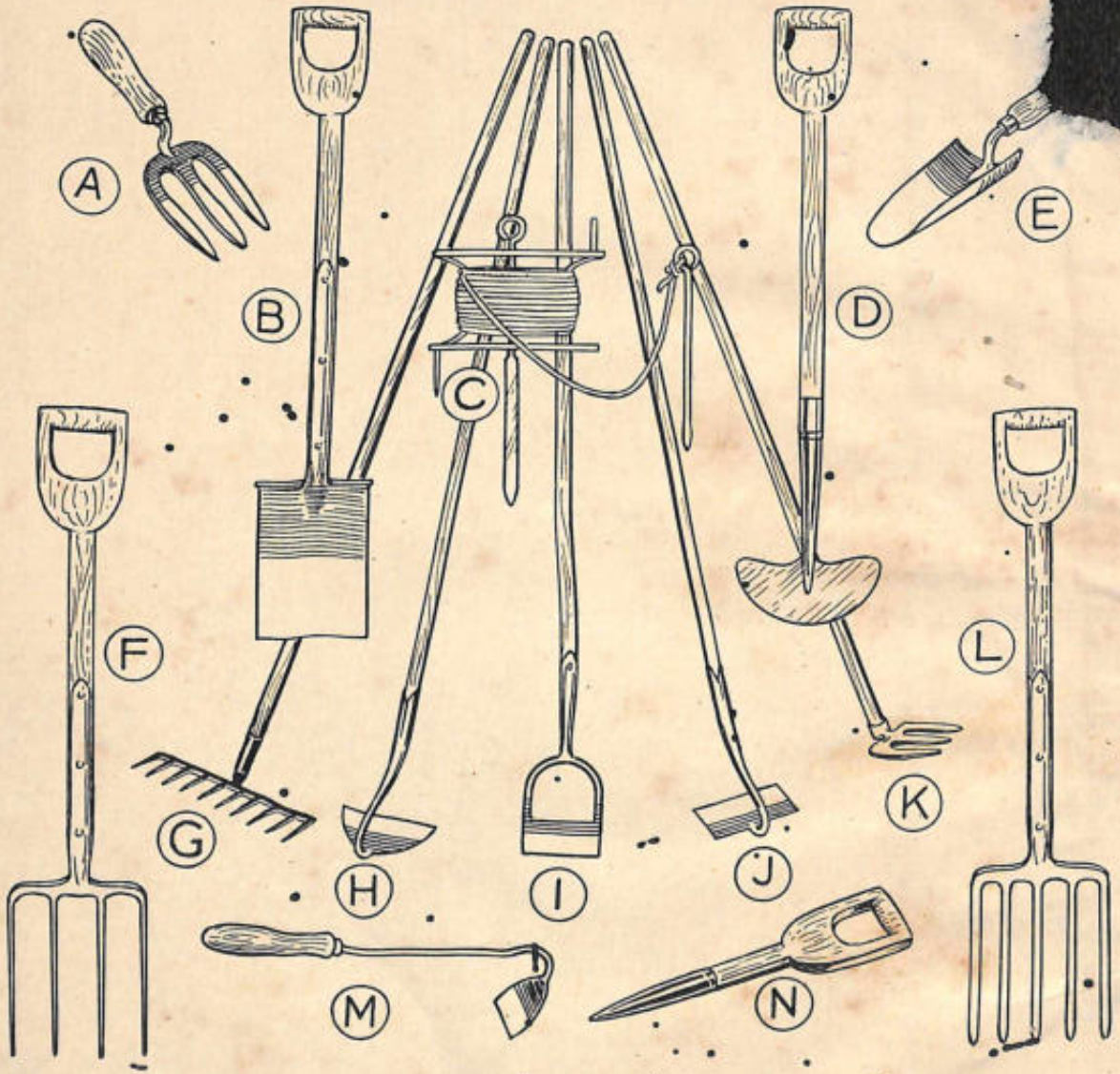
GARDENING
IN PICTURES



A SELECTION OF GARDEN TOOLS

(A) *Small hand fork.* (B) *Digging spade.* (C) *Stout garden line.* (D) *Edging iron for the lawn.* (E) *Small hand trowel.* (F) *Digging fork.* (G) *Garden rake.* (H) *Swan-neck hoe.* (I) *Dutch hoe.* (J) *Draw hoe.* (K) *Canterbury hoe.* (L) *Potato fork.* (M) *Hand hoe.* (N) *Dibber.*

GARDENING IN PICTURES

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SOWING AND PLANTING TABLES

The following tables are given in the endpapers:

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Sowing and Planting Table for Vegetables
Planting Table for Hardy Annuals

Back

Planting Table for Hardy Bulbs
Planting Table for Hardy Perennials

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PREFACE.

'THERE is nothing better than seeing with one's own eyes' – how true this statement is, and how well does it apply to the enthusiastic gardener who wants to make his garden just that little bit better than his neighbour's!

It is for this reason that photographs form the greater proportion of my book. The text has been condensed so that only the essential information is contained in each chapter, and once that information has been digested the reader can follow the requisite operations picture by picture.

Most gardening books assume that the reader already possesses a reasonable amount of practical knowledge. There must be many thousands of enthusiastic gardeners who do not possess such knowledge, and it is for them that this book is specially written.

If, after reading and using this book, the amateur gardener feels confident that he can now specialise in particular plants and increase his knowledge by reading the many excellent books written on these subjects, then I shall feel that this book has served its purpose.

Ready reference to the sowing and planting times of various subjects is always a feature which the busy gardener requires, and it is for this purpose that I have included several of these tables in the front and back pages of my book.

It would not have been possible for me to have obtained the photographs without the kind co-operation of those whose gardens I used, and also for the excellent services of the photographers who accompanied me.

Finally, I must express my gratitude to Mr. A. G. L. Hellyer, whose advice and encouragement, always generously given, have made the writing of this book so much easier than it might have been.

Hampstead, 1952 G. B. WALKDEN

1. HOW TO DIG

As the soil is the basic material with which we shall be dealing in nearly all our gardening operations, it is obvious that, unless its cultivation is undertaken correctly right from the start, good results cannot be expected from the plants.

Before describing the various methods of cultivation I should like to stress a very important point, and one which many gardeners miss. This is the importance of choosing a spade suitable for the purpose. Far too many gardeners use spades that are either too large and heavy or else far too small. As this is a tool which is going to be used a great deal, it wants careful selection; moreover, with a good spade digging can be made a much more pleasant task. When purchasing a spade, therefore, spend some little time in its choice, picking up several and going through the motions of digging.

Success depends upon digging when the soil is in the right condition. If it is very wet, it may become pasty and solid and more harm than good can be done; if it is very dry, the soil will fall apart too much as it is dug. Tackle the ground when it has just the right moisture content and your task will become pleasant.

To dig comfortably and easily the gardener must observe three essentials: correct spade, right conditions and rhythm of movement. One might, perhaps, be tempted to say 'and a light sandy soil!' – but even on the heaviest of soils digging can be a comparatively pleasant task.

I have already mentioned two of the essentials, namely the correct tool and the right conditions, but what about the third – 'rhythm of movement'? I expect many of you have observed at some time or other an old farm or market-garden labourer digging a plot of ground, and it must have struck you that the man seemed to be able to dig effortlessly for hour after hour. This was because he had 'rhythm of movement'.

In other words, he maintained a slow but steady speed all the time. The amateur gardener would do well to follow his example. Do not try to rush the job of digging; tackle it slowly and methodically, and when you feel tired – stop. As you become accustomed to digging, it will be possible to increase the area that is dug.

Never vary the speed of digging, and to add interest if rather a large piece is being dug, mark the ground off into small areas and see how long it takes to dig each one – it is surprising how time flies when doing this! Many gardeners look upon digging as a terrible task – this is not so. What is more satisfying than to see a piece of ground well dug?

Ground should be dug deeply if good results are desired. If this is not done, the subsoil consolidates, and during very wet weather water cannot percolate through and will lie under the top spit in which the roots are growing. Although plants need water, they will not tolerate their roots in such stagnant conditions.

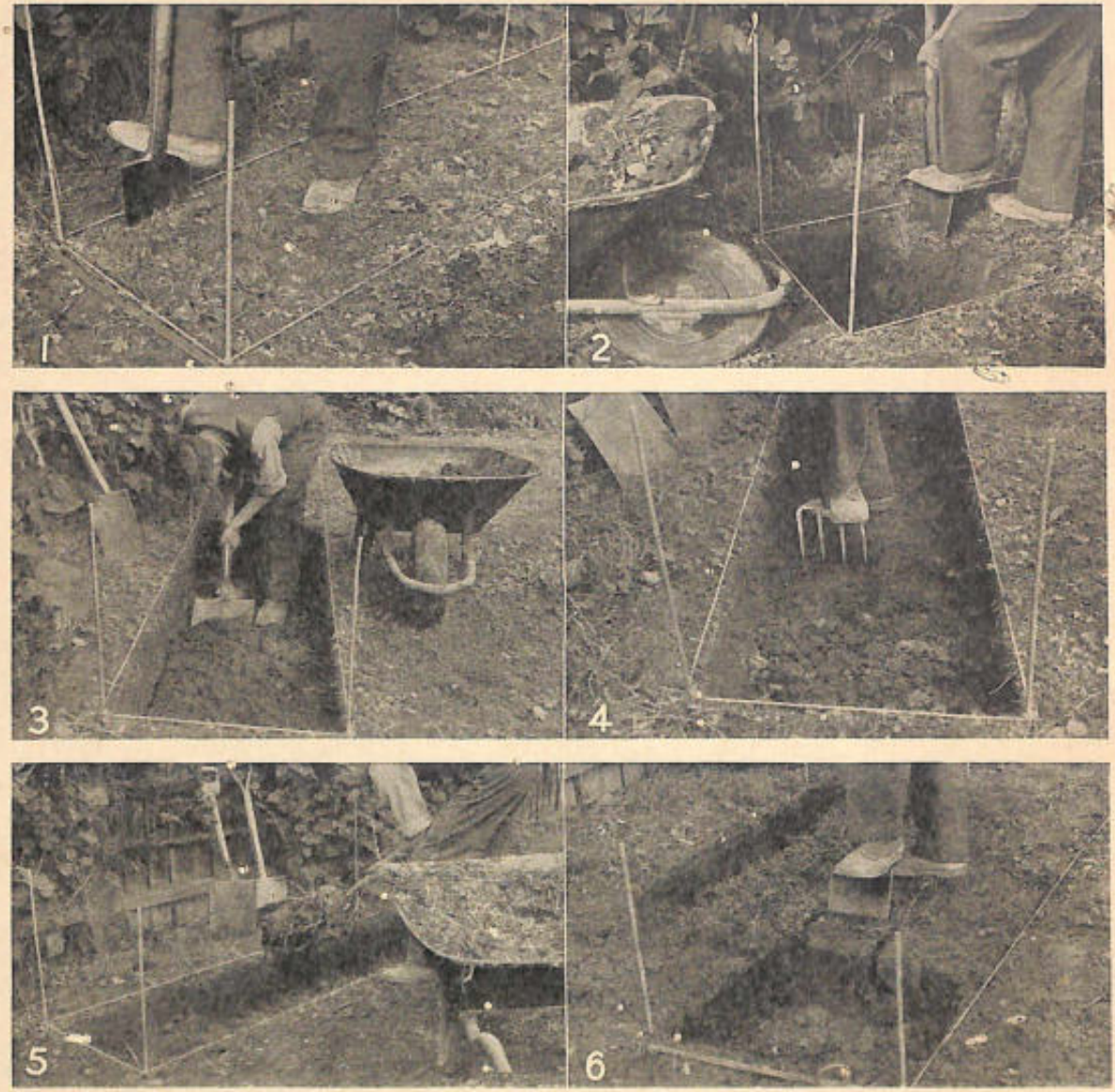
Many of the best resolutions to make a thorough job of digging are spoilt because the work is left too late. Having started your digging, stick at it until you have finished. The only exception to early digging is in the case of very light soils, when it can be left until after Christmas.

Plain Digging (*pictures opposite*)

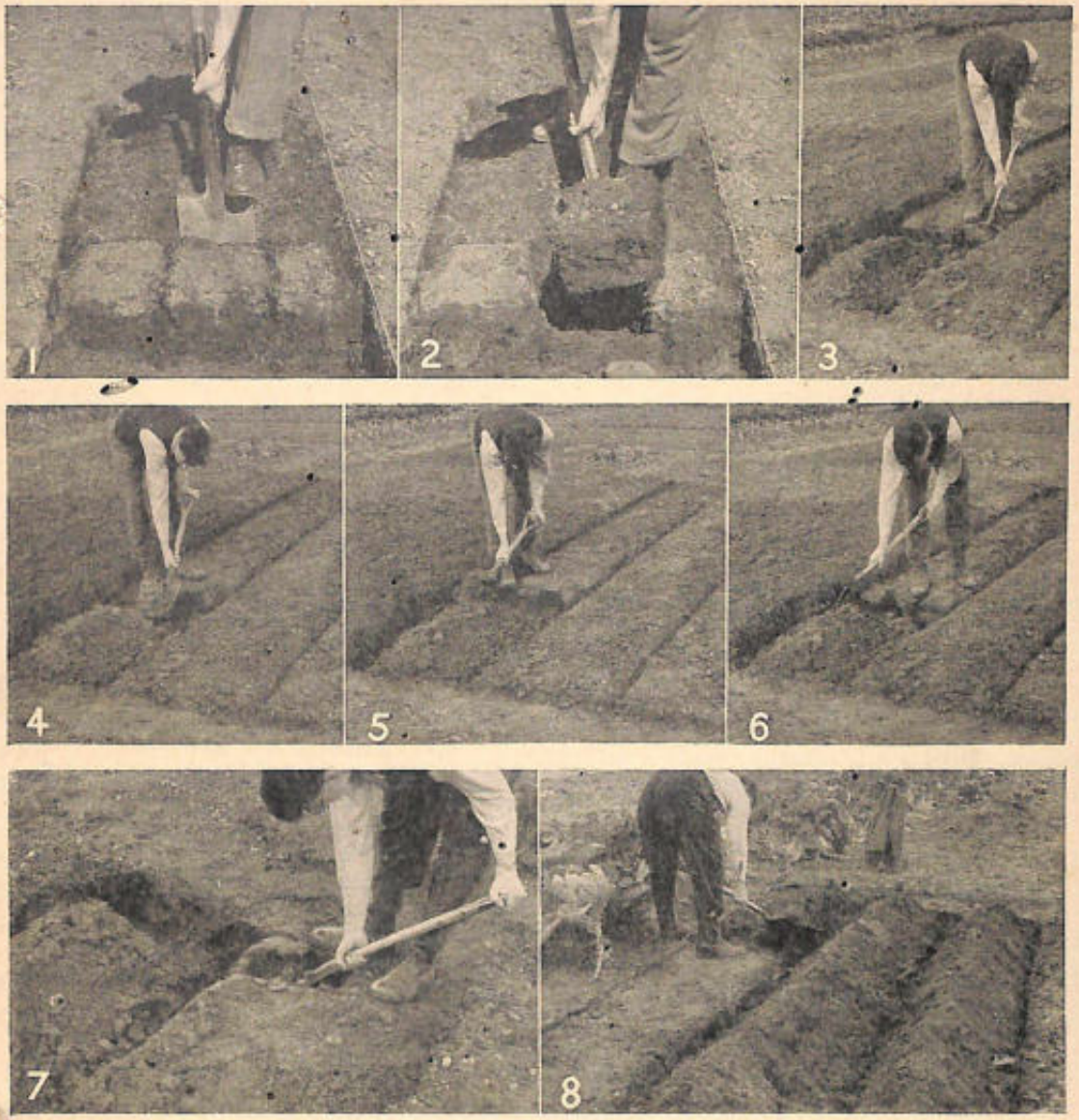
As a start, I am taking as an example a piece of ground which has been under reasonably good cultivation for several seasons. In this instance it will only be necessary to 'plain' dig the ground. Where ground area is extensive it is a good plan to divide it into convenient strips, each one being dug in turn. A trench should be taken out at one end approximately 10 inches deep and 1 foot in width. Make sure you clean the soil out of this trench thoroughly; then wheel it to the end of the plot where digging will finish. Thrust the spade or fork to its full depth and about 6 inches away from the edge of the trench. Soil should be turned right over and at the same time thrown well forward into the trench. This operation is continued right across the width of the strip and if the job has been properly done there will remain a trench of the same dimensions as the

(*continued on page 12*)

Plain Digging—(1) *The tools required for the cultivation of the soil are shown here on the barrow. They are the cane sticks for marking out the trenches, a ruler, a garden line, a spade, a shovel, and a rake for breaking down the soil afterwards,—a garden fork and a Canterbury hoe.* (2) *Taking out the first trench.* (3) *Soil tipped at the end of plot where digging will finish.* (4) *Dividing broad plot in half.* (5) *Incorrect way to insert spade.* (6) *The correct way to insert the spade.* (7) *Nicking out soil.* (8) *The soil being thrown forward.* (9) *The soil turned over as it is thrown.*



Double Digging—(1) *The trench marked out with the canes, ruler and line, and the soil is being nicked out so that when it is removed it leaves a neat, clean trench.* (2) *Removing the soil from the trench. Note the clean sides.* (3) *Shovelling up the 'crumbs' or loose soil from the bottom of the trench.* (4) *Forking up the bottom of the trench.* (5) *Adding the manure or compost to the bottom of the trench.* (6) *The second trench is marked out and the soil from it is removed, but this time it is thrown forward and on top of the manure previously added.*



Ridging—(1) *For the sake of clarity the three spadefuls of soil are marked out in the narrow strip which is to be dug. The centre spadeful is to be taken out first.* (2) *The centre spadeful about to be thrown forward.* (3) *The left-hand spadeful is taken out.* (4) *This spadeful is thrown towards the centre of the strip.* (5) *The right-hand spadeful remains to be removed, which is being done here.* (6) *This is thrown forward and towards the centre of the trench.* (7) *Turning at the end of the digging.* (8) *The turn has been completed and a new strip is being tackled.*

first into which the next 6 inches of soil is turned. Proceed like this until the whole plot has been dug. Make sure the soil is turned well forward, so keeping the trench open and ensuring that all weeds are completely buried.

Double Digging (*pictures on page 10*)

In some cases a little deeper cultivation may be required, where the subsoil is broken up without bringing this relatively infertile soil to the top. To do this a trench should be taken out 10 inches deep and 2 feet wide, and the soil wheeled, as before, to the far end of the plot. The bottom of this trench should then be forked or dug from one end to the other, the soil being broken up to a depth of at least a further 10 inches. A second trench 2 feet wide behind the first trench should be marked out, and the soil from this, to a depth of 10 inches, should be dug out and thrown into the first trench on top of the broken-up subsoil. The bottom of this second trench should also be forked up, and work then proceeds in this manner until the whole plot is completed.

Many gardeners will have to deal with new ground. At first this type of virgin land appears to be a disheartening proposition, but, if tackled resolutely in the following manner, what would appear to be hopeless ground can be turned into a fertile and productive plot.

The ground should be divided into convenient strips and a trench taken out at one end 3 feet wide and 10 inches deep. This soil is wheeled to the end of the plot where digging will finish. Divide the bottom of the trench in half longitudinally and dig out the forward half a further 10 inches deep. This soil is also wheeled to the end of the plot, but placed in another heap.

The bottom of this trench should then be broken up with a fork or spade. The upper portion of the trench should now be thrown forward on to the piece that has just been forked. This operation will expose a fresh piece of soil which in turn should be forked up.

A fresh trench should now be taken out on ground-level, but this time only 18 inches wide, and the soil thrown right forward so that it fills the first (deep) trench. The second 10 inches of soil should now be thrown on to the broken subsoil of the trench immediately in front of the digging that is now proceeding, and the newly exposed subsoil broken up. Work proceeds in this manner, by taking out 18-inch-wide trenches, until the plot is completed, and is finished off by shovelling into the last trench the soil from the smaller heap, and that from the larger heap to top off.

Ridging (*pictures on page 11*)

Where large areas of soil are required to be exposed to the pulverising action of the weather, ridging should be practised. This is done by dividing the ground into 3-foot-wide strips. Start at one end of the strip and take out a trench 1 foot wide and about 10 inches deep. This will leave you with a trench 3 feet long. Taking each strip in turn, work back down the length of it, turning the soil forward and over, but bringing the spadefuls of soil from each extremity of the short trench towards the centre. This will result in the formation of a ridge. Deal with each strip in turn until the whole plot is dug.

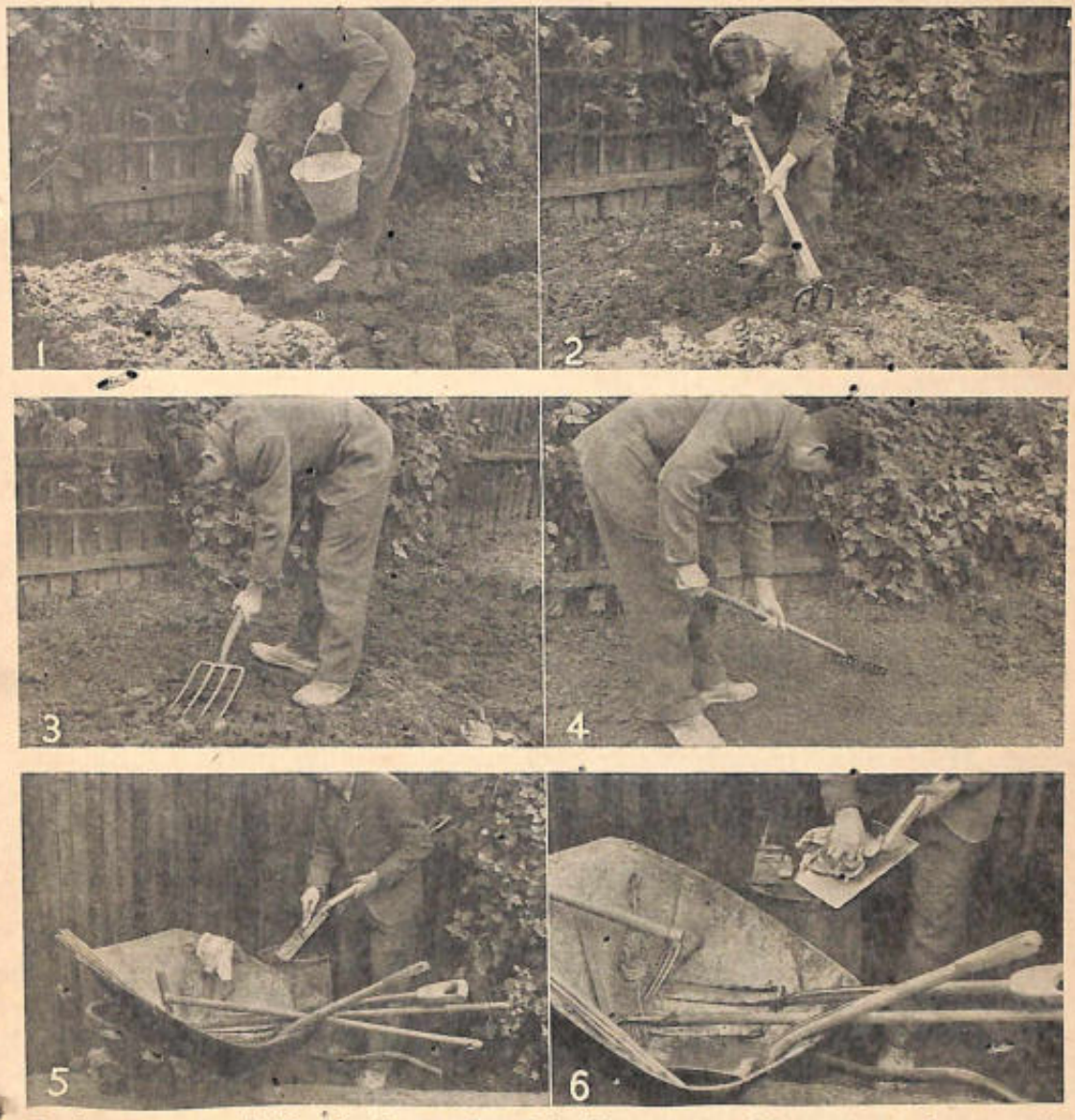
In all types of digging do not attempt to cover too much ground at a time, but dig out reasonable spadefuls. By overloading your spade you will only tire yourself out. Always keep the spade clean by scraping it while digging. By doing so, all operations requiring the use of a spade will be made much easier, and the life of such a valuable tool will be prolonged.

Cleaning Tools (*pictures opposite*)

A wooden scraper or piece of sharp slate will be ideal for cleaning the spade. After digging, all the soil should be scraped off, the blade wiped clean with a rag and a fine coating of oil should be applied to both the front and back of the spade blade.

The application of this film of oil will prevent rusting, which is bound to take place if the spade is left in the garden shed for some time without use. When the spade is used again, this film of oil will soon be taken off.

The advice about cleaning and oiling the spade applies equally to the other gardening tools such as the hoes, etc. Clean tools make for far easier work amongst the crops.



Breaking down the soil—(1) *After digging, the soil should receive a good liming (except for potatoes)* (2) *The Canterbury hoe is an ideal tool to use for breaking down soil on very heavy ground.* (3) *The soil will need breaking down still further. The back of the fork is used for this purpose.* (4) *A finer tilth for seed sowing or planting is achieved in the final operation with the garden rake.* (5) *The surplus soil should be scraped off the tools when digging or cultivation has been completed.* (6) *A final wipe over with an oily rag will prevent tools from rusting.*

2. MANURE FOR THE GARDEN

THE humus content of the soil is important, as it plays a vital part in improving the physical condition of the soil as well as providing valuable plant food. It ensures the effective aeration of the soil, thus making it easy for plant roots to travel and find their food. By its inclusion soils are enabled to retain moisture longer during hot, dry weather, but perhaps its greatest benefit lies in the encouragement of bacterial life which enables plant food to be made soluble and so allow the plant roots to assimilate it.

How, then, and in what form, can the gardener obtain this valuable humus? Horse manure is perhaps one of the most valuable sources, but unfortunately in these days of mechanisation it is very difficult and, in fact, in some cases almost impossible to obtain supplies.

Those who are lucky enough to obtain some should store it in a convenient corner of the garden, where a heap should be started. The heap should be built up layer by layer as supplies are received, and each layer should be well trodden down during the construction of the heap. Where possible the manure heap should be under cover, otherwise heavy rainfall will wash away a lot of its valuable contents. After about a month the heap should be completely remade, the outside layers being placed in the centre of the fresh stack which is started by the side of the original. By doing this, thorough decomposition is ensured throughout the heap.

As horse manure is fibrous it is excellent for heavy soils, where it helps to keep the soil particles open. It can be dug in at any time of the year, but if used fresh should be dug into vacant ground in the autumn. It is also very valuable for light soils, as it helps to give body to them. The manure can be dug in at the rate of one good barrowful to 10 square yards. All garden crops benefit from well-rotted manure, especially peas and beans, for which the manure should be placed in the bottom of the trench and lightly forked in. It is excellent as a top mulch round the base of the plants, as this helps to conserve soil moisture. When suspended in a bag, in a tank or tub of water, it provides valuable liquid manure.

Composting (*pictures on page 17*)

The majority of gardeners, however, will be unlikely to obtain supplies of horse manure and some substitute will have to be found. Few realise the value of composted vegetable waste for humus. Considering that it takes but little effort to construct these heaps, and since the ingredients are always to be found in the garden, more use should be made of this method.

There are many methods of composting, but all have much in common and all agree that the heap should be built up in layers of material. Good aeration and drainage are essential, and some form of accelerator is advisable. The many accelerators used for the different methods can be purchased from reliable seedsmen. The basic principles for making a heap are that the site should be one that is not in the full sun, the area should be lightly forked over and the size of the heap not less than 4 feet and not more than 6 feet square. A few handfuls of lime should be dusted over the area and the coarsest of the material should be placed down first to help with drainage and aeration. When the first layer up to a foot in depth has been built it should be trodden lightly. Manure from small stock such as rabbits or poultry can be spread on this layer with advantage; failing this, two good handfuls of sulphate of ammonia, or a proprietary chemical, used according to manufacturer's instructions, should be spread on this, and lime given at the rate of six ounces per layer.

The heap is built in this fashion, layer by layer, until it has reached a height of about 5 feet, when it should be finished off with a 4-inch layer of soil. A small heap is sometimes more convenient, and this can be made in a wire or wooden bin. In all the forms of composting any waste material such as grass-cuttings, leaf-trimmings and all the general soft residue from garden work can be incorporated to good advantage.

(*continued on page 16*)

(1 and 2) The inclusion of 'green manure' in the form of old vegetables such as leeks can be dug in to form valuable humus. (3) Top-dressing with fertilisers during the plants' growth will help considerably. (4) Mulching with rotted manure or compost will help to conserve moisture. (5) Chickweed and most annual weeds can be dug in as digging proceeds. (6) Liquid manure can be made by placing some manure in a sack and (7) suspending it in a tub or tank of water. (8) The manure can also be suspended in wire netting. (9) Fruit trees benefit from a top dressing. (10) This should be hoed in carefully afterwards.

MANURE FOR THE GARDEN (continued)

Green Manuring

Good results can be obtained by the use of 'green' manures. By this is meant the sowing of a suitable covering crop such as mustard, rape, vetches, cloves, tares, etc. The most useful seeds to sow, however, are those containing a high proportion of nitrogen. These include tares, lupins, cloves and vetches. The seeds should be sown thickly at the rate of 2–3 ounces per square yard, and when the ground has been well covered with them, they should be dug in generally just before they come into flower.

Mustard can be sown as late as August for autumn digging: rape or annual lupins in July, while vetches are best sown in the spring. In order to hasten decay it is advisable to dust the ground with calcium cyanamide, nitro-chalk or sulphate of ammonia (2 oz. per square yard).

Sewage Manure

The demand for sewage manure has increased rapidly since horse manure became so difficult to obtain, and it also has the added attraction of being reasonably cheap. It is not as valuable as other composted animal manures, but good sewage sludge can be dug in at rates of up to 2 hundredweight per rod. An analysis should be obtained before purchasing any, as some samples are too poor to be of much value. This analysis should show 2 per cent or more of nitrogen and approximately 1·5 per cent phosphoric acid.

Good use can be made of this material by using it when composting. It can be 'sandwiched' with layers of compost material and when rotted it will provide valuable manure.

Poultry Droppings

This material is a highly concentrated and rich plant food, containing a higher percentage of nitrogen and phosphates than stable or farmyard manure. It should be used with care, however, as it is so strong. There are two main ways of using it; it can be dried and powdered and used like a chemical fertiliser, at the rate of 8–12 ounces per square yard, in which case it should be stored under cover; or it can be mixed with suitable litter such as straw or peat and made into a heap outside, where it can be allowed to decompose on its own. When only small amounts are obtained, it is best mixed in with the general compost heap, to accelerate decomposition.

Pig Manure

This material should never be used fresh, but when rotted is a valuable manure. It can be added to the general compost heap or composted on its own with the addition of peat, straw or chaff. Pig manure is rich in nitrogen and best for poor, sandy soils. It can be applied at the rate of one barrow-load to 10–12 square yards in the autumn or spring.

Seaweed

Many people do not realise the value of seaweed. It is rich in potash but lacking in phosphates. It is especially good when used for potatoes. Seaweed can be dug in as it is gathered, at the rate of 1 hundredweight to 8 square yards. Alternatively, where rather large amounts are obtainable, it is a good plan to spread it out to dry and then use at the rate of 1 hundredweight to 24 square yards. Dry seaweed, if made into cone-shaped stacks, will keep for a long time, but see that it is stacked downwind, as it has an unpleasant smell when decomposing! The best kinds of seaweed are bladderwrack and driftweed with long, broad fronds.

Shoddy

This material is waste from wool factories. As a manure, shoddy decomposes slowly, but it improves the texture of the soil, as it is bulky. It is, therefore, most useful for heavy soils and can be dug in at the rate of 1–2 tons per acre, or approximately ½–1 pound per square yard.

Hops

These have little or no value as plant food but, as they decay slowly in the soil, they improve its texture. They can be dug in freely at any time of the year at rates up to 1 pound per square yard, or mixed in with the compost heap.

Some hop manure, as sold by garden firms, is treated chemically, thus making it into a balanced plant food. Manufacturer's instructions should, therefore, be closely followed as to rates and time of application.

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(1) *All forms of waste material should be collected systematically.* (2) *A wooden bin is most useful and some rough material should be placed in the bottom first.* (3) *Layers of waste should be placed on the heap.* (4) *Each layer should receive a good sprinkling of lime or proprietary accelerator.* (5) *Heaps can be built up by adding alternate layers of manure.* (6) *Firm the manure down well.* (7) *The resultant rotted compost should be a nice friable mass.* (8) *Fresh horse manure should be stacked in order to rot down.* (9) *Spent hops form valuable humus when applied to the trenches.*

Peat

Peat has three great advantages: it is a good source of humus; it has exceptional ability to absorb moisture, and, finally, once the moisture has been absorbed, it is retained over a considerable period.

Peat that is granular or fibrous in texture is most suitable. Samples that are full of dust or are very solid should be avoided, as these will tend to clog the soil rather than to improve its texture. It is essential to moisten the peat thoroughly before use and a bagful should be steeped in a tank of water for several hours.

FERTILISERS

There are two distinct types of fertiliser – organic and inorganic. Organic fertilisers are those having an animal origin, whilst inorganic fertilisers are those with a mineral source.

ORGANIC TYPES

Blood

This contains nitrogen, and fresh blood can be dug freely into vacant land. The dried forms, however, are much more pleasant and easier to handle. Commercial dried blood contains about 12 per cent nitrogen. Apply at rates up to 2 ounces per square yard. Apply this fertiliser in the spring and early summer.

Bonemeal

A very useful source of phosphates. It is a slow-acting fertiliser, and the rate of availability will depend to a great extent on the fineness of the grinding. The nitrogen content is 1–5 per cent and phosphoric acid 15–32 per cent. Apply at rates up to 6 ounces per square yard in the winter and autumn.

Fish Manure

This is the residue from fish factories. It contains nitrogen, phosphorus and potash. An average analysis shows 8–10 per cent nitrogen, 4½–9 per cent phosphoric acid and 2–3 per cent potash. Fresh manure can be dug into the soil, while the prepared manure can be applied at rates according to manufacturer's instructions.

Hoof and Horn Meal

A steady-acting fertiliser with an average analysis of 12–14 per cent nitrogen. Apply at rates up to 2 ounces per square yard.

INORGANIC TYPES

Basic Slag

A slow-acting fertiliser supplying phosphates and lime. The quality is variable and an analysis will show a reading of 8–18½ per cent phosphoric acid. Most useful for autumn and winter applications at rates of 4–8 ounces per square yard.

Calcium Cyanamide

A nitrogenous fertiliser which is quick-acting and which also supplies lime. It has a caustic effect and for this reason it is very useful for applying to refuse in order to accelerate its decomposition. Rate of application ½–1 ounce per square yard. Use in late winter or spring. Analysis: 20 per cent nitrogen, 22 per cent free lime.

Kainit

A very crude form of potash. This fertiliser is best applied in the autumn or winter at rates up to 3 ounces per square yard. The potash content is 14 per cent, common salt 50–60 per cent, and magnesium sulphate 20 per cent.

Lime (Hydrated)

This is the quickest acting form. Use at rates up to 1 pound per square yard.

Chalk. Slower in action and suitable for light soils. Can be used at rates up to 2 pounds per square yard.

Ground Limestone. Another form of chalk (calcium carbonate). Is even slower in action. Use in the same way as chalk.

Quicklime. This is quick acting but caustic. Suitable only for vacant land at rates up to 1 pound per square yard.

Gypsum. This can be used instead of chalk.

Gas Lime. Can be used only on vacant land, where it is useful as a soil fumigant.

Muriate of Potash

A relatively pure form of potash. Care should be taken when using this fertiliser, as it can burn the more tender root systems. Apply at the rate

(*continued on page 20*)

(1) *Do not distribute the fertiliser indiscriminately on the foliage.* (2) *It is far better to place it carefully round the base of the plants in this manner.* (3) *A useful compost bin or container can be made out of wire and the compost placed in it in this fashion.* (4) *Here is the wire container being built up.* (5) *Hen manure is very useful and should be collected regularly from the hens. It must be well rotted, however, before use.* (6) *Raspberries will appreciate a good top mulch of rotted manure or compost.* (7) *Rhubarb benefits from top mulching.* (8) *Applying manure to the bottom of a celery trench.*

of ½–1 ounce per square yard in the autumn or winter. Analysis: 50 per cent potash; usually has 13–18 per cent common salt as an impurity.

Nitrate of Potash

Also known as saltpetre. It is very useful as a liquid feed to pot plants when dissolved in water, as it supplies nitrogen and potassium. For this purpose use at the rate of ½ ounce in a gallon of water. An analysis shows 12½ per cent nitrogen, 40 per cent potash.

Nitrate of Soda

This fertiliser must be used with great caution, for it is very caustic. It is very soluble and is excellent as a top dressing. Rate of application ¼–½ ounce per gallon of water, or if scattered on the land, ½–1 ounce per square yard. Analysis: 15½–16 per cent nitrogen.

Nitro-chalk

Quick acting. Best used in the spring and early summer at 1 ounce per square yard. When used as a rotting agent it is invaluable for compost-heap construction. Analysis: 15 per cent nitrogen, carbonate of lime 48 per cent.

Phosphate of Potash

Contains both phosphorus and potassium. Very soluble. Use at ½ ounce per gallon. Analysis: phosphoric acid 51 per cent, potash 35 per cent.

Salt

Asparagus beds will appreciate an occasional application of this fertiliser. Used frequently as a weed killer. It also helps to liberate potash in the soil. Use at the rate of 1 ounce per square yard.

Sulphate of Ammonia

A nitrogenous fertiliser. It is best used in the spring or early summer at the rate of ½–1 ounce per square yard. Analysis: 20·6 per cent nitrogen.

Sulphate of Iron

Where iron is lacking in the soil, it is best applied in this form. Apply in the spring at the rate of 1 ounce per square yard.

Sulphate of Magnesium

Also known as Epsom salt. Magnesium deficiency can be rectified by applying this fertiliser at the rate of 1 ounce per square yard.

Sulphate of Potash

This is the best form of potash. It may be used at any time of the year. Rate of application is ½–1 ounce per square yard. Analysis: 48 per cent potash.

Superphosphate of Lime

This fertiliser will supply phosphates where a quick result is wanted. The most suitable time of application is in the spring or early summer. Rate of application is 1–3 ounces per square yard. Average analysis of this fertiliser is 13–18 per cent phosphoric acid.

Home-made Balanced Feed

The beginner can quite easily make up his own particular fertiliser for different purposes. A general or balanced fertiliser is one which contains the three essential foods, namely phosphates, nitrogen and potash. Such a balanced fertiliser can be purchased ready made up, but the following mixture will prove equally good:

Superphosphate of lime	7 parts by weight.
Sulphate of ammonia	5 parts by weight.
Sulphate of potash	2 parts by weight.
Steamed boneflour	1 part by weight.

Mix these fertilisers well together and use as a top dressing, or prior to sowing or planting in the spring or summer, at rates of 3–5 ounces per square yard, or in water at 1–2 ounces per gallon.

(1) A general garden fertiliser can be made up oneself by mixing 7 parts superphosphate of lime, 5 parts sulphate of ammonia, 2 parts sulphate of potash, and 1 part steamed boneflour (all by weight). (2) The various ingredients should be heaped together into one pile. (3) Thorough mixing should be carried out by turning it with a spade. (4) Here are young cauliflower plants being top-dressed with the mixture. (5) Peat is useful and is best stacked outside so that it can get thoroughly moistened. (6) A compost heap that is not being used can be put to good use by planting a marrow on it.

3. PREPARING SEED BEDS

THE ground must be in the right condition before any attempt is made to prepare it for seed-sowing. Choose a day when the surface is drying out well, when, by kicking the clods with the feet, they should readily crumble. Never attempt any preparations during wet weather or when the soil is in a very wet condition – the soil will become consolidated owing to the walking about entailed, and on heavy clay soils this is disastrous.

The ground to be prepared will probably be a mass of large clods or lumps of soil as a result of autumn digging. These can be easily broken down by beating and knocking them about with the back of the fork. A Canterbury hoe is an ideal implement to use, especially on heavy soils. Do not leave the breaking down of these clods of soil too late in the season or else they will set into a brick-like consistency, while the lighter soils will lose a lot of their moisture, resulting in retarded seed germination.

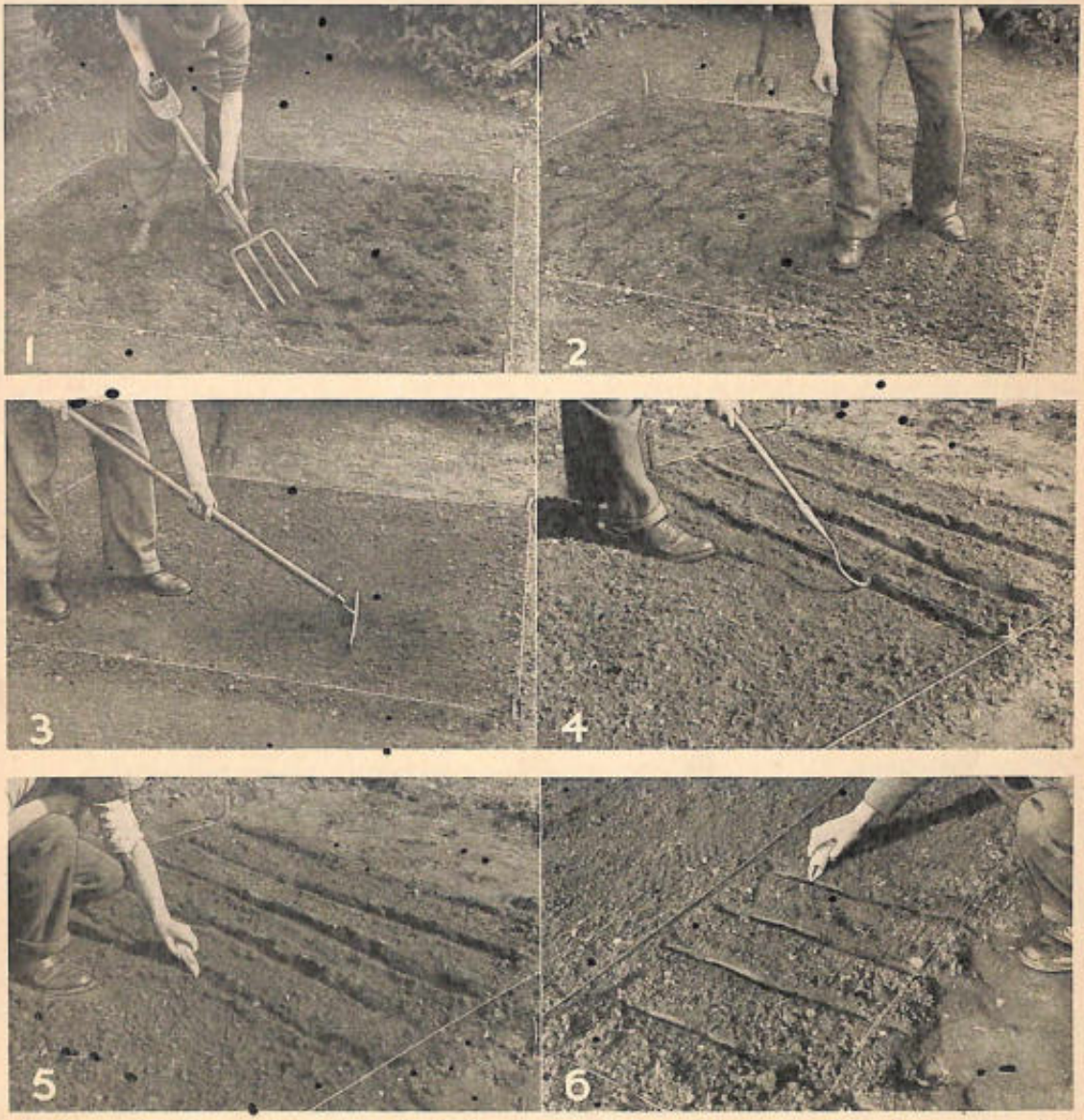
Once the clods are broken up, a light treading should be given, working up and down the bed in a systematic manner. This action will break the soil down even finer and at the same time will firm the soil – this particularly applies to light ground.

Unless sowings are to be carried out soon after soil preparation, it is wiser to leave the ground fairly rough, and rake to a fine sowing surface just before sowing. If the ground is raked very fine some weeks before sowing, there is a danger of the surface becoming hardened, especially if heavy rain is experienced in the meanwhile.

To produce a fine level sowing surface, the ground should be raked carefully backwards and forwards, any small lumps that may persist being broken down with the back of the rake. It will be found that a rake having a good number of teeth will produce a finer surface than one with only a few teeth. Rakes having 10 to 12 teeth are ideal. Whilst raking, remove any small stones that may appear and see also that a level surface is obtained. If any small hollows or depressions are left, water will collect and possibly cause the rotting of seeds or seedlings.

Seed beds should be made in the warmest part of the garden, and a bed against a south wall will be ideal. Warmth, naturally, will encourage quicker and more even germination of the seeds.

The seed beds must be constructed as close to a water supply as possible, for it would be foolish to have to carry heavy cans of water half-way across the garden to them and remember, seed beds will require constant attention to watering, especially if a dry period is experienced.



(1) *The seed bed has previously been dug in the winter and the rough lumps should be broken down with the back of the fork.* (2) *A light treading will break down further those lumps which still persist.* (3) *A final sowing tilth will be achieved with the rake.* (4) *The short drills can be taken out with the draw hoe.* (5) *Seed should be sown as thinly and as evenly as possible.* (6) *The bed can also be subdivided and very short drills sown as shown here. This is usually done where room is precious and where only a few seeds are to be sown at a time.*

4. SOWING OUTDOORS

It is a comparatively easy task to sow and germinate seeds under glass with a high percentage of success. When it comes to outdoor sowings, however, it is quite a different story, and the number of bad results and even complete failures is surprisingly high. What is the cause of this?

The gardener must realise that conditions encountered in sowing under glass and outdoors are totally different. Under glass the gardener has practically complete control of conditions in regard to watering, the type of soil and temperature, whereas in outdoor sowings the elements and the particular soil of the district have to be contended with.

The first essential is to curb any eagerness to get seeds in at all costs. Weather conditions and particularly soil conditions must be considered before any attempts are made. It is far better to lose a few days in sowing-time than to attempt sowings in bad conditions, when it is very unlikely that any time will be gained, as the seeds will not germinate well. No rigid sowing dates can be adhered to, and the beginner will be well advised to use his common sense rather than be guided too strictly by dates in books or catalogues.

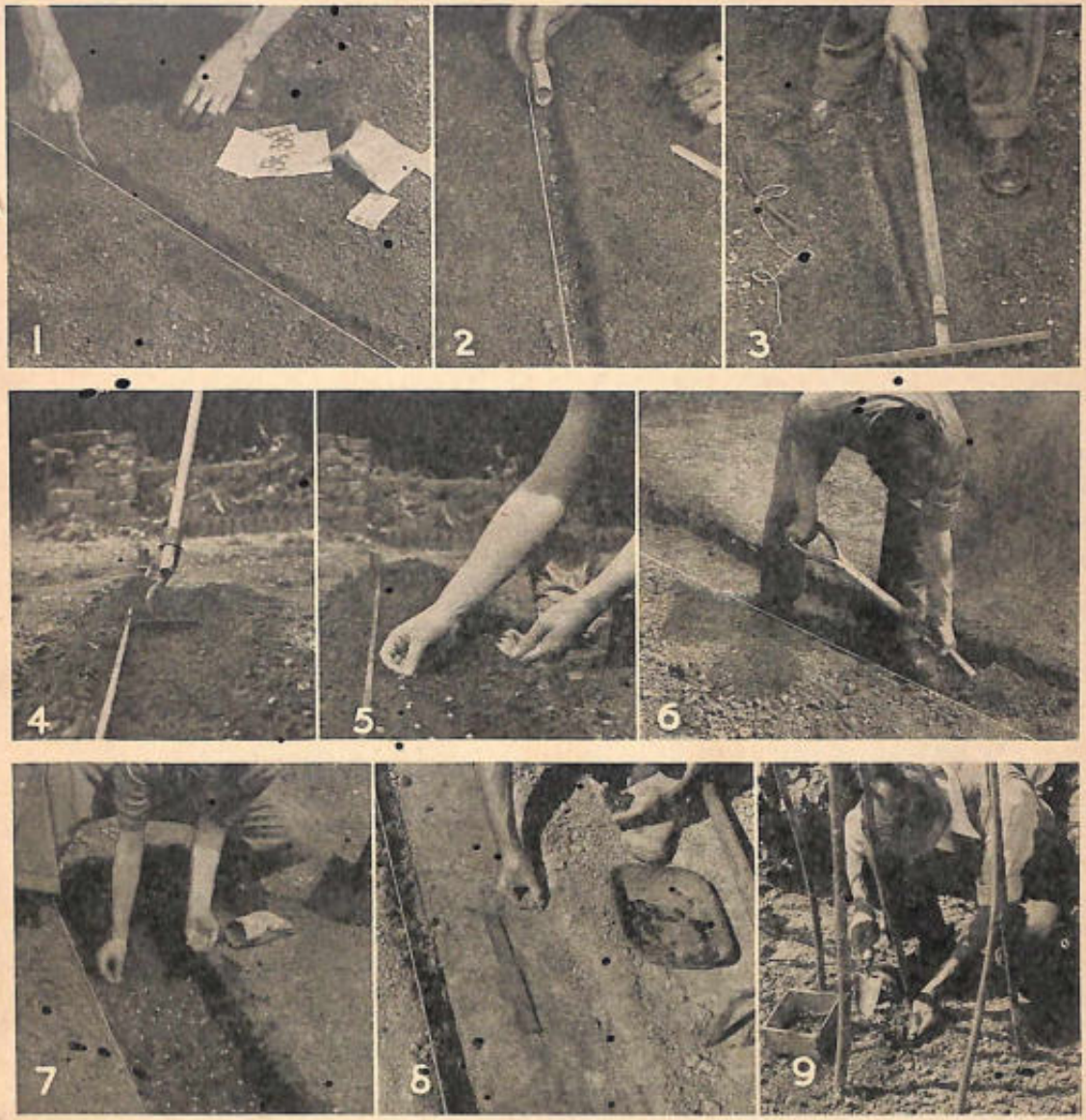
When the right conditions do occur, the first step is to draw out the drills in which the seeds are to be sown. While a wide assortment of implements are used for this purpose, the most efficient tool is the draw hoe. By using a corner and drawing it towards you in short but steady strokes, close to the garden line, a suitable seed drill can be made. Make sure that the depth of the drill is even. If seeds are buried too deeply they will not germinate, and conversely if they are sown too near the surface they will either dry out or else be eaten by birds. Larger seeds, such as peas and beans, are best sown in flat-bottomed drills, which are easily taken out with a spade. They should be the width of the spade, and about 2–3 inches deep.

As much care must be taken in the actual sowing of the seed as is required for the initial preparations. No matter what type of seed is being sown, do not sow thickly. Seeds should be distributed thinly and evenly along the row. Overcrowding can have just as fatal a result as sowing too deeply. In some cases it may only be necessary to place a pinch of seed at suitable intervals along the row, whereas, where the larger seeds are dealt with, they should be spaced individually along their shallow trench.

The actual operation of sowing can be made much easier and more effective if the seed packet is cut open with a sharp knife, thus leaving a sharp, clean-cut edge to the packet; torn edges will only result in an erratic flow of seeds. Where very fine seed is being used, it is sometimes difficult to distribute it thinly, and it is a good plan to mix some sand with the seed, when a better distribution will be effected.

Once the seeds are sown they should be covered carefully with soil. The ideal is to have the covering soil a little finer, but if a reasonably fine tilth has been procured already, this will suffice. The soil should be pushed carefully back over the drill with a rake, care being taken to replace only with the soil originally excavated from the drills and no extra. Afterwards go down the rows and level off the soil, finally firming with the back of the rake.

Do not be too severe with this firming, especially on heavy soils, as in dry weather the surface may bake hard, making it difficult for the young seedlings to penetrate the soil. It is also advisable, on heavy, wet soils, to stand on a piece of board or plank when carrying out any of the operations mentioned in this chapter. By so doing, too much trampling will be avoided and subsequent operations will be made easier. There is one important point which must *not* be forgotten, and that is to label all seed-rows which have been sown. You may imagine what terrible confusion will occur unless labelling is done at the time of seed sowing. It is foolish to rely on one's own memory as to what the seeds are and where they were sown.



(1) *Seed drills can be taken out with a pointed stick and if the stick is held close to the garden line, the drill will be kept straight.* (2) *Seed, such as lettuce, should be sown* thinly *in the drill.* (3) *After sowing, the seed should be covered carefully with the rake.* (4) *Wider and deeper drills should be taken out with a draw-hoe.* (5) *In these drills, peas or beans should be sown.* (6) *A spade can also be used for wide drills.* (7) *Here, peas are being sown, the seed is staggered in the bottom of the drill.* (8) *A ruler helps to keep accurate spacing.* (9) *Planting the beans close to each supporting pole without taking out a trench.*

5. SOWING UNDER GLASS

ONE big advantage with sowing seeds under glass is that the gardener has some measure of control over conditions regarding temperatures, ventilation and watering, whereas with outdoor sowings much depends on the weather. Nevertheless, though one starts with an advantage, conditions under glass are artificial and demand unfaltering attention, whereas outdoors one can leave seeds to germinate in a natural manner.

Before considering any sowings it is essential to be sure that sufficient temperature is available. It is often misleading to read of 'an average temperature', and very few realise that this temperature refers to that taken at midnight. It is a fairly simple matter to maintain a reasonable temperature during the day, especially with the help of a little sunshine, but maintaining night temperature is not so easy. The main essential is to try to provide an even temperature without any great fluctuations. Where only a cold house is available, do not be too ambitious and try to raise seeds that require temperatures in excess of what can be comfortably provided.

Seeds can be raised in pots, pans or boxes – but whatever the receptacle, correct compost and drainage are essential. A seed needs moisture to germinate it and to maintain it in good growth, and unless the compost is correctly mixed and the receptacles properly drained, poor results will be obtained.

When pots are prepared for seed sowing they can be filled practically half-full with crocks, on top of which should be placed fibre, leaves and moss. These crocks will ensure good drainage and, at the same time, will avoid the use of too much soil. Boxes will require only a fine layer of crocks, which should be covered lightly with some rough soil. Afterwards the boxes are filled with the compost material.

A good compost is made from loam, moss peat and sand. Of these three, loam supplies nearly all the plant food, while sand ensures free drainage. The best results are obtained from turf loam stacked for some months before use. This loam, however, *must* be of *good* quality. The peat must be of horticultural grade, neither too rough nor too fine, and the sand must be coarse and angular.

These three materials, mixed in the right proportions, form the basis of seed and potting mixtures. None of them, however, contains enough plant food to produce good seedlings. Indeed the loam is the only one containing 'food' of immediate use to the plant. So we must add to them small amounts of fertilisers to make good the deficiencies. The following mixture is known as the John Innes compost.

Compost for Seed Sowing (*pictures opposite*)

2 parts (by bulk) loam (sifted through ⅜-inch sieve);
1 part moss peat (horticultural grade);
1 part coarse sand (grading evenly from dust to ⅛-inch particles;

Add to each bushel of the mixture:

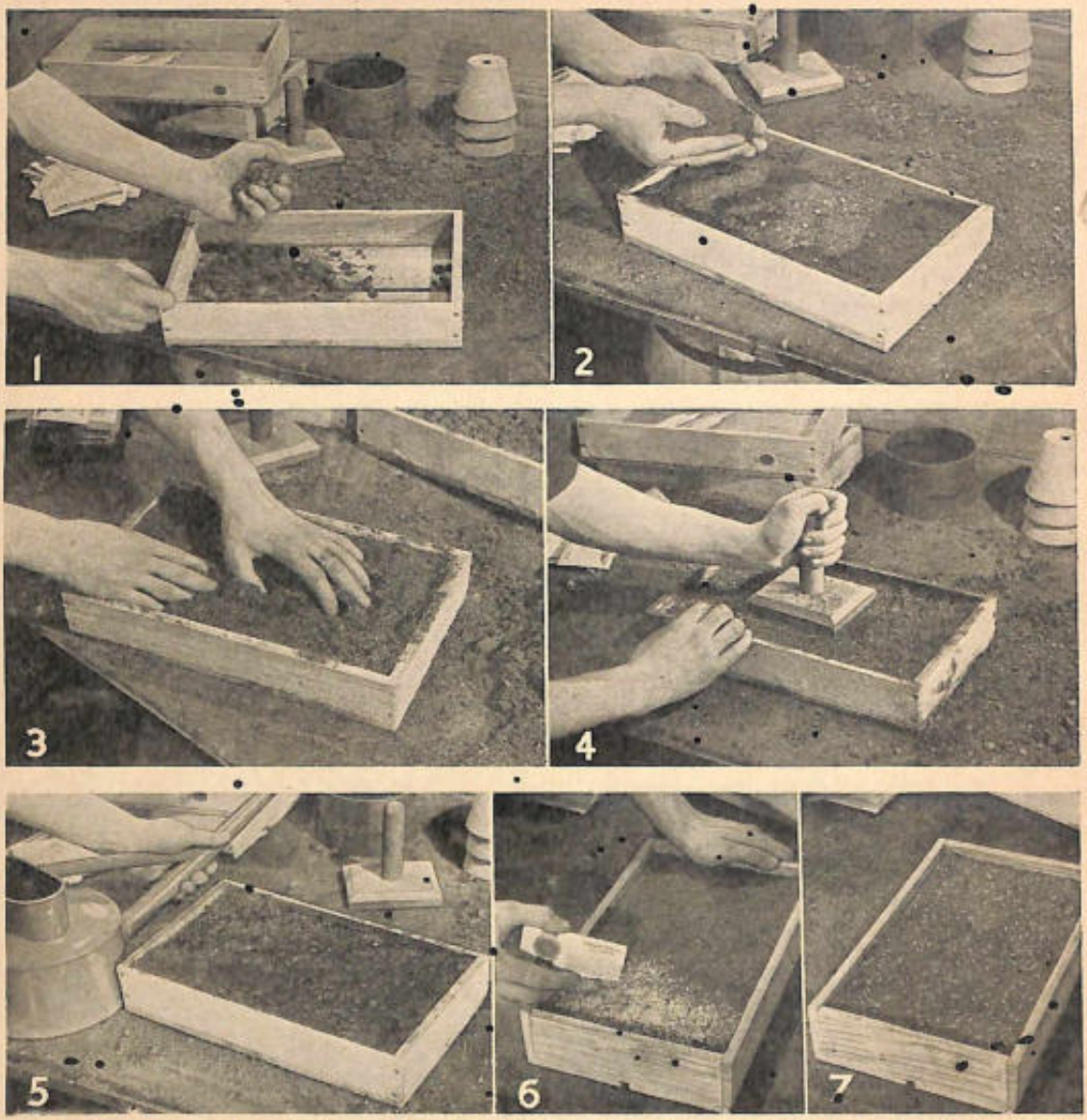
1½ ounces of superphosphate and ¾ ounce chalk.

The right ingredients and a plentiful supply of food will not ensure freedom from disease or give the best results unless some of the materials are partially sterilised. If clean peat and sand are used they will not need any treatment. The loam will need sterilising, also the leaf-mould if it is used in place of peat. It is also necessary to sterilise the materials separately. Partial sterilisation by steam is the best method. The only equipment required for small quantities of soil is a large saucepan for amounts up to 2 gallons, or a domestic copper for amounts up to 4 gallons. The loam or leaf-mould should be in a dry condition. This is important.

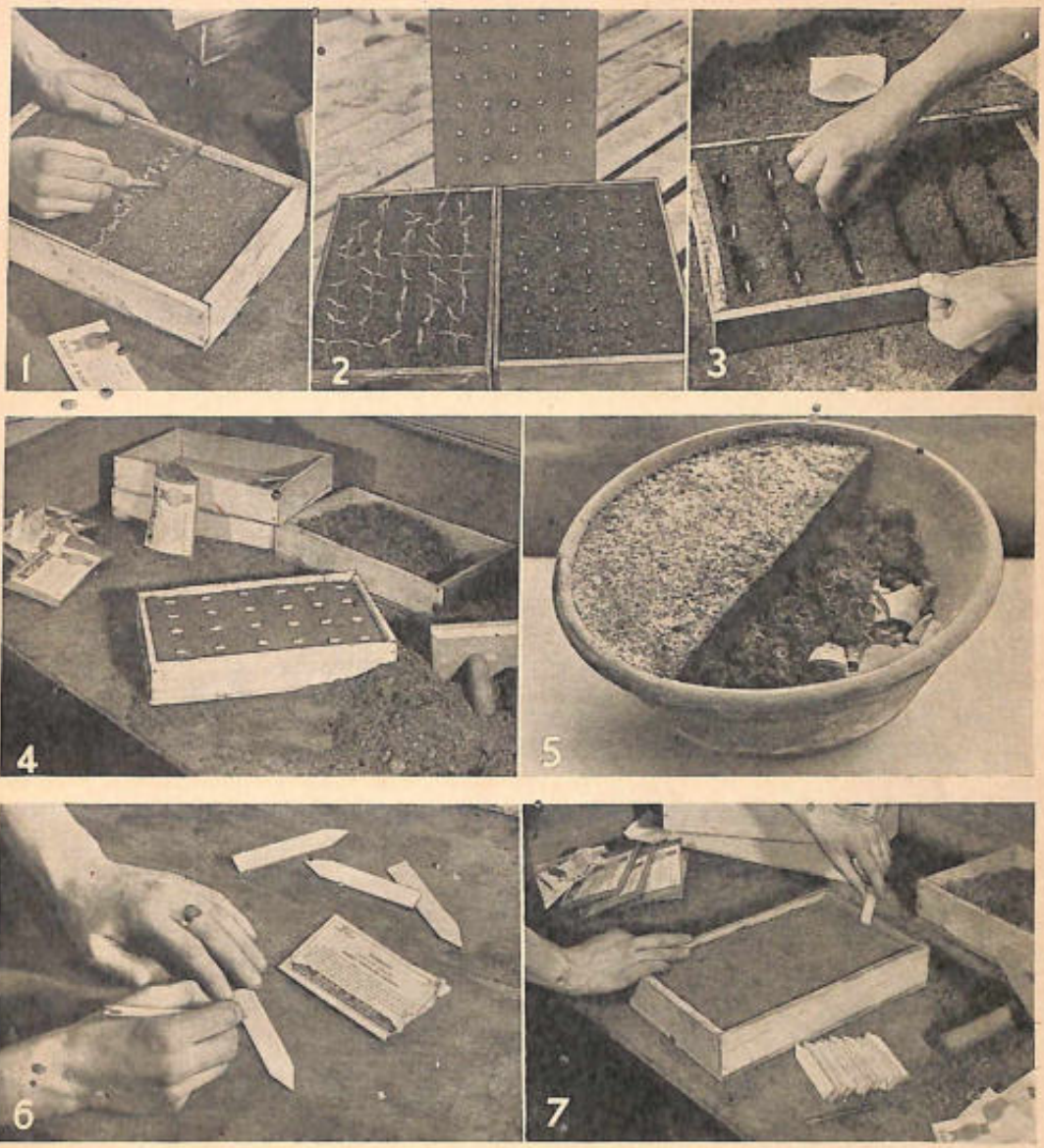
To sterilise small amounts of soil, put about half an inch of water into the saucepan, bring to the boil, then tip in the dry soil and simmer for fifteen minutes. To use the copper, put in 2 gallons of water and above it a slatted open support for the soil. Then place the soil in a loosely woven sack on the support and close the lid of

(*continued on page 30*)

Preparing John Innes Compost—(1) *Shovelling the compost or soil into a sieve preparatory to sieving.* (2) *Sieving the compost thoroughly, note that the roughage is placed in a box. This will be used for draining the pots or boxes later.* (3) *The base fertilisers are being weighed out carefully.* (4) *The ingredients ready for mixing—soil, sand, peat, superphosphate and chalk.* (5) *The various ingredients are heaped together by hand before being mixed more thoroughly.* (6) *The first turning of the mixture with a shovel.* (7) *A final turning, by shovelling the mixture over, will complete the operation.*



(1) *Drainage material in the form of roughage is placed in position.* (2) *The box being filled with the prepared compost.* (3) *An initial firming with the fingers.* (4) *A final firming with a wooden rammer also ensures a level sowing surface.* (5) *The compost should be soaked before sowing.* (6) *Do not sow too thickly like this.* (7) *This lettuce seed has been sown correctly and the resultant seedlings will not become overcrowded.*



(1) *Sowing tomato seed by pushing the seed off the glass on to the compost in the box.* (2) *Using a spacer which is shown in the background. The spaced seed is shown on the right, and the resultant seedlings on the left.* (3) *Sowing large seeds in drills.* (4) *Bean seeds spaced out correctly.* (5) *A seed pan in cross-section showing drainage material at the bottom, roughage in the next layer and finally the prepared compost.* (6) *Labelling is essential—writing out a label.* (7) *Inserting the label in the seed box.*

the copper. Bring to the boil and continue rapid boiling for thirty minutes.

If the soil is dry before sterilising commences it will be in a suitable condition for mixing and using as soon as it has cooled. Spread it out in a flat heap and add the peat and sand. On top spread the small amounts of fertilisers evenly. Then turn three or four times to ensure thorough mixing. The preparation of the John Innes compost involves a little extra trouble, but in the long run time is saved. Weeds are eliminated, no damping-off occurs and growth is more rapid and balanced. The composts properly prepared and used under clean conditions with normal attention to watering, etc., will always give good results.

Filling Boxes (*pictures on page 28*)

As each box is filled, the soil should be pressed firmly but evenly into the bottom to ensure that the soil is settled before sowing. Fill the boxes to within ½–¾ inches of the top and press firmly but gently with a flat piece of wood.

Never fill the boxes or pots right to the top with compost, always leave ½–¾ inch to allow for watering.

The boxes should then receive a good watering from a fine-rosed can. As soon as the water has percolated through, seed can be sown thinly and evenly on the surface.

Many gardeners ruin the seeds' chance of good germination by covering too thickly after sowing. The less covering the better for good germination, in fact for fine seeds like streptocarpus, calceolaria, lobelia and begonia, no covering is necessary.

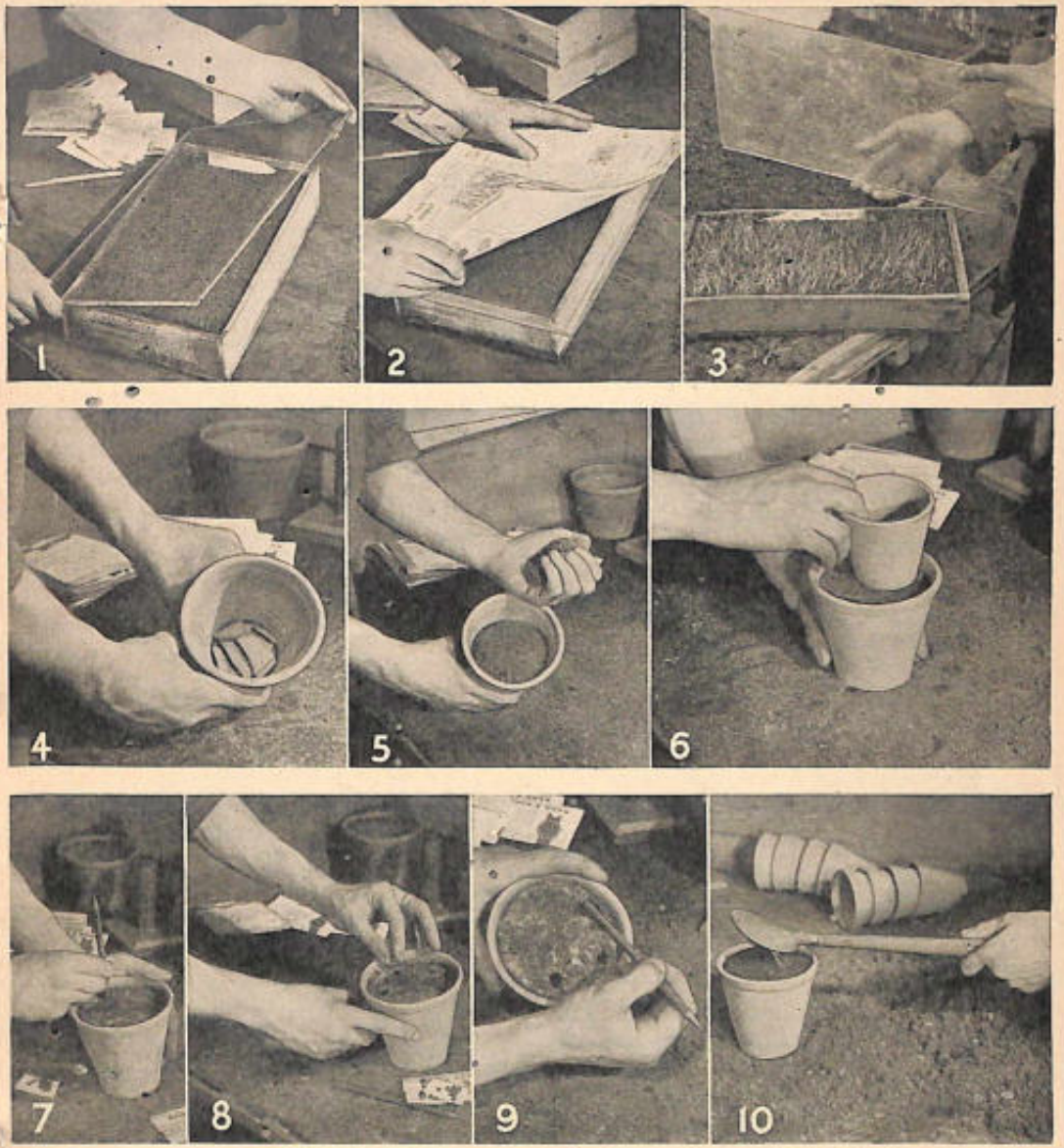
Treatment After Sowing (*pictures opposite*)

Once the seeds are sown, the boxes, pans or pots should be placed in the warmest corner of the greenhouse and covered with a sheet of glass and brown paper to conserve the warmth. It is advisable to lift and wipe the glass once or twice a day, as condensation is bound to occur. As soon as the seed germinates, the glass and paper should be removed, and as the seedlings progress, the boxes should be placed as close to the glass as possible to prevent them becoming drawn.

It is surprising how quickly some seedlings shoot up – especially if there is a little sunshine about. It is essential, therefore, to keep a careful watch on your seedlings, otherwise weeks of work and patient waiting will be wasted.

Where greenhouses have rather deep sides, it will be necessary to place the seed boxes on staging, which should be erected on a level with the top of the brick or woodwork, near the glass. If staging cannot be built, a few boxes or large plant pots, standing on end, will raise the seed boxes up to the required level.

Provision should always be made for a few shelves in the greenhouse roof on which to place the boxes of seedlings once they are well up. Some of the modern metal houses make provision for the erection of such shelves by allowing holes in the framework through which U-shaped pieces of wire can be threaded. A stout plank or planks can then be laid along the bottom of the U and the boxes placed on these. In wooden greenhouses it is a simple matter to screw into the woodwork and fasten the U-shaped wires to the screws. It is essential to be thorough in the construction, as a shelf full of seed boxes can be quite heavy!



(1) *Placing the glass over the seedlings.* (2) *Covering the glass with paper.* (3) *Badly drawn seedlings. This is the result of not examining the boxes frequently to see whether they have germinated.* (4) *A pot crocked and drained correctly with a large crock at the bottom, and smaller pieces of crock on top.* (5) *Filling the pot with compost.* (6) *Firming with the base of a small pot.* (7) *Making holes with a pencil.* (8) *Sowing large seeds—sweet peas.* (9) *Covering the seed.* (10) *A good watering is given.*

6. THINNING AND PRICKING OUT

THINNING out young seedlings is a very important operation, and one that must be carried out as soon as they are large enough to handle. When thinning is carried out at this early stage, the root systems have hardly had time to become established and consequent disturbance to neighbouring seedlings is reduced to a minimum. Seedlings should always be thinned with great care, the sturdiest plants being left in the ground to grow to maturity. This is a task that cannot be rushed. After completion, the soil on each side of the rows must be firmed carefully. Watering with a fine-rosed can will also help to settle the soil and encourage the plants to recover.

It is important to thin a crop like carrots and parsnips early on, as, unless this is done, overcrowding will result in badly shaped roots, often twisted into fantastic and unusable shapes. Plants also vie with each other for room and nutrients in the soil. By thinning out, the remaining plants are given a better chance to obtain this food, and by allowing them more room as early in growth as possible rapid development will be encouraged.

Thinning can be carried out by gradual stages in the case of onions and carrots, the young, tender thinnings then being used for salad purposes, while the plants finally remaining grow on undisturbed to mature as a main crop. There is no need to waste thinnings. Where such seed as lettuce, cabbage, endive, etc., have been sown the thinnings (provided they have been lifted with care and carry a good root system) can be planted elsewhere. It is advisable to dust the rows of carrots and onions after thinning with calomel, or powdered naphthalene as a precaution against the onion and carrot flies which can be attracted by the smell caused during thinning.

Fruit Thinning (*pictures opposite*)

Fruit thinning is also important and should be done as early as possible. Badly placed fruitlets should be carefully removed when this will give the remaining fruitlets a chance to expand and will prevent mis-shaped fruit forming.

Early thinning, especially when a heavy crop has set, will do much to lessen the amount of fruit lost during the 'June drop' period. Weak and young trees should not be allowed to carry fruit until they are strong enough to bear more easily.

Suitable Composts

Pricking out is the first transplanting of seedlings from the pans, boxes or pots in which they were sown into other similar receptacles, where they are given more room and, in certain cases, more depth by using deeper boxes, etc. Again a suitable compost is one of the main essentials and the John Innes pricking-out compost is recommended. Make up as follows:

2 parts (by bulk) loam sifted through ½-inch sieve);
1 part moss peat (horticultural grade);
1 part coarse sand (grading evenly from dust to ¼-inch particles).

Add to each bushel of the mixture:
1½ ounces superphosphate and ¾ ounce chalk.

For quicker-growing subjects such as tomatoes, a richer and stronger mixture can be used, but if in doubt, the gardener cannot go far wrong by using the above mixture.

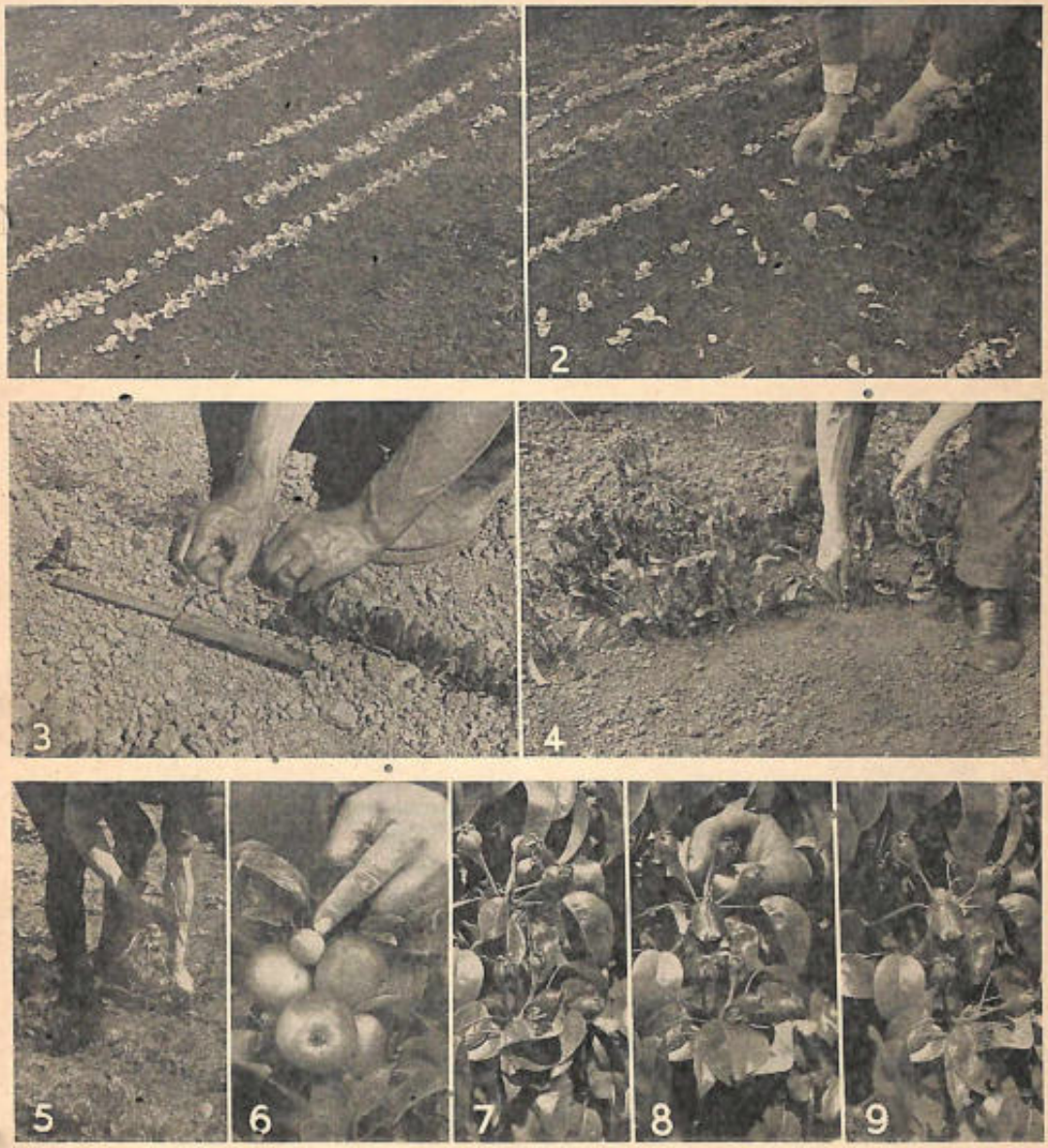
This stronger mixture is made up as follows:
7 parts loam (sifted through ½-inch sieve);
3 parts moss peat (horticultural grade);
2 parts coarse sand (grading evenly from dust to ¼-inch particles).

Add to each bushel of the mixture:
1½ ounces hoof and horn meal;
¾ ounce sulphate of potash;
¾ ounce chalk.

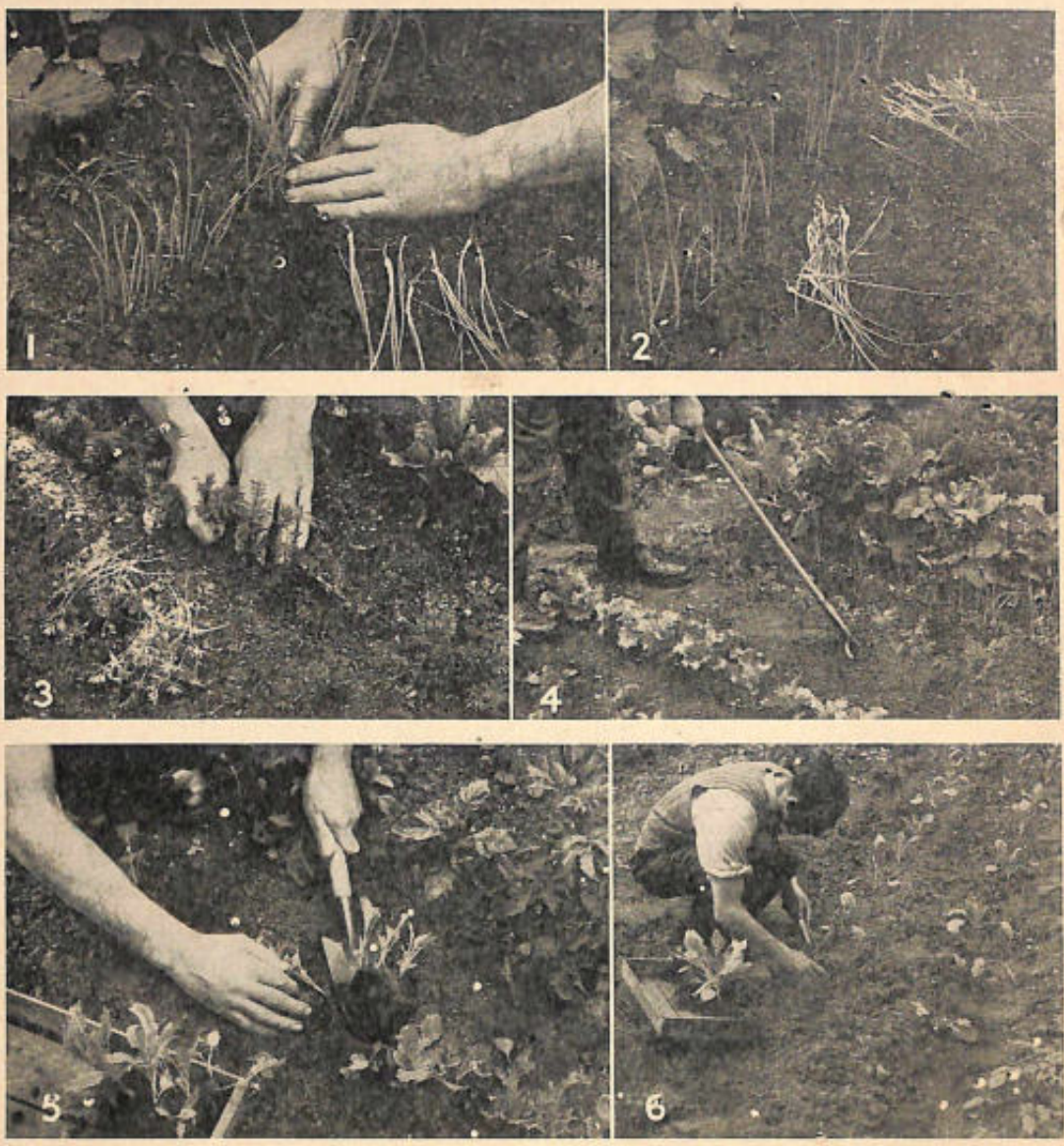
Preparing Boxes (*pictures on page 35*)

Boxes are best for young seedlings as quite a number of seedlings can be put into each box and the boxes themselves can be arranged easily on the greenhouse staging. Boxes should be about 22 inches long, 10 inches wide and 3 inches deep. There should be openings in the bottoms to ensure good drainage. The bottom of each box

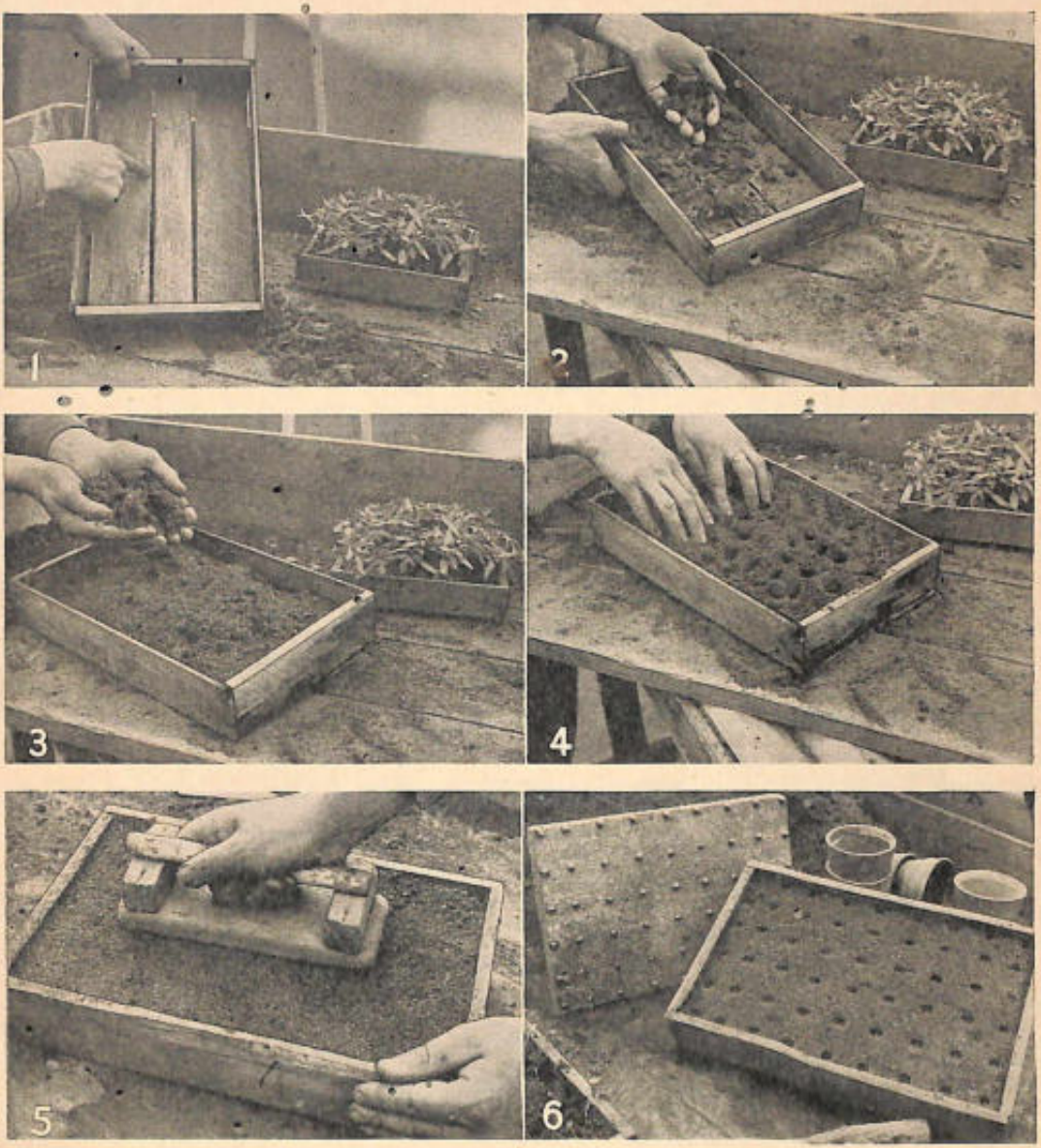
(*continued on page 36*)



(1) *Seedlings must be thinned early, and here is a bed of lettuce before thinning.* (2) *The lettuce is being thinned to 9 inches apart in the rows.* (3) *A ruler laid down beside the seedlings will help the gardener to maintain the correct spacings required.* (4) *Beetroot being thinned out.* (5) *Carrot seedlings receiving their first thinning.* (6) *Unless fruit is thinned properly, small fruit like this will be produced.* (7) *Pear fruitlets before being thinned.* (8) *Unwanted and badly placed fruit being removed.* (9) *The thinning operation completed. The remaining fruitlets will be able to swell and mature easily now*



(1) *Onions need thinning at an early stage in order to ensure good-sized bulbs. Note that the fingers of the left hand are used to press on the soil to prevent too much root movement as the thinnings are removed.* (2) *The onion row finally thinned.* (3) *To prevent distorted roots, carrots must be thinned well.* (4) *When thinning is completed, go down the rows with the hoe to loosen the soil after the trampling it has received during thinning operations.* (5) *Brassica seedlings being thinned in the row.* (6) *The thinnings are not wasted—they are used to plant out another bed.*



(1) *Seed boxes should have drainage slits in the base as shown here.* (2) *Some coarse material being placed in the bottom for drainage.* (3) *The prepared compost being added.* (4) *A preliminary firming with the fingers should be given. This ensures that there are no 'pockets' left after filling.* (5) *A final firm surface is achieved with a wooden rammer.* (6) *The prepared seed box with the stations for the plants ready marked out by means of the marker board, which can be seen on the left of the box.*

must have plenty of drainage material, as already described in previous chapters.

Pricking Out (*pictures opposite*)

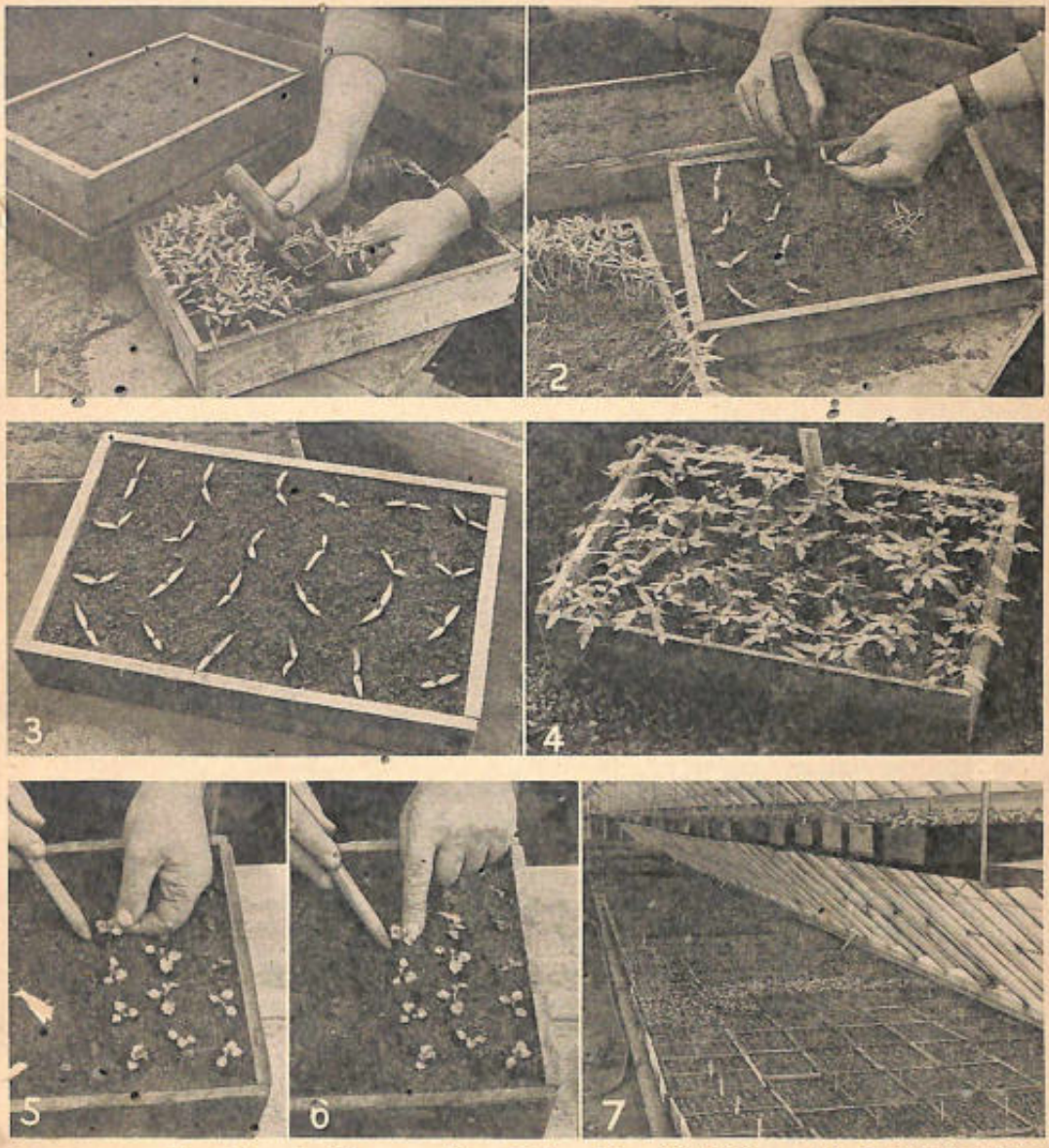
Gardeners may be puzzled as to what size the seedlings must be before they are pricked out. They should be transplanted as early as possible and as soon as they can be conveniently handled. This causes little injury to the delicate root systems and the plants 'get away' quickly once established. Being so small, however, the seedlings are bound to be very delicate and must be handled with great care, being picked up by the seed-leaves and never by the stems. The plants should be levered gently from the base of the soil with a label or small hand-fork. A good plan is to remove one end of the seed box and get at the plants in this manner.

They should be planted with a dibber for preference, which should be about as long and as thick as a fountain pen. The dibber should be rounded and not pointed. A hole should first be made in the compost with this tool and the seedling carefully placed in the hole, the roots being dropped to their full depth and not cramped. The soil can then be pressed round the plant with the dibber. A general spacing of 2 inches apart each way will be satisfactory. When a box has been planted up it should be watered thoroughly with a fine-rosed can and placed in a slightly warmer and moister atmosphere for a few days to help the seedlings overcome their transplanting check.

Later on, as growth progresses, the young plants will require transplanting again, either into single pots or, where they have been hardened off in frames, into their permanent quarters outside.

All seedlings which have been transplanted should be kept as close to the glass as possible, in order to prevent them becoming drawn or spindly. What we must aim at are sturdy, well-grown seedlings. A good start now for these young plants will mean a better prospect of a good harvest or display later on in the season.

An occasional watering with Cheshunt compound should be given so as to prevent any danger of the pricked-out seedlings succumbing to damping-off disease. Always keep a regular check on all seedlings, whether they are in the frame, under cloches or in the greenhouse. At the slightest sign of trouble, remove the affected seedlings at once. It is far better to be drastic at this early stage and be assured of healthy stock, even if it means throwing out a whole box of seedlings, than to be slack and ignore signs of trouble.



(1) Tomato seedlings being carefully removed from their seed box. (2) Pricking out the individual seedlings carefully in their marked-out stations. Note the use of the dibber. (3) The box of seedlings completed. (4) It will not be long before they grow well away and sturdy specimens should be produced like these. (5) Celery seedlings being pricked out—the seedling being placed in the hole. (6) The seedling being carefully firmed with the fingers and dibber. (7) Pricked-out seedlings in a greenhouse. Note the use of a shelf near the glass so that the seedlings do not become drawn at this vital stage.

7. HOW TO POT PLANTS

To begin with, it is perhaps as well to point out one or two of the more common faults that are made during potting operations. First, attempts are made to place the plants in pots that are far too small; secondly the pots are filled too full of compost, no room being left for watering, and thirdly the composts are so carelessly made that they eventually settle into a solid mass, almost impenetrable to water and air.

The first important point to consider, therefore, is the size of the pots to be used. The beginner must realise that there is just as much danger in 'overpotting' (which is the potting of plants into pots that are too big for them) as there is in putting plants into pots that are too small. Potting is best looked upon as a progressive operation, and as a general guide potting should be carried out as follows: from 3-inch diameter pots to those 5 or 6 inches in diameter, from these to 8- or 9-inch pots.

The question of correct compost comes next. The gardener may hear of many wonderful 'secret formulas' that some old gardeners have for their potting mixtures, but he would be advised to stick to the well-tried and proven John Innes potting compost. The main ingredient of this is loam, that is, soil that is neither clay nor sand, but a mixture of the two with some fibre and humus. The compost is as follows:

7 parts by loose bulk of medium loam;
3 parts moss peat (horticultural grade);
2 parts coarse sand (grading evenly from dust to ¼-inch particles).

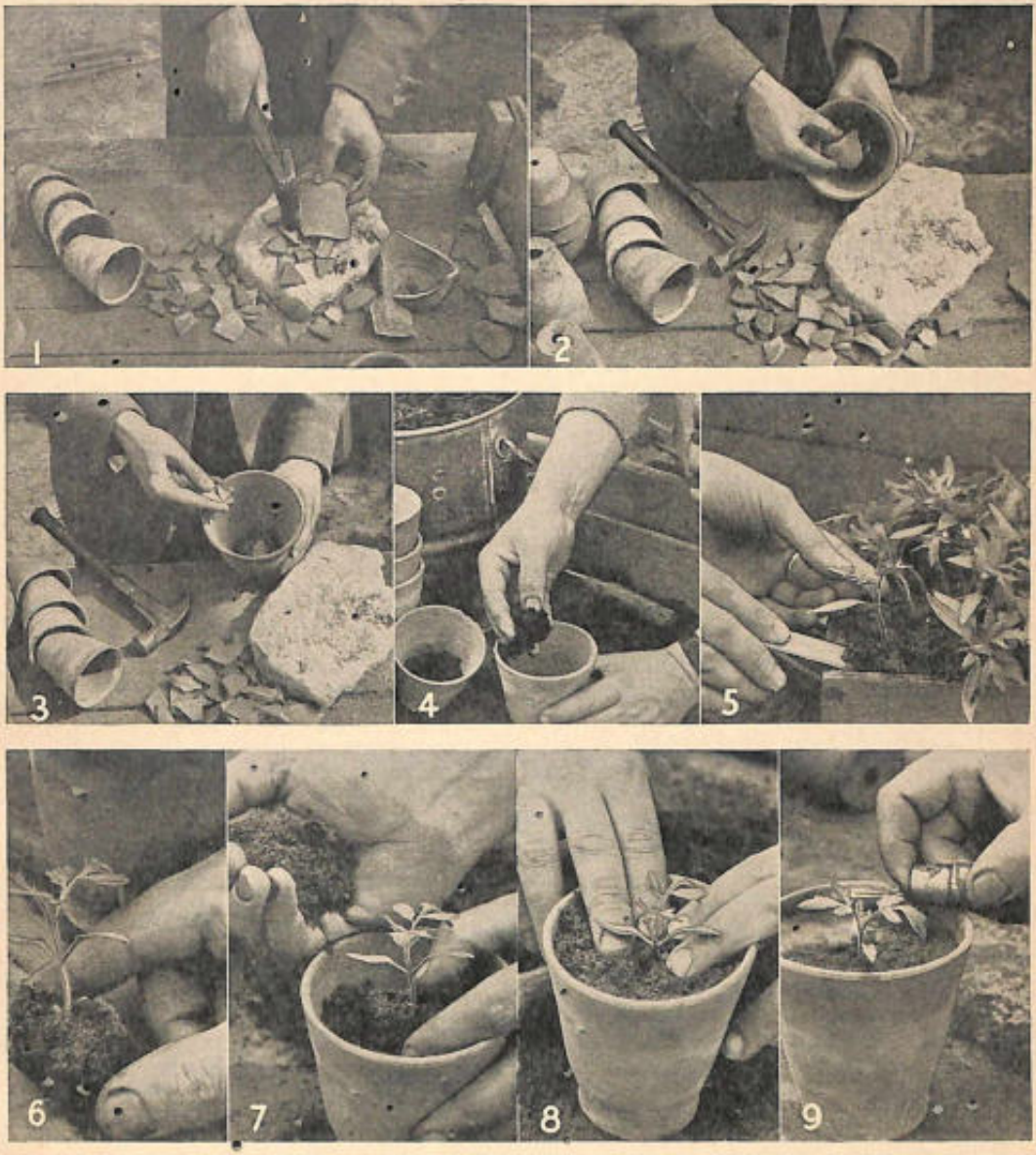
A base fertiliser is also needed, and this the beginner can readily make by mixing 2 parts by weight hoof and horn meal, 2 parts superphosphate of lime and 1 part sulphate of potash. If hoof and horn is not easy to obtain, dried blood can be used instead. Use 4 ounces of this fertiliser together with ½ ounce of ground chalk or ground limestone per bushel of potting mixture. (A bushel is contained approximately in a box measuring 22 inches by 10 inches by 10 inches.)

See that the pots used in all potting are clean. Wipe them with a piece of old sacking, or preferably, scrub them well in hot water. They should then be allowed to dry and be provided with adequate drainage material – one large piece of broken crock over the drainage hole in the bottom, four or five smaller pieces round this. A little rough soil or fibre can be placed on top of this.

The plants to be repotted must be knocked out of their pots carefully. Place the two first fingers of one hand across the middle of the pot, one each side of the plant. The other hand should grasp the base of the pot. The pot should be turned upside down and tapped smartly on the edge of the potting bench, when the ball of soil should come out whole. To prevent the ball of soil breaking up on being knocked out, the pots should receive a watering an hour or so before repotting begins. If, however, watering has been properly attended to beforehand there should be no need for this last-minute attention.

Once the plant is knocked out, carefully remove the old crocks from the base of the soil, but do not disturb the roots unduly. Place a little soil over the drainage material in the new pot and place the plant in this. Trickle some of the new compost evenly all round the old ball of soil, firming it thoroughly with the fingers. Ramming with a large stick will be necessary only when large plants such as chrysanthemums are being potted. Fill up the pot until the old ball of soil is covered and then rap the pot several times on the bench to ensure that the soil settles thoroughly and to a level surface. This is the last operation and the plants are now repotted correctly.

It is always a good plan to have a box handy in the garden into which pots can be thrown which are broken. It is surprising how easily pots are broken in the garden – frost plays a big part in this – and by having a box handy in this manner, the amateur is always sure of having a supply of crocks for drainage purposes during the busy potting period. It is as well to give the crocks a thorough washing before using them.



(1) *Preparing crocks by breaking up old damaged pots.* (2) *A large crock should be placed just over the drainage hole.* (3) *Smaller crocks follow.* (4) *Some roughage is placed over the crocks.* (5) *A tomato seedling* carefully *removed from the seed box.* (6) *A sturdy specimen at the right stage for first potting.* (7) *More compost is added round the sides.* (8) *Firming carefully with the fingers.* (9) *A little water is given very carefully so as not to disturb the soil. A* fine *rose is ideal for this purpose as it will not wash the soil away.*

8. HOW TO PLANT

THE gardener will no doubt have spent much time and care in the raising of his young plants, and the same attention should be paid during planting. This is a very important gardening operation and the plants' chances of good growth can be either made or marred according to the way in which it is done. By giving the plants a good start, a better chance of success is assured.

The first essential is to choose a suitable day for planting. The soil should be in a fairly dry, friable condition, so that the ground will not become too compressed by the walking about entailed as planting proceeds. This is a particularly important point where the gardener has to contend with heavy wet land. Do not be too eager; no gain in time is obtained by planting during bad conditions, but rather the reverse. Once the ground is in a fit state for planting the surface can be quickly broken down with a fork or rake; afterwards it should be raked well until a fairly fine tilth is produced, although there is no need to produce quite so fine a tilth as that required for the seed bed.

The next important point is to allow the plants plenty of root room. Where roots are cramped, root expansion or development is severely restricted, resulting in a delay in the time the plant takes to 'get away'. Root room is important on heavy soils, as this type of soil readily compresses into a hard, solid mass, which forms a barrier for the roots.

Dibber versus Trowel (*pictures opposite*)

The next logical step is to determine which is the best planting tool, and the gardener will be guided in the matter by remembering the importance of root room. The dibber is serviceable for planting seedlings rapidly, but its great drawbacks are that it tends to consolidate the soil unevenly and to cramp the roots in a narrow hole. The dibber can be recommended for those seedlings having long tap roots, such as hollyhocks and brassicas. The holes should not be made too large, and when the roots have been placed in position, the dibber should be pushed into the soil alongside the plants, and, with a levering movement towards the plant, the soil will be firmed round them.

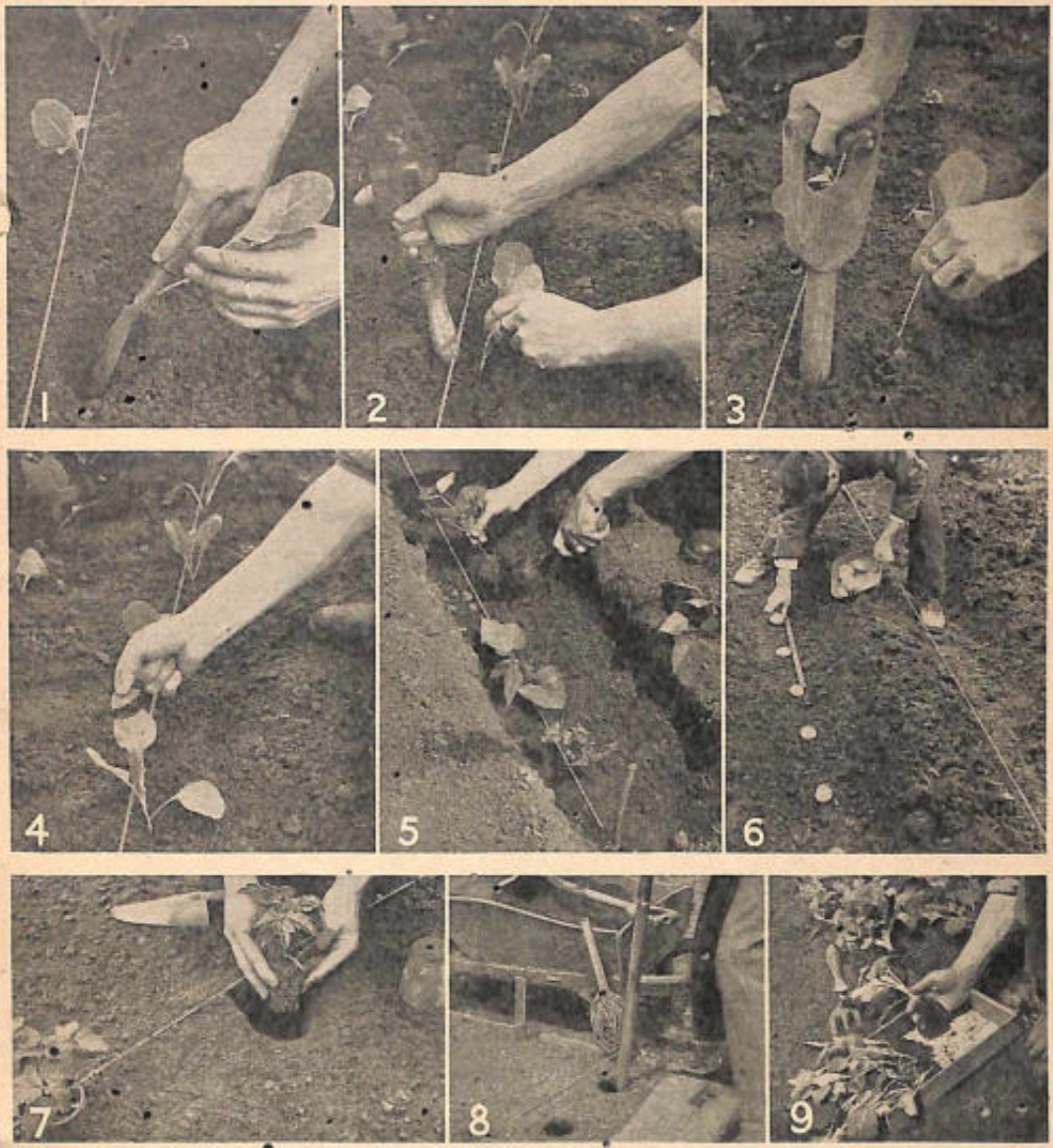
The most popular planting tool is undoubtedly the trowel, and it is ideal for small- and medium-sized plants. The holes made with the trowel should be slightly larger than the area of the plant's roots, thus allowing plenty of root room. It may be a quick method of planting to make a small incision in the soil and push the plant in this, but unless the soil is extremely light and sandy, results will be poor.

Planting Trees and Shrubs (*pictures on page 43*)

For large subjects, such as shrubs, fruit trees and bushes, the spade is the best tool to use. Holes should be wide and comparatively shallow, so that on planting the roots can be spread out laterally to their full extent.

The staking material *must* be inserted in the hole *before* the plant is placed in position. So much damage is caused to plants by having the stake driven in after planting. The result is that the delicate root systems are often severely damaged.

While it is important to select and use the most suitable tools, the choice of plants and their handling is equally important. Although one may plant correctly, it is essential to use plants that have a good root system. A puzzling point to some beginners is the depth to plant. This particularly applies to bought plants, especially the larger subjects such as fruit and ornamental trees. A rough guide is to plant slightly higher than the original soil mark on the stems of the plants. This mark is generally recognised by the stem having a paler area where it has been planted below the soil. By planting above this mark allowance will be made for soil to settle, so that once the plants have become established the soil-level will have reverted to the original mark and the roots will still remain at a reasonable depth below the surface. (*continued on page 42*)



(1) *Always take out a good hole for the plants.* (2) *Firming can be done with the handle of the trowel.* (3) *A dibber can be used for planting, but this tool is best for light soils.* (4) *If, after planting, the tip of a leaf is pulled and comes away in the fingers—the plant has been planted firmly enough.* (5) *Beans are best planted in a shallow trench which can receive top mulchings.* (6) *Potato tubers planted in a drill should be spaced out carefully.* (7) *When planting tomatoes, see that a large enough hole has been taken out.* (8) *To obtain long parsnips and carrots, bore a hole with a crowbar or pole.* (9) *Choose good plants when planting out.*

Firming After Planting

The plants should be well firmed once planted, and this can be done, in the case of the smaller plants, by pressing the soil firmly but carefully round the base with the fingers or feet. Tall subjects are obviously exposed to wind more than the smaller plants, and a great deal of root disturbance is caused by swaying in the wind, and the need for firming round the roots is obvious.

In the case of shrubs and fruit trees the root systems should be carefully spread out in the hole and the soil should be replaced carefully round the roots, a little at a time; at the same time, the tree or shrub should be gently moved up and down so that the soil settles between the roots. When all the roots are covered, more soil should be scattered, and finally this should be firmed well with the feet. Once planted, the plants should be watered in, especially if the soil is rather dry or if planting is taking place during exceptionally dry weather.

Planting against a Line (*pictures on page 41*)

If planting has been carried out during the late autumn and early spring, it is essential to go down the rows occasionally and firm the newly planted specimens with the feet. There is a great deal of loosening brought about by the swaying action of the plants in a high wind. This particularly applies to the larger plants.

Sharp frosts are bound to be experienced during this planting period and frosts have a nasty habit of 'lifting' plants slightly owing to contraction and expansion during the freezing of the soil. It is most essential, therefore, to firm the plants with the feet after a sharp frost has been experienced. If the plants have been firmed well during planting, this 'lifting' will not be too severe; nevertheless, it will pay the gardener to carry out this firming.

See that the rows are carefully measured and, when planting, keep the line taut. Unless this is done the rows will not be straight, and not only will they look untidy but hoeing will be difficult, especially where rows are only 9 or 10 inches apart. Some little time before lifting plants from the frame or seed-bed give them a good watering so that more soil will adhere to the roots. Do not lift more plants than can be planted at one time. Not only does this avoid the danger of roots drying up, but if planting operations are curtailed by rain or other forms of inclement weather the gardener will not be left with a large amount of unplanted material. Granted these can be heeled in, in a convenient corner, but it is advisable to disturb them as little as possible, and plant them out straight from the seed bed into their permanent quarters without delay.

(1) *When planting larger plants, see that the root systems are carefully spread out in the hole before proceeding.* (2) *Some* old *manure can next be spread around the roots.* (3) *As the soil is replaced it should be firmed carefully with a stout piece of wood.* (4) *A simple yet efficient way to make a circle when planting.* (5) *The topsoil is placed in the barrow.* (6) *The lower spit is arranged around the edges of the hole.* (7) *The tree is carefully slipped into position—note the protecting sacking.* (8) *Large roots can be carefully pared off with a sharp knife.* (9) *Firm the soil well with the feet as it is replaced.*

9. STAKING AND TYING

WHILE it is very important to plant correctly, it is equally important to make a thorough job of the staking and tying that many plants require. Much damage can be caused by wind. Flower buds, flowers, stems and branches can be broken or severely damaged by the wind, not to mention the loosening of the root systems caused by frequent rocking.

Choice of material for this purpose will depend on the type of plant to be staked and also its position in the garden. The larger the plant the stouter the support, of course, and the amateur should bear in mind the eventual size the plant will attain and also the weight the stake will have to bear. A good example of this is in the case of outdoor tomatoes, which can carry an exceptional weight of crop and for which, in consequence, a little forethought is necessary.

Bamboo canes can be obtained in a very wide range of sizes. These may in some cases appear to be rather expensive, but are well worth it in the long run, for both appearance and durability. Any article worth having is worth looking after, and if the ends of the canes which are driven into the soil are steeped in a wood preservative such as Cuprinol (copper napthenate), they will last much longer. It is possible to purchase small wooden stakes, and these are particularly useful for supporting dahlias and other heavy-headed plants.

While it is advisable to stake well, it is very often overdone, and some gardens look as though they are growing stakes and not plants. Provided the stakes or canes are stout enough, only one or two will be required to support each plant. All forms of supports should be placed so that they are concealed from view as much as possible by the stems and leaves.

An exception to the rule of having only one or two stakes to a plant may be made in the case of those subjects that tend to form a close mass of foliage. A good example of this is the delphinium, where the foliage should be gently opened out by means of three or four bamboo canes pushed round the centre of the clump with their other ends leaning outwards. By this method the full beauty of the plant will be displayed to advantage. Only the strong shoots should be retained, the weaker ones being cut out.

Staking should be carried out as soon as possible. In most walks of life it is advisable to train while young, and plants are no exception to this rule. It is useless trying to straighten up plants once they have been allowed to flop about. The result is a mass of twisted and bent stems and flower heads, and possibly many broken stems into the bargain.

For such subjects as roses, fruit trees and shrubs it is advisable to stake when planting. This ensures that the young, tender root-systems are not damaged by thrusting a stake in blindly afterwards. It is obvious that much stouter supports will be required for these plants; and pieces of timber 3 inches by 2 inches, or even 3 inches by 3 inches are admirable. See that the stakes are driven in well and firmed with a rammer. It is no use expecting good support for the plant if your stake is liable to work loose after a few weeks of windy weather.

Where plants are being grown in rows, as in the case of raspberries and fan- or espalier-trained trees, a reliable form of support can be constructed by driving in short stakes at suitable intervals along the rows and attaching to these wires running the length of the rows. The number of wires will depend on the ultimate height the plants are to be grown to, but the strands of wire should be spaced out about 1 foot, or at most 18 inches, apart in parallel rows.

In the case of such plants as chrysanthemums, one stout bamboo cane will be sufficient per plant with several successive ties with raffia or twine. This can be looped round the foliage and tied sufficiently tight to prevent the stems waving too much.

Many subjects are trained against a wall or frame. Here again parallel rows of strong wire can be fastened against the wall or fence. The wires can be attached to the wall by means of

(continued on page 46)

(1) *Plants which are trained against a wall or fence should be tied in carefully and frequently to their training wires.* (2) *Another method is to fasten canes to the wires on the wall and tie the leaders to the canes in this manner.* (3) *The training or supporting wires* must *have stout supports, as illustrated by the concrete post in this picture.* (4) *Supporting a weak branch.* (5) *Training wires kept taut by fixing them to adjustable screw-eyes.* (6) *Newly planted trees must be firmly supported right from the start.* (7) *A trellis will provide support for climbing plants.* (8) *Herbaceous plants supported by brushwood.*

Rawlplugs, but make sure that a thorough job is made of this, otherwise it will be a difficult and messy job to unfasten the wires later on if they come away from the wall.

The ties should be carefully made and the best material to use for most plants is broad, soft raffia or soft twine. Hard or coarse material should be avoided, as it may chafe stems badly. All the ties must be made sufficiently loose to allow for the further development of the plants. It is a good idea to have a double twist in the tying material between the stake and the stem of the plant, as this will act as a spring, maintaining reasonable firmness with just the necessary amount of elasticity. For larger plants, such as fruit trees or ornamental trees and shrubs, it is advisable to use a strong twine and, before tying this round the stem, wrap it with a piece of cloth or old sacking to prevent chafing of the bark.

Many free-growing plants, such as coreopsis, gaillardias and erigerons, produce masses of rather weak shoots, and unless these can be trained properly a rather untidy appearance will result in the borders. One of the best methods of training is to insert four or five small pieces of bamboo cane round the outside of the plant whilst young, and wind a few rows of twine or raffia round and across the canes in the same way as a bobbin. The plant will eventually grow through these and a good measure of support will be effected. When fully grown, all the supporting material will be completely hidden.

Where it is desired to grow wall-trained plants without a framework of wires, the branches can be fastened to the wall or fence individually by means of special wall nails to which are attached pieces of malleable metal. These are carefully closed round the stems, thus retaining them in position. Quite an assortment of these fasteners can be obtained from most leading sundriesmen today, but the writer is in favour of those fasteners having fabric tags which are wrapped round the stems. These allow for a certain amount of expansion and there is not the same danger of chafing or 'biting' into the stems as with the metal tags.

With a little care and forethought, therefore, plants in the garden can be given sufficient support without making the garden a mass of 'scaffolding'. The shape and beauty of plants can be preserved, and during periods of rather rough weather the gardener can relax, knowing full well that his plants will not have been beaten down or broken, through either heavy rain or high winds. The ardent exhibitor will appreciate the need for preserving his specimen plants too. Where supports do happen to show, they can be painted green, or dipped in green preserving fluid, when they will blend more closely with the foliage.

(1) *Erecting stout bean poles—note the tie-bars at the top which give added strength.* (2) *Sweet peas well staked with tall canes.* (3) *Regular tying-in is essential for sweet peas.* (4) *Chrysanthemums must also be secured carefully and often.* (5) *Chrysanthemums in pots with the canes tied to a horizontal iron support.* (6) *Inserting individual canes for chrysanthemums—they must be* firmly *inserted.* (7) *Peas trained up brushwood.* (8) *Square netting will provide good support when the plants eventually grow through it.* (9) *Removing old bean haulms from supports—note how the supports are stacked to dry for next season.*

10. WATERING INDOORS AND OUT

Watering Outdoors (*pictures opposite*)

Plants vary considerably in their requirements for water, but all plants need moisture and it is a very important factor to be considered in their cultivation. The question of drainage must be closely associated with watering, for if the ground is poorly drained it will quickly become flooded after only a moderate amount of water has been applied; whereas a well-drained soil will be able to assimilate copious quantities without forming a sodden mass which is detrimental to the plants.

The question of when to water cannot be answered in any hard-and-fast terms in a book; it is more a matter for personal observation and intelligence. A well-established, deep-rooted plant will be able to look after itself quite easily, as its extensive root system will penetrate far into the cool, damp subsoil, thus drawing up as much water as it requires. A tiny seedling, however, will not have such a large root system and will be dependent, to a very great extent, on the gardener for moisture. Having a shallow root system, the roots will be confined to the surface soil which quickly dries out.

In the case of seedlings, therefore, it is a question of water being given in small but sufficient quantities with the aid of a fine rose; a greater volume of water will damage and even wash out the seedlings.

General outdoor watering during the summer must *not* be a case of giving water when the plants are drooping. Watering should be given sufficiently frequently and freely to ensure that the soil and roots are always moist and not dried out. Later on, when the dry spell continues, the general watering of the plants must be considered, and it is only here that any approach to the laying down of precise instructions can be undertaken. The ground must be thoroughly soaked. It does not mean that the soil is sufficiently wet when the surface is wet, water must penetrate lower down, and it is only by giving a long, thorough flooding that this can be achieved.

Where the soil is very dry, a fork can be used to lever up the top 5 or 6 inches, so that the water will penetrate more easily. Do not use the jet on the hose-pipe or watering-can, but spread the water evenly and thoroughly with a fine or medium rose or spreader.

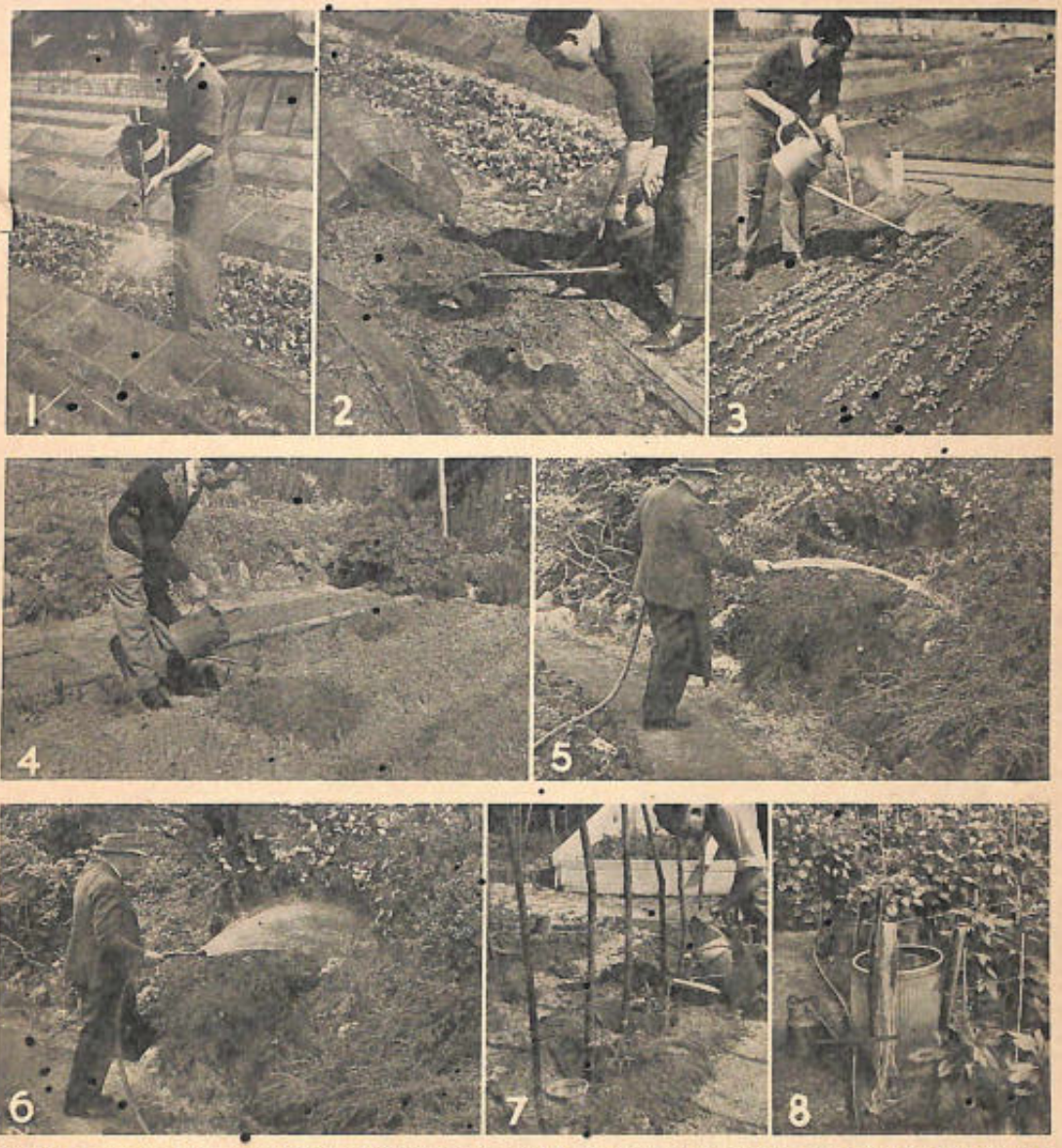
Watering Indoors (*pictures on page 51*)

Correct watering for indoor plants is vital. More plants are ruined through lack of knowledge in the art of watering than perhaps through any other cause. Gardeners often think that just because the soil in the seed boxes or pots is wet, all is well. This is not so. The word 'wet' is very misleading; a really wet soil is a sticky mass containing very little air and in no reasonable state for the promotion of good, healthy growth. The ideal is a 'moist' soil, which means that just enough water is contained in it to supply the roots with sufficient moisture without drawing out air from the 'pores' between the soil particles.

To attain this ideal, two things are necessary, a suitable soil medium and careful watering. To achieve the first the compost for filling the boxes or pots must be carefully chosen and mixed, so that the resulting product is open enough to allow good drainage. The John Innes composts have been recommended for this purpose. Correctly mixed soil, however, is not enough, and drainage material should be provided in the bottom of the receptacle. The hole in the bottom of the pots, for instance, should be covered with small pieces of crocks or broken pot, as illustrated in the chapter on 'How to Pot Plants'. It is a good plan to place pots or boxes on ash, shingle, oyster shell or gravel. This prevents the bottom holes from becoming clogged, which would happen if they were placed on soil.

To know when and how to water is, of course, essential. This art cannot be acquired at once, but will come gradually as experience is gained. Do not water unless the plants are obviously in need of it. If some plants are only half-dry on a hot, sunny day, the question of whether to water or not will have to be considered. If you think the plants will suffer from lack of water unless

(*continued on page 50*)



(1) *If the ground is well prepared, sufficient water will be received by watering overhead in this manner.* (2) *Watering individual melon plants.* (3) *Radishes must grow* quickly, *so they must be kept constantly supplied with water.* (4) *Keeping young gladiolus seedlings moist.* (5) *The wrong way to use a hose-pipe—the direct jet will easily break plants down and wash away the soil.* (6) *The correct way to use the hose-pipe—a medium rose is used.* (7) *By watering into a buried plant pot, the water will reach the roots more easily.* (8) *A tub of water at the end of a bed will facilitate watering, if the tap is a long way away.*

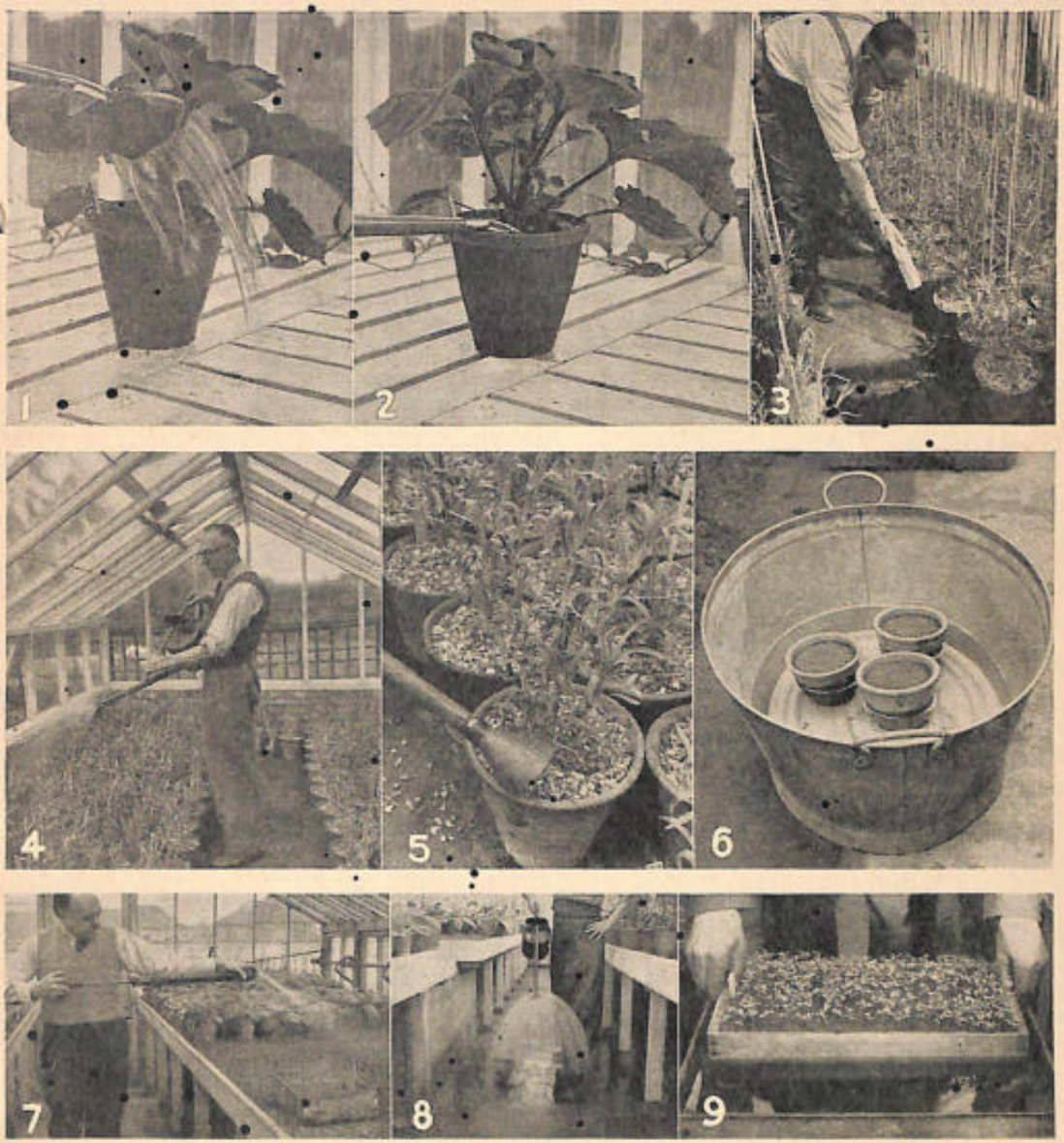
they are watered immediately, then do not hesitate to water, but on the other hand, if the weather is dull and cool it would be better to leave watering until the soil has dried out a little more.

Do not, of course, wait until the soil is dust-dry, but if this happens, the receptacle should be carefully immersed in a bucket or tank of water. It is obvious that plants will require more water during the summer months than during the winter. When watering, always fill the pot up to the rim, thus ensuring enough water being given to saturate the whole of the soil. When potting, see that enough space is left between the soil and the rim in order to hold this water.

When watering, the angle of the can must be considered. Too acute an angle will only result in a mad rush of water, 'pitting' the soil, and washing it and the plants out. To avoid this, tilt the can gently so that an even flow of water is produced; it is advisable to use a rose to reduce, still more, the power of the water. Where plants have much foliage, it often happens that water is thrown off or shed, and little reaches the soil in the pots or boxes, and thus a little extra care should be taken when watering this type of plant. It is possible to tap pots with a stick to see whether the soil is dry or not. A dull ring indicates a wet soil, while a clear, bell-like ring is an indication of a dry soil.

Boxes of seedlings, or boxes that have just been sown, can be watered by immersing the box in a tub or tank of water. Push the box in until the water comes half-way up the outside of the box, and hold it there until it has percolated through the bottom of the box and has risen up to the surface soil. By this method a really thorough soaking of the soil is assured, but care should be taken not to allow the water to flood the box too much, otherwise the seeds and the compost will be washed into the tank.

Gardeners would be well advised to construct a water tank in their greenhouse if room and conditions permit. The advantage of this is that the water will have the chill taken off, with a consequent reduction in shock to the plants during watering. A heated greenhouse will obviously raise the temperature of the water considerably, and as it is obvious that the more tender types of plant will be grown in this type of house, the advantage of warmed water will be readily appreciated.



(1) *Watering incorrectly—the water should not be directed on to the foliage.* (2) *Correct method—the water is carefully directed into the pot itself and allowed to flow* slowly. (3) *Tapping pots with a piece of wood will detect whether they need watering or not.* (4) *A* fine-rosed *can is the best for overhead watering.* (5) *Applying a liquid feed to plants growing by the soilless method.* (6) *Watering by immersing pots in a bath of water.* (7) *By pressing the fingers over the nozzle of the hand spray, a very fine spray can be obtained when watering.* (8) *Damping down a greenhouse.* (9) *Watering by immersing a box in a tank.*

11. THE VALUE OF HOEING

MANY look upon hoeing principally as a means of keeping weeds in check, but there is more to this operation than that. It is true that hoeing keeps weeds and vegetation down to a minimum, but it also improves surface tilth. By its constant use the hoe will break down the surface into fine particles, thus making it suitable for seeds and small plants, and also it will provide a form of mulch or layer of dust which prevents the evaporation of soil moisture.

It is advisable to select a hoe which has a blade width of approximately 5 inches. This is a convenient size, and if crops are planted at the correct distances it will be found that the hoe will be able to go in between them without causing damage. The hoe should be kept going as much as possible during the season, even when there are no signs of weeds, and on heavy ground which tends to cake badly on the surface it is very important that this hoeing should be kept up. In order that weeds will be killed, either a hot, dry day should be selected, or one that has a good drying wind. Weather like this will quickly burn and dry up the severed tops.

The title 'hoe' covers more than one tool, and it is important to understand something about the different kinds of hoe and their special uses. The Canterbury hoe, for instance, has three broad prongs and is ideal for breaking down clods of soil. This is particularly useful for heavy soils where the clods will not break down easily in the spring.

The draw hoe is used by chopping and drawing the hoe towards the operator as he moves forward. This type of tool is again useful for breaking down rough surface soil, and chopping down bad infestations of weeds. Two of its main uses, however, are for drawing deep drills for large seeds such as peas and beans and potatoes, and for the very essential work of earthing-up soil round potatoes and other plants.

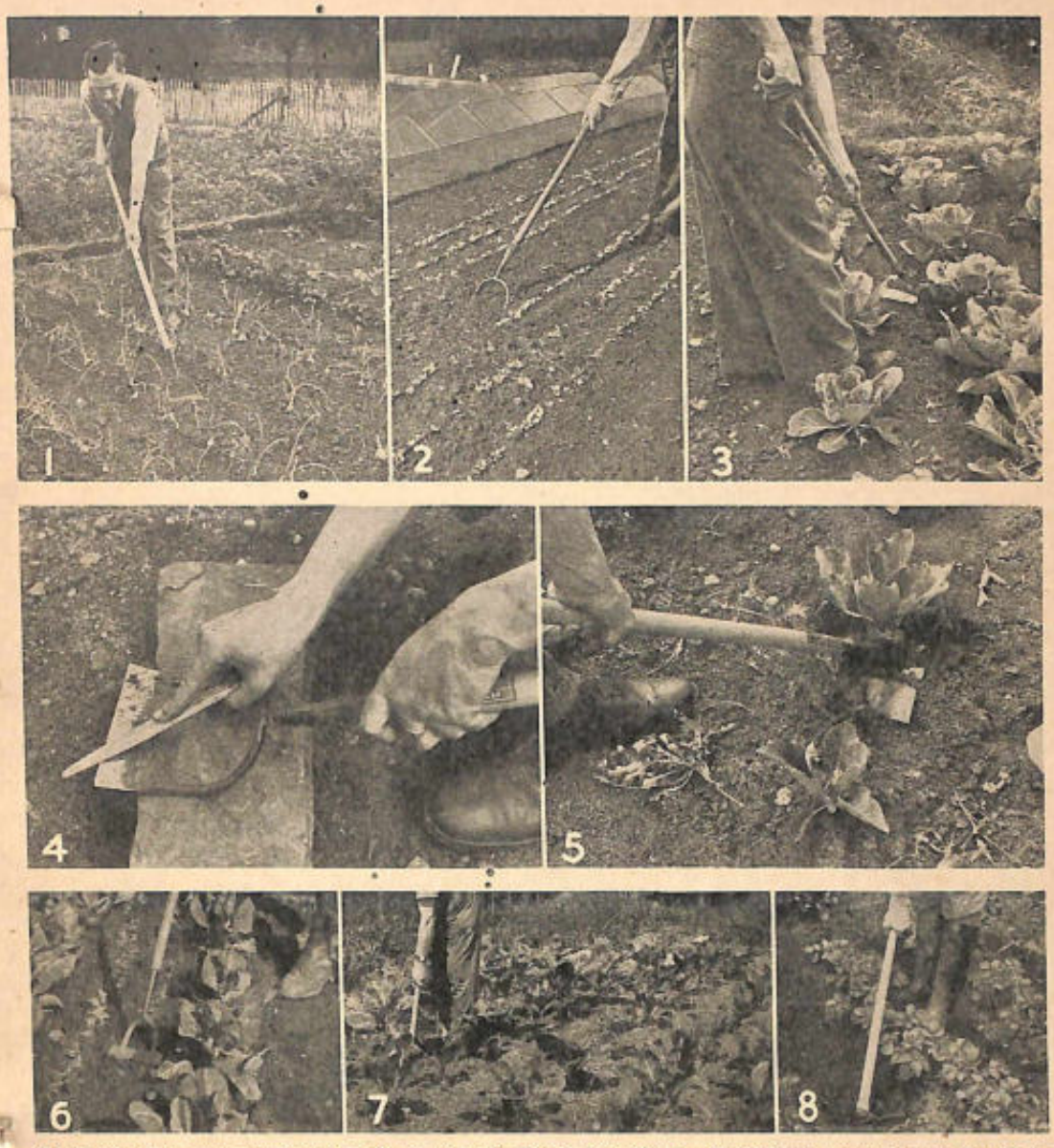
The Dutch hoe is shaped like a letter D and is the tool that does, or at least should do, perhaps the most work of all the gardening tools. This hoe is used in very much the same way as the rake, being pushed to and fro – both motions covering the same piece of ground – the first motion cutting off the weeds and the second knocking them about and, where some have been uprooted, completely shaking the soil out of their roots.

The use of this hoe demands concentration, especially when hoeing amongst very young seedlings, as one slip may result in the death of many potential plants. Make a thorough job of hoeing, and where a weed cannot be attacked by the hoe because it is too close to the stem of a plant, pull it out with the fingers.

It is desirable, where there are few weeds, to hoe in order to provide a dust mulch and at the same time work in a top dressing of a suitable fertiliser.

It should hardly be necessary to point out that hoeing should be carried out during good weather and suitable soil conditions. Hoeing during wet weather and when the soil is wet and sticky is useless. It makes the job much more difficult than it need be and in any case the weeds will not be killed. They will only be pushed out on to the surface, intact with their roots, where they will grow away again on contact with the wet soil.

Always select a dry day with a good drying wind prevailing and knock the weeds about well with the hoe so that as much of the soil as possible is removed from the root systems. During dry weather the soil should fall off the roots quite easily.



(1) *Hoeing between sturdy onion plants with the Dutch hoe.* (2) *Small seedlings must be kept free from weeds by constant hoeing.* (3) *Keeping the ground open between cabbages with the aid of a draw hoe.* (4) *Always keep the hoe blade clean and sharp.* (5) *The draw hoe is an ideal tool for hacking out tougher weeds.* (6) *Working in a top-dressing with the hoe.* (7) *Brussels sprouts receiving a good hoeing.* (8) *The draw hoe is the best tool to use when earthing up crops such as potatoes. This helps to conserve soil moisture; it prevents green tubers and also keeps the foliage or haulm upright.*

12. THE PRINCIPLES OF PRUNING

THE subject of pruning is a very large one and in order to contain it in this chapter it is necessary to condense it severely.

Before the methods of pruning are discussed some thought must be given to the tools required for the job. These are a sharp knife, a pair of sharp secateurs and a pruning saw. If standard trees are grown a pair of step-ladders or long-arm pruners may be required. When using the knife the correct type of cut must be made. It should start opposite the base of the chosen bud and slope through the shoot to just above the tip of the bud. A clean cut must be made.

If secateurs are used the anvil should be underneath the shoot and the cut made on to this. When using a pruning saw a cut should be made underneath the branch or trunk first, and when the branch is practically sawn through it will fall off without tearing the bark. Always prune any wounds so that they are smooth, when eventually a callus will form and heal over the wound.

Before pruning commences it is essential to understand what happens to a shoot after pruning has been completed. In illustration No. 1 we see a typical shoot that was pruned the previous winter at points A, B and C. In shoot 1, A marks the length of this shoot the previous winter. As this shoot was left unpruned, the growth made above point A was made during the following summer. The buds below point A are fat and they are the fruit buds which will produce the fruit next summer.

Shoot 2 was cut back by half the previous winter to point B. This hard pruning has encouraged three vigorous shoots, but there will be only about a third the amount of fruit.

Shoot 3 was cut back very hard to point C, leaving only one bud. There has been only one vigorous shoot formed, with no fruit buds. What, therefore, do we learn from this?

1. Hard pruning encourages vigorous growth.
2. The quickest way to encourage fruiting is to do no pruning at all.
3. The hard pruning of shoot 3, which is known as stubbing-back, distributes the crop more evenly.

We can see that if shoot 3 is now left unpruned it will react in the same way as shoot 1, but its fruit buds will be produced a year later. In the year when shoot 3 crops, shoot 1 will be resting after bearing a heavy crop the previous year.

Before we can prune it is necessary to be able to recognise the various parts of the tree. In illustration No. 2 a typical fully developed shoot is shown. The extension growth is known as the leader, and side-shoots are known as laterals. Each year's growth is indicated along the length of the shoot. On the two-year-old bush behind the leader there are three laterals carrying wood buds and below these three fruit buds. In the three-year-old portion the laterals, or side-shoots, have made some extension growth, and, because they have been left unpruned, the base buds have formed fruit buds. At the base of the three-year-old portion there are two-year-old fruit buds which are the beginning of spurs.

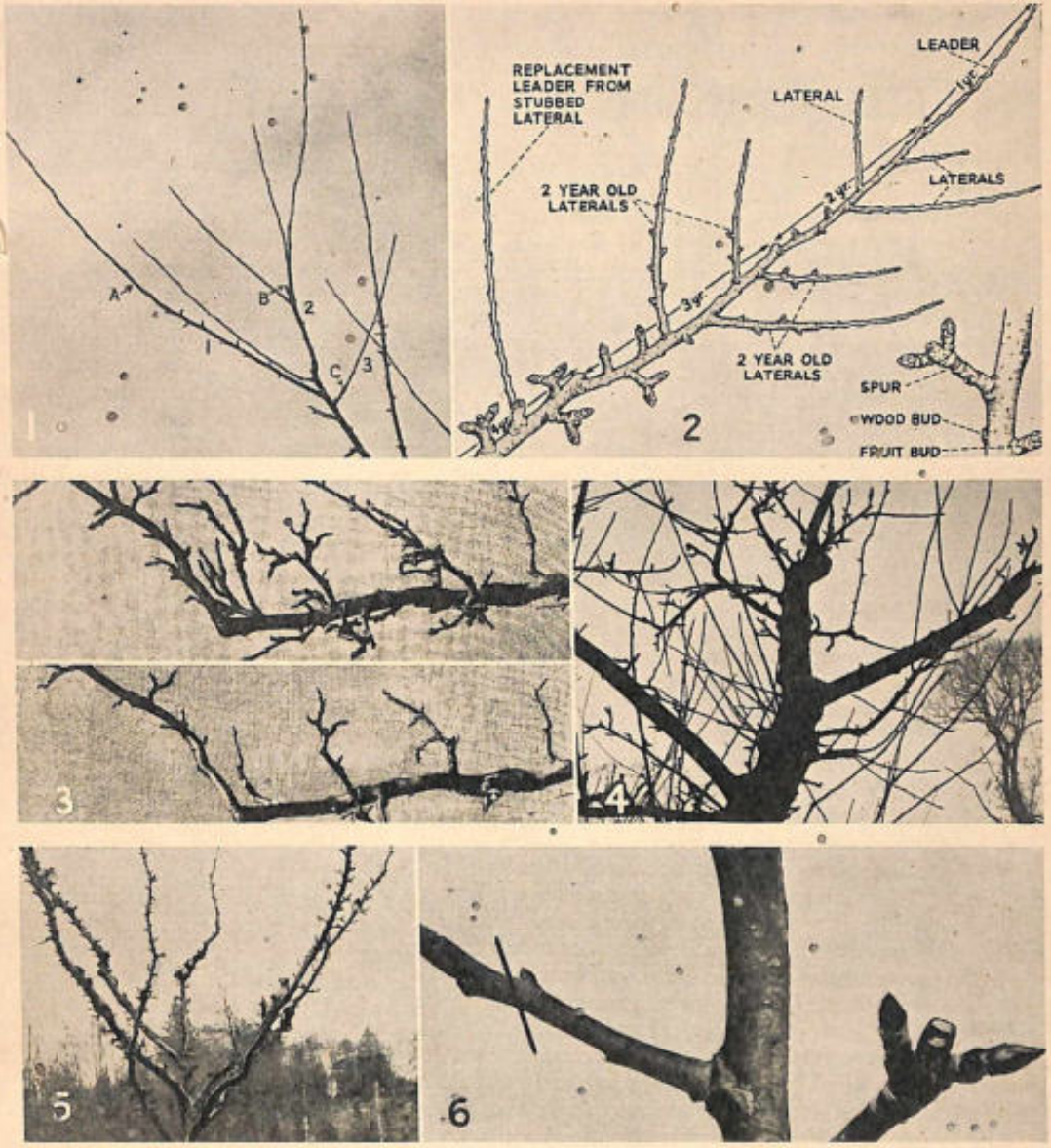
On the four-year-old section there are some spurs. The diagram in the right-hand bottom corner shows a spur in more detail. The upright shoot at the left-hand side of the diagram has been produced by stubbing back an older lateral and has thus formed a year-old shoot furnished with wood buds. This is called a replacement leader.

The four main types of pruning to be discussed in this chapter are *regulated pruning*, *spur pruning*, *summer pruning* and *winter pruning*.

Regulated Pruning

This form of pruning is easy and is most useful for vigorous trees on a good soil. Trees pruned by this method must be fed well in order to encourage new growth by feeding rather than by hard pruning. To start with, all broken, dead and diseased wood should be cut out each winter. The centre of the tree must be kept open, even if it means sawing out whole branches when necessary. Overcrowding of the spur sys-

(*continued on page 56*)



(1) *Points A, B and C show where the shoots were pruned the previous winter. In shoot* 1, *A marks the length the previous winter. In shoot* 2, *B marks the point where it was cut back by half the previous winter. In shoot* 3, *C marks the point to where the shoot was cut hard back (see text opposite).* (2) *The various parts of a fruit tree (see text opposite).* (3) *Top. An overcrowded shoot. Bottom. The same shoot with the spurs thinned correctly (see page* 56). (4) *A vigorous upright branch has been cut out of this tree (dehorning) (see page* 56). (5) *A spur-pruned tree (see page* 56). (6) *The shoot on the left is pruned to* 3 *buds. This will eventually form a spur system as shown on the right of the shoot (see page* 56).

tems must be avoided, for these spurs when left unpruned will build up and become overcrowded and they will not carry good-quality fruit. In illustration No. 3 we see at the top an overcrowded shoot, and, below, the same shoot with the spurs thinned correctly. It is quite likely that these trees will grow quite tall owing to the generous feeding and it will be necessary to shorten them by cutting out the vigorous upright branches to a junction with a weaker lower one. This method is known as de-horning, and is illustrated in No. 4.

To sum up therefore, *regulated pruning* allows the vigorous tree to have its own way, but pruning is done to keep it healthy.

Spur Pruning

The illustration No. 5 shows a spur-pruned tree, and it is easy to recognise the fruit buds which grow close to the branches. This method of pruning can be carried out quite quickly and, in fact, by rule of thumb.

1. Branch leaders are cut back by one-third to encourage the growth of laterals.

2. The laterals are all pruned back to three buds. In illustration No. 6 the shoot on the left is pruned to three buds which eventually will form a spur system as shown on the right of the shoot. In illustration No. 7 the bars on the various shoots on the top photograph show where each shoot will be pruned, and the bottom photograph shows the same shoot after pruning. It will be noticed that the growth is only moderately vigorous and spurring back will not work on trees making vigorous growth. In this case the three buds would make growth shoots and the tree would be a veritable forest of growth. Let us consider an older branch in illustration No. 8. The top picture shows the branch before pruning, with the pruning point indicated by the lines, and the lower picture shows the same branch after pruning. Overcrowded spurs must be thinned and the top illustration No. 9 shows a shoot before spur thinning, and the bottom after spur thinning.

Trees trained on supports are pruned more severely than other types, in order to keep them smaller and closely spurred. Hard pruning is carried out, but to give a further check to growth they are *summer pruned.* In illustration No. 10 we see cordon pear trees in full bloom. It should be pointed out here that cordon trees are worked on a dwarfing root stock, which makes them quite unable to grow to a very large size, even if left unpruned.

This is rather an important point, because it must not be thought that even by checking growth by hard *summer pruning* could a strong-growing tree on a vigorous rootstock be kept within the bounds of a cordon tree.

Summer Pruning is carried out as follows:

1. Laterals should be cut back when they are woody at the base, this being done in August for apples, and July for pears.

2. All laterals arising directly from the main stem are cut to four leaves above the base of a cluster.

3. Sub-laterals, that is, laterals growing from previously pruned laterals, are pruned to one leaf. See illustration No. 11.

4. Long English summer pruning can also be carried out on weak-growing varieties, where a severe check to growth is not desired. In this case all the laterals are pruned in summer to six leaves, as shown in illustration No. 12.

Winter Pruning

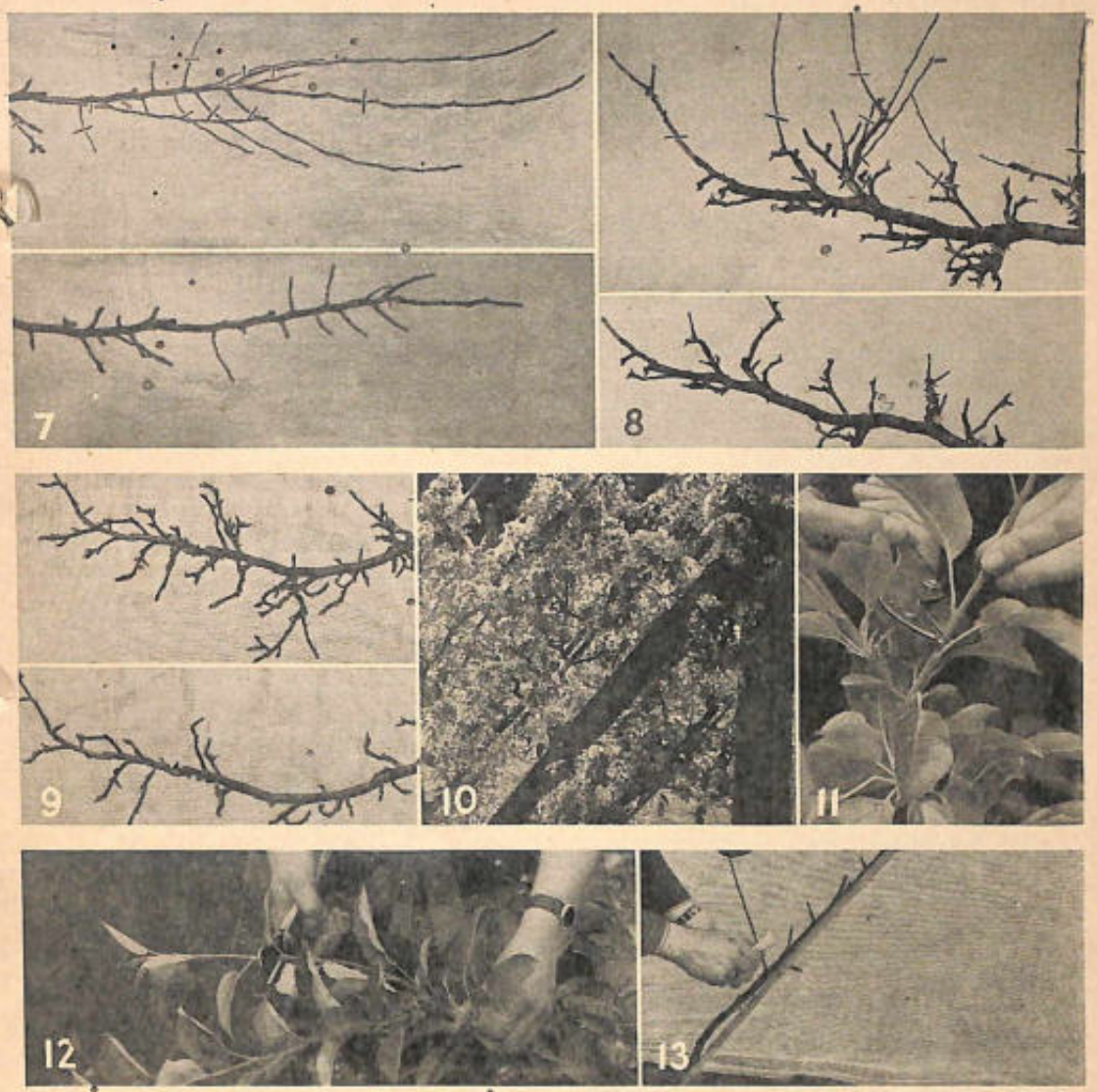
The summer-pruned shoots are cut back to three buds in the winter. The extension shoots of the central stems of cordons should be tipped each winter, when the growth of side shoots will be encouraged. This should only be done where trees are being grown on poor, thin soils. See illustration No. 13.

Plum Pruning

The plum bears fruit on young laterals and old spurs. Pruning consists of thinning out the tree head when branches become overcrowded, and dead or diseased wood must be cut out. The prunings must not be left lying about, but they should be burnt without delay.

Prune the trees in the summer when the fruits have set, but while they are small and when the tree is in full leaf. Fruit thinning is also advised.

(*continued on page 58*)



(7) *Top. The bars on the shoots show where each shoot will be pruned. Bottom. The completed operation* (see page 56). (8) *Top. An older branch with the points of pruning indicated by the thin lines. Bottom. The same branch after pruning has been completed* (see page 56). (9) *Top. It is essential to thin overcrowded spurs. Bottom. The branch after the spurs have been thinned* (see page 56). (10) *Cordon pears worked on a dwarfing stock* (see page 56). (11) *Sub laterals being pruned to one leaf during summer pruning* (see page 56). (12) *Long English summer pruning of a weak-growing variety—the laterals being pruned to 6 leaves* (see page 56). (13) *Winter pruning a tree grown on a poor soil* (see page 56).

THE PRINCIPLES OF PRUNING (continued)

PRUNING SOFT FRUITS

We now come to the methods of pruning required for the soft fruits (*pictures opposite*).

Raspberries

Pruning here simply consists in cutting out completely all wood or canes which have fruited the previous year. Newly planted canes must be cut back to within 8 inches of ground-level after planting. Autumn-fruiting varieties produce fruit on the current season's wood. These plants should be pruned by cutting back all the growth to ground-level annually in the spring.

In order to produce quality fruit, the new canes of raspberries should be thinned carefully so that only the strongest and healthiest are retained. Space the canes out along their training wires about 6–8 inches apart. The tips of the canes should be topped—cutting off about 1–1½ feet of cane.

Blackberries

The fruit is produced on two-year-old wood, and old canes should be cut out when they have fruited. Many vigorous young shoots will be produced at the base of the plants and these should be reduced to about six later on.

Blackcurrants

These plants fruit on the *previous* year's growth. Newly planted specimens should be cut back to 2 inches on planting. Old wood should be cut out after fruiting.

Red and White Currants

These bear fruit on spurs on the old wood. Shorten the laterals to five leaves in the summer. In the winter, shorten summer-pruned laterals to half an inch. On mature bushes, leaders should be cut back hard in the spring.

Gooseberries

Hard pruning will produce a good framework of branches, and after this building up, cut back branch leaders by a third. Side shoots should be spurred back to two to three buds in the spring.

PRUNING ROSES

(*pictures on page 61*)

Tea Roses

1. As these are rather tender roses, no pruning should be done until the first week in April.
2. Remove old and dead wood.
3. Thin out weak shoots and shorten to three buds. Stronger shoots should be thinned to six to eight.

Hybrid Teas. Pruning is carried out about the end of March.

1. Cut out all dead and worn-out wood.
2. Weaker shoots should be pruned to within three to four buds of the old wood.
3. Strong shoots should be pruned to a bud 6 inches to 1 foot from their base. Make all cuts to a bud facing outwards; this keeps the centre of the bush open.
4. Bushes and standards receive the same treatment except that standards require symmetry, therefore certain shoots should be pruned hard or lightly to maintain an even balance.
5. For exhibition, weak growths should be shortened to one bud, stronger ones to two to three buds.

Climbing Hybrid Teas. Prune towards the end of March.

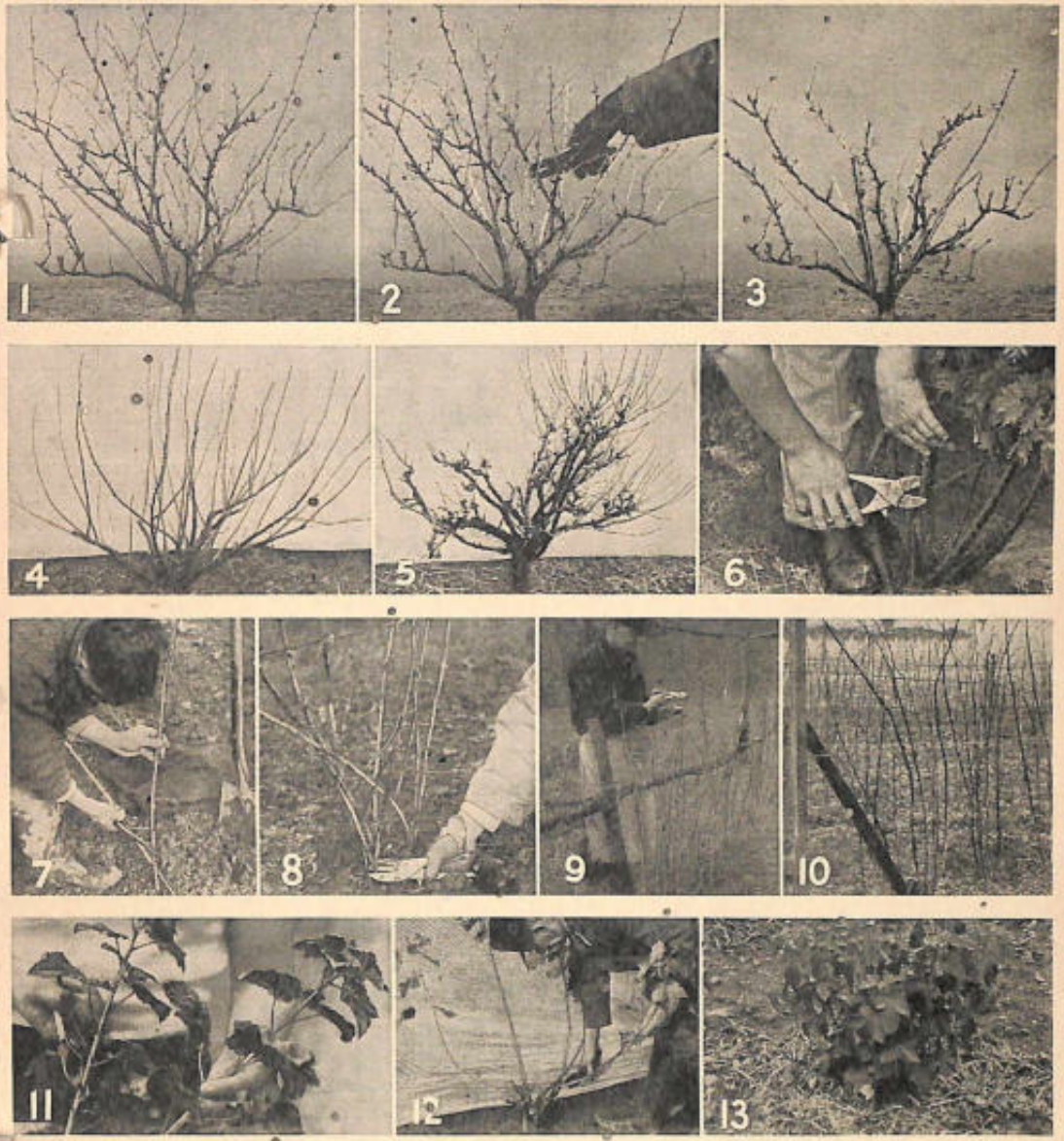
1. Dead wood should be removed.
2. Shorten weak growth to three buds.
3. Strong shoots should be tipped to remove unripened wood.

Hybrid Perpetuals

Generally, pruning can be carried out as for Hybrid Teas.

1. For large blooms, prune severely, leaving one or two eyes at the base of each shoot.
2. When Hybrid Perpetuals are grown as bushes, prune out old wood in autumn, leaving strong young shoots in order to curtail overvigorous growth. In early April remove unripened tips and bend these young shoots and peg down in a horizontal position near the soil. This will encourage the formation of flowering shoots and strong basal branches. When these branches have flowered in the autumn they should be cut out, and the current season's growth pegged into place the following spring.

(*continued on page 60*)



(1) *A gooseberry bush before it is pruned.* (2) *This bush has a good framework and pruning consists of cutting back branch leaders by a third.* (3) *The bush after pruning.* (4) *The old wood has been cut out of this blackcurrant bush.* (5) *The left side of this red currant has been spur pruned.* (6) *Old 2-year wood of blackberries should be cut out.* (7) *New raspberry canes cut down to 9 inches.* (8) *Cutting out old raspberry canes which have fruited.* (9) *Shortening the tips of raspberries.* (10) *New raspberry wood trained on wires after autumn pruning.* (11) *Shortening red currant bush to 5 leaves in the summer.* (12) *Cutting old blackcurrant hard back.* (13) *New growth induced by this hard pruning.*

THE PRINCIPLES OF PRUNING (continued)

Pernetiana Roses

Subject to frost damage, therefore pruning should be done in early April.

1. Remove dead wood.
2. Prune severely first year after planting.
3. Where wood has died almost to ground-level, especially after severe weather, this should be cut right out.

Provence Roses

Prune severely during the last week in March.

Moss Roses

Prune during the last week in March by shortening to within a few buds of the ground.

Damask Roses

Only an occasional thinning is required, in March. Cut fairly hard at the end of March, the first season after planting.

Rugosa Roses

After planting, cut down to within 6 inches of the ground at the end of March. When established, no pruning is required except to cut back when they get out of bounds.

China Roses

In their first year, cut back to half their length in early April. Little other pruning is required except to shorten back shoots affected by frost or to remove dead wood.

Sweet Briars

When used as a hedge or screen, trimming should be carried out in April and again after flowering. Generally, they are left to grow naturally, with an occasional thinning out of very old wood.

Dwarf Polyantha Roses

Pruning should be carried out from the middle to the end of March.

1. Thin and dead wood should be cut out.
2. Wood that is retained should be shortened back slightly.

Climbing Noisettes

Pruning is very similar to that required for climbing H.T.s, except that it should be undertaken in early April.

In the second year remove old wood and train in new young growth.

Ramblers

1. Prune after flowering by cutting out stems that have produced flowering laterals to ground-level.
2. Tie current year's growth in their place.
3. Reduce these to the six strongest; remove weak shoots.
4. Where insufficient young growth is forthcoming, retain some of the strongest wood which produced flowers during the current season. Spur the basal buds of the lateral growths of this wood hard at the same time that old wood is removed during general pruning. These basal buds will eventually produce flowering shoots.

Some ramblers are shy at producing young wood each season, especially the varieties Emily Grey and Alberic Barbier. In this case annual pruning should be practised as follows:

1. One old shoot should be cut back to the ground each year.
2. Other shoots should have side growths thinned out and shortened immediately after flowering.

Neglected Ramblers

1. Retain strong young growth arising near the ground.
2. Retain one or two of the straightest two-year-old branches.
3. Spur back laterals on these two-year-old branches to two or three buds.
4. Retain only three or four branches for training on worn-out ramblers. Concentrate on the production of young wood afterwards at the expense of flower production.

Weeping Standards

Prune as for ramblers. Where trained over supports, tie down young growth before they become too hard.

Summer Pruning Bush Roses

While this type of rose blooms profusely during June, it also produces flowers again in August. Better autumn results can be obtained if young wood beneath faded blooms is shortened by half its length.

(1) *A rose bush before it is pruned.* (2) *Old snags and dead wood should be removed.* (3) *An old shoot is being removed completely, close to the base of the bush.* (4) *A weaker shoot is being pruned to within* 3 *or* 4 *buds of the old wood.* (5) *Strong shoots should be pruned to a bud* 6 *inches to* 1 *foot from their base.* (6) *All cuts should be made to an outward pointing bud. Close-up showing the cut just* above *an outward-pointing bud.* (7) *All prunings from the bushes should be placed in a neat heap and then burnt.* (8) *The rose bush after pruning has been completed.*

13. LAWN CONSTRUCTION AND MAINTENANCE

MOST gardeners can boast a lawn, and no doubt the gardener will be eager to construct one in his garden as soon as possible. A patch of green that remains so during the whole of the year is a very pleasing sight, especially during the dull winter months, and we are fortunate in this country in having the choice of the best grasses, as well as climatic conditions favourable to the cultivation of good lawns.

The gardener will realise by now that to achieve good results, careful preliminary preparations are essential, and the construction of a lawn is no exception to the rule. Broadly speaking, the main factors that determine the nature and extent of the preliminary work in the formation of a lawn are the character of the soil, the aspect of the ground and the rainfall of the district.

The texture of the soil is important. A reasonably fertile soil which is light and porous is excellent. Heavy soils are less satisfactory and require a good deal of work before ideal conditions are established. Aspect is a very important point. The majority of grasses grow best in an open position, thus too many overhanging trees should be avoided. A suitable type of grass will have to be chosen for the particular conditions experienced. A good supply of moisture is essential for the maintenance of a good lawn. Where the gardener is fortunate enough to live in a district which receives a generous amount of rain, watering problems are cut down to a minimum, but in other situations it is advisable to provide for artificial means of irrigation. The question of whether to use turves or seeds must be considered, but this problem will be dealt with later on in this chapter.

I feel that it will not be much help to the gardener to take an average soil as an example when describing the various preliminaries to lawn construction, as soils vary considerably in their properties. Therefore, the following different types of soil are dealt with:

Sandy Soils

Excellent results can be obtained with this type of soil, provided it is not too sandy. This difficulty can be overcome by incorporating moisture-retaining material in the form of well-rotted manure or compost. A green crop, such as mustard or vetches, can be sown broadcast on the proposed site, and dug in well in advance of sowing. Soils that are practically all sand are very difficult to use—in fact it is almost impossible to expect good results; one way to get out of the difficulty would be to purchase good-quality loam and work it in the sand.

Heathland

The main difficulty experienced with this type of soil is that it is particularly subject to the formation of a hard layer about a foot or so below the surface. Such a layer prevents effective drainage and must be broken up before good results can be obtained. If it is impossible to penetrate this barrier for any reason, a system of shallow drains will have to be constructed.

This soil is always lacking in lime, and a heavy dressing, up to a pound per square yard, will have to be given. Plenty of farmyard manure will be necessary, and a balanced fertiliser should be given before sowing or turfing. Careful selection of seeds is essential in cases like this, as very few grasses will do well under these conditions.

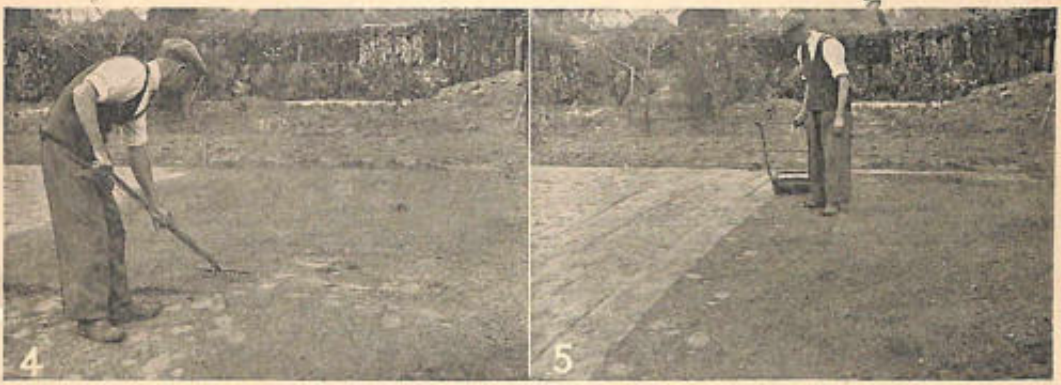
Average Loamy Soil

This type of soil should present little difficulty to the gardener. Most of the essentials for good growth, e.g. drainage and moisture-retaining material, are present, and a good deal of work is thus saved. This does not mean, of course, that the gardener need be careless in his work and just as much care should be taken.

Chalk Soils

Chalk soils are well suited for lawns, and although the depth of the soil may be small in certain localities, a good turf can usually be

(*continued on page 64*)



(1) Preparing a good sowing surface by raking the soil well with the rake. (2) Sowing seed in squares to ensure even distribution. (3) Experienced gardener broadcasting grass seed. (4) Raking the seed in carefully. (5) A light rolling is given. The roller attached to the lawn mower is quite sufficient. (6) Levelling ground preparatory to turfing. Extra soil being added as it is required. (7) Firming the soil with the feet. This prevents the soil subsiding during the later stages of the lawn's construction. (8) A final levelling and fine surface or tilth can be achieved by the rake.

established without much trouble. Where this depth of soil is inadequate, fresh soil should be added to make up a minimum depth of at least 6 inches. The use of organic manure is important for these soils, as the decay of organic material is rapid.

Clay Soils

The chief trouble with lawns constructed on clay soils is that the surface becomes slippery during very wet weather and, in very dry weather, it dries out badly – often cracking.

Drainage

Not all gardens are blessed with perfect, or even very good, drainage, and the only way to ensure success with lawns is to make sure that there is a good drainage system underneath. Where soils have been well cultivated for a few years the drainage should be quite satisfactory, but on very heavy soils, or in extreme cases of neglect, it might be necessary to construct a simple system of land drains. The main idea is to arrange for branch pipes to connect up to one main pipe, which can empty either into a main drain or into a deep trench or sump at one end of the garden.

The pipes should be buried about 12 inches below the surface at the shallow end and 24 inches at the deep end. One foot in every 100 is sufficient to allow for the fall of the main pipe, while 1 foot in 50 or 75 is sufficient for the branch pipes. The distance between the branch pipes depends to a great extent on the nature of the soil. On very heavy ground the interval should be about 12 feet. There is no need to be so thorough with large lawns, however. The branch pipes should be connected to the main pipe at an angle of about 45 degrees. Use 3-inch pipes for the main drain, and 2½-inch for the branches.

When covering the pipes, first place a layer of rough stones or clinkers on top and then ashes to within 6 inches of the surface. Make sure that the soil and other material are well rammed down, otherwise, later on, the soil might sink, revealing the exact pattern of the drains!

A simple form of drainage can be constructed by taking out trenches 18 inches deep and 10 inches wide, filling these with rough clinkers and ashes and finally topping up with soil. The trenches should be taken out through the badly drained areas of the lawn site and should connect up with a sump or main trench.

PREPARATIONS BEFORE SOWING OR TURFING

(*pictures on page 63*)

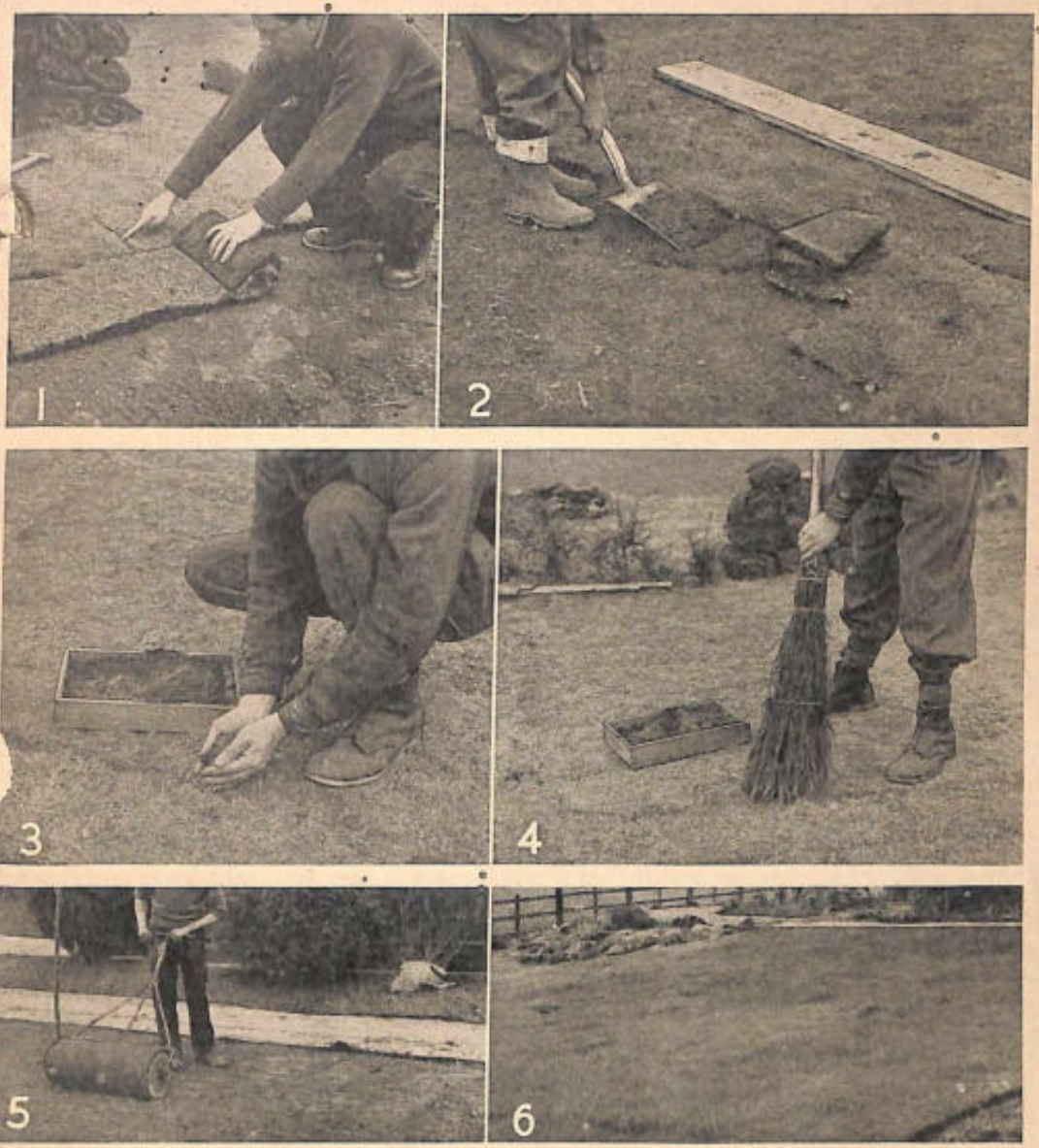
The actual design of the lawn will naturally lie with the gardener, and he will have to take into consideration the natural lie of his land. Whether it is undulating or reasonably level, a lawn which is constructed so that it blends into its natural surroundings will be a constant joy to the household.

The piece of ground selected for the lawn must be suitably enriched before sowing or turfing takes place. The best form of food for a new lawn is well-rotted farmyard manure. This material will not only help to conserve soil moisture, especially during the initial stages, but will gradually furnish a supply of essential plant food. A barrowload to 10 square yards would be a good dressing to give.

Where this material is difficult to obtain, a suitable, well-balanced fertiliser can be used, containing nitrogen, phosphates and potash. National Growmore is a fertiliser that contains these ingredients, and should be applied at the rate of 2–3 ounces per square yard. Lime is not necessary in most cases, but where soils of a sandy or peaty nature are dealt with, a dressing of carbonate of lime should be given at the rate of 4 ounces per square yard.

The ground should be cleared thoroughly before making a lawn. All weeds should be removed and any deep-rooted specimens such as docks must be carefully dug out, taking care to get as much of their root system as possible out of the ground. Where time allows, it is a good plan to prepare and clear the site several months before the actual laying or sowing of the grass is undertaken, so that any deep-seated weeds that have been overlooked will have made an appearance and can then be forked out. In some gardens, worms can be a very great worry,

(*continued on page 66*)



(1) *When laying the turves, see that they are bonded together by making sure that the joints do* not *fall opposite in the rows.* (2) *Any unevenness of the ground can be rectified by adding or taking away the soil as the turves are laid.* (3) *The joints should be filled with loam in order to help bind them together.* (4) *A good brushing with a stiff brush or besom will work the soil into the cracks or joints.* (5) *A* light *rolling will firm the turves in place.* (6) *It will not be long before the turves will knit together and form a well-established lawn.*

causing unsightly worm casts and also, by their constant upheaval of the surface soil, they cause irregular germination patches, due to the seed being unable to germinate on the broken soil. A good proprietary worm-killer will help to eradicate this pest, and should be used according to the maker's instructions and watered in a few weeks before sowing or turfing.

Levelling can be quite simply carried out by driving wooden pegs into the soil at regular intervals over the site. The height of the pegs can be regulated by means of a straight-edge and a spirit-level. One thing must be avoided when levelling, under no circumstances must the fertile top-soil be removed from the higher levels to make up the lower portions of the site. By doing this, poor subsoil is exposed on which seed is sown, resulting in very poor growth. Where soil removal is necessary, remove the top-soil first, and place on one side, after which the subsoil can be distributed as required.

When the levelling has been completed, the surface should be raked carefully, removing any stones, etc., preparatory to laying or seeding the lawn. The surface soil should be broken down as fine as possible, and the ground well firmed. A light rolling across the surface will help to ensure that no depressions will occur later on in the lawn's life.

Sowing (*pictures on page 63*)

To attempt to restrict the amount of seed in sowing a new lawn is a very bad mistake, and one that must be avoided at all costs. One ounce of seed for every square yard should be the rate of application. As a very rough guide, a tennis court for the large-sized private garden covers an area of approximately 108 feet by 54 feet. For this area, about 42 pounds of seed would be required. For quicker results, the amount of seed can be increased, but a great deal depends on climatic conditions and previous treatment of the site.

Grass may be sown in the spring or late summer. In the southern and midland districts, from the middle of March to the end of April is a suitable time, while for the northern districts it would be advisable to delay the sowing for a week or two. In late-summer work, the end of August and mid-September are two suitable periods. The soil is much warmer at this time and germination will be found to be much quicker than in the spring sowings.

In order to sow evenly, the site should be marked out into squares, and the weight of seed halved, so that the squares are sown in distinct operations – up and down and across the area. When the seed has been sown, cover lightly by raking evenly, taking care neither to bury the seed too deeply nor to leave it to the ravages of birds. After raking, the ground should be rolled in two directions. Under favourable conditions, germination should take place in approximately fourteen days.

Laying Turf (*pictures on pages 65 and 67*)

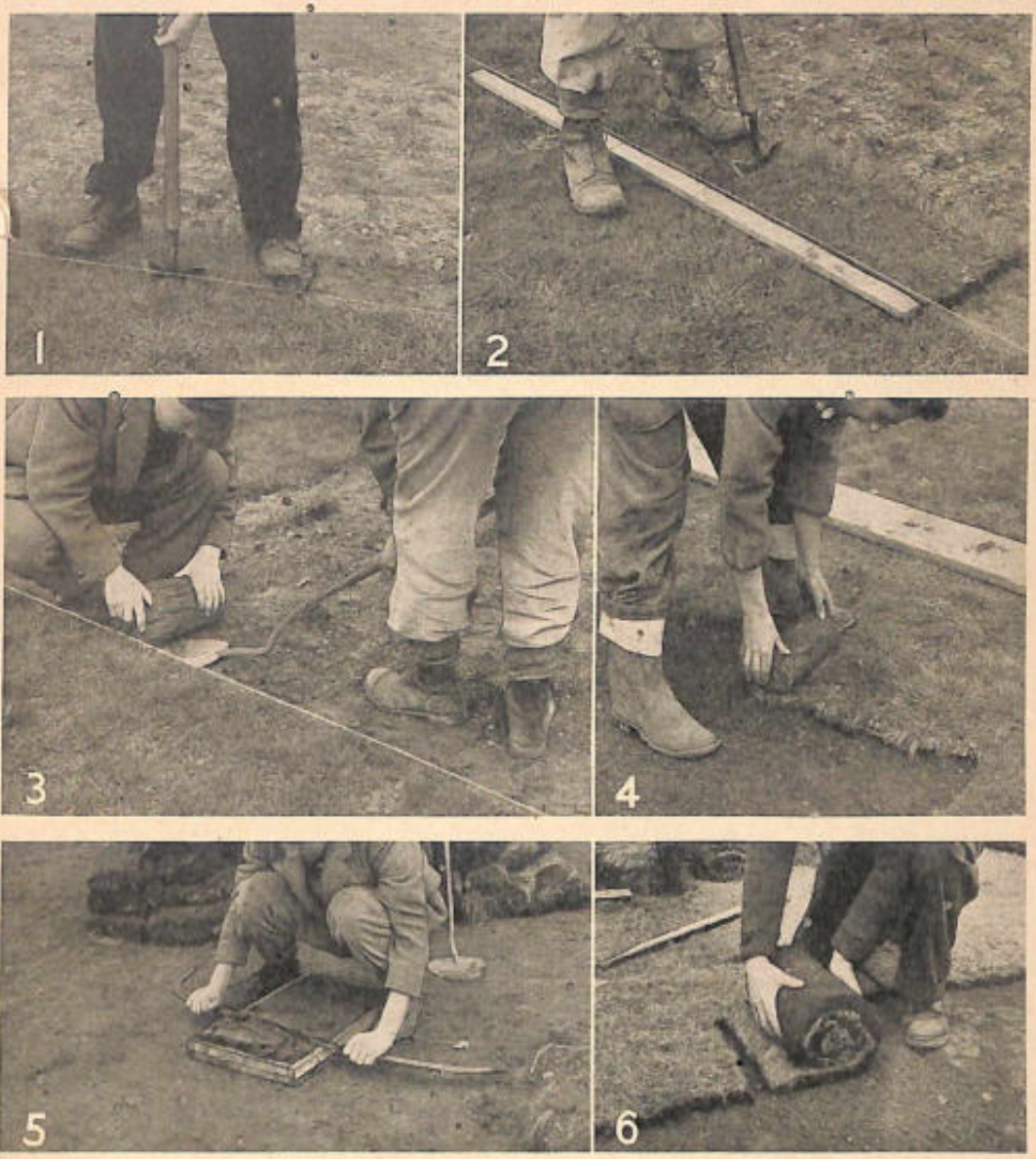
The best time to lay turf is from the end of September until early March. The only objection to be found in late-spring laying is that drying winds may cause the turves to shrink, thus leaving ugly gaps at the joints. The beginner will find that it pays to have well-cut turf, i.e. turf that is uniform in size and thickness. Turves should be laid in a similar fashion to bricks—in rows with alternate intervals, so that each piece binds the others.

Each piece must be pressed firmly into position, and any irregularities underneath can be corrected by either placing loose soil underneath or scraping some out. When laying is complete, the whole area should be covered with fine soil, which should be brushed into the crevices. The grass should be left for about three weeks, when it should receive a light rolling up and down and across its area.

General Maintenance

Only when severe drought is experienced should water be given to the new lawn, and this can be applied with either a garden hose or a sprinkler. Fertilisers should be avoided during the first six months. Afterwards, the best method of manuring is to give a complete dressing of artificials in the spring, followed by small doses of sulphate of ammonia in the summer. A com-

(continued on page 68)



(1) *Turves for lawns can be obtained by cutting strips of turf a foot wide with an edging iron.* (2) *The strips should then be divided off into lengths of three feet.* (3) *In order to lift the cut turves neatly and cleanly, a turfing spade is the best tool to use, as illustrated here.* (4) *When the turf has been cut it should be rolled up.* (5) *Turf cannot be laid successfully unless it is of even depth, and in order to ensure this, a 'depth box' should be used into which the turves are placed grass side downwards, and excess soil pared off.* (6) *When the turf is laid, each piece should be unrolled as shown here.*

plete, well-balanced grass fertiliser can be purchased from most garden seedsmen, but a good general fertiliser can be made up as follows:

Sulphate of ammonia	1 part by weight
Dried blood	2 parts by weight
Sulphate of potash	2 parts by weight
Sharp sand	20 parts by weight

Mix these well and give two applications during the spring, each at the rate of 6 ounces per square yard.

The new lawn should be given a light rolling as soon as the grass is ready for cutting. This operation should not be carried out if the ground is wet. Use a light roller, one weighing about 2 hundredweights being ideal. Mowing should commence when the grass is about 3 inches high and the machine should be adjusted so that only a light cutting is made. Subsequently, the mower can be used as often as necessary, but do not cut too closely the first year.

Care of the Lawn (*pictures opposite*)

Weeds are bound to grow on the new lawn, and one of the new selective weed-killers can be watered in, thus avoiding much back-aching work. Sometimes the surface of the lawn becomes rather hard, due to wet weather, constant wear and mowing. In such circumstances it is advisable to aerate the lawn by piercing the surface at intervals with a fork or by using a special spiked roller. The gardener will find that a water-supply laid on close at hand will be most essential, especially during droughts, which can cause such disastrous results to lawns – especially newly constructed ones.

Once the lawn is well established it should be mowed regularly, as this encourages the new grasses to grow, thus ensuring a good thick sward. Unfortunately, so many amateurs tend to overdo this mowing in their eagerness to procure a close-cropped finish, and many a promising lawn has been ruined through overmowing.

Repeated close mowing must be avoided at all costs during dry weather, as the lawn will soon become scorched if cut too close. A mowing once a week will be quite sufficient for the average lawn.

Keep the edges of the lawn neatly trimmed, for nothing looks worse than a lawn with ragged edges. An edging iron is the correct tool to use, in conjunction with the garden line, for getting that nice straight edge to the lawn. Edging shears are ideal for clipping the edge of the lawn. After the mower has been run over *close* to the edge of the lawn, use the edging shears. So many lawn edges are broken by running the mower right on the edge of the lawn.

One advantage of the lawn with straight sides over the lawn with curved or irregular edges, is that the cutting and trimming of the edges is made much easier. Where the gardener is a busy man, this point should be kept in mind when constructing a lawn.

During the autumn, when the leaves are falling from the trees, the lawn should be kept clear of leaves, and a spring-toothed rake or a stiff besom should be used with which to sweep off the leaves.

One last point—it is a good plan to try to distribute the wear on a lawn – particularly a small one, and when sitting out in deck-chairs and when having meals on the lawn, try to use a different spot every so often. In this way you will avoid constant wear on a particular area of the lawn, which usually shows up as a series of ugly bare patches!

(1) *The lawn top-dressing should be distributed evenly by hand. If the lawn is marked off into strips with the garden line, it will be easier to apply the dressing with accuracy.* (2) *The dressing should be well worked into the turf with a stiff brush or besom.* (3) *Applying a liquid selective weed-killer.* (4) *'Spot-treating' individual weeds with a strong solution of weed-killer.* (5) *Pricking or aerating the grass with the fork.* (6) *Cutting out a piece of turf preparatory to levelling.* (7) *The turf 'peeled' back and soil added to overcome a depression.* (8) *Resowing a bare patch—the grass seed being covered.*

14. CONSTRUCTING A ROCK GARDEN

BEFORE attempting to construct a rock garden, it is as well for the gardener to bear in mind exactly what he is aiming to produce. It should not be what is often unfortunately the case, a mass of hideous-looking rocks strewn about the garden – or heaped up in one corner. A rock garden should be a reproduction in miniature of a natural piece of mountain scenery. To obtain this, one of the most important points is to choose as natural a background as possible for the site. Avoid construction near formal features of the garden. Being a reproduction in miniature, proportion is a very important factor – depending, of course, on the size of the garden.

The ideal site is one facing south which is not overshadowed by large trees. The reason for this is that during the winter months there is bound to be a lot of drip from the trees, which will quickly affect the alpines in the rock garden.

Construction (*pictures opposite*)

The first essential is to provide good drainage, and it will pay the gardener to make a thorough job of this at the outset. Where heavy, wet soil is being dealt with, it will be far better to build the rock garden on a specially raised piece of ground. The other alternative, in a case like this, would be to install a system of land drains to take away the surplus water. Anyone who is not prepared to go to the trouble of ensuring this good drainage must give up the idea of a successful rock garden. On the other types of soil the sub-soil should be thoroughly broken up and small pieces of brick or sharp sand or cinders can be incorporated to keep the soil nicely open. Drainage problems are, of course, lessened greatly on light sandy soils, although the sub-soil here must also be broken up.

In some gardens the gardener will be helped greatly by the natural contours of his ground, and where a piece is very undulating, a more natural 'setting' can be obtained, provided the rocks are selected and arranged to blend with the natural rise and fall of the ground.

Having decided upon the site and aspect, the next step is to plan out the actual form of construction. A rough plan that the rock garden is to take should be drawn up, showing whether water is to be a feature; whether the effect is to be bold or whether it is to be in the form of a natural outcrop of rock. As it is presumed that the majority of gardeners will have only comparatively small gardens, the minimum of stone should be used and a careful selection of plants should be worked into the scheme, so that there will be something of interest throughout most of the year. Ultimate height should also be considered.

When the scheme has been decided upon, the outline of the rock garden should be marked out by means of pegs, and the area dug out to a depth of about 15 inches. Rubble should be tipped into this excavation and levelled off to the surrounding ground. Turves should then be placed face downwards on the rubble, thus providing a good base on which to construct the garden. It also prevents a certain amount of the soil being washed into the foundations.

It should be fairly obvious that there is everything in selecting a suitable rock or stone for the rock garden. Whatever type is used, it must blend as closely as possible with the surroundings.

The two best types for gardeners to use are sandstone and limestone. Sandstone is retentive of moisture and, having a rather rough surface, it retains the soil better and alpines cling to its surfaces very readily. Perhaps a big fault with it is that it flakes badly in frosty weather.

Limestone is another popular stone, the best type being obtained from North Wales, Derbyshire, Westmorland and the Cotswolds.

The placing of the rock requires careful attention – it is useless placing the stones haphazardly all over the site – each rock will have its own particular characteristics which will soon be revealed if it is closely scrutinised, and the art of placing rocks lies in making the most of these features. Each rock should be placed on its

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(1) *Soil to build up the rockery can be wheeled on as work proceeds.* (2) *Make sure the soil is worked in well behind the stones.* (3) *The arrangement of the stones should be undertaken carefully.* (4) *Rocks should be placed on sacks when building takes place on a lawn. This will protect the grass. Note that an old air-raid shelter is being concealed by building this rock garden over it.* (5) *Soil being placed on a piece of rock to form a 'seating' for another piece.* (6) *The next rock being put in place.* (7) *Further rocks being added.* (8) *Firming of the rocks is important.* (9) *The rocks should be arranged in terraces.*

broadest side, with the weathered surface exposed to view. Make sure each rock is firmly fixed into position. Nothing looks worse than a rock garden with loose pieces of rock – there can be a lot of damage caused, especially to young children, if any of the pieces become dislodged.

Start construction from the base, and remember that a firm base means a firm rock garden. Each piece of rock should tilt slightly inwards towards the soil, and the soil should be worked in well round the rocks, packing with smaller pieces of stone or rock where required, to ensure stability. It will be found that a short, sturdy piece of wood will be invaluable for ramming soil or pieces of rock into the various corners and crevices. Do not allow rocks to overhang one another.

The gardener will find it a great help when arranging the rocks if he places a few roughly in place and then walks back a few yards to survey his arrangement. One cannot see the effect when working on top of the job, and the gardener will find a pleasing improvement if he goes to this trouble.

Type of Soil to Use

A little care is necessary in the preparation of the soil for the various rock plants. The main essential is perfect drainage, and most loams used should have half their weight in coarse potting sand added. Should the soil used be lacking in food material, two of the best ingredients to use are pig manure and cow manure, both of which must be well rotted before use. Allow the manure to comprise not more than one-sixth of the whole compost. Leaf-mould or peat can also be incorporated. The whole of the ingredients must be mixed thoroughly by turning, and a liberal quantity of granite, limestone or sandstone chippings should be added and mixed with the compost.

Planting (*pictures opposite*)

If the gardener buys some of his plants in pots, he would be advised to remove them very carefully from the pots when planting. It is essential that the root systems are not damaged too much and, in many cases where the roots have penetrated the drainage hole in the pot, it is necessary to break the pots to extract the plants. The same care in removal should be exercised with those plants purchased or grown in boxes or pans.

Pot-grown plants can be set out at any time of the year except in the height of the summer or the winter. The best time is in the spring. Other plants can be put out in early spring and also towards the end of August. Those plants that are bulbous or tuberous can only be planted when dormant, which is from late summer until early spring.

Planting should be done firmly and the soil should be worked round each plant, whether planted in a pocket or a cranny. Correct depth of planting must also be considered, and it is advisable to cover a plant entirely up to the base of the foliage. It will be found that, as the seasons advance, many plants in the rock garden, especially those planted in the crevices of the rocks, will be covered gradually with soil washed down either by rain or by artificial watering.

During planting, a great deal of consideration must be given to the arrangement of the plants, as the whole effect of the rock garden can be spoilt by bad arrangement. The gardener should try to achieve a 'natural' effect – no rigid blocks of plants. The nature of the rock will be a good guide, and banks and drifts of plants can be arranged to cover parts of large outcrops of rock, while little crevices and gullies will perhaps accommodate only a few plants. Succession of display is another point to aim for, and planting should be carried out so that there is always a spot of colour from spring to early autumn.

(1) *A creeping type of alpine is an ideal choice for this crevice and the hole for the plant is being taken out with a trowel.* (2) *The plants should be knocked out of the pot carefully.* (3) *Firming is essential, and a pressing with the handle of the trowel in this manner should ensure that the plants are firmly seated in the soil.* (4) *In a few seasons the crevice should be covered in this attractive manner.* (5) *Before planting the alpines, take some little time in arranging the plants in their most natural setting.* (6) *Once this has been determined, it is a simple matter to plant each one in turn.*

15. PATH-MAKING

No matter what style of path is contemplated, it is essential that the foundation be satisfactory. The soil from the site of the path must be excavated to a depth of at least a foot. Into the bottom of this trench must be placed plenty of broken bricks, small stones or cinders to within about 3 inches of the level of the finished surface. A 1-inch layer of sifted ashes should be placed on top of this, afterwards raking it level so that a smooth base is formed for the surfacing material. It is important to allow the foundation to settle for a day before completing the path. Where the ground is badly drained it will be worth while laying a few field-drains in the foundation material.

Style and Choice of Materials

The design of the paths should be guided by the type of garden in which they are being constructed. In small gardens, where ground is precious, paths should be kept down to a minimum and should be made to serve the main requirement, that is, a connection between the main entrances and exits of the house. Straight and curved paths are best constructed in formal gardens, while the more ambitious twisting and rambling versions are best suited to the larger rustic gardens.

There is a wide range of materials available for path construction, perhaps the most popular of which is concrete. Concrete paths are quickly and simply constructed and, if a mixture of 2 parts small, washed ballast, 1 part builder's sand and 1 part best cement is used, a sound path can be constructed. The concrete should have a minimum depth of 2 inches and retaining boards will shape the sides of the path. If a level board is placed across these side-boards and moved to and fro down the length of the path, a reasonably level surface will result. It is advisable always to allow a slight camber on the path to shed excessive rain, especially if the garden is situated in one of the wetter parts of the country. If a crazy-paving effect is required, trace this out on the wet concrete with a trowel.

The less formal gardens are best served by that most popular material, crazy paving. Its beauty can be greatly enhanced if suitable small plants are grown in the crevices.

The two main methods of laying this material are in sand and in cement. Although sand is obviously the cheaper and quicker method of construction, cement as a bedding medium is to be preferred if a level, permanent path is required.

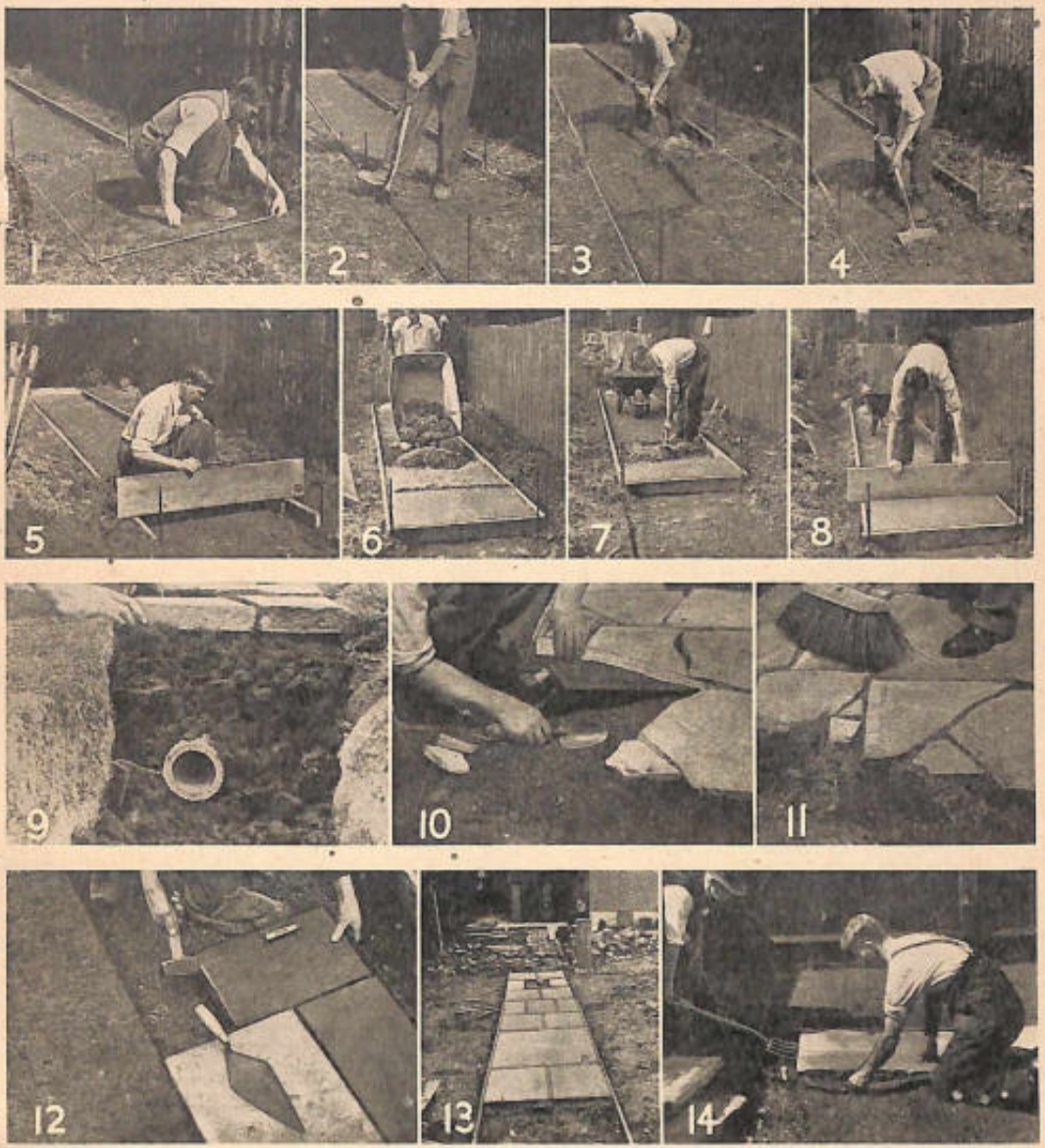
If you choose a sand base, see that it is at least 2 inches thick and raked level and well firmed before laying begins. Each stone *must* be laid individually, it is no use levelling off a piece of ground and placing the stones on this so that the area is covered; each slab must be well bedded into the sand and the crevices must be carefully packed as work proceeds. A short, wooden mallet will be found to be a valuable tool to tap the stones down.

When bedding down in concrete, a mixture of 3 parts builder's sand to 1 part best cement must be used – when mixed with the water it should have the consistency of stiff porridge. A layer of concrete to a depth of 1½ inches should be put down and the slabs placed in this. As work proceeds, concrete should be worked into the cracks. If suitable plants are to be grown in the path, then these cracks will not be filled in – in fact, they should be widened slightly and filled with a good compost.

Paths can also be made with cinders or shingle. A word of warning is necessary here. If shingle is used, it should be the type that clings together easily, and shingle from beaches should be avoided, as it does not bind together.

When using cinders or shingle it is important to have a good foundation of clinkers or brickbats. These should be well rolled in, but not sufficiently to bind the foundation too closely, otherwise you will find that when the finer surfacing cinders are rolled into place they will not 'bite' into this foundation.

The surfacing cinders or shingle should be raked level, and then rolled in. A minimum depth for these is 2 inches.



(1) *The path measured and pegged out.* (2) *Nicking down the edges.* (3) *Digging out the soil.* (4) *The loose 'crumbs' should be shovelled up.* (5) *Levelling by means of a spirit-level and level-board.* (6) *Tipping the cement in.* (7) *Working in the cement.* (8) *Obtaining a level surface by drawing a level-board along the top.* (9) *A drain under a path.* (10) *Laying down crazy-paving.* (11) *Filling up the cracks with loose soil.* (12) *Stone slabs make an effective path.* (13) *The slabs bonded with cement.* (14) *Make sure that slabs are well seated in their foundation material.*

16. HOW TO MAKE A POOL

THERE are several very important points to be considered before any attempt is made to construct a garden pool. As the pool will obviously be a permanent and an attractive feature of the garden, a little thought must be given to the all-important questions of location, design and construction.

Perhaps the most important question is – 'Where shall we put it?' The ideal position is right out in the open, away from too much shade and the danger of falling leaves. The majority of the aquatics require plenty of sunshine, and this open position is important. Make sure, also, that the pool water cannot be contaminated by infiltration of polluted surface water from either drains or other overflows. The pool will also have to be filled with water on completion, so make sure that it is placed as conveniently close to the water-supply as possible.

The location having been decided upon, the next step is to decide upon the design. The number of possible arrangements is considerable, ranging from simple forms to the more ambitious schemes of large size and complicated outlines. I would suggest that the gardener curbs his natural enthusiasm and sets out to design a simple pool for his first attempt.

The informal type of pool is more suited to gardens having rockeries, crazy-paving paths and irregular stretches of lawn. It can sometimes be worked into a conventional type of garden, where it provides a pleasing contrast. The formal type of pool harmonises better in gardens which are bedded in a conventional design. A formal pool in unconventional surroundings creates a sense of artificiality.

While it is possible to construct sunken or raised pools, the former type is the better, as it has added strength, owing to its concrete walls being completely supported by the soil. Sunken pools have the added advantage of a more equable water temperature, and this is a very important point to bear in mind if the pool is to be stocked with the more tender plants and fish.

The outline or shape of the pool must be considered next. Keep this as simple as possible. A saucer-shaped type is both easy to construct and of pleasing appearance, whilst square or oblong shapes present few problems. Avoid a very irregular outline, as this will increase the constructional difficulties.

When considering the depth of the pool, the gardener must decide beforehand exactly what types of plant he is going to use, as aquatics require varying depths of water. While the pool can be of various depths to accommodate these plants, it can also have a deep central area with a shallow trough surrounding it.

When all the above points have been decided upon, the outline of the pool can be marked out by means of pegs or stout labels, spaced 1–2 feet apart, preparatory to excavation.

Construction (*pictures opposite*)

Concrete is the best material to use in construction, and the gardener must realise that unless it is mixed thoroughly and in the correct proportions, good results cannot be obtained. The proportions should be: 1 bucket of cement; 2 buckets of sand; 3 buckets of shingle. If mixed ballast is being used, the proportions should be as follows: 1 bucket of cement; 4 buckets of mixed ballast.

Mix all the ingredients in a dry state to begin with, so that they will be completely and thoroughly mixed, afterwards adding the water gradually, mixing at the same time. The completed mixture should be of the consistency of thick porridge.

The base of the pool should have a minimum thickness of 4 inches of concrete – larger pools require 6 inches. The base is formed by throwing shovelfuls of concrete into the pool, working it level with a plank, used on edge, or else a large flat trowel. Complete the bottom of the pool first, and then build up the sides. As these should be sloping, the concrete can be laid on in the same way as for the base, the thickness being the same. It is advisable to retain a fair thickness

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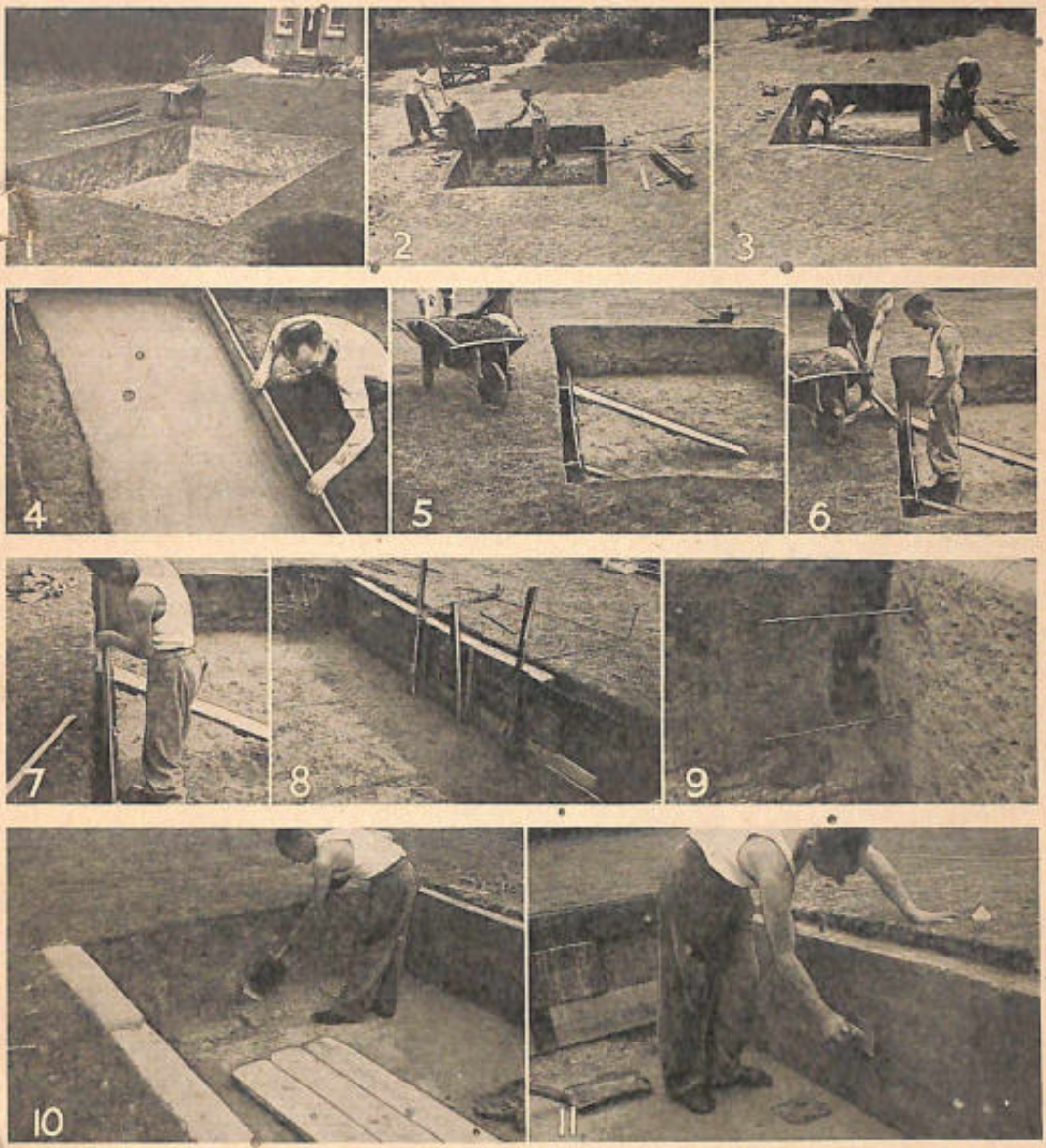


(1) *The site of the pool excavated.* (2) *Cement for the base of the pool tipped in in barrowloads prior to spreading.* (3) *The concrete well firmed as it is spread.* (4) *A good even surface formed by a level-board.* (5) *Wooden shuttering should be erected for the sides of the pool and* (6) *the cement poured in.* (7) *The cement should be consolidated with a rammer.* (8) *A method of retaining the shuttering.* (9) *Reinforcing the corners.* (10) *Before forming the sides with cement, make quite sure that the soil is evenly pared off.* (11) *A final surfacing and rendering.*

of concrete at the rim of the pool, as this is the place where excessive wear is experienced, particularly as people seem to have a habit of standing right on the very edge!

A second application of finer concrete to a depth of 1 inch is recommended to finish off with, and it is advisable to leave the original concrete surface a little rough, so that this 'surface' can adhere to it better. Mix this concrete in the following proportions – 1 part cement to 3 parts builder's sand, to which should be added a proprietary waterproofing agent, used according to the manufacturer's instructions.

It is preferable to choose a mild, damp period when laying the concrete, as in very hot weather it tends to dry out far too quickly, resulting in cracking. Under no circumstances should this work be undertaken during frosty weather.

The concrete should be allowed to set thoroughly, and at least a week should be allowed for this purpose. The pool should then be filled and emptied once or twice before attempting to stock it with plants and fish. This not only tests for watertightness, but also cleans out any impurities that may have been contained in the concrete. The water can be cleaned chemically by adding phosphoric acid until it turns blue litmus paper pink. This application will require renewing from time to time, and more acid must be added daily until the pink litmus paper remains pink for at least 24 hours.

Another method is to use enough permanganate of potash to colour the water a wine-red colour. After three days, the pool can be emptied and planted.

Very successful pools can be constructed from bricks or stone slabs. These should be built up carefully to form the floor and sides – the most important point being to see that the joints are properly concreted. The concrete must be allowed to dry out *thoroughly* before a final rendering of concrete is given all over the surface to a depth of 1 inch.

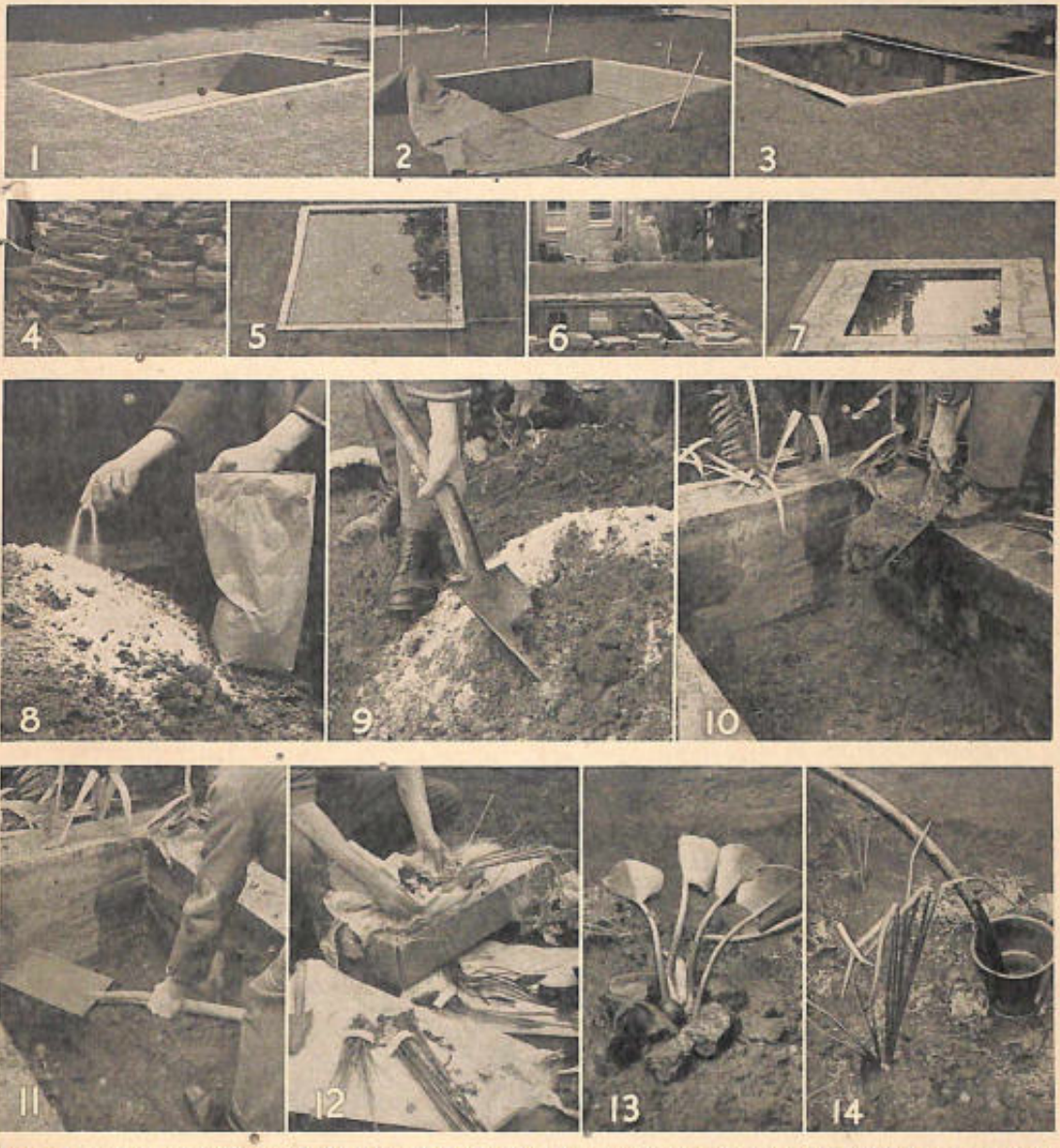
A big saving in cement is made by the use of bricks or stone slabs, and, consequently, the cost is kept down to a minimum. Some very successful pools have been constructed with old paving-stones which are very strong and thick, but which need careful concreting together, especially on the sides of the pool, asthe paving-stones are very heavy.

Those of you who, for some reason or other, do not like the idea of concreting, can still have a pool in the garden by purchasing one of the new light-alloy ready-made pools which need only a small area of soil excavating so that they are seated firmly in the ground, and they are then ready for furnishing with plants, water and fish.

Planting (*pictures opposite*)

It is quite obvious that many of the aquatics used for stocking the pool will require some form of anchoring material in which they can grow. This is best supplied in the form of a fairly heavy, rich loam. Mud from the bottoms of ponds and streams should be avoided. A good mixture can be made up as follows – 1 part cow manure to 6 parts good turfy loam. In place of the manure, a 5-inch pot of bonemeal can be spread on every barrowload of loam. Do *not* use horse or pig manure.

Always plant firmly, and plants can be anchored with small stones round the base of the stems. Wire baskets can also be used in which the plants can be placed. Marginal plants must be planted in shallow water or in the small troughs round the side of the pool.



(1) *The pool is now completed.* (2) *Protection against inclement weather whilst the cement dries.* (3) *The pool receives its first filling with water.* (4) *The crazy-paving-stones ready for edging the pool.* (5) *The area of the paths marked out with pegs and lines.* (6) *A later stage in the construction of the edging.* (7) *The completed job.* (8) *Bonemeal is being applied to the compost for the plants.* (9) *Turning the compost thoroughly.* (10) *Filling the base of a small pool.* (11) *Firming the compost.* (12) *The aquatics arrive from the nursery.* (13) *A plant anchored by small stones.* (14) *Water directed into a plant pot.*

17. HARVESTING AND STORING

Storing Vegetables (*pictures opposite*)

The vegetable season can be prolonged considerably by storing certain types of vegetable. The winter is always a lean period in the garden, and it is a wise gardener who provides for this by storing some of his crops. The crops which lend themselves to this method are the root crops.

Potatoes

These can be stored either in a clamp or else in bags in a frost-proof shed or cellar in the dark. Where only a few potatoes are grown, it is better to bag them up and place them on bricks or other suitable material, which will keep them off the floor. A careful watch should be kept for rats or mice, as they can cause a great deal of damage to the store. For preference, it is better to store the crops in a brick-built building with a concrete floor. During very severe weather it is wise to place some extra sacks or layers of straw over and under the sacks.

No matter what vegetable is being stored, it is essential that only healthy specimens are included. Damaged or decaying ones must be discarded, for they will only contaminate the others, with the result that, in time, the rest of the vegetables will be ruined. Vegetables for store, therefore, must be harvested with great care to avoid damage. All superfluous soil should be removed and the crops must not be thrown about or bruising will result. It is through these damaged areas that disease enters.

Where a large number of potatoes are grown and there is room in the garden, a clamp can be made. To construct this clamp, an area of soil should be excavated to a depth of 6 inches. The actual area depends largely on the quantity of potatoes to be clamped. Generally an area of about 4 feet square will be sufficient.

The excavated soil should be placed round the perimeter of the square, and when this is done the bottom of the clamp should be lined with clean, dry straw. The potatoes should then be carefully tipped into the clamp and, as the clamp is filled, arrange the potatoes so that they form gently sloping sides. Straw should then be packed round them to a depth of 6 inches.

An outer casing of soil 6 inches deep finally cases over the completed clamp. Before completing the clamp, some method of ventilation is required. This can be provided by inserting a funnel of straw into the top of the clamp. Give the straw a twist as it is inserted. This will prevent rain trickling down the straw and into the clamp. Where longer clamps are constructed, a funnel will be required every 6 feet.

Root Crops

The roots can be stored in sheds in dry sand or else in sacks, taking the same precautions as advised for the potatoes. They can also be stored in small clamps outside. These can be easily constructed in some convenient corner of the garden by first marking out the required area (in the form of a circle) with a piece of string and a stick. Selected roots should then be arranged in ever-diminishing circles so that a cone of vegetables is eventually formed. Between each layer, a layer of sharp sand or cinders should be sprinkled as the cone is built. A thin layer of straw can be placed round the roots before covering with 6 inches of soil. Again a few tufts of straw inserted in the top of the cone will provide sufficient ventilation. Parsnips can, of course, be left in the rows over winter and dug up as required. If they are clamped, however, it will always be possible to get some, even in the severest weather, while it will often be impossible to do so if they are left in the ground.

Onions

Onions must be lifted during dry, warm weather so that they can be left on top of the ground, when their skins will dry out thoroughly, and ripen. Superfluous soil must be removed and the onions stored in sacks or in boxes in a frost-proof place.

Onion ropes are a convenient way of storing onions. The method is to select a stout piece of

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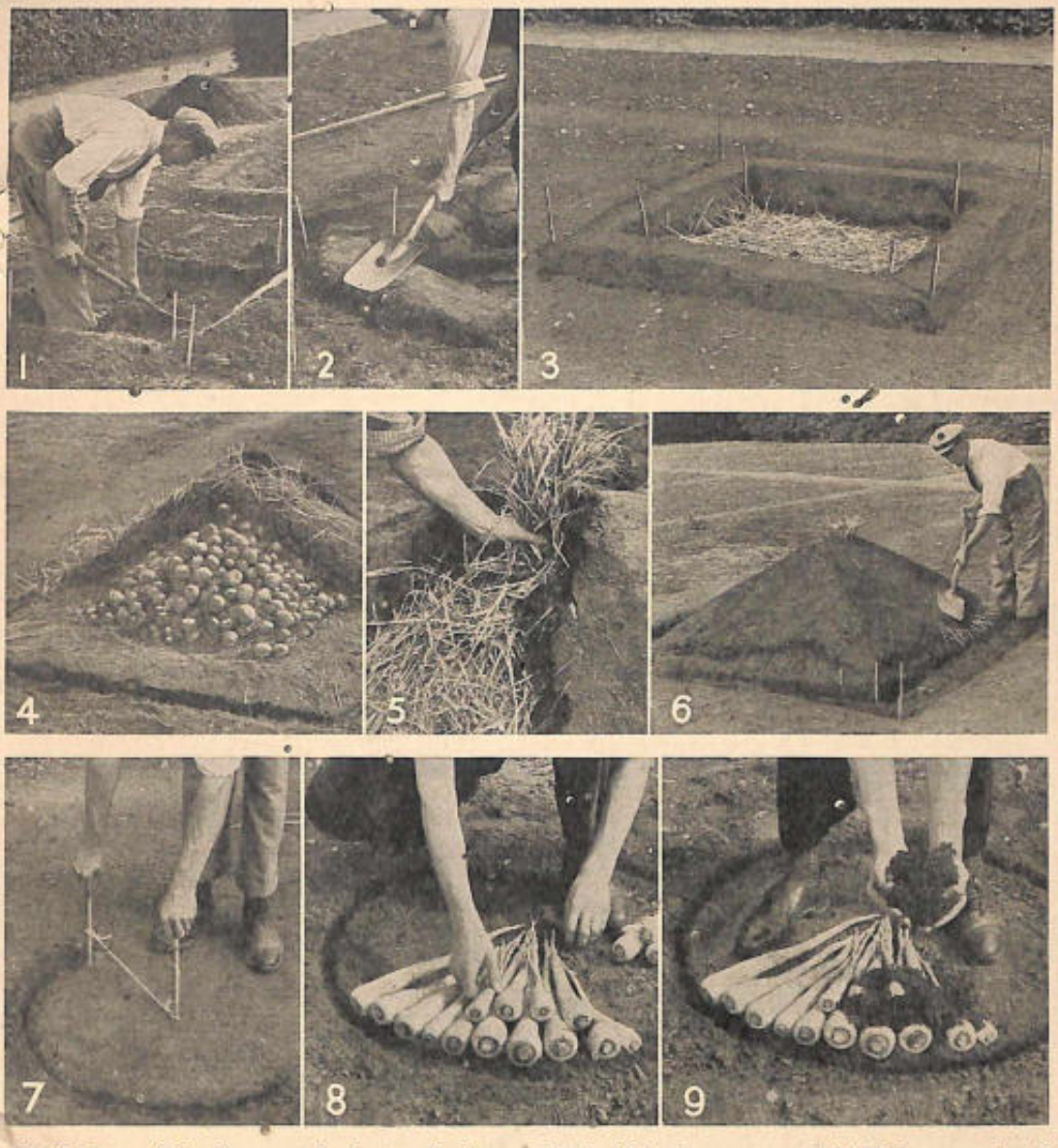


(1) *The base of the clamp marked out and soil to a depth of 6 inches excavated.* (2) *The excavated soil placed around the sides and firmed.* (3) *The bottom should be lined with clean, dry straw.* (4) *Potatoes in place, showing straw and earth covering.* (5) *Placing straw funnel in place.* (6) *The completed clamp with the sides being gently smoothed and firmed.* (7) *Marking out the area for the root-clamp.* (8) *The parsnips are now placed in position round the circle. As each layer is built up, the rows should be tapered towards the centre—thus forming a cone.* (9) *Covering with sharp cinders.*

rope and, starting from the bottom, the individual onions should be tied on with string by means of their 'necks' or the small dried-up tops. The completed ropes can then be hung up in a convenient place in the house. Ropes should not exceed 2 feet 6 inches in length, because they become too heavy and unmanageable beyond this length.

Storing Fruit (*pictures opposite*)

The principal fruits that are suitable for storing are apples and pears. The first essential is to pick the fruit at the right time and to handle it carefully. Ripe fruit should be 'lifted' off, not pulled off. When picking the fruit, the gardener should grade it as he picks. Unsound ones and those that are blemished in any way should be put on one side. No fruit should be picked when immature, as it shrivels and loses its flavour. The more tender the fruit, the more careful the handling should be.

The gardener should realise right from the start that ripe fruit is not an inert thing – it is living, and incorrect treatment in store will hasten decay. The store must be kept cool: 32 degrees F. for apples, and 40–45 degrees F. for pears. Moisture is also essential, for if the fruit gets too dry in store it will shrivel; if it gets too wet it will rot. The atmosphere of the store must be kept a little on the moist side.

The store must be clean, otherwise disease might affect the stored fruit. The fruit store, therefore, must be a clean, cool, dark, well-ventilated place through which a moist air can circulate freely and where no frost can penetrate. The fruits are bound to 'sweat' and for this reason the ventilators must be kept open to provide a free circulation of air. When this sweating process has finished, the ventilation must be reduced gradually. In dry weather it may be necessary to damp the floor to provide humidity.

The gardener will not be able to construct a special store for his fruit, but good use can be made of any weatherproof shed, outhouse, cellar or loft. See that the roof and walls are frost-proof and waterproof. Straw is a good insulating material. Where a shed is being used for storing purposes, it will be an advantage if it has an earthen floor which will keep just the right humidity.

Early varieties of fruit should be used first. Fruits should be wrapped in waxed paper (this can be bought) and either packed fairly tightly in boxes or placed on racks or on shelves.

There are, of course, certain fruits that are not suitable for storing, and, in fact, they should be 'picked and eaten off the tree'. These include most of the soft fruits such as strawberries, raspberries, red and white currants, blackcurrants, etc. Peaches, nectarines, cherries and plums are not suitable for storing. Their season can be extended by bottling many of them, and some can be dried. This side of gardening is best left to the housewife!

Flowers

The range is not so wide here, but nevertheless there are a few suitable subjects useful for drying purposes, like helichrysum, statice, physalis (Cape Gooseberry). Both statice and helichrysum should be cut for drying just before they are fully developed. It will be found advantageous if florist's wire is used to support the stems when cut.

(1) *When gathering fruit on tall trees, it is not always easy to reach some of the branches. The use of a walking-stick can help in cases like this.* (2) *Onee hooked round, the branch can be pulled towards you and* (3) *the fruit gathered easily.* (4) *This is the correct way to pick an apple* (5) *and a pear, with the thumb pressing on the stalk.* (6) *Do* not *pull the fruit like this.* (7) *Fruit should be stored in trays like this.* (8) *Periodical examination is necessary to remove the decaying specimens.* (9) *Fruit can also be wrapped in waxed paper and placed in the trays.*

18. CLOCHE MANAGEMENT

CLOCHE cultivation is a comparatively new form of gardening, having been introduced less than forty years ago, and thorough understanding of the principles of cloche gardening must be appreciated before any attempt is made to use them. Failure to understand these fundamentals is bound to lead to disheartening results.

Many types of cloche are manufactured today, but the basic styles are tents, barns and taller types for tomatoes, peas, chrysanthemums, etc. The gardener would be well advised to select those cloches having the minimum of wires or supports in their construction, for while there are many excellent cloches on the market, there are some that can only be described as contraptions!

Cloches have several practical advantages as follows:

1. *Mobility.* Whereas in the case of a greenhouse the crops have to be brought to the house, the cloche is taken to the crop, so that it is a simple matter to transfer protection from one crop to another.

2. *Watering.* Little or no watering is required, provided the beds are prepared correctly right from the start.

3. *Soil.* The soil retains its natural tilth and, as cloches are so mobile, there is no question of renewing soil, as fresh ground can be selected each year.

4. *Layout.* Rotations can be planned and sowings made with greater accuracy than can be done under ordinary conditions.

5. *Protection.* Cloches are ideal protection from birds and other similar nuisances. A great deal of protection is also offered from pests and diseases. One big advantage that is seldom realised is that protective sprayings and dustings will remain on the plants much longer and will consequently be more effective, as they are not washed off or diluted by rain, nor are they blown off by wind. It is also surprising what frost protection is offered by cloches, always provided, of course, that the foliage does not touch the glass. *Remember—cloches do not manufacture heat; they only conserve it.*

6. *Time-saving.* Crops can be sown or planted much earlier owing to the amount of protection afforded by the cloches. By covering ground beforehand, planting or sowing can be carried out despite adverse weather conditions, as the covered ground will be neither muddy nor frozen, whatever the prevailing conditions at that particular time. Crops can be harvested weeks in advance of ordinary outdoor crops. More crops can be taken from the same piece of ground if a simple cropping plan is conceived.

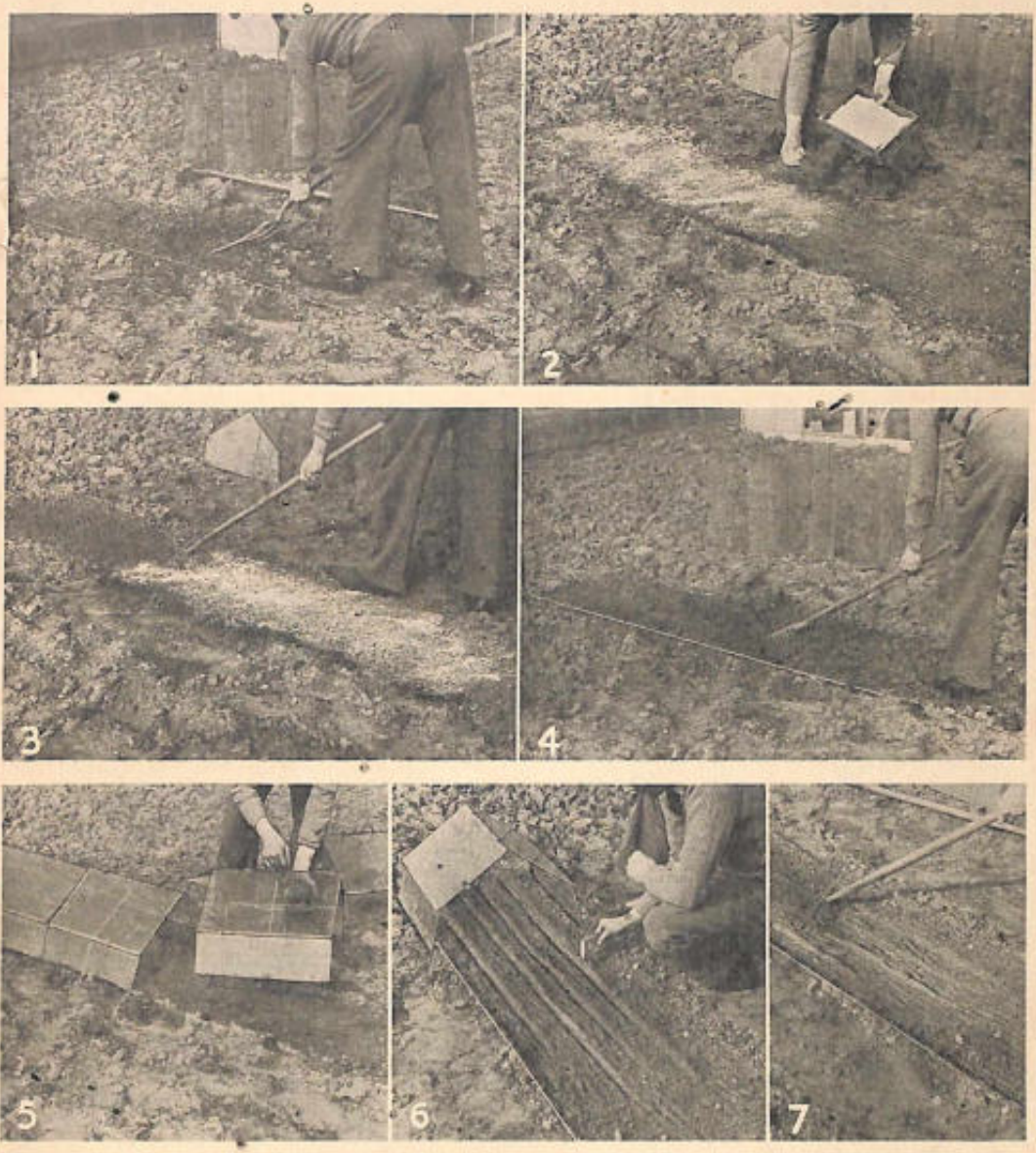
Cloches are not airtight; there is bound to be a gap along the ridge of the cloche, and when placed end to end in continuous rows it is not always possible to prevent small gaps in between. It is an advantage, however, to have these gaps, as they provide a small amount of ventilation, thus ensuring a steady circulation of air under the cloches. These gaps also permit the entry of small insects and bees, so that pollination is still effectively carried out.

Cloches must be used in *continuous* rows. Odd cloches scattered about the garden, protecting an odd plant or two, are a waste of material, and it is impossible to plan any form of crop rotation using this method. The only exception is in the case of seed-raising or rooting cuttings, when single cloches can be used as 'handlights'. There is one very important point to watch – all cloches, whether used in continuous rows or singly, must have their ends sealed by either pieces of glass or boards. If this is not done, the cloche rows will be turned into miniature 'wind-tunnels', for during windy weather the wind will blow down these rows with disastrous results to the plants underneath.

Ventilation and Hardening Off

During most of the year sufficient ventilation will be provided by the gaps in the ridges and junctions of the cloches, but during hot periods it will be necessary to increase it. This is accomplished either by spacing out the individual cloches gradually or else by means of the re-

(*continued on page 86*)



(1) *The site for the cloches should be broken down with the back of the fork.* (2) *A good general fertiliser should be applied and* (3) *well raked in.* (4) *It is essential to provide a fine tilth and even surface before placing the cloches in position. This ensures that the cloches fit together snugly.* (5) *The ground should be 'pre-warmed' before sowing by placing the cloches in position about 7 days beforehand.* (6) *A barn cloche can accommodate 4 rows of seedlings quite comfortably.* (7) *After sowing, the seed should be lightly covered by careful raking down the drills.*

movable glass roof-panel fitted to some types of cloche. An earlier remark about the necessity of purchasing rigid and simply constructed cloches will be appreciated here. It will not always be necessary to open all the roof panels of the cloches, every other cloche or one in five will suffice. For many crops, of course, the cloches will be removed entirely, thus allowing the crops to mature in the open.

Watering

This aspect of cloche cultivation always seems to cause a lot of argument. The gardener's natural impression will be that a great deal of watering will be necessary because the crops are covered by glass and therefore little rain can reach the plants 'themselves'. When he is further informed that little, if any watering is required, he will be even more puzzled, but this is so.

Perhaps if the method by which the rain reaches the plants when covered by cloches is explained in more detail, the gardener will readily appreciate the reason for several very important preliminary operations that are necessary before any attempt is made to sow or plant.

Rain falls on top of the cloche rows and trickles down the cloche roof-glass in the same manner as on a house roof. This moisture enters the soil where the glass touches the ground and penetrates not only downwards but sideways. As plant roots grow not only downwards but sideways, it will be realised that roots both inside and outside the cloches receive this moisture. Another interesting fact is that few cloches are more than 24 inches wide, so that, as water runs down the two halves of the cloche, the water is never more than 12 inches away from the crop underneath.

The amount of moisture penetration depends to a great extent on the type of soil and its cultivation. As moisture is all-important, it is necessary to conserve it as much as possible once it penetrates. Some form of material is required, therefore, that can hold and retain this moisture like a sponge, and this is provided in the form of humus, either well-rotted manure or peat, spent hops or compost.

Where this humus is not provided, poor results are obtained, and it will be readily appreciated that humus is the key to successful cloche cultivation.

Soil Preparation (*pictures opposite*)

The gardener should realise that, if carried out properly, cloche cultivation is an intensive form of gardening and makes heavy demands on the soil. This being the case, it is essential that the soil is supplied with plenty of plant food and moisture.

The preparation of the soil for various crops cannot be detailed in this chapter, and to attempt to generalise would be most unsatisfactory, since soils vary widely in their requirements.

It goes without saying that good drainage is essential and deep digging is the answer. Light soils should be made more retentive of moisture by the inclusion of plenty of humus, while heavier soils should be kept 'open' or lightened by the inclusion of humus. *The humus content of the soil is the key to successful cloche gardening.*

Seed Sowing (*pictures opposite*)

As already mentioned, cloches can be used to raise seeds, either as handlights or in continuous rows. Once again careful preparation will ensure excellent results. About a fortnight before the sowing dates, a start should be made on the final preparation of the seed bed. The top three or four inches of soil is the most important for germination and sufficient humus or organic material must be worked into this top layer to conserve soil moisture. Sifted compost is one of the best materials to use and horticultural peat is another valuable material. Use a bucketful of either material to the square yard and see that it is nicely moist. The surface soil should be brought to a fine tilth for sowing, and any stones, etc, should be removed.

Besides moisture, warmth is essential for germination, and the cloche or cloches should be placed over the prepared seed bed for about a week, when the soil will be warmed ready to receive the seed. It is amazing what a difference

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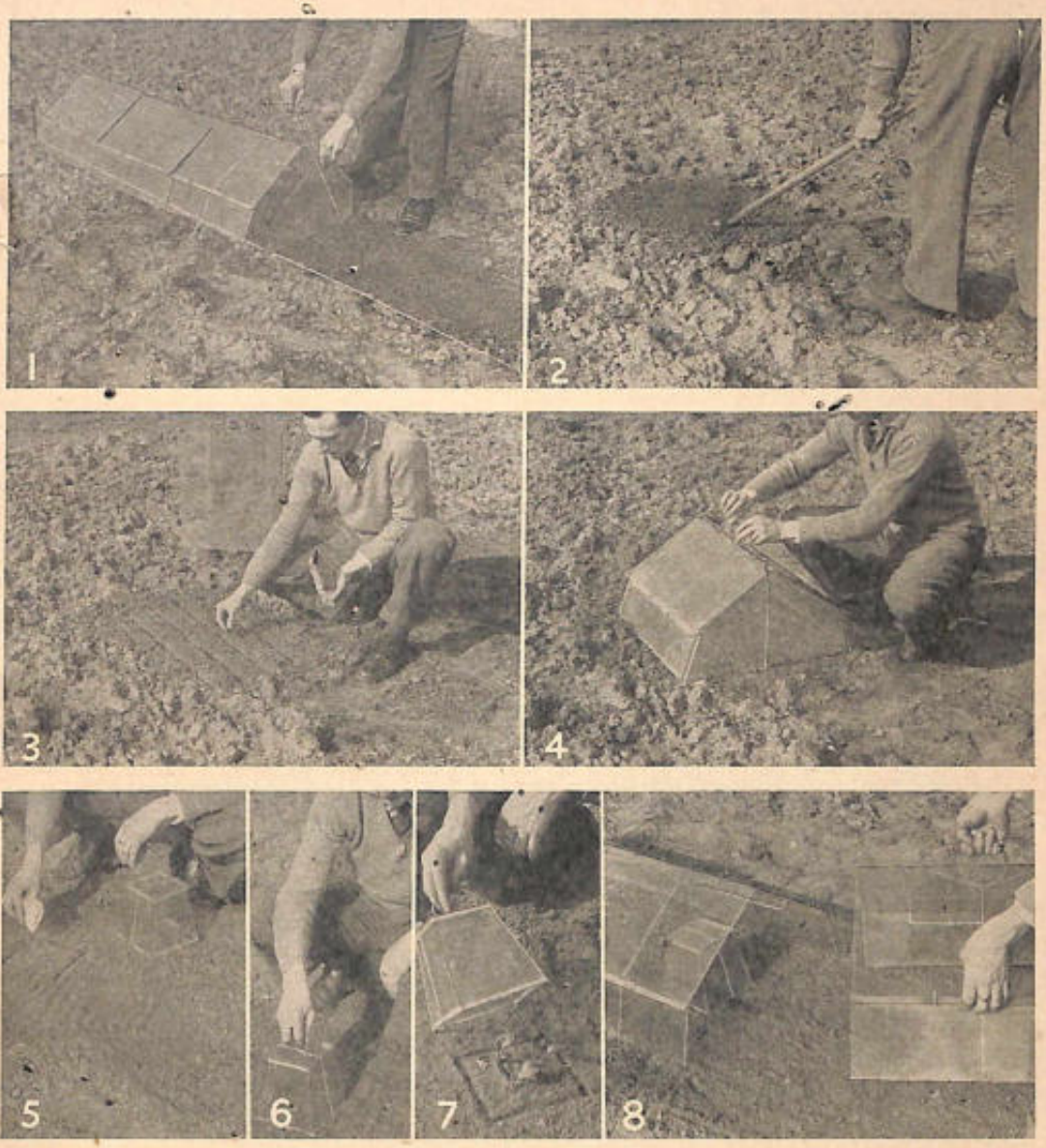


(1) *Close up the ends of the cloche rows with a sheet of glass to prevent air blowing through the cloches.* (2) *Cloches can be used as handlights. The ground should be raked level first.* (3) *The seed drills taken out and sown.* (4) *The completed handlight—note how the end glasses are kept in position.* (5) *Lantern cloches are invaluable and small quantities of seed can be sown as shown here.* (6) *The lantern cloche should be put over afterwards and* (7) *it will not be long before sturdy seedlings are produced.* (8) *Double protection can be given by placing large barn cloches over the lantern cloches.*

this 'pre-warming' has on both quickness and percentage of germination.

Seed should be spaced correctly under the cloches, and the following should serve as a guide – tents should have one row, barn types three, four or five, according to width. It is a good plan to mark the outside rows first, making sure that you have allowed for the growth of the seedlings so that they do not touch the glass later on. When the position of these outer rows has been decided, it is a simple matter to divide off the remaining space equally.

Sow thinly and cover by patting the soil down with the back of the rake. The cloches should be replaced immediately the seed bed has been sown – and do not forget to seal the ends of the cloches! The seed bed should not require any watering until germination has taken place.

When cloches are being used individually as handlights, the top 3 inches of the soil can be removed and replaced by a compost made up according to the John Innes formula.

Cloche Rotations

The gardener must not look upon his cloches as a means of protection for just one particular crop. They should be kept in use continuously, even through the winter. There is no need for cloches to be stacked away in some part of the garden at any particular time of the year. By careful planning a system of crop protection can be evolved, with the result that every square foot of the garden is brought into full productivity, with a consequent saving of time and labour.

The gardener will be aided in his cloche planning if he takes careful note of the following calculations. A square yard of ground should be allowed for every foot run of cloche row. As an example, a 30-foot run of cloches will require a piece of ground 30 feet long by 9 feet wide, i.e. 270 square feet, or 30 square yards. A common cloche width is 2 feet. Where two or more rows are being used, the cloches can be arranged in two lines close together, with a 2-foot-wide path between each double row.

The gardener will find it easier if he splits his crops into four main sections:

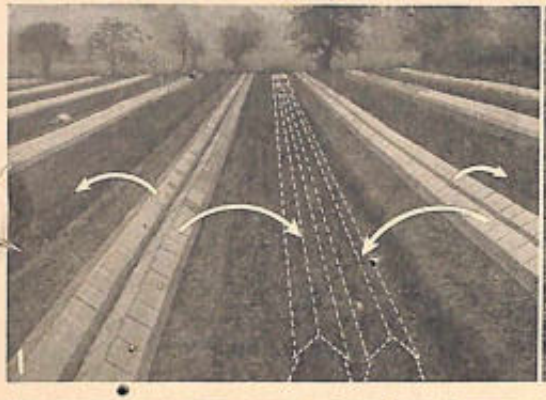
Section 1. Hardy crops occupying the cloches from autumn until early April, and those crops that will be cleared before the end of May or later.

Section 2. Late spring crops, including half-hardy crops which are cloched during April and May.

Section 3. Tender crops which are cloched during the summer.

Section 4. Autumn crops which are cloched during the last four months of the year.

Cloches are best used in strips, and this is where the term 'strip-cropping' is derived from. The cloches cover one crop and are moved over to an adjoining strip and eventually back to the former strip, which has been planted up again, or, in the case of an extensive system, on to a third or fourth strip. (*See illustration No. 1 opposite.*)









(1) *The principle of cloche movement or rotation is shown here.* (2) *Cabbage lettuce intercropped by a centre row of cos lettuce.* (3) *Spring greens protected from severe winter weather by large barn cloches.* (4) *Runner beans can be sown much earlier under cloches.* (5) *Marrow seedlings under cloches* (Chase photo). (6) *Larger cloches protect a good crop of tomatoes throughout the entire stages of their growth.* (7) *Tomatoes grown without cloche protection can be ripened off under barn cloches.* (8) *Cabbage lettuce ready for cutting.* (9) *Bulbs can be forced into growth much earlier.*

19. THE GARDEN FRAME

No garden or allotment should be without a frame of some description. Where there is a greenhouse, the frame is a very necessary accessory in order to complete the hardening-off process of the many plants that are raised in the greenhouse.

What are the main functions of a frame? These can easily and conveniently be divided into four main sections:

1. Raising seedlings.
2. Hardening off plants.
3. For growing a crop to maturity; especially during the summer months.
4. Giving winter protection.

Types of Frame

Frames can be portable or they can be permanent structures. The permanent frames are generally constructed of brick or concrete, while the portable types can be made of wood or metal.

The gardener must decide for himself what type he is going to use. The portable frames are very useful for placing over hotbeds or individual plants for winter protection, and they can also be purchased or made in separate sections and added to each other so as to extend the range.

There have been great strides made in the development of frames recently, and the gardener would be well advised to obtain a few leaflets describing the various types and to study these carefully before making a choice. Steel frames have a big advantage over the brick or wooden ones in that the cross-section of the material used in their construction is reduced to a minimum, thus permitting the maximum amount of light to penetrate, which is a vital factor, especially where young seedlings are concerned. Most of them have glass right down to floor-level, which is also advantageous. There are also many aluminium types on the market, and these have the advantages of not requiring painting and of being light and portable.

Brick and concrete frames are warmer than wooden and metal ones, which is an advantage, especially where the frame is unheated. The choice of site for these frames is very important, as they are obviously permanent affairs and cannot be easily moved once laid down.

Choice of Site

This is a most important point. The frame should not be placed where it is going to be in the way in the garden. It should be placed near the greenhouse and/or potting shed (if these are in the garden), so that the seedlings and plants can be put in the frames in the shortest possible time without exposing them to cold winds for too long during transit. Severe checks are often given through this!

A position should be selected that receives the full benefit of the sun and one that is sheltered from winds, otherwise many breakages will occur through lights being blown off. Frames should also be placed as near to the water supply as possible. Watering frames can be rather a tiring job, especially if a number of frames are employed, and to carry water any distance on top of this is far from sensible!

Not only must consideration be given to the frames when in use during the summer, but the winter must also be considered. In the depths of winter the soil round and between the frames will become sodden with rain or snow, and there is the ever-present danger of slipping and falling into the lights as well as having to work in very dirty conditions. It is always advisable, therefore, to have a good cinder, brick or concrete path surrounding the frames, when these difficulties will be avoided.

Room must also be allowed for the removal and leaning or placing of the frame-lights themselves when attending to plants, etc. It is never wise to confine a frame to a small plot of ground, unless, of course, only a small single frame is being used. This is perhaps where some of the modern metal frames score over the wood or brick types. The metal frame may either have the top light removed by pushing back a hinged

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(1) *Levelling ground before erecting frame. It is essential that the framework of the frame 'sits' well, so that the frame lights are not twisted.* (2) *A side and one end of the frame being fixed together. Note the use of the garden line to keep the woodwork straight during erection.* (3) *Placing frame lights on as a test for trueness.* (4) *Digging over the soil. During this digging, humus should be incorporated in the bottom of each trench.* (5) *Applying a base dressing.* (6) *Forking in the dressing lightly into the top 6 inches of soil.* (7) *A final tilth is achieved with the garden rake ready for seed sowing or planting-out operations*

light, which in turn can be supported by means of arms or rods, or it may have sliding glass panels.

The gardener should remember that single rows of frames all facing the same way should face south, while double rows (back to back) should run from north to south.

Construction

Wooden Frames. Any job worth doing is worth doing well, and the construction of frames from wood is no exception. Thin, flimsy material should not be considered, it may be all right in the summer, but in winter there will be very little protection from cold and frost. All wood used should be at least 1–1½ inches thick. Seasoned timber is best, and when constructed the frame should be given a good coating of a wood preservative such as the appropriate grade of Cuprinol (copper-naphthenate), *not* tar or creosote, as these will give off damaging fumes.

The length of the frame depends, of course, on the number of lights to be used and their size. Frame lights can be obtained in several sizes, although a standard light measures 6 feet by 4 feet, or 3 feet by 4 feet. The gardener would be well advised to purchase a smaller light than 6 feet by 4 feet, as these are extremely heavy and cannot be easily handled, especially single-handed.

The depth of the frame at the front should not be less than 9 inches and at the back not less than 2 feet 6 inches. A useful depth at the front is 1 foot and 2 feet 9 inches at the back. It is advisable for the frame light to sit inside the frame sides so that no draughts can penetrate. There is also less likelihood of the frame lights being blown off, but to make sure, tie the lights down securely.

Brick Frames. The first essential here is to provide a firm foundation for the brickwork. The area of the frame sides should be marked out with lines, and then a trench should be excavated to a depth of 1 foot and 10 inches wide. This should be filled with cement mixed with coarse rubble. When set firmly, the bricklaying should commence, keeping the sides perpendicular with a plumb-line. The height of the side wall at the back should be about 2 feet, and at the front 9 inches. Some difficulty may be experienced at the sides of the frame when shaping the angle of the top of the wall to conform with the angle of the light. It can be ascertained by placing a straight piece of wood across the front and back walls, and as the side walls are built up the top bricks will have to be cut to conform with the angle. If this proves too difficult, a layer of cement can be placed on top of the bricks and shaped to conform with the correct angle. Bricklaying should not be attempted in frosty weather. Hooks can be let into the brickwork at the sides so that ties of stout string or cord can be fastened round them and round the lights. This will prevent the lights being blown off during windy weather.

Concrete Frames. A word of warning is necessary here. Ample shuttering material must be available either in the form of wood or else as sheets of metal in order to form a mould into which the concrete is poured. These concrete frames can either be made as permanent affairs or else built as separate units and bolted together, thus making them portable.

As an example let us take a frame 4 feet long and 6 feet wide. Four moulds are required, two side pieces and one front and one back piece. The side pieces should measure 6 feet long and 2 feet high at the back and 1 foot at the front. The back panel should measure 4 feet long and 2 feet deep. The front panel should measure 4 feet long and 1 foot deep. Construction must be strong and thin concrete panels must be avoided. A minimum thickness of panel should be 3 inches. Added strength can be provided by inserting thin iron bars or fine-mesh netting into the concrete as it is poured into the mould.

The moulds should be well greased before the concrete is poured in and the casts left for two weeks to set properly. If a portable frame is required that can be bolted together, holes can be made in the sides and ends by fixing in dowels of wood, which are removed when the concrete has set. Bolts can then be pushed through and screwed up afterwards. Of course, great care must be exercised to see that these holes correspond.

(continued on page 94)

(1) *A handy way to make the drills is by pressing the handle of the rake or hoe into the soil of the frame.* (2) *Spacing out large seeds in the drills.* (3) *Covering the seeds with the rake—note gardener is standing on a plank to avoid trampling the soil.* (4) *Keeping the soil moistened.* (5) *Ventilation can be afforded by raising the lights slightly by means of bricks or pieces of wood in this fashion.* (6) *Mats or sacking can be placed in position to ward off frost. This protective covering must be removed first thing in the morning.* (7) *Young seedlings growing well.* (8) *Lettuce ready for cutting in a brick frame.*

Turf Frames. The virtues of turf as a building material are not appreciated as they should be. A well-built turf frame may confidently be expected to have a life of at least five years and can frequently be regarded for all practical purposes as permanent. Its principal advantages are that it costs nothing and is considerably warmer than either wood or brick. For a frame in which a moist atmosphere must be maintained, turf is the ideal material.

Two requirements are essential, good turf and a long period of construction.

Turf for frames should, ideally, be of the quality needed for making a good lawn. At the very least it should be free of perennial weeds and rank grasses, well-established, healthy and with plenty of fibrous roots. That from old permanent pasture on rather heavy, or even 'sticky' clay land is excellent. It is worth while 'nursing' a patch for a few months to bring it into condition before cutting.

Generally, the same rules apply for frame building as for lawn-making from turf. Frames should be built in the spring and allowed the summer to establish themselves, being brought into use in the autumn.

Turves should be cut not more than 2 inches thick and 12 inches by 16 inches outside dimensions. The longer side is the *width*; this allows 2 inches on either side for shaving down, to provide finally a 12-inch side-wall. The best tool for this job, if one can be borrowed, is a farmer's hay knife. The turves should be bonded, in the same way as bricks, as building proceeds. Each course should be levelled off with good soil, well beaten down with the back of the spade to eliminate gaps at the joints. The turves in the last few courses should taper in thickness to facilitate the making of the slope of the frame.

When building is complete, a 6-inch rebate is formed, with half-turves, on both sides and in front, against which the light should fit closely: this is best done with the light in position. Wooden strips may be let into the sides for the light to slide on, but with well-built walls they are rarely necessary.

Finally, the walls are shaved down, vertically inside and with a slight slope on the outside, and, for greater permanency, faced with turves placed vertically and held in position by means of sticks driven into the ground, until they have taken root.

Maintenance during the summer is directed towards ensuring that settlement of the walls (which is slight) is even, and encouraging a vigorous, weed-free covering of healthy grass. To this end, all the resources available for maintaining a lawn in good condition may be brought into play (*pictures opposite*).

Preparing Frames (*pictures on page 91*)

The first essential is to provide good drainage. On heavy ground it will pay the gardener to dig deeply and, if necessary, place some broken bricks and sharp cinders in the bottom of the trench. On lighter soils it will only be necessary to dig well and place some sharp cinders in the bottom of the trench. Plenty of humus must be incorporated in the soil, for this serves two very important functions:

1. To provide a good rooting medium for the young seedlings and other plants that may be put in the frame.

2. To provide a moisture-retaining substance so that the whole bed is as retentive of moisture as possible. This is particularly important where young seedlings are concerned and will also save a lot of watering.

The soil in the frame should be soil that has been well worked previously, for it is essential that a fine tilth can be obtained at any time for seed sowing. The frame should be filled to within a few inches of the top of the front board with soil, allowing sufficient room for the future development of the plants inside the frame without their touching the glass, for if the plants touch the glass during frosty weather, they will be badly damaged, if not killed.

Forming Hotbeds

A very useful and simple method of heating the frame is by using stable manure. Unfortunately it is not very easy to obtain these days, but where the gardener is fortunate enough to obtain a supply, it is well worth while constructing a

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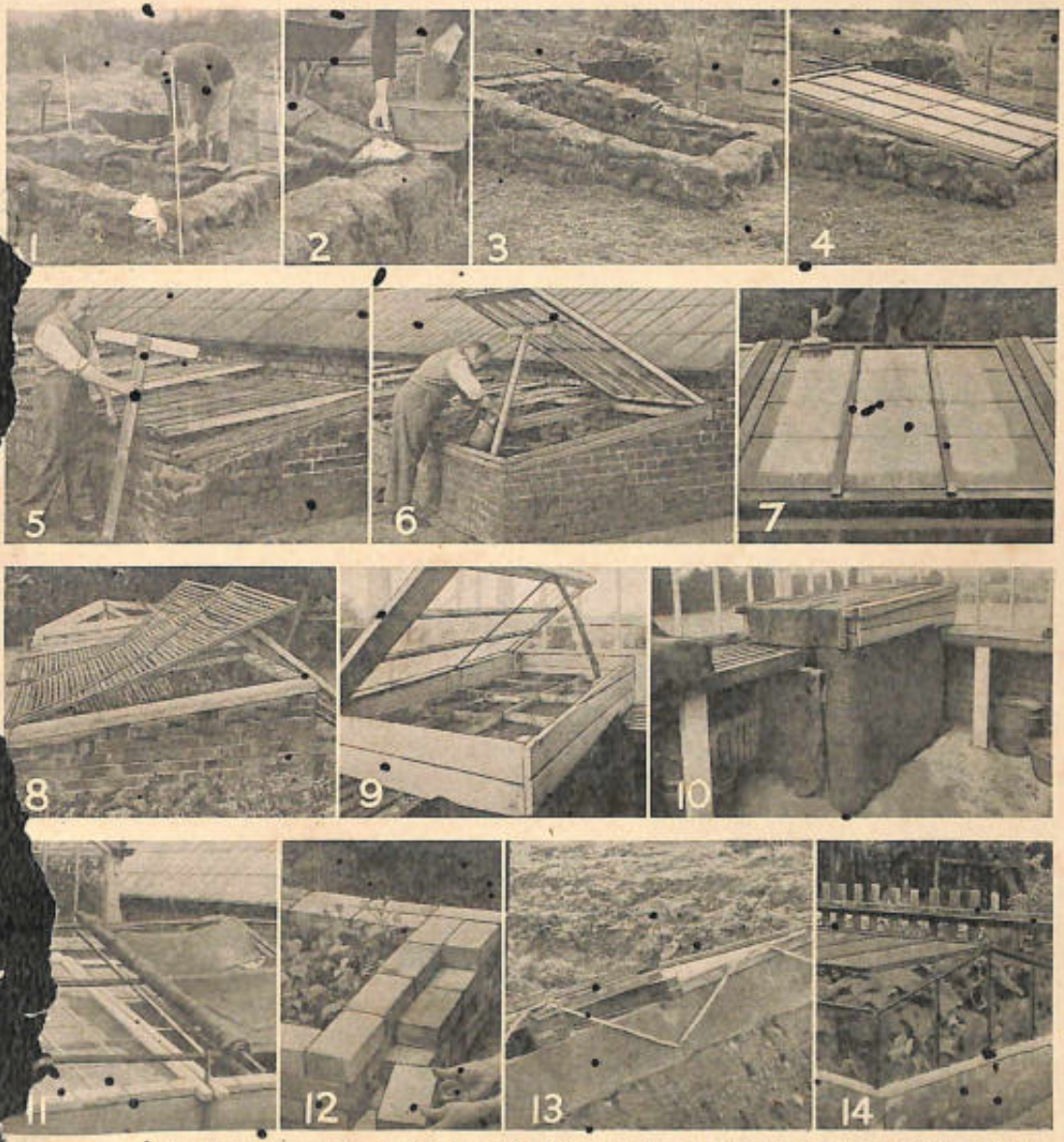

(1) *Frames made from turves laid grass-side down.* (2) *A dusting of lime between each layer will discourage insect pests.* (3) *The turf sides are completed and* (4) *the frame is ready.* (5 and 6) *A T-shaped piece of wood can be used to prop up a light when watering single-handed.* (7) *Shading with whitewash.* (8) *Thin-lattice-work will also provide shade.* (9) *A small propagating frame in a corner of the greenhouse.* (10) *A small stove placed underneath and surrounded with sacks.* (11) *Frost protection afforded by sacking.* (12) *Frames constructed with loose bricks.* (13) *Tie the lights down.* (14) *A modern metal frame.*

hotbed. *Fresh* manure should be used and old leaves should be mixed with it. These will decompose slowly with the manure and thus create a prolonged heating effect instead of a sudden flush of heat followed by coldness.

It is advisable to mix these materials with the manure as it is turned periodically. The final mixture is ready to use when the steam and rank smell have ceased to be noticeable and when a thermometer registers about 75–80 degrees F. when deeply inserted in the heap. No definite period can be given as to when the heap will reach this figure, as a great deal depends on how well it has been turned and also what types of material have been used in its construction.

When placing the hotbed in the frame, it must be remembered that it should exceed the limits of the frame by as much as 1 foot all round. The site should be marked out – remember that we can use only a portable frame for the hotbed – and 6-inch layers of manure should be placed on this and lightly trodden down. The heap should be built up to a minimum depth of 3 feet. The hotbed must be completed in one day, and as soon as it has been completed it should be covered with the frame. A further layer of manure must be placed inside the frame and then the sides of the heap should be covered with a 3- or 4-inch casing of soil or, alternatively, turves can be utilised to good effect.

As soon as the hotbed has settled, the frame soil can be placed inside, the depth varying according to the type of crop to be grown. For instance, only 3 inches would be required for radishes, while 10 inches would be necessary for lettuce, etc.

If permanent frames are being used, the soil should be dug out to a depth of 2 feet and the hotbed material should be placed in this. Soil is then replaced, filling up the interior of the frame to within a few inches of the top.

Frame Management

Ventilation. In this operation perhaps lies the secret of success with frames. The main thing is to avoid draughts. Ventilation must be the provision of a free circulation of air round the plants without blowing them right out of the frame. No hard-and-fast rules can be given, as the beginner will have to be guided by the weather prevailing at the time – and the weather is anything but predictable.

Sharp rises and falls in temperature must be avoided, and during really hot weather a little ventilation should be provided as early in the day as possible, increasing it as the day proceeds. Hardening off calls for special care in ventilation, and a gradual amount should be given, never too much at a time. The frame lights should always be tilted to the leeward side so that the wind cannot blow directly into the frames. Perhaps this is one drawback to the hinged lights, as some means of breaking the wind must be sought, such as strips of hessian.

Ventilating blocks are a necessity for frame lights, especially where a few are in use. These generally take the form of a stout block of wood cut into steps of varying depths. These are quite easily made. Remember, when ventilating during gusty weather, to make sure that the lights are tied or fastened down, otherwise losses will be experienced.

Watering. Here again no hard-and-fast rules can be given and a great deal depends on personal judgment, as already noted in the chapter on watering. Care should be taken, however, during the winter months, especially as the risk of mildew is so great then. Care should also be taken to see that the leaves are not more wet than is necessary.

Always ventilate after watering in winter to allow surplus water to escape – dry air is essential. When watering, it is advisable to use a fine rosed can.

Frost Protection. Some form of covering material is essential, so that it can be thrown over the frame lights when a severe frost threatens. It can take the form of mats, old sacks or hessian. Even loose straw is a useful medium.