. It may be used either raw or cooked, and is very easily grown.

In the remarks that I have made on soil preparation and manuring, I have already dealt somewhat fully with Celery, and, except for a few remarks on sowing and earthing, I may epitomise its treatment.

Many people sow their Celery too late, and then have to force it along with dung, and spend a great deal of time in watering, to get it right. The first sowing should be made about the middle of February, and with a little bottom heat (not indispensable, however, with new seed; I have had Celery ready to plant in June from a cold-frame sowing in February) there is no doubt about having plants ready in time. I strongly denounce thick sowing, for it necessitates early pricking off, and no Celery plant should ever be touched until it has pushed at least two rough leaves.

Soon after the seed is sown the trenches may be made. Of course, most people leave this operation until five minutes before they want to put the plants out, and then do it in a desperate hurry; perhaps, in their tardiness, missing a lovely shower, which would have sent the plants spinning along in glorious style. If the ground is vacant there is no objection whatever to preparing the trenches early, and there are many things in favour of it. With plenty of time, the job is done in a more workmanlike way than when it is rushed. The soil is sweetened by exposure, and becomes more fertile.

The general way of making a Celery trench is to throw out 1 foot of top soil, and put the Celery in the sub-soil. This is wrong. It is true that fine Celery is grown when the plan is practised, but only at the cost of working in a great deal of dung, which means time, labour, and expense. The trench should be made $1\frac{1}{2}$ feet deep, 9 inches of the top soil being thrown out on one side of the trench, and 9 inches of the bottom soil on the other. When planting time comes the top soil should be put back for planting in, because it is the best, and the sub-soil, which is inferior, should be sprinkled with superphosphate, and left to improve; it will eventually come in for earthing.

By this simple plan, excellent Celery can be grown with a little bone flour and nitrate of soda (see "Manures"), and it will be much

sweeter than the larger, coarser stuff from the dung pit—an abomination which no person of refined taste, and with a knowledge of the horrors of typhoid, would tolerate.

As a swamp plant, Celery is very liable to throw up suckers, but these should be picked out before they develop, or they may spoil the sticks.

It almost goes without saying that in dry spells good soakings of water or liquid manure (sewage or artificial according to taste) will be very helpful.

A few words as to tying and earthing. There is no gain in earthing Celery early, but there is in tying. Some people earth Celery in August or September because they see other people doing it, and quite regardless of the condition of the plants. If, however, the plants are backward they should not be earthed, unless there is danger of frost, because earthing checks growth. Celery that is barely a foot high in September will often make good sticks if a couple of ties are made, one nearly at the base of the plants, the other just under the leaves. Raphia is the best tying material, and it should be drawn tight enough to bring the stems together, without packing. In October, or whenever frost threatens, the plants should be earthed.

While soil is a great protector of Celery, and plays an important part in keeping out frost, its primary purpose in the case of early Celery is, of course, blanching. Now, Celery can be thoroughly blanched in much less time than most people think. A period of a month to six weeks usually suffices. Therefore, earthing need not be hurried, but may be done with due allowance and deliberation.

It is common to unloose ties when earthing, on the ground that if it is neglected the hearts of the plants will rot. I have not seen any such dreadful result follow a casual forgetfulness in the matter, but the principle is good, and may be acted on. Care should be taken, however, to keep earth out of the hearts. Earthing should never be done when the soil is very dry or very wet. When it is moist and crumbly it is right. Putting dry earth to the base of the plants, and then sprinkling a few drops of water on the top, is not uncommon, and frequently leads to "bolting" (running to seed). At the first earthing the soil should be placed round the plants up to a point just beneath the leaves. This will probably fill the trench. The soil should be made fairly firm, but not absolutely solid, or future growth will be small. When the growth has extended another 6 inches or so a second earthing may be given, which will take the mound above the surface. Later, a good baulk may be built up for protection's sake; and in hard weather some clean, dry litter should be scattered over the tops of the plants, or frost may set up decay, which will develop downwards.

The single-trench system is the most popular, and is the best for fine produce. There is no serious objection, however, to having any number of rows up to half a dozen in one trench where large quantities are wanted, and where space is limited. Tying and

earthing are not so conveniently performed in a six-row as in a one-row trench, but they can be done, all the same.

It goes without saying that our seedsmen have provided us with plenty of sorts. Amongst early whites, the Sandringham Dwarf White, successor to that excellent old-timer, Turner's Incomparable Dwarf White, is still one of the best. Carters' Solid Ivory is also excellent. Amongst early reds, Major Clarke's is as good as any.

FIG. 55.—A METHOD OF PROTECTING CELERY.

The top figure shows forked sticks inserted at every yard length; the bottom one shows straw mats fixed in a sloping position against them.

Later and larger sorts of fine quality are Leicester Red, Standard Bearer (red), Suttons' Sulham Prize (pink), and Wright's Giant White.

Celeriac may be raised in the same way as Celery. It is not necessary to give it a trench, but a slight earthing is an advantage when it approaches maturity. It likes a fertile soil, and liquid manure.

Chapter 17.—Cucumbers.

THE succulent and seductive Cucumber, *Cucumis sativa*, has no pretensions to nutritive value. There is only one honest reason for eating it, and that is because you like it. It is indigestible, and therefore a terror to all who have weak stomachs. It is nearly all water, and consequently has little sustenance in its enticing anatomy. With the exception of sugar, which is present in the proportion of about two per cent., its nutritive elements are represented by insignificant fractions.

In spite of these facts, which ought to be damaging, but are not, for the reason that people ignore them, Cucumbers are devoured by the million, and will be to the end of the chapter. We are told that Cucumbers are the most difficult to digest when thinly sliced and served in vinegar, and that they are not so bad if cut up in chunks. Unfortunately, it is in the first way that they are most appetising.

Happily for the Cucumber lover, there is a wide range of varieties, and the man with no pit or frame can select a sort which will thrive out of doors.

There is just one little initial difficulty to those who have no glass, and that is starting the plants. A temperature of 65° to 70° is desirable for raising the stock. If there is no chance of securing bottom heat, or a warm house, perhaps a friend better situated will lend a hand, or plants may be bought.

Unless Cucumber seeds are quite plump, they should never be sown until they have been subjected to a steady pressure with the finger tip while lying on a board. If they are hollow, and therefore worthless, they will at once crackle and collapse. The pointed end of the seed may be placed uppermost. It is a common and good plan to place each seed in the centre of a 3- or 4-inch pot, then there is no fear of the plants becoming crowded.

If the plants are to be grown under the roof of a pit or other house they should not be stopped when young, but allowed to go ahead, and staked. Ridges of soil should be made for them, about 2 feet apart, and the compost should be rough and lumpy, and finely pulverised. Three parts of turfy loam and 1 part of decayed manure will grow Cucumbers well; so will the loam with a pint of superphosphate or bone meal to each bushel of it.

It is not wise to make large ridges at first, as there is a danger of a considerable bulk of soil becoming sour before it is well occupied by roots. Half a peck, or a little more, is enough to start with, and more can be added as the roots show. The plants should be ready for putting out when they are about 1 foot high, and they ought to be stout in the stem and close-jointed.

REFERENCES.

- A, Cucumber seed, natural size.
 B, section of 3-inch "long tom" pot: *a*, one large crock fitting level; *b*, rough compost; *c*, soil; *d*, seed; *e*, fine soil; *f*, space for top-dressing.
 C, section of 3-inch "long tom" pot: *g*, top-dressing; *h*, space for water; *i*, radicle; *j*, seed leaves (cotyledons); *k*, second or "rough" leaves; *l*, growing point (plumule), or ascending axis.
 D, section of 5-inch pot: *m*, drainage—one large crock with others to make level; *n*, cinders or other rough material; *o*, rough compost; *p*, soil; *q*, seeds placed about 1 inch apart; *r*, covering of fine soil; *s*, space for water; *t*, square of glass, to be removed as soon as the seedling appears.
 E, section of 3-inch pot, showing stage at which to pot off the seedlings when several seeds are sown in a pot: *u*, drainage; *v*, rough compost; *w*, soil; *x*, space for water.

PICTORIAL PRACTICE.—PLAIN HINTS IN FEW WORDS.

FIG. 56.—HOW TO RAISE CUCUMBERS.

There is not much art in training and pruning Cucumbers, but a little judgment is necessary in order to prevent the space from becoming overcrowded, and to have it well covered with fruiting shoots. Cucumbers need no artificial setting, unless seed is required. In order to cover the wires quickly, let the leading shoot go up until it is nearly at the top and then stop it. While it has been extending, side shoots will have pushed freely, and may be trained right and left. Short breaks from these, termed sub-laterals, will show in abundance if the atmosphere is warm and damp, and will produce fruit. Each bearing shoot may be stopped at the first leaf beyond the fruit.

It is well to cut the Cucumbers before they have swollen to a very large size, in order to ensure a continuous supply. When the plants are in full bearing liquid manure may be given with advantage.

There are perhaps more Cucumbers grown on hotbeds than in houses. They cannot be had quite so early, but otherwise they are just as good. If a bed is made in winter it has to be a very large one, and therefore a great deal of manure is wanted. If made up in spring much less will suffice. In either case the same care must be taken to turn and sweeten the manure and to build up the bed firmly and evenly. The lights should not be put on until a candle will burn within the frame, thus showing that the air is sweet.

It is well to stop a young plant intended for a frame at the first rough leaf, as this will induce it to push other growths, and these can be taken up the frame, or trained from the centre towards the corners if the Cucumber is planted in the middle. In either case the Cucumber should be planted on a mound of lumpy soil, and the growths stopped 1 foot from the extremity of the frame. Fruiting shoots will then form in abundance. It is necessary to give a little attention to thinning, in order to prevent the space becoming overcrowded.

Cucumber plants will not, as a rule, canker at the collar if the soil is lumpy; should a sign of this disease show itself, rub in soot and lime. Nor will they suffer from red spider if the atmosphere is kept humid. Aridity will bring the enemy out in strong force. There are complaints sometimes of bitterness in Cucumbers, but I think these are the most common when the plants lag. If they are pushed along briskly with plenty of heat and moisture, and sustain no check, either from want of heat and moisture or from the attacks of enemies, they will be sweet.

Outdoor Cucumbers are sometimes planted out between Peas in June. It is not a bad plan, because the Peas give shade and coolness until the Cucumbers have got a good hold. If raised similarly to the others and planted out, like Vegetable Marrows, after being well hardened, in good, well-tilled soil, they usually thrive, but a dry spot will not do, because red spider will run riot over them.

Two of the best indoor Cucumbers are Improved Telegraph and Lockie's Perfection. Two of the best outdoor sorts are King of the Ridge and Stockwood.

REFERENCES.

F, plant at stopping stage when intended for frame or pit planting: *y*, growing point pinched off; *z*, laterals from axils of seed leaves; *a*, laterals pushing from axils of rough leaves.

G, plant which, after being stopped and pushing laterals as shown at F, has been shifted into a 6-inch pot from the 3-inch to prevent it from becoming rootbound: *b*, ball of soil and roots; *c*, fresh pot filled with roots; *d*, laterals stopped at second joint to induce a branching, fruitful habit.

H, plant shifted from 3- into 5-inch pot and intended for planting in a pit or house and training to a trellis: *e*, ball; *f*, 5-inch pot well filled with roots, plant at the right stage for planting in the fruiting bed; *g*, stake; *h*, laterals which ought to be rubbed off whilst quite small.

I, plant after planting out: *i*, soil or bed level; *j*, seed leaves joint; *k*, joints from which laterals have been rubbed off, this to be practised until lowest wire of trellis is reached; *l*, tendrils nipped off; *m*, lowest wire of trellis, growing point of plant pinched off if desired that it should divide into two growths, the laterals not being removed from two joints below as shown.

PICTORIAL PRACTICE—PLAIN HINTS IN FEW WORDS
FIG. 57.—HOW TO STOP CUCUMBERS FOR FRAMES AND HOUSES.

Chapter 18.—Leeks

I AM constantly singing the praises of the Leek, *Allium Porrum*, because I think it is a better friend to the kitchen gardener than he realises. When is a nicely cooked dish of Leeks other than appetising? When do the plants give trouble in cultivation, or become riddled by insects, or get damaged by inclement weather? So far as my personal knowledge goes, "Never" is the only answer.

Northerners make too much of Leek culture, Southerners too little. It is not necessary to gorge a trench with tons of dung to get serviceable Leeks. Exhibition sticks may call for much elaboration of treatment, ordinary ones do not.

The simplest of all methods of growing Leeks is to sow the seed in a drill in March, thin the seedlings directly they begin to crowd each other, drop the plants into holes made with a dibber 1 foot by 18 inches apart when they are 6 inches high, and earth them up in September. If this is not plain work I should like to know what is. Do not think that nothing but poor, half-grown sticks are secured by this simple plan. As a matter of fact, really good Leeks can be secured by it, provided the soil is well tilled. It is unlikely that anything else will be required afterwards than to eat the produce. Neither bird nor beast, neither storm nor frost, will hurt the plants. They will blanch steadily, and remain in the ground ready for use whenever they are wanted in winter or spring.

If very large Leeks are required, grow them in a heavily manured trench, and feed them up with liquid manure. To get the plants forward, sow them in a box in January or February.

I should set a bad example to the cultivator if I wrote a long chapter on Leek growing. That is to say, I should, by making a long-winded business of it, lead him to think it necessary to go into details of cultivation which will not affect the ultimate issue one iota.

I may, however, add this: No amount of good culture will give large sticks if poor varieties like the London Flag are chosen. The grower should choose Musselburgh or The Lyon at the least. If he wants large show stuff he must select a naturally fine variety like Carters' Holborn Model, Dobbies' International, or Suttons' Prize-taker, all of which are well known to me by culture in my own garden.

Lastly, do not start eating Leeks very early in the autumn; they improve with age. And if you know of no better way of cooking them, try putting them in a covered jar with a little butter, but no water, and baking them for two or three hours in an oven or on a hob. They will make their own juice, and prove tender, delicate, and delicious.

Chapter 19.—Mushrooms.

THE Mushroom (*Agaricus campestris*) is an elusive fungus. It will flourish amazingly in some places, and in others will absolutely refuse to respond to the coaxing of the cultivator.

I once knew a man whose place—it was in a suburb of London—was so alive with spawn that Mushrooms seemed to fly up everywhere, whether they were wanted or not. On the other hand, I have known plenty of people take no end of trouble to get a crop, and fail.

To take pains is, of course, a capital trait in any person's character, but it is not enough in itself, for the unhappy grower may be working in the wrong direction. No trouble will compensate for unsuitable manure, or bad spawn bricks. So important, however, are these two factors, that if they are right the rest of the business is easy.

Mushrooms will not grow in rank manure, and it is useless to try and make them. They will, however, grow in sweet manure if it is at the proper temperature. Let us ponder these things.

To make anything of a bed, two loads of manure will be wanted ; half a dozen would be better. This manure should not be wet, slimy stuff out of a stockyard, but straw and horse droppings from a stable. It does not matter if it is secured in instalments, so long as they are not so small, and so far apart, as to lose all their heat as fast as they are got in. The heap should be turned five or six times to drive off noxious gases, and if it does not heat it should be sprinkled with water.

When the bed is built up, sticks should be driven into the ground $2\frac{1}{2}$ feet apart, and inclined at an angle which will bring them to within 6 inches of each other at the top. Build to their outline, shaking the manure well out, and treading it firmly.

Now for the spawn. I have had to handle many tons of "bricks," and those which I like the best are the ones that are delicately webbed over with a whitish film. If uniformly dark in colour I do not care for them.

The bed is ready for the spawn when the trial stick which has been driven into the bed has cooled down from a temperature at which it cannot be grasped without pain to one at which it is pleasantly warm, say 80°. Never spawn when the heat is on the up grade, or your spawn may be baked. Each brick will give eight pieces, and each piece should be wrapped in a bit of litter and thrust into the bed until it is well hidden.

Watch the bed after the spawning, and in a few days look for white threads running from the pieces of spawn. Directly they are seen, cover the bed with 1 inch thickness of good loamy soil, damp

enough to bind when it is beaten down. Then cover the whole bed with straw or litter to keep in the heat. If Mushrooms do not appear in six to eight weeks, mix nitrate of soda in warm water at the rate of 1 oz. per gallon, and give the bed a good soaking.

It is easy to fail with Mushrooms by beginning at the wrong time. Those who live in the country know that Mushrooms rarely come in any quantity during the dog days. It is too dry. The Mushroom harvest comes when the sun-baked ground is moistened by the rains of September. Observing this, the gardener learns that he would act unwisely if he made up his beds at such a time—April or May—that the Mushrooms would have to make their effort to come into being at midsummer. He therefore makes a start in summer for an early autumn crop, or in winter for a spring one. The fact that some very skilful and experienced growers seem able to get a crop at all seasons of the year must not be allowed to carry too much weight.

The man who is lucky enough to possess a proper Mushroom house, or some cool, dark building that may be pressed into service, can manage with far less manure than his less fortunate brother. A depth of a foot is usually enough, and with a steady air temperature of about 55°, with humidity, darkness and cleanliness, Mushrooms will speedily come, if the other points of culture indicated are attended to.

Chapter 20.—Onions.

I HAVE heard it remarked that the best Onion grower is the man who is the proud possessor of the largest feet, which is a delicate way of hinting that the secret of successful Onion culture is firm soil. There is a great deal in it, to be sure, but it does not mean everything in these days of high culture, and however richly endowed a person may be in the way of pedal extremities, he finds a few other things demanding attention.

The Onion, *Allium cepa*, is an old vegetable, and doubtless the gardeners of past days considered that there was nothing left to learn about it. They would be surprised, perhaps, if they could revisit these glimpses of the moon and see bulbs of 3 lb. weight produced the same year as sown.

There are several important items in the production of large Onions, which I will tabulate:—

(1) Choice of variety. I put this first because it is the most vital point. However thorough the culture may be, it is impossible to produce large bulbs if naturally small sorts like James's Keeping and Bedfordshire Champion are selected. I consider Ailsa Craig to be

FIG. 58.—HOW TO GROW LARGE ONIONS.

REFERENCES.

A, seed sown in fine soil in a glass-covered box.
 B, plants ready to transplant into another box, D.
 C, a plant ready for putting out.
 E, where conveniences exist the plants may be grown on in pots before being planted out to yield very large bulbs.

the best of all. Others capable of being grown to a large size are Anglo-Spanish, Carters' Record, Cocoa Nut, Cranston's Excelsior, Lord Keeper, and Ne Plus Ultra. All of these will give bulbs 2 lb. to 3 lb. in weight. Somewhat smaller, say 1 lb. to 1½ lb., are Improved Wroxton, Suttons' A1, and Veitch's Maincrop.

(2) Early sowing, under glass. The seed should be sown between the middle of January and the middle of February, and the box placed on a greenhouse shelf. Heat is not essential, although it brings the plants along rapidly. A cold frame will do in an emergency, but the plants thus raised are hardly likely to become as large as those raised in a heated house.

(3) Deep boxes. It is a great mistake to use a box less than 4 inches deep. In shallow boxes the roots become matted on the bottom, and many are torn away when transplanting.

(4) Thin sowing. If the seeds are sown thickly the young plants become crowded, and the grower is tempted to prick them off too soon. They ought not to be pricked out until they are at least 3 inches high, because at an earlier stage the roots are very brittle.

(5) Rich, deeply trenched soil. This, and manuring, have been dealt with in a previous chapter.

(6) Thorough harvesting. The bulbs must have a good roasting or they will not keep. I find it well to bend the tops over in August, but to leave the plants on the ground till mid-September, loosening them on various occasions so as to break the roots by degrees. Afterwards lay them in the sun for a fortnight, taking them under cover on wet days and at night.

There is nothing gained by planting the seedlings very early in spring. In cold districts the third week in April is soon enough. The plants should then be as thick in the stem as a quill pen. They may be planted 1 foot apart in rows 18 inches asunder. The soil must be firm, and only enough should be loosened at planting to cover the roots.

If the soil is well tilled and fed, neither water nor liquid manure will be required after the plants start growing. My biggest bulbs have been produced when no feeding has been attempted. All the summer culture required is to keep down weeds.

If very large bulbs are wanted from a summer sowing, choose the Lemon Rocca, and sow at the middle of August. I have seen 2½-lb. bulbs of this variety.

Small Onions are too useful in the kitchen ever to be ousted by the big sorts, and they must not be neglected. The two named above, also Brown Globe, Danvers' Yellow, Deptford, and White Spanish are old favourites for spring sowing 1 inch deep in rows 1 foot apart, to be thinned lightly. Generally speaking they keep better than the large bulbs if dry—damp soon spoils them.

Pickling Onions are not perhaps grown so extensively now as they used to be, many people preferring to pickle Shallots. However, we must not forget that there are pickling sorts to be had, or

Photo : Cassell & Company, Ltd.

FIG. 59.—A 2½-lb. BULB OF COCOANUT ONION; THE SMALL VARIETY ON THE RIGHT IS BROWN GLOBE.

that the variety Queen, if grown thickly in very poor soil, makes a splendid pickler.

Potato or underground Onions are valuable, being productive, mild, and usually free from insect attacks. The bulbs may be planted 9 inches apart in rows 1 foot or more asunder, in deep, rich soil, in February if possible.

Tree Onions are hardly worth growing when we have so many more useful members of the family with which to utilise our space.

Chapter 21.—Parsnips.

It would be waste of space to devote a lengthy chapter to Parsnips after what has already been said about soil and manuring, also about Beetroots and Carrots.

FIG. 60.—RESULTS OF SURFACE MANURING ON PARSNIPS.

A, manure placed within 6 inches of the surface: *a*, soil; *b*, manure; *c, e, f*, plants forked.

B, manure placed 9 inches from the surface: *g*, soil; *h*, manure; *k, l, m*, roots forked.

The secret of growing fine Parsnips is to deepen and pulverise the soil, and sweeten it with lime. He who does this, sows seed thinly in March in rows 15 to 18 inches asunder, and thins his plants, gets a crop, and generally a good one.

Scale 1 inch = 1 foot.

FIG. 61.—HOW TO GROW PRIZE PARSNIPS.

E, *v*, fine surface soil; *w*, lower soil; *x*, hole made 30 inches deep; *y*, shallow hole made with a dibbler.

F, *z*, prize root in deep hole; *a*, good ordinary root in shallow hole.

That manure is wasteful is proved by the fact that the finest of roots are produced in specially made holes filled with nothing except sandy loam.

The best all round variety is Hollow Crown; the best for exhibition, The Student; the best for flavour, Tender and True.

Chapter 22.—Peas.

THE Pea, *Pisum sativum*, is the great vegetable delicacy of the garden, and it is small wonder that so much interest is manifested in its culture. The various points of management seem to possess an

inexhaustible attraction for the kitchen gardener, and probably the Pea is fated to remain a topic of discussion until the end of time.

I have already discussed the question of soils and manures, and the bearing which climate has upon success. I may now give attention to a few other matters.

In the first place, let me say a word on the question of expediting

that early picking which we all set so much store by. It is, of course, largely a question of conveniences, but still more of natural advantages. Do what they will, I am afraid that those persons who have no comfortable, well-protected borders, but whose quarters are exposed to the cold winds of spring, will not succeed in getting Peas so early as others who are more favourably situated.

By sowing Peas in boxes in January or February, starting them in vineries, Peach houses, or greenhouses, hardening them in a frame, and planting them out in March or April, a gain can be effected.

An outdoor sowing can be hurried along to some degree by laying some short, crumbly, well-decayed manure, mixed with wood ashes, in the trenches; but my experience with the Pea is that in the main it likes to take its own time, and means to do it. It will not start freely in a very dry soil, but, on the other hand, neither will it in a very wet one. There is, however, this consolation—the row that is

FIG. 63.—A SIMPLE BOX FOR RAISING PEAS.

the most deliberate in establishing itself often gives the best crop.

The period of outdoor sowing is a long one, but it is not the general custom nowadays to extend it so much as was once the case, except in the very large establishments. Thus, autumn sowing is probably less common than it used to be. There is never a certainty that it is going to give a gain, because the weather cannot be forecasted. Sometimes it does, sometimes it does not. A span of February to June, making the latest sowings of early varieties, sums up most people's practice.

I should like to utter an emphatic warning against shallow sowing. It is common to inveigh against thick seeding, but depth is left out of account. It ought not to be. People sometimes find their young Peas lying on the surface of the soil, and straightway breathe anathemas against the birds, the mice, the worms, and, broadly speaking, all animate creation except themselves. Now, Peas sown very shallow will often force themselves out of the soil in the process of swelling and germinating. Three inches is not a fraction too deep.

It may be interesting to dwell for a moment on the time required for a crop to be fit to gather from the sowing. I have given what I consider fair averages in a preceding table, but of course instances are

on record of much quicker work than is there recorded. Thus, I am acquainted with one grower whose invariable practice it is to sow *Ne Plus Ultra* just eight weeks before the day on which he wants to show it. I think, however, that the case must be regarded as exceptional, although it may not be unique.

It is easy, by cultural means, to greatly increase the size of Pea pods. The first step is to pinch out the growing tips of the plants, and the time for this is when they are coming into bloom, though it might be done a little before; or, on the other hand, just after the pods have formed. The second is to thin the pods. The third is to feed with liquid manure.

It is a safe rule to have the rows the same distance apart as the plants grow high, but as some seedsmen are a little inclined to understate the height of their Peas, it is wise to allow an extra foot. Thus, rows of a variety said to be 4 feet high might be 5 feet

FIG. 64.—A SUBSTITUTE FOR PEA STICKS.

Boards are placed at every 6 yards length of row, nails driven into each edge, and thatching cord is attached.

apart. It is best, in theory, to have the rows running north and south, although if plenty of room is given this is not vital.

Speaking of varieties, one is torn by conflicting emotions when one reads of the meagre list of a century ago. Our forefathers had none of the splendid varieties which we now enjoy, and so far they are to be pitied, but we must set against this the fact that they were saved the distraction of reading descriptions of some hundred or more sorts, all of which are spoken of as indispensables.

It has been my happy fate to grow many hundred varieties of garden Peas, and so full of interest is the trial system that I suppose I shall go on to the end of the chapter. In looking backward, I am able to realise what a great advance has been made. So good are the best of our modern Peas that it is difficult to see that much further improvement is possible. After a dip into past and present trial books, I have ventured to make some short lists of the varieties which have done best.

(1) *Dwarf Earlies.*

Chelsea Gem
William Hurst

(2) *Dwarf Earlies,
slightly later.*

Carters' Daisy
English Wonder
The Sherwood

(3) *Dwarf Earlies,
later still.*

Suttons' Favourite

FIG. 65.—ANOTHER SUBSTITUTE
FOR PEA STICKS.

Six feet quartering is used, to which cross pieces are attached 9 inches apart. Tarred twine is then stretched along.

(4) *Medium Height*
(3 to 4 feet)
Earlies.

Suttons' A 1
William the First

(5) *Round White*
Earlies, medium
height.

Carters' Lightning
Carters' Springtide

(6) *Medium Height Earlies, slightly*
later than sections 4 and 5.

Carters' Early Morn, Suttons' Early Giant
Laxtons' Gradus

NOTE.—If I had to choose three varieties from the above six sections, to give pods in June, I should choose Chelsea Gem, Daisy, and Early Giant.

(7) *Dwarf to Medium Second Earlies.*

Carters' Anticipation
Suttons' Peerless ...
Webb's Senator ...

{ These will yield heavily towards the end of June and the early half of July. Choose Peerless if one is wanted.

(8) *Tall Early Maincrops (5 to 6 feet).*

Boston Unrivalled ...
Duchess ...
Duke of Albany ...

{ These will be at their best from mid-July onwards. Choose Duke of Albany for one.

(9) *Tall Later Maincrops.*

Alderman ...
Matchless Marrow ...
Suttons' Satisfaction...

{ These will be in their prime towards the end of July and the early half of August.

(10) *Latest Crops.*

Autocrat ...
Carters' Michaelmas...
Ne Plus Ultra ...
Sharpe's Queen ...
Veitch's Perfection ...

{ These will be in season from mid-August onwards, according to the weather. Select Autocrat for one.

Chapter 23.—Potatoes.

THERE is beauty as well as utility in a well-grown Potato—a beauty that the eye of the grower can see, if no other can. No garden crop is there, be it flower or fruit or vegetable, which can rival in interest

FIG. 66. A GOOD SET.

this mighty tuber, and it would be a joyful thing for me (if not for my reader) if space permitted me to write my fill about it.

Volumes could be written about the Potato, volumes have been written about it. Its history, its culture, its diseases—all form themes for many a lengthy chapter. I could write of the Potato as

FIG. 67.—A BAD SET.

the novelist writes of love, discussing its strength and its weakness, its beauty and its charms, its elusiveness and contradictions, its influence on human emotion, its countless phases, impulses, and effects. All this may not be. I am tied down, by typebound decree, to a few attenuated paragraphs.

Let me select a few points of special interest in connection with Potatoes, and give them brief attention.

What is the best stamp of Potato seed? (By seed, it is well understood, I do not speak of seed proper, which is only used in cross-breeding, but of sets). Is large or small seed best? Should it be cut or uncut? Now, the more Potatoes a man grows and the more carefully he experiments—in short, the more experienced he is, the more he hesitates to answer these questions. Those experts who have never grown Potatoes, except on best quality, twopence-per-acre, sermon paper, can answer them fast enough, of course. As to the first, in a considerable collection of varieties some are naturally large and others small. A 2-oz. seed would be large in the case of Myatt's Ashleaf, but small in the case of Up-to-date. And as to the second, a cut set is good if it has a strong sprout and is dry, but bad if it is unsprouted and wet, when planted. Taking an average of many sorts, I should say (1) that 2- to 3-oz. seed is large enough for anything or anybody; (2) that it matters very little whether whole or cut sets are used so long as they are well prepared beforehand. Personally, I have done equally well under the right conditions and equally badly under the wrong with both.

People generally begin to think about their seed Potatoes some half hour or so before they want to plant. They should think about them directly they take them up the previous year. Seed Potatoes should never be clamped, but should be kept in a light, cool, frost-proof place. They will then become green. In this state they are unwholesome as food, but are much hardier than ungreened tubers, and

REFERENCES TO FIGURE ON PAGE 115.

- A, section of 8-inch pot: *a*, drainage; *b*, a "set" with one strong sprout placed at the proper depth and in the right position; *c*, depth of covering with soil if a top-dressing is to be applied when the top is well above the level of the rim of the pot, otherwise cover to depth shown; *d*, space for water.
- B, result—early Potatoes of home production.
- C, section of 12-inch pot: *e*, drainage; *f*, rough compost; *g*, soil (2 parts light fibrous loam and 1 part well-rotted manure, old Mushroom bed manure or hotbed *débris*, or even rotted leaves, answering well); *h*, "sets," each with one strong sprout, in proper position and duly covered with soil; *i*, space left for top-dressing; *j*, room ultimately required for water.
- D, section of 12-inch pot with Potato plants properly earthed: *k*, soil added; *l*, space for water.
- E, result of growing three plants in 12-inch pots, two tops being omitted for lack of space.

PICTORIAL PRACTICE.—PLAIN HINTS IN FEW WORDS.

FIG. [63.—GROWING EARLY POTATOES IN POTS.

(For references, see page 114.)

will keep fresh and sound a very long time. In February they should be set on end to sprout; and if a fairly large seed pushes two or more sprouts, a knife may be passed between them, and through the Potato longitudinally, so as to give two sets in place of one. The cut surfaces may be seared with lime or soot.

When should Potatoes be planted? All a question of soil and situation. On a warm, sheltered border, especially if the soil be light, February or early March planting is safe; but in exposed places, particularly if the soil be stiff and cold, April is quite soon enough. People exaggerate the advantages of early planting, or fail to see how inevitably they are modified by circumstances. In 1901 my best piece of Potatoes was Up-to-Date planted at the end of May, and not from very grand seed either. If the seed is in a good store, is fresh, and is sprouting well, it is often better than in the ground. Autumn planting crops up now and then, generally as a

FIG. 69.—A POTATO PLOUGH.

- 1, steel plate 10 by 18 inches, $\frac{1}{8}$ inch thick, cut as shown by the dotted line.
- 2, handle, 4 feet 8 inches long.
- 3, a piece of iron, 14 by $1\frac{1}{4}$ inches by $\frac{3}{4}$ inch. The moulds are riveted to this, and it is then welded to the handle.

consequence of some experiment in that direction which has happened to turn out well. It may be tried, but it can never become general.

The depth to plant is in some degree dependent on the soil, but 4 inches should be the minimum in heavy, and 6 inches in light, soil.

It is, I suppose, needless to say that the man who has a choice between a light and friable soil and a stiff and heavy one should choose the former. To their credit be it spoken, many owners of strong soil turn out excellent Potatoes, but it cannot be gainsaid that a sandy loam is the ideal soil for Potatoes. It occasionally happens, though not often, that the two different classes of soil are found in one parish: such is the case in the one in which I now write. Judging by general work there, the heavy soil men are the best gardeners, but the light soil brigade show the best Potatoes. Unhappily, most of us have no choice in this very important matter, and we must do the best we can with what we have, working on the principles set forth in previous chapters on soil and manuring.

Planting Potatoes closely is bad in two ways: (1) It means crowding, which favours weak growth, (2) it leaves an inadequate

supply of soil for earthing. The rule to plant first early sorts 9 inches or 1 foot from set to set and 2 feet apart in the rows, second earlies and small-topped maincrops 1 foot by $2\frac{1}{2}$ feet, and coarse-topped varieties 15 inches by 3 feet is good.

What is a good crop of Potatoes? In this connection I am irresistibly reminded of one of the sermon-paper experts, who happened to find himself on a platform extolling the virtues of an artificial manure formula that he had read of somewhere. One of the horny-handed sons of toil present asked how many Potatoes it would grow per rod, and received the startling reply, "About 20 sacks." I have no such dazzling prospect as this to hold out. One sack of a hundredweight and a half per square rod, pole or perch, equal to 12 tons per acre, is a very good crop. Once, and once only, I saw two sacks per rod lifted. The variety was Up-to-Date.

FIG. 70.—A POTATO HOE.

This is one of the most useful tools in Potato cultivation. The prongs are flat, about 7 inches long by $\frac{3}{4}$ inch wide, and the handle is Ash.

Those who are interested in the question of how many Potatoes can be grown from a given quantity of seed may be reminded of a competition which took place some twenty-seven years ago, the quantity allowed being 1 lb. A Kentish gardener was the victor, and history records (truthfully let us hope) that he produced 647 lb. of Potatoes. I must confess to having nourished "doots" about this, but I once met with a person who claimed to know all about the matter. He informed me that a strong local committee checked all the proceedings of the victorious gardener, and that there is no doubt that the record is perfectly accurate and genuine. My informant certainly astonished me in one respect. He stated that the way in which the grower treated his seed was to remove the eyes with a gouge and establish them. I just remember the variety, Eureka, a hideously coarse Potato, lumbered with eyes; but all the same I was, and am, surprised to hear that enough plants to yield such an enormous crop were secured in this way. I should have thought a great many more plants could have been secured by starting the sprouts in a box on

a greenhouse shelf, for several batches can be secured, and subsequently established like so many cuttings, in this way. But perhaps it was against the rules.

Eureka, with many a better Potato, has passed into the great limbo of the forgotten, but there are enough varieties still left to bewilder and perplex the grower. For four consecutive years I myself grew upwards of sixty sorts, changing the varieties to a considerable extent each year, yet questions reached me, and reach me still, about scores of varieties that I know only by repute. I give

FIG. 71.—POTATO SENSATION.

FIG. 72.—POTATO IDEAL.

FIG. 73.—POTATO SATISFACTION.

herewith a few tables of Potatoes which I have grown, in the hope that they and the selections which accompany them may be of use :—

First Early Kidneys :

Britannia	...	...	...	} Of these Puritan is the heaviest cropper on my stiff soil, and Ringleader much the best in flavour. I should choose the former (which often runs out to a round shape) if I had to limit myself to one.
Carters' First Crop	...	...	...	
Duke of York	...	...	...	
Myatt's Ashleaf	...	...	...	
Puritan	...	...	...	
Sharpe's Victor	...	...	...	
Suttons' Ringleader	...	...	...	
Veitch's Ashleaf	...	...	...

FIG. 74.—POTATO PINK PERFECTION.

First Early Rounds :

Suttons' A1	...	...	...	} A1 is a splendid sort, and should be widely grown.
Suttons' Harbinger	...	...	...	

Second Early Kidneys :

Pride of Tonbridge	...	...	...	} Three splendid Potatoes. I think Reliance is rather the best of the three but there is not much in it.
Suttons' Reliance	...	...	...	
White Beauty of Hebron	...	...	...

FIGS. 75 AND 76.—POTATOES LORD TENNYSON (upper) AND PRIDE OF TONBRIDGE (lower).

Main Crop and Late, White Kidneys (including pebble-shaped) :

Bruce	...	...	...
Carters' Goldfinder	...	...	...
Chancellor	...	...	...
Crawley Prizetaker	...	...	...
Daniels' Special	...	...	...
Devonian	...	...	...
Future Fame	...	...	...
Satisfaction	...	...	...
Sensation	...	...	...
Snowdrop	...	...	...
Suttons' Ideal	...	...	...
The Canon	...	...	...
Up-to-date	...	...	...

All excellent Potatoes, with Crawley Prizetaker, Snowdrop, Ideal, and Up-to-date as, perhaps, the pick.

Maincrop and Late, White Rounds :

Abundance	...	...	...
Carters' Snowball	...	...	...
Imperator	...	...	...
Royal Sovereign	...	...	...
Royal Standard	...	...	...
Schoolmaster	...	...	...
Syon House Prolific	...	...	...
Windsor Castle	...	...	...

Syon House Prolific and Windsor Castle are the pick here.

FIG. 77.—POTATO SPECIAL.

FIGS. 78 AND 79.—POTATOES ROYAL SOVEREIGN (upper) AND ROYAL STANDARD (lower).

Maincrop and Late, Coloured Kidneys :

Beauty of Hebron	...	...	...
Early Rose	...	...	...
Edgecote Purple	...	...	...
Elephant	...	...	...
Field Marshal	...	...	...
Lord Raglan	...	...	...
Mr. Bresee	...	...	...
Pearless Rose	...	...	...
Reading Ruby	...	...	...

Beauty of Hebron is much the best for general use; the others need not be grown except for exhibition.

FIG. 80.—POTATO PEERLESS ROSE.

Maincrop and Late, Coloured Rounds :

Adirondack	...	...	...
King of the Russets	...	...	...
Lord Tennyson	...	...	...
Pink Perfection	...	...	...
Purple Perfection	...	...	...
Queen of the Valley	...	...	...
Reading Russet	...	...	...
The Dean	...	...	...
Vicar of Laleham	...	...	...

These are in the main show Potatoes. I like Purple Perfection the best for general use.

FIG. 81.—UP-TO-DATE AS A ROUND POTATO.

This variety, like many others, is very variable in form.

Chapter 24.—Rhubarb.

It is as unnecessary to sing the praises of Rhubarb as it would be foolish to deery it. The community has made up its mind that it likes Rhubarb, that Rhubarb is good for it, and that consequently Rhubarb it must have. There is really no more to be said.

Nor is there much room for remarks on how to make Rhubarb grow. If the question were how to kill it, the case would be different, and there would be a fine field for discussion. Rhubarb takes some killing, and if anyone wants to thoroughly disestablish a colony of it he has to dig hard and dig deeply.

Probably the majority of people establish Rhubarb by planting "crowns"—rootstocks with latent or starting buds. This may be done in autumn or spring, the latter for choice. But seed may be resorted to, of course, and spring is the time to sow it.

If Rhubarb fails—and, accommodating as it is, it does so sometimes—the cause may usually be sought in planting on a dry, poor site. You will sometimes see Rhubarb planted on a slope, from which the water naturally drains, leaving the ground parched for a considerable part of the year. That does not suit Rhubarb. It likes moisture. With its strong roots and crowns, it revels in food too. The soil can hardly be made too deep and rich. I once knew an old gardener celebrated for his Rhubarb, in which he took great pride. He was supposed to have some great and mighty secret bearing on its culture, which no one could induce him to part with. He was bowled over at last, though. The secret proved to be a hose pipe fed from a sewage tank, and trained surreptitiously along a back way to the Rhubarb. That pipe won him many a prize.

It is no use cramping Rhubarb for room. Give the crowns a yard apart, at least; more for a big variety like Victoria. If they become very strong, they might be lifted for forcing if that is required the first year, but frequently it is wise to wait till the second. If a large stool with several crowns is lifted, it is a simple matter to cut off one or two crowns for replanting, force the rest of the stool, and then throw it away. Of course, forcing on the ground—*i.e.* turning a dark cask or tub over the undug stool, and covering it with littery manure—imposes no such strain as forcing a lifted stool in a house or shed.

It was once my privilege to visit the extensive Rhubarb forcing grounds in the neighbourhood of Leeds. There the Rhubarb is forced in low wooden sheds heated by brick flues. The roots are packed on the floor, and rich, friable soil is worked between and over them. This is kept moist, and the place kept dark. With a

FIG. 82.—RHUBARB FROM SEED.

A, a good planting crown, or may be forced in water (see page 129).
B, a good forcing stool raised from seed.

steady temperature of 45° to 55° maintained there is soon a supply of sticks.

A young plantation of Rhubarb should not be pulled from too soon. At least a year should elapse before the produce is used.

The number of varieties is not so great, fortunately, as is the case with some vegetables, and it increases but slowly. The old varieties, such as Early Albert, Johnston's St. Martin's, Myatt's Linnæus and Victoria, still have their following. The first and last are fine sorts, and if supplemented by Daw's Champion or Hawke's Champagne for early work, will give all that is necessary; indeed, Champagne for an early, and Victoria for a late, would meet the wants of most people.

Chapter 25.—Seakale.

SEAKALE is looked upon by most people rather as an expensive luxury than an everyday vegetable, and so it is—for the man in a hurry. For the man who is not impelled by a feverish eagerness to have produce on his table half an hour after he has bought the seeds or plants it is not an expensive crop at all.

Strong forcing crowns of Seakale—crowns 8 or 9 inches long, and the better part of 2 inches through—are, of course, dear, but it is the greatest mistake in the world to conclude that Seakale can only be enjoyed by buying such things as these.

The simplest and cheapest way to start is to buy seed, which is cheap enough for anybody. The seed is contained in a husk, which may be broken prior to sowing. A drill may be drawn from 1 inch to 2 inches deep in well-worked soil in spring, and the seed scattered thinly in. Transplant the resulting plants 18 inches by 2 feet apart a year afterwards, providing a rich, thoroughly pulverised soil, and have no doubt about strong crowns developing. They may be ready by the second autumn; they are sure to be by the third.

When once a stock is secured, it is the easiest thing in the world to maintain it. Lift the crowns in autumn, as soon as the leaves break away from them under slight pressure, which will probably be in November. There should be a straight growth 6 to 9 inches long and 1 to 2 inches thick (this is the forcing crown), and a number of smaller pieces, 2 to 5 inches long and as thick as a cigarette at the base. All of the latter may be cut away close to the parent root. It is the custom to cut one end straight across, and the other

FIG. 83.—FORCING RHUBARB.

· strong seedling crown forced in a wide-mouthed bottle of water
under a scullery table.

slopingly. These "whips," as they are called, should be covered with earth, like Potatoes in a clamp, till spring, when they should be planted out in rows 18 inches by 2 feet apart, the tips just level with the surface. A number of shoots may sprout at the top of each when growth begins, but they should be thinned to one, or the tops will be weak and crowded. If the soil is thoroughly well cultivated and very fertile, every such whip will develop into a forcing crown by the autumn of the same year.

REFERENCES.

- A, relating to seed: *a*, seed vessel (pod) containing seed, being the form in which the seed is received; *b*, seed proper removed by cracking the pod.
- B, root cutting taken from the root of a crown lifted for forcing and kept in soil or sand till planting time: *c*, callus and shoots formed all round crown; *d*, callus at base of cutting from which roots proceed; *e*, depth of planting.
- C, one year old plant: *f*, root with side roots broken off near main root; *g*, crown cut off; *h*, depth of planting.
- D, once forced crown kept, after cutting the heads, in soil or sand till planting time: *i*, rootstock; *j*, young shoots pushing round crown; *k*, depth of planting.

FIG. 84.—RAISING SEAKALE.

A system of natural forcing is in vogue in some of the Middlesex market gardens, and those who see the produce resulting cannot but admire it. The growers take up, say, the first row of Seakale, leave the second and third, take up the fourth, leave the fifth and sixth, and so on. This, of course, provides for a number of pairs of rows, with wide alleys between. From these alleys the soil is taken and heaped in ridges 1 foot high over the rows. When growth shows at the surface the soil is cleared away, and the produce taken. This system does not give such early Seakale as hard artificial forcing,

but the sticks are excellent. Moreover, the forced crowns are good for planting out.

The next simplest plan of forcing is to cover the stools with a pot in the open ground, and heap manure or leaves over it. Forcing crowns may be lifted, packed in soil in boxes or barrels—leaving a space of about 1 foot below the lid in order to permit of the produce developing—and placed in a temperature of about 55°.

Seakale is sometimes subject to canker, especially when grown on damp, heavy, highly manured soil. A light, very friable, well-drained soil suits it best. If the disease puts in an appearance, change the ground, if possible, and apply a dressing of kainit at the rate of 5 lb. per square rod.

Of special varieties, Lily White may be chosen, but few are offered.

Chapter 26.—Tomatoes.

THERE is no abatement in the interest that Tomatoes have commanded these past twenty years, and there is not likely to be. The crop has secured a position from which it cannot be dislodged. Its culture will extend, and the number of varieties will grow with steady persistency: that is a safe prophecy.

Naturally, when Tomato growing first began to become general, mistakes in culture were made. If there is a right way and a wrong way of doing a thing, trust human nature to stumble on the wrong one. But if the unthinking many go astray, there are always, happily, the observant few to ponder, to experiment, and finally to discover the road to success.

The general mistake made with Tomatoes was overmanuring. The plants were gorged with dung, and as a result they smothered themselves with foliage, bore little fruit, and were ready to embrace with open arms the first enemy that came along. We have changed all that. We banish the dung fork to the uttermost depths of the toolshed when we think about Tomatoes; and with a less pampered, less plethoric, plant we get health and fruitfulness. It is possible, of course, to carry the principle too far. I cannot think that the dry ash bed, which some speak of, gives the best crops. Indeed, the best which I have any knowledge of are grown in about 6 inches depth of sound turf loam, enriched with a little burnt woody refuse.

The great thing with Tomatoes is a good start. I do not mean by this a very early one, unless the grower has the markets

in view. Nor is it in the least degree necessary to push the plants along in a great deal of heat, especially if outdoor culture is the object. Experience teaches me that if the plants grow steadily during their early stages, it does not much matter if they move rather slowly, and that the plant which is only 8 or 9 inches high when it is put out is just as likely to give a crop as the 2-footer—if anything, rather more so.

It is wise to avoid sprinkling the seeds, and instead to put them in the soil one at a time, about 1 inch apart. This effectually prevents crowding, which is the great bane of Tomatoes. If plump and firm, nearly every one will germinate. Use a box, a pot, or a pan, and cover not more than $\frac{1}{2}$ inch. A greenhouse shelf is a capital place for starting the seeds. I have, however, had a good crop from plants started in a cold frame; and an acquaintance, who loves to do things in ways of his own, and finds no pleasure whatever in anything that he has to do like other people, always insists on sowing his seeds under a south wall, in the open air, and covering them with upturned pickle bottles.

The seed vessels should be shaded until the plants come through, not afterwards. The thin seeding does away with the necessity for pricking off the plants early, and that in itself is a grand thing, because shifting Tomatoes before they have formed a pair of rough leaves is just the thing to throw them back. Each plant may be put into a 3-inch pot, and transferred from that to a 5-inch, in which it may remain till planting out-time in June. I may, however, say that with a view to saving labour and pots, I have often pricked the plants straight away 4 inches apart into 4-inch deep boxes, and let them stay there till June. This plan does not give the biggest plants, but they are dwarf, stiff, and strong; directly they are put out they go ahead, and they invariably yield well.

Many a stretch of fence or wall with a south aspect that now goes bare every summer might be occupied profitably with Tomatoes, and if the plants are put out 18 inches apart, the shoots which start in the axils removed as fast as they form, and the leading growth pinched at the top of the support, there will be a crop. Or, of course, they may be grown in the open, each plant supported by a stout stake.

Defoliation is, I consider, carried to extremes by some growers. They cut off the leaves wholesale while the fruit is still only half swollen and quite green. This is scarcely wise. A certain amount of foliage is required, certainly on the upper part of the plant, and the wisest course is to thin it by degrees. Slice off half a leaf here, pick off one there, and so expose the fruit and relieve the plant without ever imparting a complete check.

Tomato history has moved fast, and the recruit of ten years
(Continued on page 136.)

REFERENCES.

- D, pot of seedlings, the seed in which have been placed 1 inch apart.
 E, pot of seedlings sown $\frac{1}{2}$ inch apart.
 F, pot of seedlings from seed sown thickly and placed in a structure having a brisk heat and moist growing atmosphere, the plants being drawn and weakly, and not worth the trouble of potting.
 G, sturdy seedling from thin sowing: *s*, radicle; *t*, fibrous roots formed at or near the surface of the soil; *u*, short, sturdy stem; *v*, seed leaves; *w*, second or rough leaves; *x*, growing point.
 H, moderately stout, but rather long-stemmed or leggy seedling: *y*, relatively indifferent roots and long stem; *z*, comparatively drawn top growth.
 I, sturdy seedling properly potted into 3-inch pot: *a*, drainage; *b*, soil; *c*, space for water.
 J, rather leggy seedling in 3-inch pot: *d*, drainage; *e*, soil; *f*, space for water.

PICTORIAL PRACTICE.—PLAIN HINTS IN FEW WORDS.

FIG. 85.—HOW TO RAISE TOMATOES.

REFERENCES.

K, section of 6-inch pot with plant transferred from 3-inch pot; *g*, drainage; *h*, soil; *i*, space for water; *j*, roots and the ball of soil as turned out of the 3-inch pot.
 L, part section of 8-inch pot with pair of plants shifted from 5-inch pot.
 M, section of 12-inch pot; *k*, drainage; *l*, soil; *m*, space for water; *n*, ball of roots and soil of plant from 6-inch pot; *o*, laterals (which ought to be rubbed off whilst quite small); *p*, truss of flower and fruit; *q*, stake.

PICTORIAL PRACTICE.—PLAIN HINTS IN FEW WORDS.

FIG. 86.—REPORTING TOMATOES FOR FRUITING IN POTS.

REFERENCES.

A, 10- or 12-inch pot with young Tomato planted: 1, sod of turf on which pots are stood; 2, soil, leaving space of about 4 inches for top-dressing; 3, young plant.

B, the plant at a later stage: 1, space left for top-dressing filled up.

C, section of pot showing piece of zinc fixed round the inside of the rim to allow for further top-dressing: 1, top-dressing material.

D, another view of the pot, showing the piece of zinc fixed.

E, a different method, strips of turf placed round inside of pot above the rim to allow for top-dressing: 1, turf strips and soil.

The plan of giving young pot Tomatoes very little soil at first, and top-dressing as they grow, finds favour with many successful cultivators.

FIG. 87.—TOP-DRESSING POT TOMATOES.

ago is the veteran of to day. The old Large Red was long the favourite sort, and, unless I am much astray, I can trace its features in many of the modern sorts. It, with Trophy, Hathaway's Excelsior, Hepper's Goliath and Acme, held sway twenty years ago. Then came Hackwood Park Prolific, Dedham Favourite, and Perfection; then Conference, Ham Green Favourite, Maincrop, Earliest of All, and Laxton's Open Air; then Challenger, Chemin Rouge, Duke of York, Early Ruby, Comet, Eclipse, Frogmore, Supreme, and all the rest of them. It is hard to say which is the best. For outdoor work Comet and Early Ruby are two of the best. For indoors Challenger, Duke of York, and Frogmore are very fine. Maincrop and Supreme do well indoors and out. Perfection is almost unbeatable for show purposes.

Chapter 27.—Turnips.

"TAKE away the flea beetle, and we will do the rest" I fancy I hear many harassed kitchen gardeners groaning this. Well, I have said my say in an earlier chapter about the arch-enemy, and I can add no more now.

When we have a cycle of dry summers Turnip-growing is difficult; when we have a series of wet ones it is easy. That sums up the story. Even in dry seasons we may be able to get Turnips by going to work early and late in the year. A sowing in February or March will often give a crop when a sowing in April, May, or June results in failure. Again, a July sowing may come to grief, and a patch put down in August or September will yield well.

Turnips love coolness, and anything that can be done by deepening the soil, by shading, and by watering, to give them the conditions they prefer is likely to be rewarded. Further, dustings with soot and wood ashes in early morning, when the young plants are probably wet with dew, will help them to fight the enemy. It is a great thing to keep them moving when young, and so get them quickly into the rough leaf stage. This is not everything, for I know to my cost that there is never a stage when the beetle will not attack them, but it is much. Sowing broadcast, in the shade of Peas or other crops, is preferable to sowing in exposed rows.

Those who have a warm border should certainly try a February sowing, say, of Early Milan. A little protection can be given if a very cold spell comes after the plants are through,

even if it consists in nothing more than laying bushy Pea sticks over the bed. In March, Snowball, or one of its class, may be sown. For April and May sowings I prefer Red Globe and Green Round. They may not be quite so delicate in flavour, but they are far less liable to run to seed. For late summer sowings Cannells' Model, Dobbies' Model, Orange Jelly (Golden Ball), or Chirk Castle may be sown. The two first named are

FIG. 83.—A VEGETABLE MARROW ON A WIRE FRAME.

good varieties for pulling to use in October or November. The others are varieties which may be stored over the winter.

Chapter 28.—Vegetable Marrows.

IN my remarks on manuring I expressed the opinion that the manure bed is not an unmixed blessing for Vegetable Marrows, especially in a dry season. I have seen a cartload of manure used for a Marrow bed, and for a limited time the plants rode rampant, but after some weeks of drought the manure, unable

to hold sufficient moisture, failed to keep the plants going, and under the stress of cropping they began to wither.

Of the two, I would rather have a manure pit than a manure heap for Marrows, but neither is really necessary. In well-tilled, fertile soil the plants will thrive and crop amazingly if only put out on the level, just as you might plant a Cabbage.

One good seed in the centre of a 4-inch pot, inserted in March, and put on a hotbed, on a greenhouse shelf, or in a frame, will give a strong plant, and this may be transferred to a 5- or 6-inch pot. By the end of May it should be 8 to 12 inches high, and very sturdy. It should then be turned out without disturbing the ball, planted firmly, and protected with an old basket or

FIG. 89.—A VEGETABLE MARROW ON A RAISED FRAMEWORK.

A, section of framework; B, framework erected and covered.

some other simple shelter until it has got a good hold of the soil. Some people sow out of doors in May.

Stopping is sometimes practised, but it is quite unnecessary. A sturdy plant will fling out growths in all directions without any help from the grower directly it has become established. Even in dry seasons I leave my plants to look after their own fertilisation and their own feeding—two functions which they never fail to perform to their own and my complete satisfaction. I am convinced that we should hear fewer complaints, by many, of fruit falling after setting, instead of swelling up, if the plants were grown in the natural soil of the garden.

It is a mistake to let the fruits get large, except towards the end of the season when one or two giants are coveted by the housewife for preserving. They should be cut young. For exhibition, an even pair, with a tender skin which will admit the thumb nail readily, stand the best chance.

There is no more useful Marrow than the Long White, but Custard, Moore's Cream, and Pen-y-Byd are very fine in flavour.

Chapter 29.—Some Minor Vegetables.

THERE are certain vegetables which the average Britisher either does not care for, or does not consider equal to his stock crops. Yet some of these "minors" of the kitchen garden are well worth growing.

Cardoon.—The midribs of the inner leaves of this Globe Artichoke-like plant are delicious, and the Continentals know it,

FIG. 90.—A GIANT MARROW.

The fruit is supported by a piece of netting to keep it clear of the ground, and prevent it being damaged or soiled before the show.

if we don't. The seeds are sown in April, the plants thinned, and eventually put out in rich soil. In light land trenches are made. In August the leaves are drawn together, made secure, and the plants earthed up. The stems then blanch.

Garlic.—This white-bulbed sister of the Onion, Leek, and Shallot may be grown exactly like the last named.

Gourds and Pumpkins.—A large tribe, most ornamental, but some useful. Seeds of several species are offered by the leading seedsmen, and may be treated like Vegetable Marrows. The Large Yellow, Ohio Squash, and Turk's Cap are three of the most popular.

Horseradish.—Usually propagated by "thongs"—pieces of root as thick as a penholder, and 6 inches to 1 foot long. These may be planted in spring, either on the level, or diagonally in a mound of soil 2 feet high. The latter plan is good because the

crop is kept under control. In the ordinary way it is apt to become a nuisance.

Kohl Rabi.—A capital substitute for Turnips, though not often grown in the kitchen garden. In dry summers a crop of Kohl Rabi can often be got when Turnips fail. Treat them like Turnips.

Maize (Indian Corn).—Our American cousins have taught us the value of this crop, and we owe them a debt of gratitude for the lesson. Successions may be secured by sowing seed in pots and boxes in March, and out of doors in April and May. The rows should be 5 feet apart, and the plants 18 inches asunder. The soil must be deeply tilled and rich. The cobs, or lower heads, are delicious if gathered and cooked before becoming hard. Henderson's and Early Dwarf Sugar are two of the best varieties.

Salsify (Vegetable Oyster).—This vegetable really ought to be grown far more than it is. People are too apt to dismiss it as a sort of inferior Parsnip. It is nothing of the kind, of course. When well cooked it has a flavour of its own, and that good. Moreover, it is as good cold as hot, perhaps a little better. Sow in drills 1 foot apart in April, thin to 9 inches asunder, and lift and store like Beet in October.

Scorzonera.—This purple root is liked by many, and it may be grown just like a Parsnip. It is hardier than Salsify.

Shallot.—A most valuable crop, and one that seems to be growing in favour, especially for pickling. There is no trouble in raising a stock from seed, but for quick returns plant bulbs, or "cloves" as they are often called, in well worked ground in February. Bury them half their depth, and do not let the soil under them be hard, otherwise they will be forced out of the ground when the roots strike down. Late planting is bad. Lift and ripen in July.

Spinach.—A useful "catch" crop, coming in well between rows of Peas. The round-seeded is often spoken of as Summer, and the prickly-seeded as Winter, Spinach, but, as a matter of fact, the round is just as good for winter as the prickly, and it is probable that the round-seeded sort, known as Victoria, is the best for all purposes. A rich, well-tilled soil is necessary, and thinning should be practised, for if the plants are crowded they will run to seed. Sow from February to September for successions.

FIG. 91.—HOW TO PROPAGATE HORSERADISH.

C, thin, straight root for planting, furnished with a crown; thin root fibres on the side of the stem, to be removed with a knife before planting, to prevent forking later on.
 D, root ready for planting, with thin side roots scraped off.
 E, roots planted 9 inches apart in rows: 1, surface soil; 2, 3 or 4 inches of soil between crown and surface.

Chapter 30.—Salads.

THE kitchen garden is incomplete without its provision for the salad bowl. Let us therefore glance at a few of the most important ingredients.

Beetroot.—A few slices are indispensable. They must not be too large, therefore we shall give preference to the long over the 'Turnip-rooted when they are in season. Culture and varieties have already been discussed: see a previous chapter.

Celeriac.—What an invaluable vegetable is this! It can be sliced for the salad, used to flavour soups, eaten as a relish with bread and butter, and cooked as an ordinary table dish. Yet it is rarely grown. It is referred to under Celery.

Chervil.—A minor ingredient of the bowl, yet a pleasant one. There are several kinds, but the curled is the commonest. This may be sown $\frac{1}{2}$ inch deep in spring, and the plants thinned to 4 inches apart. Curled Chervil may be sown at intervals right through the summer and autumn if required.

Chicory.—Both Common and Witloef Chicory are grown, the latter perhaps the more extensively. It is a favourite cooked dish in Belgium. Sow in April and thin to 9 inches apart. Lift the roots in autumn, pack in a box with light moist soil, and put in a dark shed. The crowns should be left exposed. Leaves will soon push, and may be gathered and used, the roots being thrown away.

Chives.—These come in useful as a substitute for young Onions, the leaves being cut close to the ground, where they will be succeeded by others. Seeds may be sown or plants divided in spring. No special culture is required.

Corn Salad.—Lamb's Lettuce may be raised from seed in spring, and onwards to September. The later sowings are the most important, for they are destined to yield leaves in winter and spring, when salading material is scarce. Sow on a warm border, preferably in light soil.

Cress.—With Mustard, the most popular of relishes. The culture is almost too simple to require detailing; remember, however, that the seed should be sown four or five days earlier than Mustard to be in at the same time, as it is slower growing.

Cucumber.—An indispensable ingredient, the culture and varieties of which have already been dealt with.

Dandelion.—Sometimes used as a substitute for Endive, the leaves being bitter. Sow in spring.

Endive.—Hardier, generally speaking, than Lettuce, and of an agreeable bitter taste, Endive ranks high amongst salads, especially for winter use. It likes a light, rich soil, if sandy all

PICTORIAL PRACTICE.—PLAIN HINTS IN
FEW WORDS.

FIG. 92.—SOWING AND THINNING SPINACH.

A, early stages: *a*, portion of a drill 1 inch in depth, the seeds sown about 1 inch apart; *b*, portion of drill in which the seed is covered with fine soil;

c, row of seedlings in first, and showing second, of young plants thinned to about 3 inches asunder; *d*, row of young plants thinned to about 3 inches asunder; *e*, plants finally thinned to 1 foot apart.

C, leaf showing how Spinach should be picked.

the better. Seed may be sown in May, June, July, and August 1 inch deep, and the plants put out 1 foot apart, except the broad-leaved, which may have 15 inches. Blanching is important, and may be done (1) by tying up the top and covering with an inverted pot, the hole of which is stopped; (2) by covering with boards; (3) by tying up and mounding with ashes. Green Curled and Broad-leaved Batavian are two of the best.

Lettuce.—A long supply of Lettuces is necessary, and both sections, Cos (upright) and Cabbage (spreading), must be recommended. Light, rich soil is the best: in any case the ground must be well tilled. A simple plan of managing the spring and summer crops is to sow $\frac{3}{4}$ inch deep, in drills 1 foot apart, prick the plants out 2 inches apart, finally plant them 6 inches apart when they have half a dozen leaves, draw some early, and leave others to mature. This ensures a good supply, and some fine specimens if wanted. The January and February sowings must be under glass; the March sowing may be out of doors if there is a warm border. The last sowing should be from the middle of August to the middle of September, and the plants should be put out by the end of October, in a sheltered position if available. A little protection is advisable in severe weather. The Cos varieties must be blanched by tying. Superb White is a good Cos variety for general use, and Black-seeded Bath may be chosen for autumn. All the Year Round and Continuity are two of the best Cabbage sorts.

Mustard.—See Cress.

Onions.—The thinnings from permanent crops will supply what is needed in this connection.

Radish.—Tough and indigestible when they have to fight for life in poor, dry, hungry ground, Radishes are reasonably tender when grown rapidly in rich, moist, friable soil. Sow $\frac{3}{4}$ inch deep, broadcast, and thin to 3 inches apart. January sowings must be made under glass, but an outdoor sowing may be tried in February in a warm, sheltered spot, though severe weather may necessitate protection. From April to the end of August there is no trouble, except to net against birds, and keep the soil moist. Early in September a sowing may be made for winter. This may be in rows 1 foot apart, and the plants thinned to 6 inches asunder. Wood's Frame is a good early Radish, and so is French Breakfast, which is mild and sweet. The Turnip varieties are perhaps the most generally useful. The Black Spanish or China Rose may be sown for winter.

Rampion.—Both the roots and leaves of this little plant are pressed into service. It may be sown early in May, the seed, which is very small, being barely covered, and the plants thinned to 6 inches apart. Gathering may be practised in October, November, and onwards.

Tomatoes.—These have already been dealt with: see special chapter.

Watercress.—Although running water is best, Watercress may be grown on a damp, shady border: the flavour is usually a little stronger, that is all. A start may be made with seed, or some fresh bits of Cress may be put in 4 inches apart: they will soon be established.

Chapter 31.—Herbs.

THE herb border has its charms as well as its uses: it is usually a pleasant, aromatic spot, where one loves to linger. The complete herb garden will contain the following, and perhaps some others: Angelica, Balm, Bush and Sweet Basil, Borage, Chervil, Chives, Coriander, Dill, Fennel, Horehound, Hyssop, Lavender, Mallow, Pot Marigold, Sweet Marjoram, Mint, Parsley, Pennyroyal, Purslane, Rampion, Rosemary, Rue, Sage, Summer and Winter Savory, Skirret, Sorrel, Tarragon, Common and Lemon Thyme, and Wormwood. Nearly all may be raised from seed in spring, and others, such as Lavender, Mint, Sage, and Thyme, can be quickly propagated by cuttings.

The smallest garden should contain its quota of herbs, Mint, Parsley, Sage, and Thyme being regarded as indispensables. Frequently they are thrust away into a corner, and allowed to look after themselves. This is unfortunate. If possible a bed should be made, and the Parsley will come in admirably for bordering it. Mint is easily propagated by cuttings, and it is best to establish a fresh stock at times, and clear out the old; for the plant runs so freely at the root that it greatly impoverishes the soil. Moreover, it is often attacked by a disease called rust, and frequent renewal is, therefore, additionally advisable.

Parsley will generally stand the winter, but it is advisable to sow a fresh row, or rows, every year, as second season rows frequently run to seed. Some beautifully curled strains are now offered by our leading seedsmen.

Sage is readily propagated by cuttings of the young growing shoots in early summer. Common Thyme is easily increased by division in spring. Lemon Thyme is not quite so hardy, and in cold places is best lifted and potted in autumn, and cuttings struck in spring. Where it stands the winter it may be increased by division in spring.

Chapter 32.—Exhibiting.

As rules for exhibiting gardens and allotments, and vegetables at shows, are often asked for, I venture to give those drawn up and used by myself for several years under the competitions scheme of the Kent County Council Technical Education Committee, which I believe to be the most extensive and complete of all.

For plot judging, the following scale of points is used :—

Maximum Points.	CROP OR SUBJECT.	Maximum Points.	CROP OR SUBJECT.
10	Potatoes.	6	Rhubarb.
9	Winter Greens.	5	Tomatoes.
9	Onions.	4	Cabbage (Red).
8	Peas.	4	Asparagus.
8	Carrots.	4	Seakale.
8	Parsnips.	4	Artichokes.
8	Cabbage (Green).	4	Shallots
7	Turnips.	4	Salads.
7	Beet.	4	Spinach.
7	Broad Beans.	4	Cucumbers.
7	Scarlet Runners.	3	Herbs.
6	Leeks.	4	Minor Crops.
6	Celery.	10	Fruit.
6	Cauliflowers.	10	Order and System.
6	French Beans.	8	Flowers (Window and Garden)
6	Vegetable Marrows.		

Two visits are paid to each garden and allotment, the first usually between the middle and the end of June ; the second during August. Thus early and late crops are both caught. The points gained by each competitor are placed to his credit on the judging sheet.

Prizes are not fixed in number and amount, but depend upon the number of points earned. By this system the best Centres and the worst do not receive just the same amount, as is the case where fixed sums are given as prizes, but the amount earned by each is correlative with the merits of its work. Moreover, individual competitors are rewarded in precise proportion to the respective merits of their plots. If two points divide a pair of allotments 2d. is the difference in the prize.

Prizes, not exceeding four in number, are given at each Centre to competitors obtaining 90 points or upwards. If, how-

ever, more than four competitors obtain 140 points or upwards a prize is given to every such competitor. All prizes are at the rate of one penny per point according to the judges' award.

If examples are needed to make the above clear, take two Centres. In one eleven men gained 140 marks and upwards, and eleven prizes at one penny per point were awarded; total, £8 5s. 5d. In the other only two men gained more than 90 marks, and consequently only two prizes were given; total, £1 2s. 4d.

It is of the greatest importance that the system of judging which is practised should be thoroughly understood. This one is as simple as it is practical, and it is applied with the utmost exactness and care.

In the first place a careful estimate is formed of the respective quantities of the different crops. Sometimes a competitor reduces the quantity of his Potatoes or other leading crop in order to get in a number of comparatively unimportant things, under the impression that as he will get marks for the Potatoes just the same he must necessarily be the gainer. A sharp lookout is kept for this, and the scheme is thwarted by deducting points under the head of order and system. I never conclude the judging of a plot of ground without counting up the number of rows of the principal crops, and if there is a serious shortage marks are taken off.

In the second place attention is paid by the judge to the provision made for securing the longest possible succession of produce. It is considered a fault if all the Peas are coming in together. It is considered a merit if good judgment in the selection of varieties and the times of sowing results in securing Peas for several successive weeks. Points are given for good cropping if the place of failing crops is immediately filled with young stuff. There should not be a glut at one time and a scarcity at another, but there ought always to be a supply of vegetables ready for use. Overcrowding is a defect.

During the past seven years I have judged 5,000 gardens and allotments on this system, and it has been found to work with perfect success.

In judging vegetable produce at shows the following principles are observed:—

Broad Beans should open crisply, and display tender seeds. Pods which show black-eyed seeds are not liked.

Kidney Beans, both runner and dwarf, should be even in size, of good colour, and brittle. Pods that will not snap under pressure without discharging a large seed like a bullet, or which are stringy, are passed.

Beet should be of medium size, fangless, and show a dark red colour when cut. Very large, coarse, fangy roots, which frequently cut pale, are usually passed.

Cabbage should be of medium size, free from caterpillar, and

show a close white grain when cut. If soiled, perforated, and soft it is deemed imperfect.

Carrots should be even in size, symmetrical, bright in colour, and devoid of greenness at the top.

Cauliflower should be smooth, even, close, and white. If yellow, coarse, and partially burst it is imperfect.

Celery should afford a firm resistance to the pressure of the hand, be clean, well filled out, and crisp. If very yielding under pressure, full of suckers, showing flower, and worm-eaten, it is generally passed.

Onions should be even in size and clear in skin. Judges look particularly for ripeness in autumn-sown bulbs. Spring-sown bulbs should be thin at the neck. The Onions must be single, not garnished with offsets.

Parsnips should be clean, smooth, and straight. Fanged or rusty roots are not liked.

Peas should be even in size, the pods well filled and of good colour, the Peas fresh and sweet. Discoloured, tough pods with maggoty seeds are passed over.

Potatoes should be even, smooth, clean, and not of a huge size. Judges do not like to see large and small Potatoes mixed on a dish, nor coarse, deep-eyed, or scabbed tubers, nor roots too large to be properly boiled.

Turnips should not show a coarse tap root, and they should be white, crisp, and sweet when cut. If discoloured or fluffy and strong in taste they are imperfect.

Vegetable Marrows are usually shown in pairs. Each Marrow should be of about the same size as its fellow, should yield under pressure, and be tender enough in the skin to admit the thumb nail readily. If yellow, as hard as a board, and tough in the skin, it is passed.

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