Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

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DISCONTINUANCES.—Responsible subscribers will continue to receive this journal until we are notified by letter to discontinue, when all arrears must be paid.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not later than the 15th of the month.

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Garden Notes.

DAHLIAS.

These have long since finished their harvest of beauty and consequently are liable to be neglected. In the mixed border the tubers are frequently left in the ground, though this leads to deterioration and sometimes to the loss of the plant. Where not already done the tubers should be lifted, washed or shaken free of soil and stored in a dry place. Do not leave the labelling till another day, in the case of named varieties, for that day often does not arrive or comes too late to prevent a hopeless mix up. Do the marking at once.

DELPHINIUMS.

Delphiniums are also liable to be forgotten at this time of the year. Mark their positions quite plainly for they very much dislike having their roots cut or disturbed. Now or later the ground around them will want to be enriched for they are very hungry subjects. Before the young shoots appear put some fine but gritty coal ashes over the crowns or protect with zinc rings, otherwise the slugs will have an invitation to supper, which they will not neglect. At this time of the year they may be easily raised from seed. Sow in boxes or open seed beds, the former for preference. In either case they will want the protection of a pane of glass. If a frame is available so much the better. Get the best seed you can and use clean open friable soil for sowing on.

CHRYSANTHEMUMS.

Those who wish to grow fine chrysanthemums should not let this month pass, without preparing the beds in which their plants will ultimately flower. This is another of the heavy feeding brigade. It is not an easy matter to make the ground too rich. Though the plants will not perhaps be placed in these beds for many weeks they will benefit by this early preparation. For the first digging turn over the ground two spits deep, mixing a liberal amount of stable manure, which may be quite raw, with the lower spit and leaving the surface quite rough. Between this and planting out time dig over the bed two or three times, mixing another allowance of manure, older this time, with the final turn over. If artificial manure is preferred use coarse bone dust at the first digging and a fairly thick dusting of super and sulphate of potash afterwards, three of the former to one of the latter.

VERBENAS.

Those who have been disappointed with the results of growing Verbenas from cuttings or slips should adopt the very simple and satisfactory method of raising the plants from seed, which are best sown quite thinly in pots or square pans, which must be clean. The best mixture of soils is that composed of loam, leaf mould and sand, and for seed sowing of this kind equal parts of each should be first mixed, and then passed through a fine sieve to remove the rougher parts. The rough material that does not pass the sieve is of value for first covering the crocks to keep the drainage clear. Fill the pots with soil to within half an inch of the rim, and make firm and quite level before sowing. Give a thorough watering from a fine rose can to settle the soil, and an hour later sow the seeds thinly and cover lightly with fine soil. Verbenas may be had in the following colours separately:—White, blue, scarlet, purple, and others. The better way is to sow one pot or pan with one colour only. When the seedlings are large enough to take hold of with finger and thumb they may be transplanted into other pots or pans, and from these to the beds for flowering. If the seed pans are covered with brown paper little water will be required and the paper must be removed when the seedlings appear above the soil.

ASTERS.

It is exceedingly doubtful whether any other annual is so popular as the varieties of the so-called Aster that is known to the botanist as Callistephus, and there is no disputing the fact that, when well grown, the many beautiful varieties now on the market take a lot of beating, considered either from a garden or house decorative point of view. As with every other plant that we grow, good cultivation must exist from the beginning, and for the first batch of plants a sowing must soon be made. This first sowing should be made under glass, and where a hot-bed exists this is the best place to raise the seedlings. Secure some 4-inch deep boxes, bore or burn some holes in the bottom, and cover these with pieces of broken pots. The soil for sowing the seeds in must be of a rather light nature, one consisting of two parts good loam, and one part sand suiting admirably. Pass this through a quarter-inch mesh sieve, then place a layer of the rough material over the crocks in the bottom of the box and fill up with the fine soil. This, when pressed moderately firmly, should come to within three-quarters of an inch of the top of the box. All is now ready for the reception of the seeds, and these must be scattered thinly, half an inch apart being none too much. Cover with a quarter of an inch layer of fine soil, give a light finishing with clean sand, and press just tight enough to fix it with the bottom of a clean pot or pan. Give a good soaking through a fine rosed can, cover each box with a sheet of brown paper, and stand in the greenhouse or hot-bed frame.

PETUNIAS.

This month should see the sowing of some at least of the Petunia seed for planting in the open bed or border later on. There is hardly another plant to be named in preference to it, when all its many good points are considered. Get good seed, sow it carefully, give the seedlings a few weeks in a well prepared nursery bed and the Petunia will repay you generously. By careful sowing is meant thin sowing on nicely prepared pots or pans of leaf mould, sand and loam which have been well mixed. The seed will require very little covering, just a sifting of sand and powdery old cow manure. Then cover with shaded glass, till the seedlings appear. Petunias are certainly one of the things which like being trained in the way they should grow by frequent pinching back. Aim to have stocky, bushy plants. The long straggly stems one often sees rob the plant of half its beauty. Do not be in too great a hurry to get the young plants out in the open for they have many enemies, but otherwise are very hardy. Give them a well manured (not too fresh) well drained position with plenty of water and they will smile gaily through the hottest weather.

AQUILEGIAS.

More than twenty years ago two very handsome species or forms of Aquilegia were discovered in the Rocky Mountains, and immediately became very popular. These were A. caerulea and A. chrysantha, the former being blue and white and the latter yellow. Almost at once growers proceeded to cross these two species, a matter of the greatest ease amongst this class of plants. The result was a great variety of colours, combining the characteristics of the two parents, and producing flowers having various combinations of yellow, blue, purple, 'and bronzy purple. Ever since then they have frequently been crossed, either intentionally or by allowing the bees to do so in the field or garden where they were planted. There is nothing better for mixing with the flowers than their own foliage, which is of light and graceful character. The stems are also slender, the upper portion more especially, so that each flower is held gracefully above the foliage. This explains the popularity of this race of hybrid Aquilegias. They are equally suitable for garden decoration, or for cut flower purposes. In either case they are difficult to beat. A large bed or patch can readily be obtained by seed sowing, and when these come into bloom the cultivator can cut and come again.

ROSE GARDENIA.

As a button hole it is exquisite; a rich canary yellow, the outer petals lemon white and of a delightful shape. The buds are surrounded by two or three others in a smaller stage, which should be remembered when plucking if only coat flowers are required. Gardenia makes a good pillar Rose, with its great drooping branches. I like to see it best, writes an English gardener, lifted off the ground by some roots or other supports, and allowed to ramble at will. A three year old plant of this Rose would cover a space of 100 squre feet, the annual growths being of prodigious length. To maintain the quality of buds the old wood needs to be freely discarded each year.

DEALING WITH INFERIOR PLANTS.

It is disappointing to grow annuals, and especially perennials, from seed and when the flowering time comes to find that some of them are not altogether satis.actory in colour. Too often a novice does not dream of taking summary measures. Plants may be of a dull muddy hue, but he has grown them; they have been put into some space that required filling—and they are left to fill it. He would be aghast sometimes, at the suggestion to pull up such specimens and throw them on the rubbish heap. Yet if we would aim at beautiful gardens that must be the fate of them and fresh seed should be sown.

SURFACE STIRRING.

This is one of the routine operations of gardening, either in summer or winter, which must never be overlooked or neglected, as it aids one so materially on the road to success. In the generality of cases Dutch hoeing is the best form of cultivation, for at the same time as it opens up the surface it cuts down the weeds, but it is not always possible of adoption when plants are closely packed in the beds and borders and are making free growth. In this event the most useful tool is a planting fork attached to a long Ash handle. With this one can work in and among the plants without the remotest chance of doing injury, but it will of course, be necessary to do the weeding by hand. Such a tool as this comes in handy for several purposes and should always have a place in the set.

ROSE PRUNING.

In rose pruning, the rule is that strong growing plants require less severe cutting than weak-growing ones. As roses always flower on new wood, it is essential that to have good blooms the bushes must be pruned regularly. All weak growths, exhausted and worn-out wood, must be removed, retaining only the vigorous growths. It is generally advisable to always prune to four or five eyes or buds, so as to have subsequent strong growths, always pruning into the previous season's wood. Spindly growths, especially in the centres of the bushes, should be removed, the plants being trained with an open and angular habit.

PRESENT PLANTING.

Continue planting roses, deciduous trees, shrubs, and climbers; those with evergreen foliage may also be put in, but usually get away with a better start if left till the ground is a little warm. Having planted a tree or shrub do not consider that there is nothing further to be done. See to the staking if necessary. Give water, even if the work is being done on a wet day. Afterwards see that the soil around the plants does not cake and that weeds are given no opportunity of competing with and perhaps choking them. A little early training and rubbing out of unnecessary shoots may save some waste of energy. Plant firmly and trim the roots with a sharp knife if any are frayed or broken. One is almost ashamed to repeat this advice so often but a good beginning often makes a good ending and at least half the plants put in each year are doomed from the beginning.

WATTLES.

For a quick-growing, ornamental flowering native shrub, the Cootamundra wattle (Acacia Baileyana) cannot be surpassed; it attains a height of 15ft. or more, but may be kept lower by judicious pruning. In A. elata the foliage is handsome, the plant is a fast grower, and if allowed, will attain a height of 20ft. and upwards; its flowers are a pale yellow.

CUTTING HEDGES.

Most hedges may be cut with shears but with large leaved plants such as pittosporum undulatum, hollies and coprosma the best effect is obtained by using secateurs and trimming rather than shearing. By this method there will be no dead and dying leaves to make the hedge unsightly.

ABOUT LIME.

Where the soil is heavy or sour, or where sorrel is plentiful, the garden should be given a heavy dressing of fresh lime, giving a fair dusting all over the surface. Lime should not be used in conjunction with leaves, garden debris, leaf-mould, stable manure, or any other organic matter used for humus. These should be first disposed of by digging well into the soil; then shortly afterwards a top-dressing of lime may be given.

CLEARING UP.

In cleaning up the gardens, all light litter and dead foliage should either be dug in, or, better still, it should be placed in an out of the way corner to form a compost heap. Leafmould is especially useful in any garden, and where such plants as Azaleas, Rhododendrons, Liliums, etc., are grown, or for pot plant work, it is exceedingly valuable. In forming the compost heap, no medium whatever should be added to help the rotting down of the leaves, unless it be a little sand. Any chemical added will render the mould unsuitable for its special objects.

SPRING FLOWERING SHRUBS.

If the spring flowering shrubs should have not previously been pruned, they should be allowed to remain until after the next flowering. This especially applies to such plants as Spireas, Philadelphus (Mock Orange), Deutzia, and other early flowering shrubs. To prune these now would mean the certain loss of a great proportion of their flowers.

FRAGRANT CINNAMON FERN.

A correspondent of the American "Fern Bulletin" points out that Osmunda cinnamonea glandulosa is distinctly aromatic. If bruised early in the day it is of a spicy fragrance. The evidence appears to be against the suggestion that to this fragrance the Fern owes the origin of the name cinnamon. The editor observes that most glands on plants secrete a volatile oil and that nearly all such oils are odoriferous. A large number of these are what we call fragrant, but many are quite otherwise.

PRUNING SHRUBS.

In pruning, the shrubs may be well thinned out, especially removing any weak upright, or old flowering growths; keep the shrub always at an outward growth, inclining to a broad bushy type, instead of to an upright habit. By this means, the lower regions will always be furnished with good growth. Shrubs and trees of all descriptions should never be allowed to become too crowded; they require to be opened, so as to allow sunlight and air into the interior, where it is most needed. This is one means by which this class of plants may be kept healthy and free from disease. Very few shrubs resent pruning, and the majority of them, including Australian shrubs, such as Acacias, are very amenable to the pruning knife.

BANKSIA ROSES.

For covering a wall, trellis, or shady arbour, there are not many things to beat these beautiful roses. They like any amount of sun and will enjoy a north or western aspect which might prove too exposed for more tender varieties. They may be grown quite easily from cuttings of ripened wood put in now.

SPIREAS.

Although the individual blooms of the Spireas are of moderate size, they are produced in such numbers that a large plant has a beautiful appearance. They can be propagated from cuttings, but plants of some size can be obtained in a much shorter period by layering the branches. Of course, when a very large number are required it is necessary to be content with small twigs for cuttings, but in order to get large plants as quickly as possible, good sized branches may be layered in some fresh soil, which will be all the better for containing leaf mould and sand. The branches should be cut on the lower side in the same way as a Carnation, and this will hasten the emission of roots. The soil should be frequently watered if the weather should prove dry at the time of layering. Most of the varieties are white flowered, and as the flowers come somewhat in advance of the leaves, the white appearance of the myriads of flowers is seen to the best advantage, as they make a conspicuous object even when seen from a considerable distance. The pink flowered Spireas are less common, but quite as beautiful.

PENTSTEMONS.

Few flowers have been so greatly improved of recent years as has the pentstemon, which is now among the finest of our perennials. Many years of patient work has been put into perfecting this beautiful flower, for no haphazard methods could have produced the wonderfully fine strains which are now obtainable. The most beautiful colors and flowers of large size, combined with great hardiness, strong, sturdy growth, and long spikes of gorgeous bell-shaped flowers, makes it one of the most indispensable of garden flowers. It is equally good for indoor decoration. It is quite easily raised from seed or cuttings, which should be made from the young growth, about 3 or 4 inches in length. These may be set around the edge of fair-sized pots, or in open beds of nice free soil.

GLADIOLUS.

The gladiolus is another flower which has been improved almost out of knowledge. It is plantable almost all the year round, and if one has not already a good supply the present is a good time to procure them. They are easily raised from seed. For this purpose a kerosine box on its side will do well. First put in 3 in. of broken bricks, oyster shells, charcoal or other drainage, and on that a layer of seaweed to keep the soil from blocking the drainage; then fill to within 2 in. of the top with soil made of half sand and half loam. Water well, and let remain until the soil is crumbly. Plant the seeds an inch apart in rows two inches apart, and cover lightly. Sprinkle fine washed or spent horse manure an eighth of an inch on top; water gently, and keep moist. The plants should be put out in the garden after they have died down and rested, and the second season many will bloom.

WATER GARDENING.

The little water garden is easily formed by obtaining sound oil casks, sawing these in two, burning them out, so as to remove the oil, and sinking them in the soil. A hole should be dug of sufficient size to admit six of these half casks being sunk in it to such a depth that their rims are 6 inches to 1 ft. beneath the surrounding soil. This can then be gently sloped away with the spade, so as to leave the casks in an apparently natural depression in the ground. A foot of soil should be placed in the casks, and one of the best of the water lilies planted in each. The spaces between the plants may be filled with sandy peat, and in this water loving plants may be grown. The casks must be kept filled to the brim with water, which will keep the soil between the casks moist.

BEAUTIFUL RIVALS.

There may be doubts as to whether Lady Gay or Dorothy Perkins is the better. While the last-named is undoubtedly a splendid rose for making hedges, covering arches, pergolas, and pillars, Lady Gay may also be employed for the same purpose, and always has darker flowers. They quickly respond to cultural treatment, and even the first year after being planted make a fine lot of young shoots. Dorothy Perkins has paler flowers, even in its best condition, and during the first year, at least they soon lose color and become of a very faint or washed-out pink. It is the experience of some, however, the when fully established the color is better retained. No doubt both of these varieties would keep their color better in a situation not fully exposed to the sunshine during the whole of the day.

Lady Gay produces large bunches of bright cherry pink flowers that retain their color for weeks. The color lasts longer, however, in situations that are shaded somewhat. This shade may be produced by trees, but the latter should be at some distance from the roses to prevent the roots from getting into the bed and also to allow of plenty of diffuse light. A free play of air is also essential to most roses to get that texture in the foliage and flowers which is desirable and to properly ripen the wood.

The climbing stems which it makes during the year are slender, like those of R. wichuraiana, one of the Japanese parents of it. Their natural tendency would be to rise in a little arch and then spread on the ground, forming at first a carpet and then a bank of greater or less height by the addition of each year's young wood, provided it were left to its own resources. It is susceptibe of being trained, however, in any manner that may be desired, so that it can cover pillars, pergolas, arches, and so forth.

PAMPAS GRASS.

There ought to be money in growin pampas grass for its plumes, at least, we have read that over one million are grown in California for export each year. They are said to fetch about £40 per thousand plumes. This statement we take the liberty of seriously disbelieving, no doubt, 40 dollars is what is meant. Apart from its more or less vague financial possibilities, it is a noble grass which should find a home in every large garden. It is quite out of place, however, in the ordinary suburban flower patch.

WHY A COLOR SCHEME?

Several undoubted authorities on horticulture have laid down the law that for the correct border of herbaceous plants there must be a scheme of color. Thus Robinson, in his "English Flower Garden," devotes a chapter to this subject under the heading, "Color in the Flower Garden"—the pith of which is to advise the reader to start one end of the border with purples, lilacs, and whites merging gradually into yellow and orange, then to bring into play the various shades of red, and finally to terminate with blue, a somewhat dangerous color, and one to be relieved by dabs of white and yellow.

All very admirable, but why this grouping of hues in rainbow fashion. Surely not following the teaching of Nature, for how often one sees natural growth in direct contravention of this so-called color scheme. The theory that I advocate is that any flowers of any color look well together on a border, due regard being given to height and foliage. Perhaps this idea may seem crude, writes a correspondent to "The Gardening World." Some years ago in accordance with this theory of tints, we arranged a border, 50 yards long, averaging 5 yards in width, on this plan. Our expectations were great, and, let the confession be made at once, were not realised. There were exceptions, of course. But the general effect was considered disappointing; so, twelve months later, when laying out a second border of similar dimensions to the first, the color scheme was discarded, or at least adhered to only in isolated cases. The things, however, that we did pay special attention to were the heights and foliage of the plants. The borders have paths on either side, and though in a general way the tallest were grouped down the centre, great care was taken to arrange the heights naturally, and not to have all the small plants in front, many about 2½ ft. in growth being placed near the edge. The result, looking along the border, was a natural harmonising of the things, and passing up the paths hidden beauties and unexpected peeps were discovered. Then, with regard to the foliage, especial care was taken to well distribute plants of striking appearance, so that a monotony of the more ordinary type of leaf was avoided. Again, we were careful not to make the patches too large of plants whose appearance become unsightly after flowering.

Of these two borders the second was considered to have the more natural appearance, and more admired, so no color schemes for me.

PATHS.

This may not be such an interesting subject as many operations, yet it is a very necessary one, for if there is one thing that is absolutely required, it is a well-made path. Every bit of "laying out" that we may have to do demands the outline and partial completion of the paths first, both as a guide to work by and for convenience in carrying out other operations. There is no example in nature to guide us, paths being a design of man, for his convenience and comfort, on the same principle as roads and railways.

The inference to be drawn from this is that a direct line should be the aim, though we are not compelled to be geometrically correct, except on a terrace. On the other hand, an excess of curves is about the most inartistic, exasperating muddle to be found anywhere, especially when it traverses a level area.

Now, as to width. It is a question which will never be dicided, but "as broad as possible" is the very best advice that can be given. This holds good even in small gardens, where space is at a premium, as effective outline cannot be achieved by narrow tracks, and we should remember that much of the beauty and dignity of a garden is the result of ample and proportionate walks.

CLIMBING ROSES.

It always makes for a beautiful effect to have in the garden a few more climbing roses than the majority of gardens display. Where they are, as it were, a dominant feature, we get the eye carried to color in well massed stretches considerably above the eye-level, and that is always good. There are other things, too, besides the mass of color—the necessary supports, pillars, arches, etc., break up a dead level surface, and give that variety of height that is invaluable. Again, in the small garden climbing roses will give an area of brilliant color at the minimum of ground space.

Where it is at all possible roses should be planted by themselves, making a garden of roses of some portion of the garden however small. The climbing roses may sometimes be planted at the back of other roses with advantage, and trained to stout posts. Where we are dealing with a really small garden a series of arches down the length of the principal walk has a thorougly artistic effect, and if the arches are at sufficiently close intervals, and are of good substantial appearance, the pergola effect is attained at a distant view.

PROPERTIES OF WOOD ASHES.

Wood ashes contain all the mineral elements of plant food in varying quantities according to the trees which were burned. In other words, they contain potash, phosphorus, lime, magnesia, sulphur, and iron. The most valuable ingredient, however, is potash, and the younger the wood that is burned the richer the ashes would be in this ingredient. There is no absolute weight or quantity which may be applied, but very few gardens ever had the opportunity of being overdone with wood ashes.

ROSES ON BANKS.

For covering sloping banks in gardens many of our modern roses are, naturally, well adapted, and more particularly that comparatively new race of creeping or trailing roses—the wichuraianas. They can be planted either at the top of the slope or at the foot of it, in the one case to trail downwards, and in the other to be trained upwards and along the face of it. Very little training is necessary, as the growths extend themselves along the banks, rooting here and there as they go, like strawberries, and with very little guidance.

The number of plants necessary to cover any given space should be carefully considered, for much will depend upon the length and depth of the bank which they are required to cover. The tendency will be to plant to as many roses, forgetting that the young plants give no idea of their rambling capabilities when fully grown. The fact is these wichuraianas are among our most rampant growers, and consequently when inserted in good soil, and plenty of it, as they should be, they will cover a much larger surface than would at first appear possible. The best of this class of rose is that when not in flower the foliage alone makes a most attractive covering to any bank down or over which it is trained. When well established these roses will require comparatively little attention. In the spring the plants should be looked over, and some of the older branches cut out.

WEEDS.

Weeds are now getting ready for their annual attempt to take possession of the garden paths. There are many weed destroyers obtainable from seedsmen, and many homemade remedies may be recommended. A very common one is made by dissolving lb. of powdered arsenic in three gallons of cold water, which is brought to the boil, stirring the while, then add 2 lb. of crushed soda, and bring the mixture up to 10 gallons.

Apply with a fine rosed watering can, on a dry day, and see that none falls on the grass or other vegetation. Quite a moderate sprinkling will destroy the weeds. Crushed rock or other cheap salt is often used as a destructive agent, and carbolic acid at the rate of 2 oz. to each gallon of water is sometimes recommended

SWEET PEAS.

As the seedlings are growing much good will be done by stirring the soil between them twice a week, this allowing air to freely enter and permeate the soil, and at the same time destroying young weeds that are sure to appear. Thinning must be attended to early, leaving the plants 4 inches apart at first, and when they get three inches high pull out every other one, so that finally they stand 8 inches apart at the very least. For exhibition purposes twice this distance is none too much. As soon as tendrils appear twiggy sticks 12 inches or 15 inches high must be afforded the plants, leaving the main sticks until the plants have nearly reached the top of the smaller ones. This may seem double labor, but it is quite justified by results. If the tall sticks are placed in position at the outset the plants frequently become attenuated, and weak, but by using the smaller sticks first a sturdy healthy foundataion is secured.

(Continued on page 632).

Plants Under Glass and Shade.

— The Greenhouse. —

Bring in Azaleas, Camellias and advanced Cinerarias and Primulas from the frames and shadehouses, cleaning the foliage of the former well before staging them.

These with the aid of Clivias, Zonale Pelargoniums, etc., will help to make a display during the month.

Coleuses and Iresines may be kept alive through the winter where the greenhouse has a warm sunny aspect and great care is taken not to give too much water. The morning is the best time to apply water to pot plants during the winter, as it allows them to partially dry up by the return of the cold of evening.

Plenty of air should be admitted during fine weather, but the ventilators should be closed early in the afternoon so as to imprison as much of the sun's heat as possible.

If aphides or greenfly appear close up all apertures and fumigate with tobacco waste or tobacco paper, always bearing in mind that two weak doses are more likely than one strong one to destroy the aphides with the least injury to the plants. Sponge the dust from off the leaves of palms and other hardy foliage plants, using a little soft soap in tepid water.

— The Shadehouse. —

There is not much doing in this department at present. Most of the plants are at a standstill, and only a little cleaning up can be attempted. Beds may be roughly dug up, and the old fronds of ferns, and leaves of shrubs and climbers, gathered up and burnt at once.

Daphnes, Fuchsias, Violets, and Palms make a fair show.

Cinerarias, where frosts are few, may be hardened well in the shadehouse, but will require close watching to prevent the depredations of slugs, snails, etc.

Native Ferns will make a little growth, and when their natural habits are followed can be made to grow very prettily.

Sporelings should be saved, for though they may be the same as the parent Ferns, their constitutions are generally of a more robust nature.

— The Stovehouse. —

In the stovehouse the temperature must be maintained and should not fall below 60 deg. on the coldest night, as upon an even temperature much of the success in cultivating hothouse plants depends. When making up the fires at night always see that the firebars are scraped, and no choking by clinkers should be permitted.

Now that the hose is almost enticely laid aside, insects will increase in the stovehouse, and every attention should be paid to keeping them down. Scales are the most troublesome, as in most heated houses fully half a dozen species may be found. Resin wash is about the best destroyer, but care must be taken in testing various plants. The simplest method is to dip the plants into the solution, and then, after lying on one side to drain, they are stood away for a couple of days, then taken outside, when a small keen jet of water from the hose will remove all the scales quite easily. Red spiders are easily got under by painting liquid sulphur on to the hot flues as fumes are generated by the heat and the mites effectually destroyed.

Specimen plants should not be potted just now, unless it is a matter of compulsion; and great watchfulness should be exercised to prevent any plants standing under a drip from the rafters.

All plants which grow up from the centres—Palms, Pandanus, Dracaenas, etc., require constantly turning upside down during the winter, to prevent the lodgment of water within the leaf folds.

Coleus, Fittonias, Rex Begonias, etc., may be propagated from cuttings; and Impatiens, Hawkeri, and Sultani should be potted on, as they make excellent specimens in warm moist corners.

Cuttings should be rooted in sand of Alternantheras, Plectranthus, Iresines, for potting up and hardening in spring, prior to being used as bedding stuff.

Liquid manure can be given freely of a weak strength to most growing plants, and Cypripediums in bloom will be benefited by it.

Keep Poinsettias close to the light, and do not give very much water.

A pretty dwarf plant which should receive more attention by those owning a hothouse, is the bright blue Saintpaulia.

— Pits and Frames. —

Continue potting on Cinerarias and Calceolarias as the roots reach the sides of the pots. Keep them well watered, but try to strike the happy medium, and never sodden the pots.

Fumigate with tobacco when aphides first appear.

Show, Regal, Fancy, Bi-color, and Tri-color Pelargoniums should now be making good progress, and to keep them sturdy they must be kept close up to the glass, and occasional doses of liquid manure will benefit them, as well also a syringing overhead at intervals. Admit plenty of fresh air into the frames. Any Zonales which are coming into bloom should be taken into the greenhouse.

Cuttings may be made of Fuchsias, Pelargoniums, Hydrangeas, Verbenas, Carnations, Pentstemons, Marguerites, and perennial Calceolarias for successional plantings.

Any young seedlings which have been pricked out into pits to grow on a little before being removed to the open borders, should be kept free of weeds, and receive all the light possible.

A lady asked her gardener why the weeds always out-grew the flowers. "Madam," answered he, "the soil is mother of the weeds but only step-mother of the flowers.

Notes on Rose Planting.

Roses must have beds or places to themselves if finest quality blooms are wanted.

Start in the centre of the bed with the taller growing kinds, and graduate the others so that their heights shall slope towards the edge of the bed.

The beds should not be so wide that you must tread on them to gather blooms from the centre. Four feet wide is a good width, but some rosarians recommend five or five-and-a-half feet in which they plant only three rows of Roses, the tallest in the centre, and the others at 18ins. distant from that. This is a very good arrangement if you can afford the space for it.

As soon as you receive the plants unpack them at once. If the weather is wet and the ground is sticky do not plant, but heel them in. When the ground is right proceed to plant. Be careful not to break the roots and stems, disentangle any which are matted together, cut away from the roots with a sharp knife any bruised or injured portions, shorten roots which are over long especially such as go straight down, and cut away any suckers, and remove buds on the roots which will cause suckers. Do not plant too deeply. Do not cover the plants deeper than they were planted before. If stakes are required drive them in their places before you plant. Spread the roots out equally in all directions (seeing that none cross) in the hole prepared to receive them, then scatter fine soil amongst them. Lift the plant up and down a little to settle the soil amongst the fibres, then fill up the hole with fine soil and trample it so that it is firm. Then give them a good soaking, and later on fill in the hole with fine soil level with the surface.

Before planting see that the labels are secured on the plants. If the roots of Roses are dry when received, water them well. Do not allow the plants to remain uncovered whilst you are planting the one removed for that purpose as the wind (especially from the east), dries the sap out of them. Some people place the Roses in a mud puddle, but it mats the roots. If you cannot unpack the Roses immediately they will not hurt if left unpacked in an outhouse for a day, or even for a little longer. If for longer then lay them in.

Laying in means to lay the plants flat on the ground and bury them completely, roots and tops, six inches deep. Afterwards give them a good soaking with water, and at the end of three days they will be generally restored to their original growth. This is a good way to revive them if very wilted and dry after a long journey.

Making a Pond.

Clay is not absolutely essential in these matters, but on a shifting sandy bottom is very desirable, and generally proof against cracking. Concrete with cement surfacing, however, may be made strong enough for any purpose provided the bottom below the concrete bed is not swept or inundated by water in winter time. In such circumstances the strongest concrete, by virtue of its own dead weight and settling down, may crack. Hence the need of a body of adhesive soil, as, e.g., tempered clay, which remains uninfluenced by the water. Provision should be made for at least a 9-inch bottom of concrete, a good proportion being three of clean gravel to one of cement. The surfacing coat should consist of clean, well-washed sand and cement in equal proportions, and 1 inch in thickness for the bottom and lower sides, modifying the thickness as the surface or upper portion is reached. This should make a perfectly water-tight and reliable basin. If a finer or more finished surface is desired, finish the whole off with a thin skimming of neat cement.

There are few farmers, gardeners or householders generally, who have not experienced the annoying and expensive action of rust of their tanks, troughs, agricultural machinery, etc. Should you be one of these sufferers we would refer you to the advertisement appearing in this issue of "Plymel" rust proof enamel. The paint is not only absolutely impervious to moisture but will, to a certain extent, absorb the rust when painted on metal which is already corroded, and the fact that it is used almost exclusively on the W.A. Waterworks systems (which are, of course, among the largest in the world) is sufficient proof of the value of this unique composition. It is invaluable for covering damp walls and when dry may be calcomined or covered with "King's Compo" without discolouration or rubbing off. The manufacturers have now established a factory in Sydney, so that, escaping import duties, Plymel can, profitably, be sold at very reasonable prices. Messrs. King & Co., of Marlborough Chambers, Waymouth St., are the agents to S.A. and Broken Hill.

(Continued from page 629).

FERNS.

The propagation of ferns is a pleasing and very interesting operation. The spores, or sporules, the reproductive bodies of ferns, are quite different to other ordinary seeds; they are composed of cells, and the embryo is absent; usually they are formed on the underside of the fronds. Some, however, like the osmunda, are borne on spikes.

To gather the spores in readiness for sowing, select the ripe fronds on which the spores have formed and place them in a box, with a sheet of paper at the bottom, to catch the spores as they fall, or become detached from the fronds, after which they are ready for sowing.

To sow by a good and simple method, procure a six-inch pot, half fill it with crocks, so as to ensure good drainage, spread over this a little moss, and fill up to within half an inch of the rim with fibrous peat, finely sifted, and some clean silver-sand. The surface afterwards should be pressed firm and moistened, and the spores evenly distributed over it and slightly covered with some very fine soil, after which the pot should be placed in a saucer containing water and covered with glass to stay evaporation. An occasional spray of water should be given on the surface, empty, but shading from the sun is never allowing the saucer to become essential to success. In about nine weeks the spores will start into life, and form little pretty green dots, which grow into beautiful fronds. At this stage ventilation is needed, afterwards pricking them out into boxes or pans as soon as they are large enough to handle.

Another simple method for the propagation of spores, while they are still fast on the fronds, is to procure a rectangular tray; in the centre place two soft bricks close together, or some other very porous material. On the surface of this, press firmly half an inch of fine soil, lay the frond on this, spores downwards, and just merely cover over with some fine sandy soil pressed firm. See that the tray always contains sufficient water to thoroughly saturate the bricks, and keep in a shaded place in the greenhouse or frame, with a little attention to damping overhead every few days; the resultant reward will be success to the enthusiast.

SNAPDRAGONS.

To obtain the best results from these plants very rich soil is not advisable, the tendency in such being to make gross growth at the expense of flowers. Soil that was well manured for a crop last year is best, and if a quantity of old mortar can be incorporated with it so much the better. The Snapdragon, however, is not at all fastidious as to soil. One foot apart is a good distance to plant, taking care to retain the ball of soil and roots as intact as possible. The Tom Thumb varieties, owing to their compact habit, are useful but not so graceful as the taller varieties, and are not so extensively grown now as they were some years ago, the more graceful taller varieties being most favoured.

Beds of one colour in each are very effective, hence it may be well to name a few of the best varieties. Crimson King is one of the best. As its name implies, the flowers are of a brilliant velvety crimson, the leaves being deep green on the upper surfaces and dull crimson beneath. White Queen, a pure white variety, and Yellow Queen, a clear yellow, are two other splendid varieties. The habit of the three named above is very similar. Cottage Maid is a good variety. The colour of the flowers is a mixture ol pale rose and white. Golden Chamois and Carmine Pink are also excellent varieties in the tall section, the colours being explained by their names.

Antirrhinums are not annuals and of course take longer to mature and produce flowers than do annuals. Very beautiful colours have been evolved during recent years. Self tones makes a more effective display than do particoloured flowers, though this is largely a matter of individual preference.

There is a use for Antirrhinums that shows them off to their full value and beauty, and that is to use them in a well-planned bold rockery. They delight in a warm, well-drained position such as this should afford, and often flower best when in a soil that is 'not over rich. They will often seed themselves and spring up between the closely laid rocky slabs, or ledges, anywhere it would seem where they can figure picturesquely, for they have a charm, a beauty, an independence that hand planted specimens never achieve, try as we may, we cannot imitate this subtle and almost indefinable beauty of placing.

Propagating Fibrous-Rooted Begonias.

This class of Begonias is perhaps not so well known as the tuberous rooted type, but is almost equally beautiful. Individually the flowers look quite small by the side of the best tuberous varieties, but this is more than recompensed by there being twelve to twenty times the number of flowers on a plant.

They can be propagated by cuttings of new growth. The making of the cuttings requires a little explanation. The base of the cutting must be a node (the point from which the leaves grow on the stem) or it may have a slight heel by cutting off a very small portion of the older stem from which it is growing. Sand is a suitable medium for rooting the cuttings, or light sandy soil may be used. Pots that will hold four or five cuttings, or shallow wooden boxes may be used. The cuttings root readily in a warm frame or hand-light.

In about a month from the time of inserting the cuttings they will be ready for potting off singly in small pots, or if large potfuls are desired three cuttings may be placed in a 4-inch pot. Use soil composed of equal parts loam and leaf mould, adding plenty of sand. Peat is not essential for fibrous-rooted Begonias, but if available it will be beneficial to use a little with the potting soil. Return the newly-potted plants to the frame or hand-light for a week, letting a little air in, which may be increased each day. A slight spraying with a syringe or fine rose water pot will be helpful, and slight shading from bright sunlight will be necessary.

How to Prepare a Lawn.

There is nothing more restful and refreshing for tired eyes than a well-kept grass plot, no matter what its size may be, and nothing provides a better setting for the highly-colored flowers of many kinds that abound in most gardens.

— Preparing the Soil. —

As in every other gardening operation, a good beginning is absolutely essential if success is to crown our efforts, and it is quite useless to sow or plant a lawn on soil that has only been prepared in a haphazard manner. Artificial draining is not often required, but if it is needed it must be done before anything else is seen to. Levelling will be the next task, and this needs a certain amount of care so as to ensure as nearly as possible an equal depth of good soil over the surface. This good soil ought not to be less than 9 inches in depth all over the plot; twice as much is better. If the soil is very heavy or sticky it will be necessary to add such substances as road scrapings, leaf-soil, burnt earth or garden refuse, or well-decayed old manure, so as to render it more friable.

— Levelling. —

Levelling should be carefully done and is best accomplished with a spirit level, a piece of straight edge, and a number of pegs. Drive the first peg into the ground until it shows the exact height you wish, and work from this. After levelling thoroughly, dig the soil, taking care to remove the roots of any perennial weeds that may be present. Many opinions exist as to the wisdom of manuring soil for lawns, but as in most other things this will be ruled by local circumstances. It is certainly preferable to secure a site that was manured well for some other crop previously, but where the ground needs manure, this may be incorporated when digging, taking care to use short material only and see that it is evenly distributed.

Digging finished, the ground must be allowed to settle for a few weeks. By this time, if much levelling was needed at the outset, some parts of the plot will have settled down more than others, and additional levelling will be necessary. Select a day when the soil will not cling to the boots for this work, and after levelling, tread the whole of the bed so as to make it firm but not hard. When this is finished the surface in general should be quite level, and a raking with a coarse-toothed rake is all that will be needed before sowing.

— Sowing the Seeds. —

A still day must be selected for sowing, and it is imperative to scatter the seeds evenly over the surface. Some sowers prefer to go over the plot twice, using half the quanitiy of seed each time, working across the first course taken. After sowing, give the bed a raking over to cover the seeds and then roll it with a light roller, doing this in two directions so as to ensure every portion being rolled.

— After Treatment. —

The young plants will usually present themselves in three or four weeks, and growth will subsequently be fairly rapid. If the weather is dry copious waterings will be needed or the young plants will quickly perish. The first mowing should be given when the young grass is about three inches high, and this operation needs a good amount of care. A sharp scythe is usually better than a mowing machine, but the latter may be successfully employed providing the knives and blades are perfectly adjusted so that the cutting is clean. Close cutting must not be performed, it only being necessary to remove the tops of the plants. Throughout the summer light rollings and mowings will be necessary, and waterings must be attended to.

The Strawberry Tree.

(Arbutus Unedo).

In this shrub flowers are somewhat like those of the Lily of the Valley, but rather longer and not so white. Some varieties have their flowers tinted red, especially the variety A.U. rubra. The leaves are not unlike those of the Sweet Bay or true Laurel, being leathery, dark green and glossy.

The fruits are produced in bunches, and are very rongh on the surface of the berry, which turns red, reminding one of a Strawberry or Raspberry, hence the popular name, Strawberry Tree. The rough surface and the colour also closely resemble the fruit of the Strawberry-Raspberry, although in this case the berried fruits are not quite so large.

The specific name, Unedo, means "I eat one," in allusion to the tempting appearance of the fruit, which would induce one to eat them, but feel satisfied with one. Although not very agreeable to the ordinary palate in the raw state, it may also be used in tarts, and for preserving, when its agreeable acid flavour proves different from other fruits we have, and might be used for that purpose. Occasionally one may get cooked fruits of this tree in London restaurants. As an ornamental shrub, however, every garden of any size should have a specimen or two planted.—Exchange.

Azaleas After Flowering.

These plants are apt to be neglected after flowering, others coming into flower and needing room. This must not be done if plenty of healthy foliage and flowers are expected the following season. When flowering is over the seed-pods should be picked off carefully, cutting back any shoots that spoil the symmetry of the plants. They will soon begin to make their growth, when if any require potting into larger pots it should be done then. Do not give a too large shift, and pot very firmly. The pots used should be quite dry and clean, and see that they are carefully drained with from 1 inch to 2 inches of potsherds, according to the size of pots. Plants not requiring potting should have the surface cleaned off and be top-dressed with compost.

Raffia or roffia is a product of at least two Palms. The raffia so largely used by gardeners is prepared from the leaves which are tough, but made very pliable in process of preparation.

The owner of an English estate some years ago, purchased three Water Lilies at a cost of £7 to beautify a lake in his park. They have increased to such an extent that boating is almost impossible. He has offered £1,000 for their removal. A case of having too much of a good thing.

Plants with white blossoms have a larger proportion of fragrant species than any others; next comes red, then yellow and blue; after which, and in the same order may be reckoned violet, green, orange, brown, and black. The flowers of spring are white and highly fragrant; those of autumn and winter are darker, and with still less perfume.

Vegetable Garden

Notes for July.

Vacant plots should be well dug over at this time, adding gypsum or lime where any pests have been prevalent. In other beds, stable manure should be well worked into the soil.

The soil should be rich, well worked, and warm, so that a quick growth may result. Vegetables grown quickly are generally more tender than slowly grown ones; and frequent changes of crops in the plots will give better results. At this season, weeds will require constant checking; frequent use of the hoe will therefore be necessary, and, in the rows, hand weeding should be resorted to.

All seedlings should be planted out, especially seedlings of cabbage, cauliflower, lettuce, and onion. Seeds of peas, carrots, parsnips, radish, lettuce, and broad beans may be sown.

Asparagus beds should be kept free from weeds, they should have a loose surface, and a light top dressing with old manure would be beneficial.

In the frames, cucumber, vegetable marrow, pumpkin, water and rock melon seeds may be planted. These are best planted in pots, placing three or four seeds in each pot. They then suffer no check when being transplanted into the beds.

Market growers will already have their first batch of tomato seedlings well up before now, but for the ordinary amateur the much-before Christmas tomato is hardly worth the trouble of raising from seed especially if he can get some nicely hardened seedlings in a couple of months time from a trade grower. The amateur who is running a hot bed will, of course, have no trouble in raising all the seedlings he wants, and should not delay longer in getting his seed sown.

Asparagus roots should be planted this month, and seakale can be divided or roots purchased and planted. Rhubarb crowns should be planted in very deep, rich soil. Suckers from old plants of globe artichokes should be taken off and planted in new beds. Plant Jerusalem artichokes in good soil, giving them plenty of room. The planting of potatoes of course depends on the possibilities of frost. As we have had rather more than our share this year already, it is quite likely that we shall be let off lightly during the spring. Where it is reasonably safe by all means make a planting of potatoes this month.

In sowing and planting in the vegetable garden, it is always well to remember that "a little and often" is a really good rule to go by. Seed is so very cheap that the money side of the question is not important, but it is certainly annoying to find when you have room for exactly 24 lettuces that you have about two thousand seedling in the box which cannot be planted, or if grown cannot be eaten. A pinch of seed sown once a fortnight is a much wiser practice than a packet once a season.

Points to be Observed in Storing Turnips.

The following points should be observed in storing turnips :—

A dry open situation should be selected on which to place the heaps. Although proximity to a hedge may secure shelter from cold wind, roots often keep much worse under such circumstances than in an open exposed place.

The roots should be dry and clean when carted. If topped and tailed, the operation should be condurted so as to injure the bulb as little as possible.

The turnips should be well matured before storing. This is indicated by the lower leaves being yellow.

It is a good plan, weather permitting, to leave the roots lying in the field, after topping and tailing, for three or four days before carting. This hardens the skin, and brings them into better condition for storing.

Unless frost threatens, soil should not be put on the heaps for at least a week after the roots are carted. This permits of the circulation of air and escape of moisture.

Pineapples were first introduced into England during the time of Oliver Cromwell; a present of the fruit sent to him being the first recorded instance of its appearance there.

Fruit Garden

Notes for July.

Low headed trees are best.

Start the fruiting wood within 18 inches of the ground.

It is a good plan to keep scions back for grafting by burying them in slightly moist soil.

Standing water will soon kill almost any tree.

Young thrifty trees of moderate growth are always better than overgrown ones.

Refuse of any sort should be banished from orchard or garden.

Do not plant citrus till the ground has a little warmth in it.

Deciduous trees should, as a rule, be in the ground by the end of July.

The proper time for grafting is when the sap is rising freely in the stock. The scion should be not quite so forward.

A vigorous healthy stock is an important item in grafting.

One should know what varieties are best suited for local conditions.

Trees which have been heeled in should be carefully watched lest they dry out.

The shorter the time between the nursery row and the permanent position in the orchard the better for the tree.

Do not plant in heavy, wet and sodden soil.

In cold, wet, and late districts, planting may be left a little later than where the season comes earlier.

Pruning when the sap is active is said to promote the formation of fruit buds.

In fruit growing we get a blending of the useful and beautiful.

Insect pests and the germs of disease are bred to a large extent in the waste and rubbish of the orchard.

In the peach the fruit buds are often carried at the end of the shoots. Bear this in mind when pruning.

Cross fertilisation is now coming to be recognised as an important factor in fruit production.

Old, unsightly, and unprofitable trees may often be brought into bearing and beauty by renovation and feeding.

The fruit bud is generally plump and short as compared to the wood bud. This is the beginning and most of the end of pruning.

Careless or ignorant pruning may quite possibly reduce next season's fruit crop to less than a quarter of what it might have been.

In the case of a peach shoot carrying only leaf buds, cut it back to two or three eyes, by so doing you get rid of useless wood and promote the growth of that which may be useful.

Broadly speaking, in pruning an established peach tree the object is to get new wood for next year, which afterwards will in its turn be cut away. Thus there is a constant system of renewal being carried on. The more abundant up to the limit of safety and the more evenly distributed the yearly growth of fruiting wood the better the pruning.

The winter spraying with oil emulsions for woolly aphis, red spider, peach aphis, etc., should not be delayed.

Gooseberries require liberal feeding. Farmyard manure at the rate of 12 to 15 tons per acre is said to be the most profitable dressing.

The four cardinal principles of good orchard management are—Cultivation, spraying, pruning and manuring.

Always cover all large wounds made in renovating old trees. Before doing so see that the exposed surface is smooth and at such an angle as to throw off all water.

If peach aphis makes its appearance, no time should be lost in getting control of this very serious pest. A strong nicotine solution is a safe and tolerably effective remedy. It frequently happens and spraying must be repeated throughout the season, but if taken in time the first spraying is an effective check. An oil emulsion may be used for the same purpose but only so long as the trees are quite dormant, it is unwise to use it when the buds have begun to show signs of swelling. At this stage they may be destroyed by any oil treatment.

Though it is too early to plant citrus, every opportunity should be taken of getting the land to be planted into the best possible condition, i.e., deeply stirred, sweet and friable. Orders for trees, if not already placed, should be sent to the nurseries without delay to prevent any possibility of disappointment.

By the law of averages we may reasonably expect a moist spring, in which case peach curl leaf will probably be prevalent. It is early yet but it is well to keep it in mind. A good rule to go on with in regard to this disease is, that if your trees were attacked last year they will this, and if they were not they probably will be. Bordeaux Mixture is probably the most generally used specific, and the time to apply is just as the buds are showing colour.

The cost of spraying is practically covered by a few fruits saved per tree, yet by doing so a full crop has often been harvested, 75 per cent. of which would otherwise have been lost.

Lime-sulphur is a valuable remedy for many insect pests, it is also of some and often considerable value as a fungicide. It possesses some objectionable features in its corrosive effect upon any iron or steel on pumps and harness, and in its caustic effects on exposed parts of the body. These may be somewhat obviated by greasing the metal and by rubbing the hands and face with olive oil or vaseline prior to spraying. Horses, of course, are also sensitive to its action and if used, should be given some covering.

Before spraying with oil emulsions or lime sulphur, all rough bark on apple and pear trees should be scraped off; this will mean the certain destruction of any codlin moth larvae which may be hidden beneath.

Pruning.

The object and aims of pruning are to maintain a moderately good growth in the tree, and at the same time produce good crops of marketable fruit. Trees that are not pruned will only produce good fruit in the earlier stages of their growth, while the tree is small and unprofitable; hence, the object of pruning is to maintain an equal balance between the growth and fruit-bearing qualities of the tree. A one year old tree just planted should have the leading shoot cut back to about 15 in. from the ground. This will form the future stem of the tree, and in the spring when the buds begin to shoot, leave the three top buds, and rub off all the buds below. These three buds will form the foundation of the tree and should be allowed to grow unchecked throughout the summer. During the following winter these shoots should be shortened back; cut off say two-thirds of their growth, always cutting back to an outside bud. In the next spring two shoots may be allowed to grow from each branch; this treatment will give six branches, and these will form the main branches of the tree. To form a well balanced head the branches should be spaced as nearly as possible at equal distances from each other.

During the future growth of the tree, additional branches may be left as required, taking care that they are not overcrowded. Lateral branches will make their appearance during the third and fourth years. Those growing inside should be well thinned out, leaving a few only to fill up the body of the tree, whilst of those growing outwards the strongest may be retained where required to further extend the tree. The leading shoots will also require shortening back, leaving the strongest shoots longest, and cutting the weaker shoots back a little shorter. Where a branch makes a strong growth and takes a decided lead from the others, it should be pinched back in the early summer. This will check the growth, and allow the weaker branches to grow more vigorously.

Where trees are growing in an exposed situation the prevailing winds should be taken into consideration when pruning, otherwise they will be blown all to one particular side. The pruner should counteract this as much as possible by pruning to an outside bud on the windy side, and an inside bud on the sheltered side.

Many varieties of apples and pears form natural fruit spurs without any trouble; others again, such as Jonathan and Rome Beauty, grow to laterals. This is the point where many pruners fail. They cut off all the laterals with the expectation that fruit spurs will naturally follow, but instead only thin spray wood makes its appearance. This is again cut off, and so the process goes on until the lower portion of the tree becomes quite bare and devoid of both fruit spurs and leaves, and the whole of the growth has been forced into the extremities of the branches, which gives the tree the appearance of a broom. Instead of cutting off all these lateral shoots, they should be moderately thinned out, and the full length of the ones that are left should be retained, not being cut back at all. The following summer fruit buds will develop along the whole length of these shoots, and will become permanent fruit spurs. They should be gradually shortened back a little every year as the growth of the tree expands, and the tree will then be furnished with fruit bearing wood right from the fork. Should too many of these lateral shoots have been left to form fruit spurs, they can always be thinned out or shortened back and so help to regulate the crop of fruit. Fruit spurs of trees in full bearing should be thinned out every year, if good quality fruit is required. Unless this is done, the fruit spurs increase so rapidly that the tree is unable to properly mature the crop of fruit that sets, with the result that it is very small and of little value. Again, many trees such as the Winter Nelis pear, where the spurs have not been thinned, bloom so profusely that the tree exhausts itself in blooming, and is unable to set any fruit. Orchardists should therefore study the habits of the different varieties of trees they are dealing with, and regulate the fruit spurs according to the capacity of the tree to bear a crop of fruit of the best quality.

Soils for Citrus Fruits.

The influence of the soil on the quality of crop produced, more especially in the case of fruit trees, is discussed at considerable length in an article appearing in the Rural Californian. The following extract relates to soil preferences shown by oranges and other citrus fruit—

Citrus fruits prefer soils with good surface and subsoil drainage, and with favourable exposures. Rich soils, when low and too moist, produce fruits low in acid and sugar, so that the citrus characteristics are practically lost. A deep soil is desirable, but when drainage is good, oranges and lemons often do well on soil no more than 4 feet deep, and resting on impervious hardpan. Under certain conditions even land of less depth has grown good orchards, but such land should only be planted when all the more suitable soils have been occupied.

Hose for Orchard Spraying.

Some good pointers on spray hose are given in The Fruitgrower and Farmer. There is no part of the outfit which needs more care in preventing breakdowns and delay during the progress of the work. Few parts are given such severe strains. It must stand the full pressure of the liquid from the pump when the nozzles are shut off in passing from row to row or tree to tree, and this in power outfits runs up to 200 pounds per square inch. It is worn away on the outside by dragging over rough ground and stones, from the inside the spray chemicals are weakening the material, and all the while it is being twisted and kinked.

Hose which has been used one season or more should be carefully examined for cracks and strains before it can be relied on for service. Even if apparently good it is best to have new sections in reserve. New hose should be selected with care. Some brands have but two thicknesses of canvas within the rubber and others eight to ten. Some kinds are stiff and heavy, while others are light, easily handled, and at the same time durable.

Pruning the Almond.

The almond is not, properly speaking a nut, but a drupaceous fruit, whose structure corresponds to that of the cherry, plum, apricot, and peach. The seed is the kernel, which is, in each case mentioned, enclosed in a hard case (endocarp), called the shell, stone, or pit. Surrounding this is the mesocarp, which is soft, juicy and edible in the plum, cherry, and peach, etc., but forms a leathery husk in the almond. This fact is only of interest now from the light it throws on the near relationship of the trees, and the treatment one might expect would be likely to be required by all. Yet there are many people who although convinced as to the necessity of pruning the peach and apricot, argue that the best thing to do in the case of the almond is to let it alone, and "it will bear when it wants to." That, however, very often is by no means when the owner requires the fruit. That the almond tree requires regular pruning, as much as an apricot tree, may be readily seen by examining any old tree, and noting how it grows, and where the fruit buds are to be found. Indeed, it is most instructive to study an almond and an apricot tree in conjunction, and then compare the two with a peach tree, for although the stone varieties of trees are nearly related, and obey the same general laws, there are wide differences, due to habits of growth, etc., the peach requiring much more skilful treatment than either the apricot or almond. No one can possibly learn to prune really well who does not spend time studying how the various trees grow, and how they carry their fruit.

In pruning the almond the same general plan should be followed as in the case of the apricot. What is wanted is a strong sturdy trunk not more than knee high, with rigid main arms on which the fruiting wood will be carried. The trees should not be allowed to get much beyond hand reach, for if this is done they will not suffer from the disastrous wind storms in spring, which so often strip the old style top-heavy trees of the greater part of their crop.

To conserve moisture, the surface of the soil must be kept loose.

The plant food made available by fallowing, and removed from the soil by crops, can be restored by commercial fertilisers.

Mop-Headed Peach Trees.

Quite often one sees in suburban gardens peach trees which have obviously got away from their owner's control. A short trunk with five or six long bare poles each carrying a more or less dense mass of twiggy growth. They evidently began life in the way they should go but latterly have seriously departed therefrom. This running up is of course a development to which the peach is particularly liable. In very small gardens it is not perhaps entirely undesirable, for by growing, or rather allowing them to grow in this fashion one can arrive at a sort of double deck garden, some fruit up above, and if the tops are not too thick, some vegetables or flowers underneath. Many people who own such trees think them beyond redemption and do not attempt any pruning or more drastic treatment. Some improvement, however, should in such cases be attempted. Unless it is wished to renew the whole tree, the best method would be to cut out at least one-third of the bunch of leaders, choosing of course the worse placed and least healthy ones. ' Shorten back the remainder and cut back to three buds, half the twiggy growth which remains. The quality of the fruit next season will be much improved and there will be a good growth of wood for renewing the head or heads. A more thorough method, but one involving the loss of a season's fruit, would be to cut down the tree to about 2ft. 6in. from the ground, the height depending on the build of the tree, and as it is somewhat risky to depend on natural shoots in an old peach tree, it is better to insert a few bark grafts on each of the limbs to ensure the formation of a new head. This should be done after the sap has commenced to rise freely so that the bark can be raised without difficulty. The scions of the same or any other or any number of varieties should be prepared now and kept in a moist cool place. If the work is done properly the buds start away directly, the shoots can be nipped back and made to branch or to form fruit spurs as desired, and in the one season a fine, shapely head will be formed, capable of bearing a nice crop next season. If it be desired for any reason to keep the tree high, the limbs should be grafted at the height desired. Another plan is to put in dormant buds or side grafts round the branch in the summer, cut off the branch above them in the winter, paint or wax the end, and in the spring the buds will put out and form a new head to the tree. This obviates the difficulty there always is when cutting down an old tree in getting new shoots to put out just where they are wanted.

Fowl manure should be spread thinly so as not to heat or ferment, and allowed to dry in the air. Its value is double that of the fresh droppings, and is worth four times as much as stable or farmyard manure.

Preparation of Grafting Wax.

A useful recipe for the preparation of grafting wax was lately given in the American Journal of Agriculture. It is as follows :--

The best grafting wax is made from 4 parts of resin, 2 parts of bees' wax, and 1 part of tallow, all by weight. An iron vessel of some kind should be used for melting the components of the mixture, which should be done over a slow fire. The resin is melted first, then the bees' wax is added, and finally the tallow. The three ingredients are gently stirred so as to bring about a thorough mixture.

The melting process will take from twenty minutes to half an hour, and care must be taken to avoid burning the melted mixture. When properly mixed, a small portion is poured into a bucket of cold water, and in a short time it will be cooled sufficiently to be lifted out with the hand and worked in any way desired. During this process, the hands must be kept moderately greased with tallow to prevent sticking.

When the colour of the grafting wax mixture has become pale yellow, it has been worked sufficiently, and may be made into rolls of convenient size—3 or 4 inches long, by about 1 inch in diameter — and placed in another vessel of cold water to harden.

More of the melted mixture is now poured into the cold water and treated as before, and this process is repeated until the whole lot is worked up. The rolls of wax soon harden, and can be put away until required in grafting.

This wax, when applied to the trees, will not melt and run down in warm weather. If, however, the weather is very warm at the time grafting is done, it is well to allow the wax to lie in cold water for a time before using in order that it may be of the proper consistency.

In applying the wax around the grafts it should be pressed very closely. It is advisable also that the hands should be rubbed with a very little tallow before starting the grafting process. This, however, must be done with judgment, since if the hands are so greasy as to affect the wax, it will not stick properly to the cut surfaces of the grafts.

Sulphate of Ammonia and Acidity in Soils.

A note in the Gardeners' Chronicle draws attention to the "curious appearance of the herbage" in a grass plot at the Rothamsted Agricultural Experiment Station, England, which has been manured continuously with sulphate of ammonia and chloride of ammonia for a long period of years. The vegetation on this plot is described as being composed almost entirely of three grasses, while the surface soil consists of a peat-like mat of semi-decayed plant remains. The following particulars are given of investigations carried out in connection with the condition of the soil of this plot:—

Recent investigations that have been made in the laboratory show that the soil has become acidl a result that often may occur as a consequence of the long-continued use of ammonium salts. It was found that the organisms which ordinarily oxidize the ammonia to nitrates were only present in small quantities, and their action was almost inhibited owing to the acidity of the soil. The slight amount of nitrification observed, together with the other facts, which need not be considered here, point to the fact that this condition is attributable to the beneficial action of the small residual quantity of lime present in the soil. This acts partly, no doubt, as locally neutralizing the acidity, and it is possible that further investigation may show that its influence may also be connected with other physiological properties which this substance is known to possess. The acidity of the soil is, at least mainly, brought about by the action of various micro-fungi, which are able to utilize the ammonia, setting free the acid in the soil. The general result of the investigation, which has a practical value of considerable importance, indicates that 'the decline in fertility of the acid plots may be attributed to the repression of the normal bacterial activities of the soil, and the encouragement of the growth of moulds."

Soil Moisture and Humus.

Dealing with methods of improving the condition of land in a low state of fertility, Farmers' Bulletin 245 of the United States Department of Agriculture, entitled "The Renovation of Worn-out Soils," has the following passage on the importance of maintaining a proper supply of humus in the soil:—

In producing sufficient grass to yield a ton of dry hay on an acre of land, a quantity of water approximating to 500 tons is withdrawn from the soil by the grass. In order to supply this enormous quantity the land must not only be in condition to absorb and hold water well, but it must be porous enough to permit water to pass freely through the soil. The presence of large quantities of decaying organic matter (humus) adds enormously to the water-holding capacity of the soil. One ton of humus will absorb two tons of water and give it up readily to growing crops. Not only that, but the shrinkage of the particles of decaying organic matter and the consequent loosening of soil grains keep the soil open and porous.

Furthermore, humus of good quality is exceedingly rich in both nitrogen and mineral plant food. The maintenance of fertility may almost be said to consist in keeping the soil well supplied with humus. The first step in renovating worn-out soils is to give them an abundant supply of humus of good quality. Perhaps the best source of humus is stable manure containing both the liquid and the solid excrement, especially when the stock are fed on rich nitrogenous foods. Even a poor quality of barnyard manure, which has had much of the plant food leached out of it, has considerable value because of the humus it makes.

Another cheap and valuable source of humus, but one which must be used with judgment, is the use of green crops grown to be ploughed under as manure.

Cross Fertilizing Mediums.

The experience gained by a suburban resident, while it may be valuable to growers, is not likely to be forgotten by him for some time. Three years ago he had a Coe's Golden Drop plum growing in his garden close alongside a blue plum, the name of which cannot be obtained, writes the "Australasian." The Golden Drop for years carried heavy crops of fruit, but as two plum trees were considered superfluous in a garden of this kind the owner decided to chop the blue plum down and utilise it for firewood. This was done two years ago, and the Coe's has since failed to bear. Among animals this might have been regarded as a mark of sympathy towards a comrade, though fruit-growers with experience of the Coe's Golden Drop will realise that the medium by which the blossoms were cross-fertilised having been taken away the tree naturally returned to its shy bearing characteristics. The most successful growers of this variety of plum are men who have planted other varieties close alongside to provide the cross-pollinating influence so necessary to ensure the proper setting of the crop. Of late years many instances of the value of planting varieties with the object of securing proper fertilisation have been referred to. Such beneficial results have followed this practice that intending planters would be unwise to plant out a block of trees without first giving consideration to those kinds which are benefited by being grown in close proximity to others which bloom over the same period, and provide an interchange of pollen. One of the most striking instances of this kind recently came under notice in a Narre Warren orchard. Mr. Bailey carried out a large experiment with his pear trees by placing bottles filled with blossom in the forks of the trees, while at the foot of others he put out dwarf trees in pots. In almost every instance the lower parts of the trees were heavily loaded with fruit, which hung in dense clusters, while towards the tops the trees scarcely carried any fruit. Similar results have been obtained by blending together varities of apples in the one plantation. Cross-pollination may not be necessary to secure fruit, but it is essential to the regular development of good average crops.

To Prevent Hares from Touching Fruit Trees

The following recipe is from an old English book:—"Put a teaspoonful of asafoetida in half a bucketful of thick clay water, and applied with a brush on the stems or branches of young trees, will preserve them from the attacks of hares or rabbits without injury to the trees. It has to be renewed three or four times every season." The renewing is the trouble. Weak carbolic acid or cowdung will preserve the trees for a time, but suddenly the owner finds he has left the fresh application a day or two too long, and a number of trees are badly bitten.

The Importance of Colour in Fruit and Vegetables.

It is not alone for aesthetic reasons, that we should take into consideration the question of colour, when planting fruit trees or vegetables, but often for purely practical and commercial reasons for the colour of fruits and vegetables has a value recognized in commerce and the household, says a writer in the Wisconsin Horticulture. There are certain standards and ideals of colour to which fruits must conform more or less closely to be assured of popularity, and this is equally true of vegetables. A beet that is blood red throughout will meet this ideal standard better than the red, white or yellow flesh varieties. A white sweet corn is most desired but a yellow may be tolerated if distinctly tender and succulent. Yellow fleshed rutabages seem to be the popular kind and yet the white is quite preferable for table use. Yellow fleshed potatoes are hardly tolerable and red skinned ones are not so popular except for early markets in the city. There is no distinct reason why speckled or dark beans should not be as marketable as any except that fashion says their colour should be white. Onions may be brilliantly white, red or yellow and yet be indifferently accepted by the cook. Perhaps this discriminate choice arises from the fact that she tearfully removes the colorful coating that covers the odorous bulb that is always white within. In fruits, too, we have some color vagaries that arise to even greater importance in the field of commerce and culinary art. Our first fruit of the season, the luscious strawberry, comes to us unifomrly clad in red and we like it best if the red is full, deep and glossy and the flesh itself blood red to the core. The deep red flesh gives the best color when canned and a much more inviting look than the white fleshed sorts. The bright red or black of the cherry seems to fully satisfy for color. The ideal raspberry is bright red or coal black. Dull colors do not seem to meet our ideas as well, even when quite acceptable in quality and size. In currants the red are decidedly more marketable than white varieties while gooseberries go to the market almost as green as grass. In blackberries, no light colored sort has been profitably grown and we accept their blackness as just the right thing. In grapes we have many colors, white, yellow, red, pink, purple and black. If the quality is distinctly good none of these colors are barred from public favor.

The most important color for apples is red. If upon a clear, light ground, a flush will do; but if suffused in bright carmine over an ivory white, it becomes irresistably lovely in the market. While green colored apples are sold in large quantities it is undeniable that all parties concerned would be better pleased if the fruit were full colored red. There is, however, a finish of glossing and coloring of well grown and well matured fruit that will make it very attractive when secured in the largest possible degree. To secure this brilliancy of finish that should be present when harvest comes, is a part of the art of the fruit grower. Trees overloaded with fruit, those suffering from insect or fungus depredations, those underfed or choked with drought may not be able to color their crop. While nitrogen in the soil is essential to grow abundant foliage, a soft, succulent growth caused by too much nitrogen, will retard rather than produce color. Potash, lime, sulphur and phosphates are probably the coloring factors as far as soil elements are concerned. To thin the fruit, feed the tree a balanced ration and protect its foliage from insect and fungus foes, is to prepare for the full maturity, splendid finish and glorious coloring of autumn sunshine, without which the labor of the season becomes partly abortive.

Citrus Fruits.

— The Importance of Age. —

The young tree bears the largest fruit, and matures them early; but as regards quantity, though there are exceptions, the balance is in favour of the old trees. This varied time of bearing is of great importance in an orchard. If your trees are all of the same kind and age, marketing the crop comes all at once, and outside help, when often hard to secure, will have to be obtained. But with fair areas of varied age, one crop will follow another in regular sequence, and the pickers, packers, and carters kept at steady work all the time.

The young tree, like the young animal, passes through a number of infantile complaints. The young citrus tree is especially liable to the dangerous black scale that is accompanied by a sooty fungus covering the leaves. Persistent spraying removes this, and in later life the tree is rarely attacked. Red scale, another enemy, is far less virulent to the aged than the young tree. On the other hand, white lice and borers are the accompaniments of decay, and rarely found, except on old trees or unthrifty young ones. Speaking of unthrifty young trees, age may be premature, from poor surroundings, lack of pruning and cultivation, a mere bush of a tree may show all the signs of senile decay. On the other hand, an aged tree, by a vigorous use of the saw and manure, may retain its youth and a new lease of life. "While there is life there is hope" is a lasting truth in horticulture; but in case the tree is stunted and long neglected, it will often pay better to root it out rather than go through the process of forcing a new growth. — "Farmer and Grazier."

What do you Spray For?

We have often, for many years, urged our fruitgrowers to spray, but we have tried to show that we must first know what we desire to achieve by spraying.

— Jaw Feeders. —

Injury to plants by insects falls under two heads; first, where the plant itself has been eaten; second, where the juice has been sucked out, leaving the tissues. Insects causing injury of the first class are called biting or chewing insects, such as grasshoppers, caterpillars, cabbage and army worms. They have well developed jaws fitted for cutting and chewing plants. They can be destroyed by using poisons, such as the arsenics.

— Sucking Feeders. —

The insects of the second type have long lance-like beaks, which they insert into the tissues of the plants sucking out the juice, causing the plant to collapse, wilt, and die. This class includes all the scale insects, plant lice, harlequin, and Rutherglen bugs, etc.

The external application of arsenical poisons to plants would have little or no effect upon this group as the poison does not enter the cells of the plants. Materials are used to act externally on the bodies of such insects, either as a caustic or to smother or stifle them by closing their breathing organs.

Insects do not breathe through their mouths, as do higher animals, but through small openings on either side of their bodies called spiracles. By spraying anything of a caustic or oily nature over the body, these spiracles are closed and the creature is destroyed.

These remarks apply especially to insects which feed upon the exterior of plants or pass the greater portion of their lives in an exposed condition where they can be readily reached by one of the methods mentioned. Insects of both classes at times feed upon plants above the ground for a short while, and pass a portion of their lives upon the roots below the surface. The Phylloxera and peach aphis are examples. Still other insects live in straw, grain, seeds, and manufactured products of the mill where neither poisons nor irritants can be used. In such places the fumes of various gases are employed for their destruction. Gardeners should carefully consider the nature of the insect before applying any remedy.

Shape of Trees.

Much matter is written from time to time by horticultural writers on the shaping of fruit trees. As a matter of fact, regarding size, the grower has little to do with it. The tree, unless handled in a way quite unjustifiable, will, in size and shape, adjust itself to the soil and situation. In a shallow, poor soil, it will keep low; in a deep or fertile soil, run to wood, and size. In an exposed situated, the tree will be naturally low and burly, and every effort should be made to keep it so, for the great enemy to vegetation is wind, and a low growth close to to the ground suffers less from blowing about than a tall erect tree. Another strong consideration regarding fruit trees, a low tree is more easily sprayed or fumigated, and the time and trouble of gathering the crop much less. The real work of the grower is not shaping the tree, but the cutting out of surplus wood to encourage fruiting, the general idea being to leave air space round all main branches, to clear out the centre, and to head down feeble attempts on the part of the tree to go beyond its proper height. Care, however, must be taken to leave sufficient shelter for the main stem of the tree, or from having too much shade, you jump to the other evil, too much sun, and your tree is likely to be what is locally known as "scalded." As clipping, say a horse, seems to make it more thrifty, so it is with most orchard trees. Pruning is a stimulant that awakens the sluggish grower and bearer. Naturally, from the first planting, you will strive to get your tree well balanced and symmetrical. Starting with three small forks and low head, you will cut your main limbs as nearly vase shaped as possible. And with the shears always at hand you will trim and prune to this ideal. —Exchange.

The Builders of the Nation.

"The City folk they whirl about
In cab and tram and train,
They grumble at the days of drought,
They grumble at the days of rain.
To comfort wed and cosy ways,
They fear to soil a hand;
But the men who build the Nation
Are the men upon the land."

Essex Evans.

The farmer talks in the same sense that money talks—for he has the attention of the whole world.

Grafting the Vine.

The operation of grafting is simple, whilst the results of converting a vine yielding grapes of poor quality into one giving a much superior crop, is as satisfactory to the home gardener as it is in many cases necessary when growing for market. Vine grafting is, of course, the same as any other grafting, and it is necessary to remember that growth takes place in a special tissue of cells, known as the cambium layer, situated between the bark and the older or hard wood of the stem of the vine. If the reader will take any shoot of a growing plant, and peel off the bark, he will find the cambium layer represented by the soft, sappy tissue just underneath. It is important that he should distinguish this cambium layer, and remember the fact that growth takes place there, because it will enable him to understand that in making a graft he must place the cambium of the scion in contact with the cambium of the stock, so that the new tissue may unite the two into one plant.

Everyone is familiar with the formation of callus on the base of a cutting before it sends out roots, which forms most readily in the neighbourhood of a node, or "joint. Now, in a sense, the work of starting growth in a scion may be likened to the starting of a cutting, i.e., in order that the scion may grow to the stock, it must callus, and, being in close contact with the cambium of the stock, the callusing of the two forms a union. In order to do this the conditions are that the air must be sufficiently excluded to prevent the drying of the tissue, the stock and scion must be in close contact, the growing tissue, i.e., the cambium, must come together, and the temperature and moisture conditions must be favorable.

These conditions are secured by careful fitting of scion and stock, binding them together, and covering the whole of the cut surfaces with either soil, clay, or grafting wax. In vine grafting it is usual to graft below the surface of the soil, and cover with soil, which must be neither too wet or too dry. The soil affords the necessary protection, and at the same time permits of the supply of the oxygen necessary for the healing of the wound, i.e., the union of the stock and scion.

As the success of grafting depends on the union of the scion and stock, it is, as a rule, necessary first that the sap should be moving at the time. It is also desirable that the weather conditions should be favorable, i.e., neither wet and cold nor yet hot and drying. Experience and opinions differ as to whether early or late grafting is better. Vines can be grafted in summer either by using wood which has been kept dormant in sand in a cold, dark place, or by using well hardened wood of the current season's growth. Vines may also be grafted readily in autumn, say, just after the grapes are ripe. The graft heals and the shoot remains dormant until next spring.

For a few vines, a saw to cut off the old vine, a good sharp knife to trim it, and cut the scion, and an ordinary chisel to split the stock are all that are required. For extensive work a wedge-shaped chisel is desirable. For tying ordinary binder twine is as good as anything. It is strong when used, but rots by the time it is needed no longer.

It is desirable in spring grafting of the vine to take the stock at the time when the sap is flowing, but not flowing too freely, lest the excessive bleeding cause unduly moist conditions. The scion, on the other hand, is preferably in a dormant condition, so that the callusing may begin before the leaves open, and allow of the circulation of sap, and the proper union under the most favorable conditions.

Vines are frequently grafted some distance below the surface soil, the object being to provide a double root system, but it is certainly not necessary, and may be prejudicial to the growth of the renewed vine. Equally good results are obtained by putting in the graft or grafts at ground level, in order to do which it is necessary, or at all events desirable, to remove the soil immediately around the stem of the vine in order to give a little clear working space. Saw or cut the stock off horizontally about half an inch below the surface, and smooth over the top of the section. With knife or chisel, as may be needed by the thickness of the stock, split the stock open and insert a small hardwood wedge to keep it open. Then take the scion and insert it at the side of the split in the stock, taking care that the cambium layers of stock and scion correspond, for this is the vital point in success. Remove the wooden wedge, tie the stock tightly with binder twine, put in a stout stake, and fill in the soil, heaping it over the scion. The scion may be completely covered, as the soil will sink a little.

To prepare the scion, which should possess two healthy buds, it should be cut from just below the lower bud into a wedge, cutting from both sides, the side of the scion on which the last bud is placed, and which, when in position, will 'point away from the vine, should be thicker than the opposite side; the wedge should taper down to a thin flat point from the bud downwards. Cut into the pith only on one side, which will bind the wedge stronger and firmer. The scion will be firmer and better seated on the stock if a small square shoulder is made on either side where it starts.

An even more simple way is to cut the wedge on the scion quite 2 ins. long, starting some distance above the lower bud, making a long, tapering wedge, the bud coming nearly half-way down. Cut close up to the bud, but as long as the middle is left it is all right. Slip the long wedge well down, so that the bud is half an inch or more down the side of the stock. A graft put in like that won't fail, for the graft takes first on each side of the bud, and a strong shoot always comes from the bud, and it never blows off.

When the stock is old and large, say, 3in. or more in diameter, it is better not to split the stock open, but with the chisel split down the side. Then with a sharp knife smooth the side of the split, cut the scion knife-shaped, to fit the stock, and insert one on each side.

When the stock and scion are about the same size, use the whip and tongue method of grafting. As before, care should be taken to see that the cambium layers on one side coincide. If the scion and stock are of the same thickness they will coincide on both sides, but it is important that one side be right. In preparing the scion and stock, first cut each with a clean, oblique cut. Then cut the tongues, and when put together they will fit exactly.

Cultivation and Fertility.

Thorough and judicious cultivation is essential for a soil to give its best results as a crop-producing medium. Providing a soil is well-drained, the more deeply it is cultivated, the more extensive is the area through which the plants can forage in search of food, and thus it is that improvement in tillage methods which result in deepening the soil and promoting nitrification, tend to have the same effect as applications of manure.

The advantages of a deep soil, as compared with a shallow soil, are obvious, and—expressed concisely—these may be said to consist in the fact that when land is ploughed to a depth of no more than 3 inches, the plants growing thereon have 3 inches of food, while when the land is ploughed 6 inches deep the plant has access to 6 inches of food, and so on. The lower portions of the soil are not so rich in available plant food as the upper portions, but this may be remedied to a large extent by suitable cultivation, which results in admitting air, moisture, and heat, the necessary conditions under which fertility is developed.

It need hardly be pointed out, however, that any deliberate attempt to lower the line of division between the soil and subsoil by deeper ploughing should be carried out gradually and with caution, and the most judicious plan is to extend the operation over several years, i.e., to plough just a little deeper each season than was done in the previous year. Many instances are on record in which the fertility of land remarkable for its crop-producing capacity has suffered enormously as the result of lowering the depth of ploughing 2 or 3 inches below the normal level in one occasion. This is because the surface soil containing the organisms which are responsible for the breaking down of plant food, has been buried, and a heavy raw infertile subsoil brought to the top.

Another important point in connection with the capacity of a soil to return large crops is its ability to retain moisture. This power is greatest when the land contains a good proportion of humus, is well tilled, thoroughly pulverised, the subsoil firm, and the soil kept in the form of a loose mulch at the surface.

As the result of all these conditions, absorption of rain water takes place readily, and this is retained instead of rapidly draining away. Water in a cultivated soil is held in the form of thin surface films enclosing each separate particle. It is obvious, therefore, that the more thoroughly the land is pulverised by cultivation, the greater will be the number of soil particles, and the greater the capacity of the land to retain moisture. The presence of humus increases this storage capacity, and reduces evaporation. It has been estimated by agricultural physicists that a ton of humus will store over seven times as much moisture as a ton of sand, and further, that sand loses its water by evaporation from three to four times as rapidly as the humus. Clay soils store only about one-fourth as much moisture as humus, and lose it by evaporation about twice as rapidly.—Agricultural News.

To make the colt a finished product, either for saddle or harness, requires experience and time. It is nearly, if not quite, a science, but you must be gentle, patient, and firm.

Zante Currants.

Of the many industries followed in South Australia that of currant growing has proved one of the most profitable during recent years. The climate suits the Zante currant vine, which flourishes in every part of the State, even in the drier districts where irrigation has to be resorted to. The natural atmosphere evidently provides conditions similar to those of Greece, of which the vine is a native, for, except in abnormal seasons, the fruit ripens regularly and during our best drying period of the year. The currant will grow on any kind of soil, but a good loam with a clay bottom is to be recommended. In some cases this vine grows well in limestone soil, but will not live so long as on the former class of land. Where a good deep subsoil is available there is no reason to doubt that the currant vine, in spite of the cincturing process, which is said to shorten the life of the plant, should live to a considerable age. After selecting the soil, break it up to a good depth and then proceed to lay off the rows. On good land currant vines should be planted with not less than 13ft. between the plants and 10ft. between the rows; that is, where only one stem or cordon is used. On extra good soil, and where irrigation can be resorted to, 20ft. is a good distance. The writer favours the digging of holes 18ins. square down to the clay. After planting, cut the young vine back to two eyes; cultivate the soil well, and the subsequent season the leader should be cut back to a length of 9in. or a foot. With the third pruning the leader should be taken up to the wire and bent for a foot or so along it. The growth made during the previous season will regulate this. The fourth year the laterals can be cut back to two or three buds, and these can be allowed to fruit. The main limb along the wire should now be 5ft. or 6ft. long, and from now on should be encouraged to make good growth, which must be cut back every year into good solid wood. The whole length of 20ft. should be reached by the sixth or seventh year. The first wire should be 2ft. from the ground and the top wire 1ft. 9in. above that. I do not favour ringing until after the fifth year from planting. Up to that age the vines should grow as much as possible. A check caused by too early ringing can do no good. The writer has tried three methods of ringing. When this system was first introduced it was recommended that a piece of bark a sixteenth of an inch in diameter should be cut out. This plan was followed for years, but I found, after lengthy experience, that such a wide cut caused the formation of too many "bucks," or overgrown fruit, and the fruit did not ripen so evenly as when a very slight cut is made. Some seasons the bunches would ripen on one side, leaving the other side quite green. For several seasons past a different method has been adopted. A large Saynor pruning knife is run right round the vine stem and is pushed into the green bark with slight pressure. Only one ring is made. This plan gives best results, as the sap is only slightly checked. Two years ago the single cut, being made spirally round the vine stem for a length of a foot or so, was tried; but this plan showed no improvement over the last, and meant more work.—From an address by P. J. Curnow, Wirrabara Branch Agricultural Bureau.

The San Jose Scale.

This orchard pest is far more general and destructive in the United States than it is in Australia. In parts of that country it is said to do an extraordinary amount of damage, and is considered to be the greatest insect pest of modern times. Its life history is, says a writer in The Garden Magazine, most interesting.

Commencing in June for a period of approximately six weeks the females continue to produce young, each averaging about four hundred, or from nine to ten every twenty-four hours.

The new-born wanders forth in search of a favorable place to establish itself, and within relatively few hours (on an average a little over twenty-seven) settles at some convenient point and works its slender, hair-like beak through the bark. If it be a female, it never moves from this spot, and soon loses legs, antennae and eyes and becomes virtually an animated pump drawing the vital fluids from the tree.

The female scale insect requires about thirty days to attain maturity, and the male from twenty-four to twenty-six; thus the round of life may be completed in from thirty-three to forty days. Detailed studies made at Washington show that four entire generations are normally developed in a year. The fecundity of the insect, in connection with its ability to produce a number of generations annually, results in an enormous increase.

The San Jose Scale has been recorded upon a large number of food plants, but is very injurious to comparatively few. The fruit trees—peach, pear, plum, cherry and apple—are preferred in about the order named. Currant bushes are very subject to injury and among ornamentals none are worse affected than Japanese quince. Lilacs, snowberry, willows and some other ornamentals are also liable to serious injury.

The Farm

Washing Udders.

To determine definitely the amount of filth that gets into milk during the process of milking, and how much this can be lessened by washing the udders, the following comparison was made :—It was determined after several trials with three different milkers that it requires an average of four and a half minutes to milk a cow.

A glazed dish, 11in. in diameter, the size of an ordinary milk pail, was placed in the top of a pail and held under the cow's udder in the same position as when milking. For four and a half minutes the milker went through motions similar to those made in milking, but without drawing any milk. The amount of dirt and dust which fell into the dish during the operation was, of course, about the same as would have fallen into the milk during the milking process. The dirt caught in the dish was then brushed into a small glass weigh-tube, the udder washed, and the process continued.

The dirt which fell from the washed udder was also carefully brushed into a weighing-tube. After drying twenty-four hours the contents were weighed on a chemical balance. Many trials were made at different seasons of the year. With udders that were comparatively clean it was found that an average of three and a half times as much dirt fell from the unwashed udders as from the same udders after they were washed.

With soiled udders the average was twenty-two, and with muddy udders the average was ninety times as much dirt from the unwashed udders as from the same udders after washing. If we were to place a pail of water just beside the pail in which a cow is milked, and observe the amount of sediment that has gone to the bottom and the particles of dust to be seen floating on top, it is not likely that we would be willing to pour that water into a tea-kettle to make the coffee for breakfast. And yet we use some of that cream and milk in our coffee without question.

Treatment of the Sow.

It makes all the difference in the profits whether the sow produces good, strong pigs, and then feeds them well, or produces a litter of weaklings, and then has nothing for them to eat ; whether her system is nice and cool, or hot and feverish. In one case, she will be good-natured and let the pigs suck and will furnish plenty of milk ; in the other, fretful and peevish, and the chances are will eat her pigs as soon as born.

These conditions depend very largely, if not entirely, upon the way the sow is treated and fed during pregnancy. It is an almost unheard-of occurrence for a brood sow, running out on good pasture, ever to eat a pig. Sows are not cannibals by nature, and are only made so by the ignorance or foolishness of the owner.

Sows should have access to a box filled with a mixture of six parts charcoal, two parts wood-ashes, with 2lbs. of salt and ½lb. of copperas to each bushel.

The brood sow should be fed just enough to be kept thrifty and strong, but not to make her fat, and the amount will depend upon the size of the animal. She should have all the water she wants at all times. It is also very desirable that the sows be handled so as to be very tame and quiet. If sows are so treated good litters of fine pigs will be assured.—Live Stock Journal.

Ploughing.

The object of ploughing may be said to be fourfold :—

1. The loosening of the soil.
2. The stimulation of bacterial activity.
3. The destruction of weeds.
4. The burial of manure.

The first is essential in order to prepare a good seedbed and to enable the plant roots to penetrate more deeply, so that they can get nourishment and moisture from lower strata of the soil. A further advantage of ploughing is that it opens up the soil to the atmosphere, the oxygen of which changes the character of some injurious combinations, and renders it available for food-fertilizing material of a slowly-soluble character. Not less important is the improvement of the moisture conditions of the soil caused by the loosening of the soil by ploughing. A friable soil allows the water to percolate down, and on the other hand the fine soil is able to retain more moisture, which otherwise, drawn from the lower soil by capillary action, would be lost by evaporation.

Land must not be ploughed in a too wet condition, otherwise it cakes still more.

An important benefit of ploughing is the stimulation of bacterial life. This subject is now engaging more and more attention, and much remains to be cleared up; but it is certain that light, warmth, air, and moderate moisture are all beneficial, and all these conditions are promoted by ploughing.

Every man who has decision of character will have enemies ; and the man who has no decision and no character can have no friends.

Feeding Wheat Crops off by Sheep.

The practice of feeding off the early wheat crops is one which is followed by many farmers who combine sheep-raising with wheat-growing, writes the Agricultural Gazette of New South Wales. This practice, when discreetly followed, has much to recommend it. It also requires considerable judgment upon the part of the farmer. Wheats cannot be fed off advantageously indiscriminately. There are many points to be taken into consideration. Wheat grown upon light open soils, and sown early, may be advantageously fed off. The tramping of the stock consolidates the soil, to the advantage of the crop. Soils which run together at the surface and contain a fair proportion of clay may be seriously injured by the tramping of the sheep. Soils which are rich in vegetable matter, and are what are termed rather strong for wheat, if sown early should be fed off. The heavy growth induced prevents the access of heat and sunlight, resulting in weakened tissues at the base of the stems which often precedes a lodged crop. The eating off of the excess of leaves aids in preventing rust and other diseases, and strengthens the straw materially.

During seasons of good autumnal and winter growth crops may grow too rankly. Such are very susceptible to frosting, and if at all practicable should be grazed. Wheat such as the Lammas, Fifes, and others, which have procumbent leaves and stems during the winter, and stool freely, are more suitable for grazing. Many of the new wheats have a more erect habit of growth, and stool sparsely; such cannot be grazed to the same extent as the former. In districts where dry early summers are the rule, wheats should be grazed in the winter, but should be let run up no later than the end of July. In districts where the rainfall can be depended upon throughout the early summer, they may be grazed later. Generally speaking, for grazing off, wheats should be sown early. Some soils are sufficiently forcing to compensate for early sowing, and may be sown later. Where wet winters are the rule, heavy soils, owing to too much consolidation by tramping, are not suitable for grazing. The crop should not be continuously grazed for a considerable period. It is preferable to subdivide sufficiently to ensure the eating off to the ground within a fortnight. Stakes and wire-netting make an easily removable subdivision fence. Sheep, when turned into large areas of rank crop, trample and spoil more than they eat. Sheep should be taken out during wet weather. All areas should be thoroughly harrowed, to loosen the surface, after being grazed. The food supplied by early sown or winter-proud crops often proves very acceptable for the sheep during a period when green food is not plentiful. The laxative effect aids the digestion of dry grasses and other fodders. Care should be taken, or excessive scouring may be induced in some animals. Sheep in poor condition should be fed cautiously for a few weeks. Ewes and lambs, if judiciously fed, are much benefited by a change on to young wheat.

Prolific Pigs.

The Irish pig is expected to pay the rent. In America the same useful animal may be trusted to buy a farm.

Not long since two men were driving by the home of a successful farmer. As they passed the house a thrifty little sow pig crossed the road between them. They remarked about the beauty of the little animal, and the older of the two remarked :—"You may not believe me, but I can take that little sow and in four years with her increase buy the best 80 acres there is in this neighbourhood, and have enough pigs left to stock up the farm and pay a good share of the expense in their keeping."

At first thought the statement does not seem possible, but a little figuring will prove it is not far from the truth.

We will suppose that the sow and all her female increase will farrow for the first time when they are a year old, and will give birth to a litter every six months thereafter, and that each litter will average six pigs, three males and three females.

At the end of the first year we have the sow and six pigs—three males and four females. In 18 months the sow has a second litter. This brings the total up to seven sows and six males. After two years have gone this sow has her third litter, and each of the three sows of her first litter also farrow. This gives us a total of 19 sows and eighteen males. In two years and a half the three sows of her second litter are old enough to farrow. This brings our number up to 40 females and 39 males. In three years the sows of the first, second, and third litters will farrow, and in addition the nine that were born to the three of the first litter. This increases the number to 97 females and 96 males. Thus it goes on in progressions till the end of four years, when we have a total of 508 females and 507 males, pigs enough to buy a good-sized farm. —Wallace E. Sherlock, in Farm, Field, and Fireside.

Rabbits.

A Victorian farmer adopted a simple and effective method of destroying the rabbits which occupy extensive warrens in his cultivation paddock. Around each of the warrens he erects a yard with 140 yards of netting. After starving them for a time, he "feeds them" —to use his own term—with jam and strychnine. When indications point to all the occupants of the warren being destroyed, the netting is raised, and others permitted to take up their quarters there when the process is repeated. This may be carried on indefinitely, or till the rabbits in the paddock are eradicated.

Milk weighs about 8½ lbs. to the gallon, varying a little, according to the per cent. of solids.

Woodlands and Water Supply.

The popular idea that extensive woodlands have a beneficial effect upon the water supply of a locality has its basis in established fact, though the actual reason for this influence does not appear to be generally understood. A note on the conclusions arrived at in this connection at Forest Experiment Stations of Germany, Austria, and France may therefore be interesting.

Briefly, it may be stated that the real effect of woodlands in this direction, as opposed to deforested areas, does not so much consist in bringing about an increase in the actual amount of rainfall experienced, as in economising the normal supply, and in modifying the agencies which tend to allow the rainfall to waste by evaporation or percolation. It is true that if very extensive areas were planted up, some small increase in precipitation might, after a time, be noticed, which would be due to the reduction of temperature associated with forests, and to the greater absolute and relative humidity of the air within the wooded area.

It appears more reasonable to conclude that, in the majority of cases, the amount of rain that reaches the ground is—generally slightly, but sometimes more appreciably—diminished over thickly wooded areas as compared with the open country. This is due to the thick canopy of leaves which intercepts a proportion of the rainfall, that is afterwards rapidly evaporated. In this connection, however, much depends on the nature of the rainfall. In a district enjoying a high annual precipitation, the proportion thus intercepted is smaller than in localities where the rainfall is light. The same is true of heavy and long-continued rain as contrasted with gentle showers. In the latter case, indeed, little of the moisture reaches the ground at all.

Observations have clearly shown, that although less rain reaches the surface of the soil in woodlands than in open country, yet this small quantity is better conserved. Forest soils are generally found to contain a large amount of moisture (in comparison with field soils in the neighbourhood). There are several reasons which account for this, the chief of which are the reduction of evaporation—owing to the exclusion of the sun's rays by the foliage, partly to the air in a forest being more humid—as a result of which evaporation is again checked, and partly to the absorbent and retentive character of the decaying vegetable matter that covers the ground of a dense and well-managed wood. It may be pointed out, too, that the rapid surface-flow of water which occurs on sloping land in the open after heavy rain is checked in woodlands by the frequently occurring tree roots.

Another agency which assists in increasing the moisture-retaining properties of forest lands is the lightening and opening influence exercised by tree roots on the soil. These penetrate to a considerable depth, and when they die they leave large holes through which water readily percolates from the surface. This percolation of moisture into the ground is facilitated by the loose and friable condition of the surface soil beneath the trees, as compared with the denser and more compact character of land in the open. The consequence is that streams in a wooded country are not so subject to rapid rises and falls, the flow being maintained more equably throughout the year.—Agricultural News.

Horns.

Of what use are the horns of the dairy cow? To the wild animal, of course, they are indispensable as a means of defence, but on the domesticated cow they are a danger. "You may get your eye poked out when you tie the animal up in the stall, while she is certain to try and rip up her neighbour whenever she gets a chance. There would be fewer torn hides and ruined milk-bags if the horns were absent, or at least rounded, like those of the Jersey breed. I am, therefore, a great advocate of having polled cows as much as possible, thought outside the Red Polls I do not know where we are to get them. . . . As a matter of descent, many of our breeds—the Shorthorn and the Ayrshire, for instance—had originally horns similar to those of the Jersey, and the wide or straight or upstanding horns we now see are the result of senseless showyard fads. If we want really to improve the utility and hardiness of our animals, we shall return to the old form."—Exchange.

Horses breed slower than any other kind of domestic stock, so it is inevitable that progress towards superiority should be gradual.

Amateur Weather Prophecy.

A writer on weather signs gives the following rules for judging the weather by clouds :—

Soft-looking or delicate clouds foretell fine weather, with moderate or light breezes ; hard-edged, oily-looking clouds, wind. A dark, gloomy blue sky is windy, but a bright blue sky indicates fine weather.

Small, inky-looking clouds foretell rain. Light scud clouds, driving across heavy masses, show wind and rain ; but if alone may indicate wind only.

High upper clouds crossing the sun, moon, or stars, in a direction different from that of the lower clouds, or the wind then felt below, foretell a change of wind towards their direction.

After fine, clear weather, the first signs in the sky of a change are usually light streaks, curls, wisps, or mottled patches of white, distant clouds, which increase, and are followed by a murky vapour that grows into cloudiness. This appearance, more or less oily or watery, as wind or rain will prevail, is an infallible sign.

Usually, the higher and more distant such clouds seem to be, the more gradual but general the coming change of weather will prove.

Light, delicate, quiet tints or colours, with soft, undefined forms of clouds, indicate and accompany fine weather ; but unusual or gaudy hues, with hard, definitely-outlined clouds, foretell rains and probably strong wind.

Misty clouds forming or hanging on heights show wind and rain coming, if they remain, increase, or descend. If they rise or disperse, the weather will improve or become fine.

Dehorning Cattle.

The two methods of dehorning usually practised are (1) the removal of the horns after they have reached their growth, by means of a saw or clippers, and (2) the prevention of the growth of the horn while the animal is yet young, by the application of a chemical.

In the early history of dehorning in America, the instrument commonly used was a sharp saw. The animal was placed in a strong stanchion, a halter placed on the head, and the nose drawn up. With the head of the animal in this position the horns could be quickly removed. The operation caused more or less excitement to the animal, and some pain. About 1890, clippers made especially for the purpose began to gradually replace the saw. By this method the animal need not be secured except to be tied to a post with a strong halter. The clippers first used crushed the horn-core, leaving a wound that took a long time to heal, but with the modern clippers this crushing is largely avoided.

There is very little choice between the use of the saw and the clippers in regard to the quality of the work done. The use of the saw requires a longer time, but in skilled hands does better work. By the use of the clippers the operation is done more quickly, and is all over before the animal has a chance to struggle. When the clippers are used the blood vessels supplying the horn are cut off smoother than with the saw, consequently bleeding does not stop as quickly. Where either the saw or clippers is used, it is necessary to get one-eight to one-fourth of an inch below the point where the horn and skin grow together to prevent further growth. Unless this precaution is taken, the horn is likely to continue to grow, giving an unsightly appearance to the head.

The operation should not be performed during either hot or cold weather. The best time is in the autumn after the flies have gone, and before cold weather sets in, or in the early spring. When the horn is cut off the frontal sinus is opened, and during cold weather the air drawn in at each inspira- is likely to cause catarrh, and give rise to serious trouble. If done in summer time the cavity frequently becomes fly-blown and filled with maggots, which prevents its healing, and causes great agony to the animal. The operation should be performed on a pleasant day, when the animals can be turned out after the work of dehorn- is completed. It is well to have on hand a little flour or other absorbent to check the flow of blood.

The easiest, cheapest and most successful method of dehorning is by the application of caustic while the animals are young. Although this causes some pain, it is merely a burning sensation, which does not last more than an hour at the outside, causes no nervous shock, and there is every reason to believe that it is much less than the pain caused by the use of saw or clippers. By the use of this method there is no set-back to the animal, as the calves never miss a feed and there is no danger of the loss of a single animal. Another advantage of this method is that it leaves a much neater head than when the horns are taken off after they reach their growth, leaving the head resembling a natural poll rather than with a square top.

The substance used is caustic potash or caustic soda, which is in sticks about the size of lead pencils, and can be procured at almost any chemist's shop. When not in use they should be kept in a closely stoppered bottle, as they will absorb water from the air and go into solution. It is claimed that this method is successful after the horn is an inch or more in length, but the best time to apply it is after the calf is a week or two old, or just as soon as the button or young horn can be felt with the finger. The best method of application is to clip the hair from around the young horn with a pair of scissors, wet the stick of caustic potash (not with the tongue), and rub it vigorously on the skin over the horn. This requires but a few minutes, and can be done by any man. A brown scab will form, which will come off in about a month or six weeks, leaving a smooth, clean poll. To protect the hand, the stick of caustic should be wrapped with paper, leaving one end exposed. Do not get it too wet or it will run down over the side of the head, making a needless sore and may get into the eye. In making the application rub in thoroughly, as many failures have been caused by insufficient rubbing.

Since this method has come into general use, a numqer of patent dehorners have appeared on the market. These are nothing more than saturated solutions of caustic soda or potash, and are sold at many times the price at which it can be purchased in sticks from a chemist. The cost of the stick form is so small as to render it almost inappreciable.

Cost of Production.

One of the things that farmers know least about in definite terms is any carefully-considered method for determining the items of cost in the production of any crop (says H. J. Spurway, in the Country Gentleman); yet, as in any other business, an accurate knowledge of such cost is very necessary to economic production and safety and success in the undertaking.

It is not always the man who knows the most who makes the greatest success, but the man who thinks. It is necessary to read, and, as a rule, the one who reads the most thinks the most. The day of haphazard farming by plenty of brawn and no brains has gone by. No two farms are exactly alike. Every farm is a separate and distinct problem, to be worked out by itself. So much depends upon the man. The man who finds that there is "no money in farming" and says, "I'm going to quit," doesn't think, or he doesn't keep accounts.

Let us first study what a man and team are worth per day. There are Sundays in a month, and probably two other days in which the man will not be working. It took me three years to figure out the cost of a horse's work. You know what corns, oats, and hay you feed the horses. I gave them the usual quantity of hay and then took it out of the mangers and weighed it. The horse includes the use of the harness and repair bills.

By running over the workbook at the end of the season we can easily get the number of days spent in working each field, and with the price per man and horse can figure the cost of the crop grown in that field. There is certain labour on the farm that must be charged to the place as general expense, and not per acre to any crop; for instance, a 40-acre field of corn may have four sides fenced; this fence is not for the benefit of the corn, but for the purpose of keeping live stock, and it should be charged to the live stock.

Farmers' Experiments.

Field experiments made by farmers in their own fields are not intended to solve problems connected with the general practice of agriculture, but to afford information as to the special needs of the farmer's own fields, and to show in how far he can increase his profit or economize by the addition or omission of certain fertilizing ingredients.

It is the province of scientific institutions to investigate general principles. It is the province of the individual farmer to ascertain by trials on his own fields to what extent the results obtained by the institutions are applicable to his farm.

Every farmer should make such experiments, because the results will afford guidance to be obtained so accurately in no other way. It is by such means that he can find out what kinds and quantities of the different fertilizing ingredients will yield the best results; in what constituents he can economize; and in what he should be more liberal.

Before the introduction of artificial manures the treatment of the soil was a simple matter; but now that the farmer has at his disposal a variety of artificials, and is recommended to expend considerable sums of money on them, it is essential that he should ascertain by actual experiment and calculation how far the expenditure will result in an increased profit. He should examine this question just as carefully as any other manufacturer before incurring outlay for increased machinery and plant calculates how far the expenditure will be remunerative.

It may be thought that an analysis of the soil, or the results obtained at an agricultural scientific institution, afford sufficient guidance, but it is not so. Chemical analysis, useful as it may be, will not show conclusively the quantity of available plant food in the soil; the results obtained at the institution; also useful in a general way and admirable as signposts showing the direction, do not indicate with precision the special requirements of the farmer's land; nothing can reveal this need but a trial on the spot.—Mark Lane Express.

A pig that is stunted in growth may recover from it to all appearances, but in all probability the poor treatment received by the parent will crop up in the offspring.

There is a distinctive character about the Suffolk Punch which he seems to have maintained from ancient times, as there is no record of any other variety of horse being used to improve the breed, the only difference being that the modern specimen is bigger than the ancient one was.

Dry Farming

It will be remembered that the ex-Minister for Lands (N.S.W.), Mr. N. Nielsen, attended the dry farming conference in America, and acted in other capacities in the United States, while a member of the Legislative Assembly. In a report to the Premier on dry "farming," he points out that the term "dry areas" is purely a relative one, and that the configuration of the country, the soil, the natural drainage both on and below the surface, the seasons during which the rains fall, and a dozen other considerations come into play in determining the value of any country or part of a country for the growth of economic plants. Mr. Nielsen deals at length with experiments carried out relative to the amount of water necessary to support the growth of plants by Hellreigel, in Germany, King, in Wisconsin, U.S.A., and also Widsoe and Merrill, in Utah, U.S.A. Looking at these experiments from the dry farming point of view the following general deductions are made :—

"1. That under arid or semi-arid conditions it requires from 500 lbs. to 800 lbs. of water to produce 1 lb. of dry matter in the ordinary crops that may be grown in dry farming country.

"2. That if wheat is taken as a fair sample of cereal products in dry farming country—that is, one that gives a fair proportion of straw, chaff, and flag to the grain—it is obvious that only about half of the dry matter produced will be grain, as dry land wheat produces about an equal weight of straw, flag and chaff to grain. It therefore follows that to produce 1 lb. of actual grain 1,000 to 1,600 lbs. of water is necessary. This means that from 27 to 43 tons of water are necessary to produce one bushel of wheat.

"3. That as 1in. of water on an acre of land weighs about 226,397 lbs., or, roughly, 101 tons, if the whole of this water could be converted into dry matter it would be equal to a production of from 2 1-3 bushels to 3¾ bushels of grain per acre per inch of rainfall, and a 10-inch rainfall, if all could be stored and used, would produce from 21 to 27 bushels per acre."

— Limitations. —

"Of course, it is impossible," Mr. Nielsen adds, "to get the benefit of the whole of the rainfall of the year; part of it falls outside the growing season altogether, and must, to some extent, be eliminated from consideration, except, perhaps, to the extent that it can be retained in the soil by fallowing and other forms of scientific agriculture. But, allowing that even two-thirds of the total rain is available, mostly by reason of it falling during the growing season, and partly by it being stored in the soil during the off season; and assuming as a basis of calculation that the crop only gets the full benefit of two-thirds of this by the employment of all the known sctientific methods of dry farming, a 10-inch rainfall would thus leave for the actual growing use of the grain about 4½ inches of this amount. This should produce from 10½ to 16¾ bushels of grain per acre. These figures may be fairly considered as the possibilities of dry farming methods in parts of the country where the rainfall is 10 inches or thereabouts per annum under ordinary conditions. If the mean of these figures is taken, dry farming in a 10-inch rainfall should produce an average of 13½ bushels of grain per acre. This would mean 27 bushels in a 20-inch rainfall, and 40 bushels in a 30-inch rainfall, if the same proportion of the water falling should be conserved."

Allowing for the other factors, Mr. Nielsen says: "By the adoption of proper dry-farming methods on all the suitable lands of any country where the rainfall is less than 30 inches per year, crops of from 10 to 35 bushels of grain may be expected where now are grown from nothing to perhaps 15 bushels." The report points out that in New South Wales, only 36 per cent. of the land surface has over 20 inches of annual rainfall, while 64 per cent. has less than that amount, of which 25 per cent. has less than 10 inches annually. In the United States the proportions are, roughly, 49 per cent. under 20 inches and 51 per cent. over 20, and of the 49 per cent. under 20 inches 18 per cent. has under 10 inches.

— Main Principles. —

The main principles underlying dry farming are the retaining in the soil, not only of the water that falls during the actual growth of the plant, but also a proportion of that which falls during the period between harvesting and sowing. The treatment of the soil that secures this end is the essential basis of all dry-farming operations. Plants will not grow without water. No amount of fertility in the soil and no amount of commercial fertiliser that may be added will cause plants to grow and mature without water.

— Fallowing. —

Dry-farming has gone beyond the experimental stage; its practical application has been carried into effect more or less in every country in the world. What is now required to complete the usefulness is to secure its general adoption by the man on the land. To do this he must be shown first that it is practicable and second that it is profitable. It would be useless to urge its adoption unless it would be shown that the returns justified the extra work involved. With the exception of very exceptional natural phenomena, there is no reason, except the shortcomings of the farmer himself, why failure of crops should take place in any country where the rainfall is 10 inches or over per annum. The value of fallowing land is not only because it helps to keep the water in the soil, but also because it allows the greater part of the rain that falls to get into the land and break up the soil into finer particles. Fallowing also prevents the growth of weeds and other useless plants which rob the soil of much of the moisture that would otherwise be available for the crop. It should not only consist of a simple turning over of the soil, though this in itself is very valuable, but it should be carried out in such a way as to prevent as much as possible the "run-off" of any rain that falls; and made quite effective in securing the sinking of such rainfall well into the sub-soil. It should provide for the cultivation of the top portion of the soil to provide a dust mulch (to break the capillary action or surface tension, which draws the moisture from the soil upwards) and so prevent evaporation; and never be considered sufficiently well done unless it ababsolutely prevents the growth of weeds and other useless plants.

To secure these ends it is necessary, (1) to plough deeply so as to open up the land and give the subsoil a chance to participate in the economy of the process; (2) to cultivate the top of the ploughed land so as to secure the dust mulch and the breach of the upward capillary action of the soil, and so check evaporation; (3) to do this after every considerable rain so as to keep this breach up and also to prevent the growth of weeds. If these rules are followed the greatest results will be secured, and it is possible by this means to keep available the greater part of the that the land receives throughout the operations both of the fallow and the growth of the crop.

— A Lesson From Nebraska. —

Mr. Nielsen states that Alway, of Nebraska has conclusively proved by his experiments that it is possible to grow wheat without any water being added to the soil after planting. He filled cylinders of galvanised iron, 6ft. long, with soil and added water until the soil was full, the surplus water was then allowed to drain off, and the cylinders sealed, except at the top. Wheat was then planted in the moist surface soil, and about an inch of dry dust was added to prevent evaporation. No more water was added, and the air kept dry. The wheat developed in from 132 to 143 days, and was normal in every way, and produced a crop considerably above the average crops of the State. The advantage that the wheat in these experiments had over wheat grown under field conditions was in the 6ft. of the depth of soil, a condition that does not always exist in actual field practice, but it is very valuable in showing that, so long as sufficient moisture can be secured and conserved to supply the requirements of the crop, the fact that it does not fall in the growing season does not necessarily result in a failure. In fact, it shows that success is assured so long as the necessary amount of water can be stored in the soil.

It has been conclusively proved in the arid and semi-arid parts of the United States, as well as in other countries using the dry-farming system, that by each year's cultivation the surplus water is allowed to penetrate deeper and deeper, so that an arid farm each year it is used becomes more and more drought resistant through its sub-soil each year becoming more and more capable of saturation.

By proper methods of dry-farming it is possible to store in the soil not only the amount actually required for the crop grown during any season, but in addition to this almost the whole of the surplus moisture that enters the land and is not used up by the growth of the crop. Thus at the harvest time, if proper methods have been adopted, there is always a fair proportion of soil moisture remaining to go towards next season's crop, and to provide against any deficiency that there may be in that season's rainfall.—"Dalgetty's Review."

Molasses as a Stock Food.

The fattening effects of molasses when used as a stock food are well known, and in Great Britain, there are many proprietary feeding stuffs on the market of which molasses is the chief constituent. In Louisiana, it is reported, the practice of feeding this material to draught animals, as a regular portion of their daily ration, is growing in favour. From figures collected by an official at the Louisiana Experiment Station, it appears that about 10 lbs. of molasses per head is the average quantity fed to the horses and mules. Some green food, such as pea vines or cane tops, are chopped and mixed with the molasses, as well as a few pounds of some concentrated food, such as cake or corn. It is always desirable to begin with small amounts of molasses when this material is first introduced into a ration.

The conclusions drawn from the data collected in Louisiana are certainly in accord with the generally accepted view that molasses, where it is available at reasonable prices, constitutes a nutritious and easily digested, as well as economical, constituent of a ration for draught animals.—Agricultural News.

The Most Profitable Breed

An interesting experiment was made some years ago in Iowa to test the relative merits of various breeds of sheep. Ten lambs of each variety were selected and fed in the same way. Of the English breeds, the Cotswolds gained most rapidly in weight, the Suffolk and Lincoln breeds coming next, and the Oxfords and Dorsets last. As regards yield of wool, the Lincolns came out at the top with a fleece averaging 12.85 lbs.; the Cotswolds came next, with fleeces of 12.65 lbs.; the Leicesters, 11.50 lbs.; Oxfords, 10.95 lbs.; Shropshires, 8.75 lbs.; Suffolks, 7.65 lbs.; Dorsets, 6.8 lbs.; Southdowns, 6.75 lbs.; and Merinos, 9.9 lbs. The most valuable fleeces in natural condition were the Leicesters, the Lincolns, Cotswolds, and Oxfords, following in that order. The Merino fleeces were valued at the least money per pound in the natural condition, but after scouring commanded by far the highest price. The merino fleeces shrank no less than 67 per cent. in weight. The Leicesters shrank the least, only 38 per cent.

A horse may never be known to kick, and yet around his heels is no place for small children; for after the explosion regrets won't mend the pieces, nor clubs better the horse.

Vitality of Farm Seeds.

An extensive series of experiments was commenced in 1896 with a view to testing :—(1) how long under ordinary conditions of storage the vitality of certain seeds is maintained ; (2) to determine the annual loss of vitality ; (3) to ascertain the real value of seeds held over for one or two years ; and (4) to investigate the rapidity of germination of the seeds experimented with. Samples of forty-three kinds of seed, including those of six cereals, seventeen grasses, twelve clovers, six turnips and allied plants, carrot and yarrow, from the harvest of 1895 were obtained. The samples have been stored in paper bags in the close-fitting drawers of a cabinet, and have been regularly tested each year. Full details of the results are given ; the following is a brief summary :—

— Cereals. —

In the case of barley and wheat the germination was but little affected during the first five years, but thereafter a rapid loss of vitality occurred, and proceeded at an increasing rate till in the tenth year no live seeds remained. Oats were quite different ; not until the ninth year was there any serious loss of vitality, but by the end of the fourteenth year no living seeds of white oats remained. Some of the black oats lived for two years longer. The great vitality of oats as compared with wheat or barley is stated to be due to the protection afforded to the embryo of the oat by the fact that in its case the glumes which, in wheat and barley, fall off as chaff, remain attached to the seed.

— Grasses. —

The death of all these seeds occurred between the eighth and the thirteenth year, but there was a good deal of variation as to the manner in which the loss of vitality occurred. Some, such as timothy and tall oat grass suffered little for the first four years, though after that the loss was rapid ; in others, such as hard fescue and sheep's fescue, the loss was heavy and rapid until a germination of below 10 per cent. had been reached, but after that it remained stationary for a year or two. Still others, such as Italian rye grass and meadow fescue, showed a fairly steady decline from first to last.

— Clovers. —

Of the three true clovers, all the seeds of red were dead in eleven years ; alsike and white showed a small percentage of germinating seeds in the eleventh year. Sainfoin was shorter lived and lucerne survived two years longer. On the whole the clovers lose little during the first three or four years, then there is a rapid loss for another four years, and finally the last 10 per cent. of germinating power is only slowly lost during the space of another three or four years.

— Turnips and Allied Plants. —

The special feature of this group was the remarkable drop in the germination during the tenth year.

— Rapidity of Germination. —

In these experiments records were also kept to ascertain the rapidity of germination, a character in which seeds differ greatly. In the first year eleven kinds of seeds completed their germination within a week, viz., barley, white oats, meadow fescue, timothy, white clover, sainfoin, swedes (2), turnips (2), and rape. On the whole, as the seeds became older the time required for germination increased, though it was noticeable that in the case of the five seeds—smooth-stalked meadow grass, wood meadow grass, cocksfoot, sweet vernal, and sheep's fescue—which were specially slow in germinating, every one showed more rapid germination in the second year than in the first, and in three of them it was more rapid still in the third year.—Journal of the Board of Agriculture.

Extermination of Rats.

Writing to the Editor of the South African Journal of Agriculture, a correspondent says :—Some time ago we noticed considerable correspondence re exterminating rats in the garden. We were very much troubled with a certain species of field rat, which burrowed in the ground, generally haviag three entrances. We tried several kinds of poison, cement mixtures, etc., which killed many, but could not exterminate them. We were then advised to try bi-sulphate of carbon, and we found it effectually exterminated the rats. The recipe is as follows :—

"First place some sulphur over the fire (any tin will do), then dip strips of cloth in this and hang them up to dry, which they will do in less than a minute. Next hold a strip over the entrance of the hole, light it, and blow the smoke into the hole with a bellows. Wherever the smoke emerges cover it up with earth, leaving open the hole into which you are blowing. This will make the burrow airtight except for the open hole.

Next take a piece of ordinary garden hose one yard long (⅝in. will do), place one end well into the hole (about three-quarters the length), and pour about a quarter or a third of a bottle of bi-sulphate of carbon through the hose into the hole, pulling the hose out sharply as soon as you have finished pouring, so as to leave a trail of liquid to the entrance. Stand clear of the hole and drop a lighted match on the dampness, when the whole lot will immediately explode. Some one must be standing ready with a spadeful of earth, and as soon as the explosion takes place the earth must be dropped on to the hole, as as not to allow the fumes to escape. The fumes will then travel into every corner of the burrow and will asphyxiate the rats."

Anybody trying this recipe had better take a long stick, make a cleft in one end, and insert a piece of wadding into this. Dip this wadding into methylated spirits, or else kerosene oil, ignite it, and apply the flame to the dampness. He can then see with complete safety how the explosion takes place, and can avoid being injured if working in hard ground.

Bi-sulphate of carbon will not explode by being shaken, but great care should be taken to keep it away from any flame whatever, as it will explode (if cork is not secure) from a flame a foot away. You can ascertain if you have bi-sulphate of carbon by dipping a finger in it, when the finger will turn ice cold. It is a liquid looking like water, but having a disgusting odour. In hard ground the explosion is severe, often ripping up the burrow. In light sandy soil the report is a muffled puff of flame, to be immediately covered.

Flies in the Dairy.

The Journal d'Agricdlture Pratique says :—It has been found that flies have a great objection to the colour blue, and if tenements infested with flies are washed with a blue instead of a white wash, flies will desert the place. In support of this, an instance is reported by that journal :—" A farmer had 170 cows housed in different sheds; they were pestered witn flies, but he observed that in one shed, the walls of which were a blue tint, the cows were not worried. He therefore added a blue colour to the lime with which he washed the walls of his buildings, and from that time the flies have deserted his buildings. The following formula is used by him for the wash :—To 20 gallons of water add 10 lbs. of slacked lime and 1 lb. of ultramarine. The washing is done twice during the summer.

Many a woman is not making as good butter now as when she set milk in dishes, owing to the fact that she does not quickly cool the cream as it comes from the separator. It must be set in cold water and stirred occasionally.

The best pigs are found only among the best breeds, and it is useless to look for them elsewhere.

The Life of a Tree

From Bulletin 175, U.S.A. Dept. of Agriculture.

(Continued from April Issue.)

— Annual Rings. —

It is correct to speak of these rings of growth as "annual rings," for as long as the tree is growing healthily a ring is formed each year. It is true that two false rings may appear in one year, but they are generally so much thinner than the rings on each side that it is not hard to detect them. Very often they do not extend entirely around the tree, as a true ring always does if the tree is sound. Whenever the growth of the tree is interrupted and begins again during the same season, such a false ring is formed. This happens when the foliage is destroyed by caterpillars and grows again in the same season, or when a very severe drought in early summer stops growth for a time, after late frosts, and in similar cases.

— Heartwood and Sap. —

An annual layer once formed does not change in size or place during the healthy life of the tree, except that it is covered in time by other, younger layers. A nail driven into a tree 6 feet from the ground will still be at the same height after it is buried under 20 or 50 or 100 layers of annual growth. But in most trees, like the oaks and pines, the wood becomes darker in color and harder after it has been in the tree for some years. The openings of its cells become chocked so that the sap can no longer run through them. From living sapwood, in which growth is going on, it becomes heartwood, which is dead, because it has nothing to do with growth. It is simply a strong framework which helps to support the living parts of the tree. This is why hollow trees may flourish and bear fruit. When the tree is cut down, the sapwood rots more easily than the heartwood, because it takes up water readily and contains plant food, which decays very fast. Not all trees have heartwood, and in many the difference in color between it and the sapwood is very slight. Since water from the roots rises only in the sapwood, it is easy to kill trees with heartwood by girdling them, provided all the sapwood is cut through. But in those whoch have no heartwood the tubes of the older layers of wood can still convey water to the crown, and when such trees are girdled it is often several years before they die.

A great many theories have been proposed to account for the rise of water into the tops of tall trees, some of which, as in the big trees of California, may be over 300 feet from the ground. But none of these theories is quite satisfactory, and it must be admitted that we do not yet know how the trees supply their lofty crowns with the water which keeps them alive.

— Trees in the Forest. —

The nature of a tree, as shown by its behavior in the forest, is called its silvicultural character. It is made up of all those qualities upon which the species as a whole, and every individual tree, depend in their struggle for existence. The regions in which a tree will live, and the places where it will flourish best; the trees it will grow with, and and those which it kills or is killed by; its abundance or scarcity; its size and rate of growth—all these things are decided by the inborn qualities or silvicultural character, of each particular kind of tree.

— The Various Requirements of Trees. —

Different species of trees, like different races of men, have special requirements for the things upon which their life depends. Some races, like the Eskimos, live only in cold regions. Others, like the South Sea Islanders, must have a very warm climate to be comfortable, and are short-lived in any other. So it is with trees, except that their different needs are even more varied and distinct. Some of them, like the willows, birches, and spruces, of northern Canada, stand on the boundary of tree growth. Many other species grow only in tropical lands, and can not resist even the lightest frost. It is always the highest and lowest temperature, rather than the average, which decides where a tree will or will not grow. Thus the average temperature of an island where it never freezes may be only 60 degrees, while another place, with an average of 70 degrees, may have occasional frosts. Trees which could not live at all in the latter on account of the frost might flourish in the lower average warmth of the former.

In this way the influence of heat and cold on trees has a great deal to do with their distribution over the surface of the whole earth. Their distribution within shorter distances also often depends largely upon it. Even the opposite sides of the same hill may be covered with two different species because one of them resists the late and early frosts and the fierce mid-day heat of summer, while the other requires the coolness and moisture of the northern slope. On the eastern slopes, where the sun strikes early in the day, frosts in the spring and fall are far more apt to kill the young trees or the blossoms and twigs of older ones than on those which face to the west and north, where growth begins later in the spring, and where rapid thawing, which does more harm than the freezing itself, is less likely to take place.

— Requirements of Trees for Heat and Moisture. —

Heat and moisture act together upon trees in such a way that it is sometimes hard to distinguish their effects. A dry country or a dry slope is apt to be hot as well, while a cool northern slope is almost always moister than one turned toward the south. Still the results of the demand of trees for water can usually be distinguished from the results of their need of warmth, and it is found that moisture has almost as great an influence on the distribution of trees over the earth as heat itself. Indeed, within any given region it is apt to be much more conspicuous, and the smaller the region the more noticeable often is its effect, because the contrast is more striking. Thus it is frequently easy to see the difference between the trees in a swamp and those on a dry hillside nearby, when it would be far less easy to distinguish the general character of the forest which includes both swamp and hillside from that of another forest at a distance. In many instances the demand for water controls distribution altogether. For this reason the forests on the opposite sides of mountain ranges are often composed of entirely different trees. On the west slope of the Sierra Nevada of California, for example, where there is plenty of moisture, there is also one of the most beautiful of all forests. The east slope, on the contrary, has comparatively few trees, because its rainfall is very slight, and those which do grow there are small and stunted in comparison with the giants on the west. Again, certain trees are commonly found only in very moist land; others, only on the driest soils; while still others seem to adapt themselves to almost any degree of moisture, and are found on both very wet and very dry soils. In this way the different demands for moisture often separate the kinds of trees which grow in the bottom of a valley from those along its slopes, or even those in the gullies of hillsides from those on the rolling land between. A mound not more than a foot above the level of a swamp is often covered with trees entirely different from those of the wetter lower land about it.

Such matters as these have far more to do with the places in which different trees grow than the chemical composition of the soil. But its mechanical nature—that is, whether it is stiff or loose, fine or coarse in grain, deep or shallow—is very important, because it is directly connected with heat and moisture and the life of the roots in the soil.

— Requirements of Trees for Light. —

The relations of trees to heat and moisture are thus largely responsible for their distribution upon the great divisions of the earth's surface, such as continents and mountain ranges, as well as over the smaller rises and depressions of every region where trees grow. But while heat and moisture decide where the different kinds of trees can grow, their influence has comparatively little to do with the struggles of individuals or species against each other for the actual possession of the ground. The outcome of these struggles depends less on heat and moisture than on the possession of certain qualities, among which is the ability to bear shade. Tolerant trees are those which flourish under more or less heavy shade in early youth; intolerant trees are those which demand a comparatively slight cover, or even unrestricted light. Later in life all trees require much more light than at first, and usually those of both classes can live to old age only when they are altogether unshaded from above. But there is always this difference between them: the leaves of tolerant trees will bear more shade. Consequently the leaves on the lower and inner parts of the crown are more vigorous, plentiful, and persistent than is the case with intolerent trees. Thus the crown of a tolerant tree in the forest is usually denser and larger than that of one which bears less shade. It is usually true that the seedlings of trees with dense crowns are able to flourish under cover, while those of light-crowned trees are intolerant. This rough general rule is often of use in the study of forests in a new country, or of trees whose silvicultural character is not known.

— Tolerance and Intolerance. —

The tolerance or intolerance of trees is one of their most important silvicultural characters. Frequently it is the first thing a forester seeks to learn about them, because what he can safely undertake in the woods depends so largely upon it. Thus tolerant trees will olten grow vigorously under the shade of light-crowned trees above them, while if the positions were reversed the latter would speedily die. The proportion of different kinds of trees in a forest often depends on their tolerance.

The relation of a tree to light changes not only with its age, but also with the place where it is growing, and with its health. An intolerant tree will stand more cover where the light is intense than in a cloudy northern region, and more if it has plenty of water than with a scanty supply. Vigorous seedlings will get along with less light than sickly ones. Seedlings of the same species will prosper under heavier shade if they have always grown under cover than if they have had plenty of light at first and have been deprived of it afterwards.

— The Rate of Growth. —

The rate of growth of different trees often decides which one will survive in the forest. For example, if two intolerant kinds of trees should start together on a burned area of an old field, that one which grows faster in height will overtop the other and destroy it in the end by cutting off the light.

The place where a tree stands has a great influence on its rate of growth. Thus the trees on a hillside are often much smaller than those of equal age in the rich hollow below, and those on the upper slopes of a high mountain are commonly starved and stunted in comparison with the vigorous forest lower down. The Western Chinquapin, which reachs a height of 150 feet in the coast valleys of northern California, is a mere shrub at high elevations in the Sierra Nevada. The same thing is often observed in passing from the more temperate regions to the far north. Thus the Canoe Birch, at its northern limit, rises only a few inches above ground. Farther south it becomes a tree sometimes 120 feet in height.

(To Continued.)

Milking.

Milk may, and often does, receive taints during the process of milking which cannot be removed by any subsequent treatment. The cow-house should not be cleaned out while the cows are being milked, nor fodder disturbed at this time. Feeding is best done either before or after. Dirty udders must be washed or well wiped with a damp cloth before milking begins. The hands of the milker cannot be too clean, and should be washed or rinsed after milking each cow; the habit of dipping them into the milking pail or wetting them by milk from the udder cannot be too strongly condemned. The first jet or stream of mi from each teat should be allowed to fall on the ground. Milk from an inflamed undder or teat should be drawn into a separate vessel and fed to pigs. Milk from freshly-milked cows should not be used for butter-making until it has assumed the character of ordinary milk. Clean, quick milking is most important if the milking capacity of the cow is to be maintained and the full yield of butterfat obtained. The milk of each cow should be strained directly it is milked through a fine wire strainer or four folds of muslin or straining cloth. The immediate straining is most important, as many particles of dirt would have become disseminated through the milk before it reaches the dairy.—The New Zealand Farmer Stock and Station Journal.

Protecting Seed Maize.

One of the safest and best ways of tarring maize and yet not affecting its use in a drill is said to be the following. The idea is quoted from an American Exchange which states that the method is largely practiced over large areas of the corn belt as a protection against birds, mice, etc. Put one-fourth to one-half bushel of seed maize in a tub, pour in a pail full of hot water or enough to cover the seed, dip a stick in gas tar and stir this briskly until the seed is entirely black, then pour off on to bran bagging, spread in the sun and stir two or three times during the day. If this is done in the morning and the day is sunny, the seed will be ready for sowing next day.

Dairying.

Dairying is depressed by one element that must for ever stand in the way to block the dairyman from success. That element is the small-yield cow. Many a milk producer, with a herd of thirty such cows, representing an investment of £200 or £250, is losing money regularly, and must lose as long as he insists on operating with such cows. He can invest his £250 in, say, twelve cows that cost £20 apiece, and these cows will give him more milk than thirty scrubs give him. He would save the feed of eighteen cows, with all the labour and other costs of their keep, and he would be in the way to make money. There is no change in farm and market conditions that promises ever to put a profit into dairying carried on with cows that average 1,000 to 1,500 quarts of milk per head per year, and producers may as well open their eyes to this truth.—New York Farmer.

Bits of Dairy Wisdom.

Few farmers realize what it costs to be rough with cows.

Make a test and be convinced. Use the Babcock test when the cows are handled quietly and properly, and again when they are yelled at and hurried in the stable.

The loss following rough treatment will astonish most farmers.

A careful milker, quiet in his ways about the stable, is worth pounds more in a single season than one who is brutal.

There is not a cow, no matter how poorly bred, that will not respond to kind treatment.

The more highly bred she is the more susceptible she is to these influences.

Never allow a harsh, unfeeling man to handle the cow barn. It is not possible to give a cow too much care.

Profitable dairying depends largely upon getting cows to eat large quantities of feed.

To do this the feed must be palatable and healthful.

Stinting in the feed will never bring full production and profit.

A Comparison.

Experiments were made on the Somersetshire County Experimental Farm, near Taunton, a few years ago, to ascertain the truth or reverse of the theory that the feed of cows should be in proportion to their live weight. The Shorthorn and Jersey cows were weighed, and the former found to be about 50 per cent. the heavier. The ration of food, therefore, given to the Shorthorns was half as much again as that given to the Jerseys—6 lbs. of cake to each Shorthorn per day and 4 lbs. to each Jersey, and so with cabbages, carrots, hay, and roots. The milking returns showed that the extra milk given by the larger cows was in almost exact proportion to the extra food consumed, though the Jerseys proved the better when the quality test was applied.

The horse that contracts bad habits readily is generally one that can be taught the most useful traits with the least trouble.

A Waste.

The Experimental Farm at Guelph, Ontaria, reports on the amount of feed consumed, bedding used, and manure produced by a calf the first three years of its life. The total weight, including 6 tons and a third of straw was 29.64 tons. The manure produced was analyzed, and it's value determined on the basis of its equivalent in commercial fertilizer. The total value of the manure was £30. This fact shows the enormous waste that is going on when proper care of the manure is not had.—Exchange.

Dairy Trials.

Some interesting dairy trials were made at Buffalo, U.S.A., about six years ago. Five cows of each of ten breeds of cattle were selected, and the milk-yield of each batch for six months was registered. Three of the breeds were essentially American—viz., the Polled Jersey, Dutch Belted, and French Canadian; the other seven were Shorthorn, Ayrshire, Guernsey, Jersey, Red Poll, Dutch and Swiss dairy varieties. The Dutch cows gave the best record, producing the largest quantity of milk, butter-fat, and butter. Their yield was 3,900 gallons of milk; the Ayrshires came next with 3,300 gallons, the Shorthorns 3,180, Swiss 3,080, Red Polls 2,869, Guernseys 2,710, and Jerseys 2,690. The three American breeds were far behind these seven. The best individual butter yield was that of a Guernsey, 354 lbs., a Red Poll coming next with 323 lbs. The Guernseys' butter proved the most profitable, and that of the Shorthorns' the least of the seven.—Exchange.

Moist Facts for Dry Farmers.

By Geo. L. Sutton, Agricultural Commissioner for the Wheat Belt (W.A.)

Moisture can be stored in the soil.

To store moisture, the soil must be able to absorb the rain that falls.

Loose soil will absorb 40 per cent. of its weight of water.

Compact soil will absorb only 20 per cent.

Cultivation or tillage loosens the soil.

Cultivation or tillage some time previous to the sowing season is known as fallowing.

Dehoring.

dehorning of calves:—"Clip the dehorning of calvs:—"Clip the hair off from over the point where the horn will grow; then grease with lard the parts surrounding the horn germ, but put no grease over the germ; then moisten the end of a stick of potash and gently rub on the horn germ until the hair begins to brown and the skin looks slippery, and the job is done. Please keep in miod that it is far from a painless operation, although bloodless. The little calf really suffers more from the burning of the caustic—probably twenty times as much—than the mature animal does in having the horns removed with the clippers, as it is a continuous pain for several hours. All in all, I don't personally advise it, as cattle grow up just as pugnacious when dehorned in calfhood." — Sydney Morning Herald.

Fallowing Stores Moisture.

The longer the period between the initial operation of fallowing and that of planting, the greater will be the quantity of moisture stored.

In dry districts fallowing should commence early.

The moisture stored by fallowing is wasted by weeds.

Weeds can be destroyed by surface cultivation.

The stored moisture is easily lost by evaporation.

Much of this can be prevented by mulching, or covering the moist soil with straw, litter, or loose dry soil.

The only practical mulch for large areas is the soil mulch.

Soil mulches, to be effective, must be loose and dry.

An effective soil mulch is produced by tilling or cultivating the surface of the fallowed land from two to three inches deep.

Skim Milk Paint.

A cheap and durable paint for fences and other outdoor work is made by mixing two quarts of milk, 8ozs. fresh slaked lime, and 6ozs. boiled linseed oil. The lime must be slaked in cald water and allowed to fall into a fine powder; then mix it with one-fourth part of the milk, adding the oil by degrees. Stir with a wooden spatula, adding the remainder of the milk. Lastly, add 3 lbs. of the best whiting; the whole to be thoroughly mixed. Two coats are necessary, and this quantity is sufficient for 27 yards twice over. Dry ochre paint may be used instead of the whiting, thus making any color of brown desired.

Cream will weigh about 8 lbs. to the gallon, varying according to the per cent. of butter fat. The richer the cream the less it weighs.

Kerry Cows.

The native home of the Kerry is in Ireland, of which country it is the only distinct breed of cattle. Kerry cows are small in size, an average cow weighing no more than 700 lbs., while the average weight of a Jersey is about 850 lbs., of an Ayrshire, 1,100 lbs., and of a Shorthorn, 1,350 lbs. The usual colour of the Kerry is black, with white streaks along the belly and udder, but they are sometimes black and white. This breed possesses short, thick, wiry hair, and long horns, set somewhat widely apart. The great point in favour of the Kerry cow is that it is hardy and able to exist on the scantiest and roughest fare, and is nevertheless capable of giving excellent yields of milk. In Ireland and parts of England this breed is known as "the poor man's cow."

Mistakes in Silo Filling.

One mistake in filling silos is that the stuff is drawn away from the sides, so letting the air down between the silage and silo, in which case there is considerable waste. This is due to the fact that the middle is kept too full, and the sides not full enough, nor yet trampled enough. The weight of the silage from the elevator continually falling in the middle is almost sufficient to insure consolidation at that part, and the outside should be kept at least three feet higher than the middle, and well trampled. It would pay to have planks cut the shape of the silo to lay on the top to exclude the air, and on the top of these planks to place weights, either in the shape of posts, sleepers, bags of sand, or whatever is easiest to handle.

Another mistakes is sometimes made in making the silo too great in diameter. This should be proportionate to the number of animals to be fed. King gives the following table as furnishing the best guide as to the diameter of silo, which insure sufficient being removed from the surface daily to prevent any going bad :—

30 cows	...	150 sq. ft.	...	14 ft.
40 cows	...	200 sq. ft.	...	16 ft.
50 cows	...	250 sq. ft.	...	18 ft.
60 cows	...	300 sq. ft.	...	19¾ ft.
70 cows	...	350 sq. ft.	...	21¼ ft.
80 cows	...	400 sq. ft.	...	22¾ ft.
90 cows	...	450 sq. ft.	...	24 ft.
100 cows	...	500 sq. ft.	...	25¼ ft.

The Consitution of the Jersey.

It might possibly be supposed that a breed of animals so long and so closely hedged round by precautions against outside influences might show deterioration from in-and-in breeding, but practically this is found to be by no means the case ; in fact, it is with good grounds believed that the type of animals is constantly improving. Beyond the experience on this point, gathered within recent memory, there are in existence in Jersey pictures of cows drawn years ago, representing animals whose shape and general character would now be considered very defective, and these pictures thus prove that careful mating and the advance of scientific knowledge in the management of stock have attained the ends that were desired in the improvement of the race, without suffering any drawbacks from the deprivation of an admixture of flesh blood. One thing is certain, there is no endemic disease among Jersey cattle. Tuberculosis is quite unknown, and so marked and irrefutably established is its absence that Jersey enjoys the privilege of exporting cattle to America, without their previous examination for this disease, a privilege conceded by the United States to no other country. Other complaints, anthrax, redwater, etc., unfortunately so rife elsewhere, have never made their appearance in this happy land, and it is therefore abundantly evident that there is no delicacy in the constitutions of its cattle.—Farmer and Stockbreeder.

Dairying.

— Churnability of Cream. —

In an article, by Messrs. Cooper, Nuttall, and Freak, of the Cooper Research Laboratory, dealing with the fat globules of milk, a number of investigations are described which were undertaken with the object of explaining the variations in the behaviour of cream in churning. It appears that the cream of various breeds—and even the cream of individual cows—shows a persistent difference in behaviour as regards the time required for churning and the amount of fat recovered in the form of butter. It appears that cream in which the average size of the globules is large gives the best results for butter making, whereas for cheese making the smaller globules give better results, which confirms the experience of practical men.

An Insect Injurious to Stored Grain.

The Grain Weevil (Calandra granaria).

This is a small black or dark-brown beetle, averaging rather more than one-eighth of an inch in length. It is provided with a long smooth cylindrical snout—that of the female being the longest. It has no wings under the wing-cases.

The female bores a slight hole in the grain with her snout, deposits her eggs in the wheat or other grain (for almost all kinds are attacked), the tiny larvæ are hatched, burrow into and through the corn, inside which they remain until full-grown, when they eat their way out. The perfect beetles do even greater damage than the larvæ, for they, too, feed on grain. When the attack is severe, the whole stock in a granary will sometimes be destroyed before the damage is observed, for the work is all carried on inside the shell of the grain, and there is nothing to rouse the suspicion of the passer-by.

The time occupied between the pairing of the beetles and the hatching of the eggs is about forty days. During warm weather this beetle breeds most rapidly, and it has been calculated that during the summer one pair will produce over six thousand beetles. This is quite sufficient to account for the devouring of huge quantities of grain in a short time.

Occasionally these insects do considerable damage, especially, if from any circumstances, grain is held over for any lengthened period.

Luckily, a simple, cheap, and efficient remedy is available—bisulphide of carbon. Where small lots of grain or seed have been attacked, they should be put in a tight box or tank. Place a small quantity of the chemical in a shallow vessel, or on a piece of cotton wool on the top of the grain and tightly close the tank. Bisulphide of carbon evaporates rapidly on exposure to the atmosphere, and as the fumes are heavy, they quickly sink through the grain, killing all the insects present.

If large quantities are to be treated the granary should be made as airtight as possible, and the bisulphide then spsinkled over the heaps, or placed on top in shallow vessels. One pound of the chemical is sufficient for a ton of grain, unless the buildings have many openings, in which case a larger quantity will be needed. The fumigation of such buildings is best performed on Saturday, and the place then securely locked for forty-eight hours, after which the premises may be ventilated. This should be repeated once every five weeks while the grain is in store. It will then be found perfectly sound, for no insect life can withstand bisulphide. This treatment does not in any way damage the grain, either for seed or milling purposes. All fumes disappear on exposure to the air for a few minutes.

It must always be remembered that no trace of fire, not even a cigar, is to be allowed on the premises while this chemical is being used; the fumes are very explosive. This is the only precaution necessary.

Poultry Notes

EXPECTATIONS.

Do not expect too much of a good thing. We all read of 100 per cent. hatches, but they do not always or even often come off. It will save a heap of disappointment with travelled eggs, if we consider 75 per cent. as an extra good result and 60 per cent. as quite satisfactory. Work out your own average for last season before you begin to bless (with variations) the seller of a setting from which you have just hatched eight chicks. There are a lot of unreasonable people in the world, but the buyer of eggs for hatching often takes a prominent position in the crowd.

SORTING OUT.

It is surprising what a number of useless birds are still kept in many suburban poultry yards. A rigid sorting out in such cases would certainly make the poultry balance sheet look more rosy. Discussing this subject a correspondent to an English paper writes—Breed is of less importance than the individual. In selecting the individuals that are to compose the flock there are often a few specimens that are not wanted. Old birds are not profitable. Don't keep an old hen simply because she has some peculiarity you like. Sentiment is all right in its place but in the poultry yard it doesn't always pay. The second season as a rule is long enough for the best hen to live. Don't have immature pullets in the flock. Have them well developed before cold weather comes. Have no cripples or deformed birds; none that are of have been sick. If you want to breed true to the breed cull out all that are off in color and shape. Cull out the lazy birds. Have no loafers. Like begets like. Have no male that is not vigorous and full of life. Have the flock made up of individuals that are a good representation of the breed, a fair size rather than over or under. Have them well matured and from a good healthy parent stock." Very good advice and well worth acting on—to-day.

KEEP A FEW FOWLS.

Considering the price of eggs during the past three or four years the fact that there does not appear to be any probability of there being any marked decrease in the cost of this very essential kitchen requirement, it would not seem to be necessary to urge every suburban householder to keep a few birds to at least supply that very necessary adjunct of the breakfast table—the new laid egg. The average commercial egg may be good enough for ordinary cooking purposes, but for boiling shop eggs do not come within coo-ee of the home grown article. Looked at from any point of view the keeping of a few fowls is a good proposition. In the average home the waste of the kitchen and garden will easily supply half the food necessary to keep from six to eighteen fowls. This means that the bought food will average certainly under 3/- per head. Allowing that they lay twelve dozen eggs each and it is by no means an unduly liberal estimate, and we get anything from 72 to 216 doz. prime eggs at a cash cost of 3d. per doz. as against four to five times that amount, which is the average price of a much inferior article, taking the year right through. A few pounds is not a fortune but most people consider them worth saving.

PROVIDING THE CORPSE.

In congratulating Mr. Lawrie last month on his valuable assistance in the preliminary work in the proposed resusitation of the "all round" breeds and the formation for this purpose of an association at present unnamed. —How would "Society for the Propagation of the Popularity of the Black Orpingtons and Kindred Broken Breeds and the Financial Betterment of Breeders thereof" do? A little complicated and a trifle lengthy may be, but not more complicated or longer than the job it stands for—we expressed the opinion that he had had a lot to do with providing the corpse. A correspondent, commenting on the club and seeking further information, appears to differ either from our opinion or mode of expressing it, for he writes:—Though you may be correct in the opinion that the exclusion of the other breeds from the scope of the poultry work at Roseworthy (if it is a fact) has been prejudicial to their advancement, it is only fair to Mr. Lawrie to remember that he is privately a keen admirer of the general utility and table breeds, of which he was at one time a breeder." Our correspondent is no doubt correct, but with Mr. Lawrie's personal predilictions in the matter of poultry, we have, of course, no concern nor has anyone else. They are doubtless wholly correct and entirely admirable. Our correspondent would, we think, have been on more solid ground had he pointed out the fact, which certainly is a fact, that Mr. Lawrie, in his official capacity, has, in his writings and lectures, been a consistent advocate of the value of the all round breeds. No breeder of the dual purpose bird can with any show of justice, deny that the Poultry Expert has given him and the breeds he favours a fair and square deal in this matter. From our point of view the Poultry Department has enough sins of omission on its shoulders without lugging in any of which it has certainly not been guilty.

THE ROOT OF THE TROUBLE.

We certainly think that the droping of the "any other" breeds from the Roseworthy list (if it is a fact) has, as our correspondent says, "been prejudicial to their advancement." In the public eye they have been sort of "weighed in the balance and found wanting." We also think that the liberality to say the least of it, with which the "standard of the breed" has been interfered in the matter of admission to the Roseworthy competition pens, has been a contributary cause in providing the aforesaid corpse. For both of these factors in the present comparative unpopularity of the breeds the Poultry Expert is at all events nominally responsible. The real root of the trouble, however, lies in the breeds themselves, and we are quite ready to admit that the "passing" of the dual purpose bird is, as far as commercial poultry keeping (the only sort of poultry with which the Poultry Expert is officially interested), is concerned, is not a wholly undesirable event. As a suburban utility and as an exhibition fowl, the heavy breeds will always command a large amount of well-deserved support. As money makers on any commercial scale, and as long as prices are as they are, they will remain dead.

PARAFIELD.

There has been some talk amongst breeders as to conditions at Parafield. This talk, or such of it as we have heard, has not been exactly of a complimentary nature. In this connection we notice that a letter in reference to the competition was sent, presumably by one of the competitors, to one of the evening papers. It seems that a copy of it was forwarded to the Poultry Department so that the reply might appear at the same time as the letter. To judge by results as reported, the said department found that there was nothing to answer, or perhaps—too much. A direct reply might have been courteous, but it isn't our funeral, in fact it doesn't seem to be anybody's, except the man who wrote the letter, if he happens to be in a hurry to see himself in print or for the information he was presumably on the hunt for. Since then we notice in the official report that the birds are to be kept confined to the houses for some time. As far as we are aware, this is the first announcement of such intention on the part of the Department. If so, it does not appear to have been quite as candid as it might have been or to have played the game quite fairly. We imagine that had this confinement been a generally understood condition, many breeders would have made some alteration in the preparation of their team. The argument that it is the same for all is hardly sound. To take up open run bred birds and pen them up, is to add considerably to the chances of a dangerous moult. It is certainly more likely to result in trouble than to take birds reared on the confined system and put them in a similar house somewhere else, and if there are any "confined system" competitors, they may quite reasonably bless the Department for its sudden conversion to the beauties of the system, or perhaps only for its unpreparedness. However, as we told a competitor, it is no good crying over spilt milk, supposing any such accident to have occurred, and if all competitors got a level start at Parafield, as presumably they did, there does not appear to be much to growl about. Even Mr. Lawrie cannot perform miracles.

REPLACEMENTS.

Discussing competitions a successful breeder recently suggested that the time had come to discontinue the admission of replace birds in competition pens. His argument was that constitutional strength now played so important a part and that ovarian troubles were so common, that it was time to encourage those breeders who had most closely studied the question of vitality and constitutional vigour in their birds and that it was reasonable to penalise those whose stock had been brought to the borderline of a break-down. It is an interesting point, one on which much might be said for and against. The question was of course a good deal discussed in earlier competition days but the rule of allowing replacements, if deserved, or requiring breeders to send extra birds became pretty general. Conditions have somewhat altered. Deaths used to occur from general causes now they appear to be most frequently due to some form of break-down in the organs most directly concerned in egg production. It would seem that breeders have largely eliminated the danger of casual illness and death. They have bred greater vigour, a greater capacity perhaps to manufacture eggs, but a lessened ability to lay them. Nine tenths of the machine has been improved, the remaining tenth has not. In the olden days deaths took place throughout the pens, now the greater number occur in those which are laying heavily, at least so we are informed. Whether this actually is so or not we do not know. The strength of a chain is that of its weakest link, and the same thing largely applies to a pen of birds. You can of course repair the chain at a price and replace a bird at Roseworthy or in the home breeding pen—also at a price but in the latter case it may not be possible to catch up with the mischief which may have been done. Accidents and unexpected misfortunes occur we know, in the best regulated concerns, but we don't put our money in them if we know of this liability. So in poultry most people would, we imagine, prefer to breed from a pen which did a 230 gait and lived to the finish than one which broke on the journey but landed a 250 winner—with two reserves in the team and a couple of original members in the cemetery.

An Interesting Subjet.

CAPONS AGAIN.

A correspondent to whom we replied last month on this subject, asks for further information, especially with regard to the financial side of the question. He does not appear to think that we gave caponising quite a fair deal as a profitable practice, and adds that he thinks we were in error in saying that the operation did not add to the size and weight of birds so treated, and further adds that he has heard that it is extensively carried on in America and that poultry breeders there must find it profitable. We would remind our correspondent that we were not discussing caponising generally, but as applied to certain given conditions. His question, briefly put as we remember it was—Would you recommend anyone with a fair sized flock of Leghorns now returning a satisfactory profit, to try to improve their table qualities by caponising or by cross breeding, or to take up another breed better adapted naturally for table purposes and try to push this side of the business as well. Our answer was and is—No. When a man is running a concern successfully it would seem to be pretty poor policy to make any radical alteration in the method of working it. Extend by all means, but on the same lines which have already been proved and tested. With regard to the financial side of the caponising question, which is the important one, it may be mentioned that the costs of poultry feeding are quite different from the costs of going to a picture show. In the one case they depend on somebody else, in the other, on the man himself and many varying conditions, yet there is a tendency to consider one as fixed as the other. If one puts the mean average food cost of raising poultry with wheat at 3/6 per bushel at 4½d. per lb., he will, we believe, be as near the mark as it is possible to get. How much more or less will depend on the feeder and his working conditions. The price received is even more difficult to arrive at. We should say that in putting the mean average under auction conditions at 6d. per lb. live weight and at 1/- pec lb. dressed weight for private sale, we should be on the reasonably safe side. Until proved otherwise the cost and return of capon flesh must be taken to be the same as that of cockerel meat. We regret that we cannot give our correspondent more exact infocmation but take some comfort in the thought that nobody else can. "Circumstances alter cases" as much or more in poultry feeding as they do in anything else. For instance, we could give the actual cash out of pocket cost of 250 dozen eggs and rather over 500 lb. of cockerel meat for the last twelve months, but as for the last

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Mating White Wyandottes.

In discussing the mating up of White Wyandotte breeding pens, a fancier who has gone in largely for this variety for a number of years, writes :—" No breeder can mate a pen of birds unless he knows their pedigree. Their individual merits must also be studied. In his mind's eye he must have a perfect bird, and keep this model always before him. Most people think it is easy to breed white birds. All birds look white, but by an up-to-date fancier they are seen differently. When we know that the White was a sport from the Silver Wyandotte can we wonder that even now, occasionally, a little grey ticking or a black feather can be found? Therefore, never breed from a bird that shows brassiness. But do not mistake creaminess for brass. Females showing brass on the neck should never be used to breed from. Males often show cream or yolk color until a year old, and then when the feathers harden down they become snow white. Fanciers overlook type more than anything else. A full breasted male mated to a low set female will produce fine shaped birds. A male with a long shaped head rarely produces any show stock. A poor eye on a male produces 75 per cent. of bad eyed birds, but a poor eye on one female in a pen will not produce 10 per cent. poor eyed birds. A stub of feathers on the legs will not produce 20 per cent. so afflicted.

You can produce good eyes, comb and legs in one season, but shape and stay-white plumage takes longer. Never pen a large, overgrown male with undersized females. The best specimens are generally produced by mating six or seven 7lb. hens to a 6½ or 7lb. cockerel. A vigorous cockerel can be mated to more than seven females. Sometimes large, well developed pullets have yellow in shaft of feathers ; mate these to a stay-white male with pale legs and skin, and they will produce a large percentage of show specimens.

You should depend to a great extent on the male for color and shape, and the female for size. The beginner generally looks for good eyes, comb and legs, and passes over shape and color, thus sacrificing the two most important points of the White Wyandotte.

Travelled Eggs.

It should not be a matter of surprise that eggs which have travelled by train, coach, or steamer, are not in the best possible condition for immediate setting or for ultimate hatching. The life germs contained in fertile eggs are certainly endowed with extraordinary vitality and one frequently hears of successful hatches under surprisingly adverse conditions. There is little doubt that eggs which have travelled are benefited by being allowed 24 hours to settle down before being placed under the hen. At least that is the opinion of most breeders, though we can see no particular reason why it should be so.

The Fresh Egg.

The fresh egg, even if it costs twopence, is not more costly than steak. The average price, however, is not much more than half that amount and this again is reduced to considerably under a modest halfpenny, where a few fowls are kept under the favoucable conditions of the ordinary suburban home. Apart altogether from the question of cost there is the quality to be considered, and it is not too much to say that any housewife depending on the grocer for her egg supplies really has a good deal to learn, for by far the greater majority of eggs sold are "frying" eggs—that is to say, that are not in the best condition for boiling or for any delicate cooking. One recalls in this connection the boarding house story of the guest who, tired of omelettes, fried, poached, and scrambled eggs, asked for them plain boiled. "I don't buy them that fresh," confessed the landlady. People want educating up to the knowledge that a fresh egg, from the dietetic point of view, is one of the cheapest foods they can buy ; that one fresh egg is worth two stale ones ; that the cheap egg is a nasty egg, and it is only because many people's palates have been ruined by eating nothing but stale eggs that they are content with the present state of things. The public should in more cases deal direct with the egg producer. No one who has ever regularly had really new laid eggs cares for any a little "off," but many are simply indifferent. The claims of the new laid egg want pushing.—Exchange.

Filling the Winter Egg Basket.

Nothing is more profitable in poultry keeping than success in inducing poultry to lay well during the winter time. Most people have their own idea as to what is the best breed for winter. One man likes a pure breed, another has a special favourite cross that he swears by. Of course, every man is the best judge, because there are so many variations of position, climate, accommodation, available food, etc., all of which are important to consider, that it is impossible to lay down one single rule that will apply to all classes of poultry keepers alike.

Most people now understand the importance of housing and the necessity of scratching sheds and other sheltered places. It is quite impossible to expect good results without such accommodation. Birds so treated lay and pay well, but let them be moping about in corners, huddling for shelter against the wind that sweeps through a poultry run from side to side and from end to end, and there will be no eggs whatever. Keep them warm, well fed, well exercised, supplied with green stuffs such as are available, provided with grit, and then there is not much likelihood of the egg basket being empty. With regard to food during the winter fowls should begin the day with a meal of warm soft food, and they should end the day with a good feed of grain, in which a little (but only a little) maize is included.

One word only in conclusion with regard to the roosting places. These should be open fronted. This is a plan more likely than anything else to prevent the fowls from having roup and colds and similar complaints, such as are prevalent in winter. There cannot be in an open-fronted poultry-house any accumulation of bad air to irritate the lungs and to start the pre-disposition of catarrhal troubles which is quite likely to develop into an actual cold or attack of roup, and that means a big drop in the profits.—Exchange.

A Law of Nature.

A law of Nature, upon which absolute reliance may be placed, assists us very materially in selecting this year's breeding stock, writes an American poultry keeper. Put into ordinary language the law is that the more any part of the body is used, the larger and stronger it becomes, while the less it is used, the weaker and smaller it becomes. That is to say that a man who spends all his time doing manual labour increases the strength of his muscles and sinews, while his brain does not develop in the same proportion ; a man who devotes all his energies to head work increases the power of his brain, while his muscles decrease in strength. Applying this law to poultry, we find that the better layer a bird is, the bigger are the egg organs ; if edible qualities are its chief characteristic, the breast is well developed ; while if it is evenly balanced, we know at once it is what is termed a general purpose fowl—that is, good all round. Such a bird is a better layer than table breeds, but it does not possess such good edible properties. It is better upon the table than a laying breed, but it produces fewer eggs. By means of this law, it is possible to select the breeding stock with far greater certainty than would otherwise be the case, and from quite a large flock the best layers, the best table fowls, or the most suitable all-round birds can be chosen. There are, of course, certain outward characteristics that denote for what a fowl is most suitable. A large red comb usually indicates a good layer, a small rose-comb often, though not by any means always, denotes a general-purpose fowl; while very few really first class chickens have featheced or yellow legs. In selecting hens for laying, birds firm and close in body should be chosen, of a good size, well developed behind, clean and tall on the legs, and active in habits. For table purposes the hens should be heavy in body, shortish on the leg, and deep in breast.

Some Causes of Intertility.

Unfertile eggs can be accounted for in many ways. Stock birds that are not of a suitable age, too old or too young, the lack of a regular supply of green food, over-feeding, food containing too much starch, too frequent a use of spicy condiments, neglect to supply a reasonable amount of animal food, such as green bone, boiled lights, etc. Cold, wet, and sudden changes in the weather are responsible for many bad hatches. In mating up your breeding pens, take for preference hens in their second year of laying, and mate them with a vigorous cockerel, or vice versa. During the winter and early spring five females to one male are quite sufficient, but as the weather becomes warmer you can increase to eight or nine, or even twelve.

There the three things absolutely necessary to be a successful horseman : gentleness, patience, and firmness, particularly the first.

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six months the birds have subsisted largely on lucerne, peaches, tomatoes, sugar corn, box thorn berries, sweet potatoes, trombones, marrows, etc., and are now having a happy time on soursop bulbs and olives, it probably would not help our correspondent much and would certainly be an absurdity as a guide to commercial poultry keeping. Returning to more practical matters it will be seen from the figures suggested, that at the worst table poultry pays its way and that if one combines least possible cost with highest returns it looks very like a most profitable proposition, but under similar conditions so is egg production only more so, so why should our correspondent or anyone similarly situated make any change.

SIZE AND WEIGHT.

As to size and weight, we cannot in this matter speak from experience, but the subject was pretty thoroughly tested at one of the American Experimental Stations, if we recollect aright, with the result that it was found that there was "no noticeable difference in the size and weight of treated and untreated birds grown under exactly similar conditions. In some few instances there was an apparent gain of up to 1 lb., but this was believed to be due rather to the individual character of the birds than to the caponising. The operation resulted in a temporare check to growth which was afterwards fully regained.

AMERICAN PRACTICE.

In discussing American methods one must remember one essential difference of conditions, that is the tremendous demand for poultry flesh, from the 100z. baby broiler to the 10lb. soft roaster. Where the Australian housewife says chop her American sister murmurs chicken and won't be happy till she gets it. There is undoubtedly a big trade in capons in the big American markets, to supply the demand for soft meated birds in the season when the young cockerel of 4 to 5 lbs. is not procurable in any sufficient numbers. They are not usually sold as capons, simply as "roasters." Breeders caponise their later hatches so that in the winter the place of the spring and summer chicken may be taken by its emasculated brother. What are called "extra fancy capons" fetch high prices in Boston and New York. It is a rather interesting fact that they are almost invariably bred by mating a light Brahma cock with Cochin hens. Chcickens are hatched in July and August and make 8 to 10 lbs. by January or February, when they are worth 10/- to 12/- to the growers. As the price to the consumer is said to be from 15/- to 20/-, one can understand the statement that the demand is strictly limited."

NEARER HOME.

Prices and practices from the other side of the world are, howevec, not of much use to us. Let's get nearer home. Some years ago at the Hawkesbury conference a breeder read an interesting paper on "Surplus Cockerels," in which he strongly advocated the use of the knife or rather of the canula, which is the special instrument used for this purpose. His principal argument, as we remember it, was, that by doing so he was able to carry over his stock for a suitable market, that he could buy store condition stock in the market or on the farms, operate on the birds, feed them up and sell at a liberal profit. He appeared to sell the birds at 4 to 6 lb. and looked to the bare winter and early spring market for his harvest time. No special quality was claimed for his goods. He made no losses through deaths and maintained that all breeds were suitable, even the feather weight division, making satisfactory subjects, but he expressed a preference for the middle weight classes. There was some difference of opinion expressed principally with regard to value of the process as applied to light breeds. Several members of the committee who had personal knowledge of the process and its results confirmed the opinion of the writer of the paper.

Care After the Show.

The process of preparing fowls for exhibition receives a good deal of attention, and methods effective and otherwise are largely practised but that any treatment other than to throw the birds into the pens when they return from the show may be necessary, or advisable, seems to be generally overlooked. It is to be regretted that this method of handling returned birds is in general practice; the fact that more trouble does not result speaks well for the care given the birds at shows and for the vigor of exhibition fowls, but even so, it is not to be expected that they will arrive in the best of condition. If they are put directly into the pens with other fowls and made subject to the same conditions, they have a fair chance to take cold or to develop any cold, or other trouble, that they may have acquired at the show. It happens occasionally that a bird afflicted with some disease or one that carries the germs of disease, finds its way into the show room and menaces the health of all birds cooped near it. On that account, if for no other reason, fowls returning from shows should be cooped, or penned, separate from the others until they can be cured of slight ailments and have a chance to recover their strength and natural condition. Four or five days, or at most a week, is sufficient to get the home coming fowls in condition to return to their regular quarters or to be mated for the season's breeding without danger to themselves or to other birds. This may seem like too much work to avoid a mere possibility of serious trouble; but when difficulties arise from such sources they are usually far-reaching in their efforts and decidedly expensive for the poultryman in whose flock they occur. A little time and a little money spent to prevent such troubles are well invested.

Tick.

Reply to T. H.—If you only have a few fowls and a few tick, you might try going over the birds carefully and dab a little olive or any vegetable oil on any single tick or colony of them. Provide a good dust bath, the birds will probably make a bee line for it, and the dust and oil will probably finish the tick. If there are a number of badly affected birds you better try dipping them in kerosene emulsion. Kerosene 1 quart, water 20 quarts, soap ½ lb., oil ½ pint. Make a thorough emulsion by dissolving the soap in a small quantity of boiling water, add the oil and kerosene and pour into the bulk of the water, which should be as warm as you and the fowls can conveniently stand. Then keep pumping the mixture into itself for ten minutes. Dip the birds in this. See that the liquid penetrates to the skin. One minute for bird should be sufficient. See that all parts except the head are covered and rub a little into this. Squeeze all the moisture out. They will do their own drying. Do the job as early in the morning as the sun has taken the chill off the day. Keep the birds on the move if they should happen to want to camp in the shade. Choose a sunny day. Give the birds a couple of hot meals and hope for the best. You will of course keep the birds in an absolutely clean place between the time of the operation and moving them to your new home. We should do it two or three days before the moving. Keep the liquid warm and thoroughly emulsified. The proportions quoted are a guide only, you may find it necessary to vary a little. Bear in mind that what you want to do is to coat each tick with a thin film of kerosene and oil. The principle destructive agency is the choking of the breathing tubes.

Correspondence.

WANTED—A FAIR CHANCE.

To the Editor.

Dear Sir.—I am glad to see that a club has been formed to encourage breeders of the heavy breeds. As you see by my address I am too far away to help in the good work but I may perhaps be allowed to suggest the importance of maintaining the standard of the breeds. It should be remembered that the Orpington, Wyandotte and Plymouth Rock were bred to occupy a definite place. There were not intended for and never in my opinion, will become equal to the best of the egg breeds on the one hand or the best of the table breeds on the other. I venture to hope that breeders will recognise the truth of this. I would advise my brother breeders of that grand fowl, the Black Orpington, to depend on its proved merits and not to attempt to force it into another class. I think a mistake has been made in the past by breeders in sending birds to the competitions which but poorly represented the breed they were supposed to be. I speak more particularly of the Black Orpingtons which I know best. I visited Roseworthy on one occasion and have heard others express the opinion, I then formed, viz., that the breed was being ruined by breeders too short-sighted and eager for present profit to look ahead, to see that to breed heavy breeds out of type and class was to kill people's interest in them. I remember, Sir, that on one occasion your paper donated prizes for standard points. I hope to see the newly-formed club take this matter up and try to arrange for some recognition of standard merit even apart from the number of eggs laid. I think your Poultry Expert should be asked to fix a weight limit under which no birds should be eligible. I am told that in the earlier competitions, and now, there is laxity in reading of the rule about breed qualifications. I think that more stringency in this respect would be a step in the right direction. I can quite understand that he would in the earlier competitions at least, not wish to discourage breeders by rejecting their birds, but it is different now. I hope that the club will support the Expert in the course I have suggested, and also individually send up worthy representatives of their breeds. Trusting that I have not occupied too much of your space, and that some more able pen will take the matter up, I am, etc.,

Breeder of Black Orpingtons.

Horsham, Vic.

We thank BOBO for his letter and sympathize with his preference for the heavy weight black. We fear, however, that as long as eggs are 1/- per dozen and poultry meat 6d. a lb., the public call will continue to be for the bird which lays the most eggs, irrespective of other considerations. Commercial poultry keeping is not a matter of sentiment, and both breeder and buyer see more profit in an extra 2 dozen eggs than in 2 lb. extra meat. BOBO is in error in one point. The Poultry Expert had nothing to do with the first three competitions. If we recollect aright the appointment was not made till after they were completed and he did not, we believe, take sole charge until the fourth or fifth, consequently of course he had nothing to do with "admitting non-representative birds to the earlier competitions." In this matter he inherited what was possibly a bad practice, and possibly continued it. Of course there are quite a lot of people who ask, what is the good of type, size and feather, and even the greatest stickler for standard points might be hard put to it to demonstrate their actual practical value in the South Australian poultry world. If breeders of Black Orpingtons find that their best layers are to be found amongst their active tight feathered, comparatively small birds, it is of course natural that they should send such birds to represent them. Why shouldn't they? They certainly know their own business best and as they pay the piper there is a good deal of justice in thinking that they ought to be allowed to call the tune.—Ed.)

Rearing Turkeys,

The following information was given us by a friend a few years ago, writes a correspondent to a Victorian paper. The lady's birds were a cross of the Amiercan bronze. She has always had good luck in rearing turkeys. She fed the young birds on bran and pollard, mixed with clover and other green stuff, cut with a chaffcutter. The old birds got the same. It was mixed the night before, soft and damp. The chicks were kept under cover in wet weather. They were not fed heavily. There was also a splendid grass run for them, a garden with fruit trees, and plenty of shed accommodation. To rear turkeys successfully they must be bred from sound and matured stock (two-year-old birds at least). They do not want to be pampered or kept too much confined. They should also sleep in the open-air.

In keeping fowls for profit it should never be forgotten that the stock must be young. It is impossible to expect success unless this point is remembered and acted upon.

Lucerne.

The value of lucerne as a green food for poultry is pretty generally recognised by breeders, though its great superiority to most other forms of green food is not so well understood as yet. This superiority is made very evident in a report of the chemist at the Dominion of Canada Experimental Farm, Ottawa, in which he states that "alfalfa furnishes a large amount of forage especially rich in flesh-forming constituents," and that it belongs to "a class of plants, including the clovers, peas, beans, vetches, etc., that is characterized by possessing a large proportion of nitrogenous matter (crude protein) in their tissues." This expert further states that cured alfalfa possesses fourteen per cent. of crude protein, that red clover possesses twelve per cent., while mangels, which are used veey commonly by poultrymen as winter green food, contain only one and one-half per cent. of crude protein. He then adds, "It is evident that alfalfa furnishes a more nutritious fodder, weight for weight, than the grasses, Indian corn or roots."

The chemical division of the agricultural experiment station at the University of Minnesota, referring to an analysis of foods it has made, states that "the most striking feature shown is the large amount of protein in the alfalfa," in comparison with clover, "the former possessing, in this analysis, seventeen and one-half per cent. of protein and the latter thirteen per cent." "This substance" (protein), adds the chemist, "is always the most valuable constituent of a feeding stuff. It is the substance that enters so largely into the composition of the flesh and the vital fluids of the body, and, in a dairy animal, of the milk. Here, then, we have a source of protein which seems to be far superior to red clover, which heretofore has held undisputed the title of being the best nitrogenous forage for Minnesota."

Lucerne is very easily grown in this climate, and preparations for sowing a patch should be at once made by all poultry keepers who have not already an established plot. It is not worth while sowing just yet but the stand will be all the better if the ground to be sown is dug over and well manured. A fine crop of weeds will soon make their appearance which can be dug in before they get too big. If this digging is done once or twice before the seed is sown, it will be nice and mellow by the time the first of the warm weather comes. Lucerne is a bit tender at first, and requires a clean, level, and well pulverized surface for best results.

Running Incubators.

The incubator should be set up carefully according to directions, and the hatching chamber gradually brought to the proper temperature. The temperature which the thermometer should show depends somewhat upon its position in the draw. If the thermometer merely records the air temperature on a level with the top of the eggs, as they lie upon the trays, and is suspended near the centre of the chamber, then a temperature of 102½ will bring the chickens out promptly on the twenty-first day.

The eggs should not be placed in the incubator until after the operator is able to maintain a fairly uniform temperature. Unless the regulator is properly adjusted to the right temperature and all the parts in good working order, it is an easy matter for the temperature to run too high, and thus injure, or totally destroy, the hatch. The temperature should be maintained as uniform as possible. All violent fluctuations are unnatural and injurious. This is especially true of temperatures above the proper incubating temperature. Cooling the eggs a few degrees below the proper incubating temperatures does no harm, and in case the ventilation of the machine is not sufficient to supply the germs with enough oxygen, this cooling may be necessary for a good hatch.

— Ventilation and Moisture. —

The ventilation of the machine is next in importance to the temperature. During their developments the germs absorb oxygen, and throw off carbon dioxide or carbonic acid gas, as it is sometimes called. If the carbon dioxide is allowed to accumulate, or in other words, if the vitiated air is not replaced by pure air, with sufficient rapidity the germs will be weakened, and those which are somewhat naturally weak, will be killed. Bowel trouble and non-absorption of the contents of the yolk sack, two very common ailments of incubator chickens, are frequently caused by lack of fresh air in the incubating chamber, during the hatch.

The eggs must be given plenty of fresh air, but if this is overdone another trouble is encountered. The eggs loose too much moisture, and the chicks dry fast to the shells, thus destroying many chicks, and producing many cripples. On the other hand if the eggs do not lose enough moisture, the chicks are weak and flabby and do not have sufficient room so that they are unable to break their shells and thus make their escape. Between the two extremes of too much moisture and too little there is a medium where the moisture conditions are just right, and when, closely adhered to in practice, gives best results.

Incubators for Farmers.

To no one are an incubator and a rearer more useful than to a farmer. He should raise his chickens at the proper season, and in goodly numbers. The machines will do this with much less trouble and time than the hens, and he will have larger hatches of a uniform age, which is important. The first five or six weeks of a chicken's life is the most critical period. If allowed to become stunted at that time, chickens never recover sufficiently to gain the size they would otherwise do, and special care can be better and easier given during that period when larger numbers are of one age; there is less hustling of the younger by the older than when there are broods of all ages raised by hens at odd times. To produce fine chickens the farmer should begin at the start, and keep them going right away. Given the right type of bird to suit his conditions, and his chickens properly fed, he will find an incubator and a foster mother two of the most useful implements on his farm.

The Egg and its Value.

The yolk of an egg weighs about one-third of the whole, the white about 60 per cent., and the shell, which chiefly consists of carbonate of lime, of 10 per cent., or slightly less. Under analysis it is found that from 72 to 75 per cent. of an egg consists of water, but this varies in accordance with the system of feeding, while the fat and albuminous matter, each slightly varying, complete the weight. Although the shell weighs about 10 per cent. of the whole egg, it varies enormously in its mineral contents or composition.

When eggs are exposed to the air they lose weight; the shell being porous, the water evaporates, its place being taken by air, for which reason it gradually changes in flavour, and finally in composition. In one experiment sixteen eggs were exposed for ten days, when they lost 1.6 of their weight. This was nearly doubled when they were left for twenty days, and more than trebled, the loss being 5 per cent., in thirty days.

When eggs are coated with a preservative, such as water-glass, the loss of moisture from within is prevented, and it is for this reason that this material is now so largely used for preserving purposes.

If we compare the egg with meat which is moderately lean, we find it equal in round terms to its weight of moderately lean meat. If, therefore, meat is worth 10d. per lb., free from all waste, the egg at 1d. is one of the very cheapest foods on the market.

Report of the Maine Experiment.

By Dr. Raymond Pearl.

(Continued from May Issue).

From these tables (published in the May issue, Ed. G. & F.) the following matters are to be noted :—

1. The percentage of infertile eggs is distinctly high, being 19 per cent. in one case and 18 per cent in the other. This, however, does not mean, as might at first thought be supposed that there is some weakness on the part of the males or females bred. As a matter of fact the explanation of this poor record of activity is that when the pens were mated up early in February no interval of time was allowed for the establishment of fertility before beginning to save eggs for hatching. That is to say, the eggs were saved and incubated from these breeding pens on the very same day that the male bicd was put in the pen, and in a few instances it is probable that eggs were actually included from hens which had never been with a male bird at all. Every practical poultryman knows that on the average it takes from 6 to 10 days to establish good fertility in eggs after b rds are mated together. As a result of this incubating of the eggs taken from the time that the male and female birds were put together the record of fertility suffers a heavy handicap. Actually after fertility was once established (that is, after the male bird had been in the pen about 10 days) the average percentage of infertile eggs for the remainder of the season was about that which is considered normal in the work of this station. This figure is on the average about 10 per cent. of the eggs infertile.

The reader may be disposed to wonder wh-- eggs which were practically certain to be infertile were incubated. The reason was primarily that it was desired to get just as many chicks as possible hatched April 1st or within a few days of that time. Experience has shown that, under the environmental conditions which obtain here, that time is the best to hatch chickens which are to be used in fecundity work. Such birds came into laying at the proper time without either forcing or retarding. Now it is a fact that while, on the average, it takes from 6 to 10 days to get fertility well established after a mating is made, yet there are individuals in which the very next egg laid after the first copulation will be fertile. Because of this consideration all possible eggs were saved from the beginning of the matings, with the certain knowledge that while the relative or percentage fertility of these early eggs would be low, yet absolutely a few chicks would be obtained. The desire to get these chicks far outweighed any idea of making a maximum record of fertility of eggs, the latter, in fact, not entering into consideration at all.

2. The hatching quality of the eggs as indicated by the per cent. of fertile eggs hatched is again somewhat below what may be considered normal for the Maine Station stock at the present time. With large numbers of eggs the normal hatching percentage of fertile eggs is on the average a little over 60, taking the whole season through. Toward the last of the mating season (the month of May) the hatching percentage normally rises considerably.

Here, just as in the case of fertility, the records tabled bear a rather heavy handicap, which could have been avoided had the only purpose been to bring out the best record of which the birds were capable. The factor in question here is the holding of the eggs before incubation from the first week in February on. No eggs were put in incubators until March 7th. More than half of the eggs set at this time were over two weeks old when put in the incubator. Everyone who has dealt practically with incubation knows that this means a serious reduction in the percentage of fertile eggs hatched. The reason for managing in this way was again to get the greatest possible absolute number of chicks hatched about April 1st, regardless of the relative proportion of chicks to eggs set.

3. Taking all the records together and using the averages in the computations it appears that, even with the handicap mentioned, in the high fecundity lines it required only 2.6 eggs in the incubator in 1911 to produce one chicken three weeks old. In the low fecundity lines it requires 3.2 eggs to make one chicken three weeks old (As is well known three weeks covers nearly the entire chick mortality. The subsequent death rate among chicks which at three weeks of age are in full health and vigor is relatively insignificant). These figures are for the whole of the hatching season of 1911, that is, from February 1st to June 1st. They do not represent the normal reproducing ability of the stock because of the heavy handicap explained above. In spite of this fact, however, these records can only be regarded as indicating an excellent performance.

Certainly these figures for hatching and reaing give no support to the view that the constitutional vigor or vitality of the Station Barred Plymouth Rock has been impaired by many years of continued artificial incubation and rearing. When it takes but three eggs or less to produce a chick three weeks old the stock cannot be said to be in a condition of reduced vitality.

4. It is plain that there is no substantial difference between the females of the high fecundity lines and the females of the low fecundity lines with respect to hatching records. What small differences there are indicate that birds of the high fecundity lines are on the whole somewhat surer reproducers than those of the low fecundity lines. While the percentage of infertile eggs is smaller in the low fecundity lines, on the other hand the percentage of fertile ebgs hatched is also lower and a slightly larger percentage of chicks died during the first three weeks of their lives. Particular attention is called to this matter here because it has been alleged by one critic that selection for high egg production was inimical to reproductive capacity in the domestic fowl. As a matter of fact, as the present figures show, that is not at all the case. The criticism was based upon the accepted fact that there is a negative correlation between winter egg production and the hatching quality of eggs in the subsequent breeding season. This, however, is purely a physiological and not a genetic matter. High laying during the winter months undoubtedly tends to bring about a somewhat fatigued condition of the whole reproductive system with the result that the eggs in the subsequent spring do not hatch quite so well as under other circumstances. This, howeuer, has nothing to do with the innate hereditary capacity of these same birds in respect to fecundity.

(In the next section of the report Dr. Pearl discusses the interesting subject of in-breeding as it affected the purpose of these experiments. —Ed.)

Home Notes.

Children's Hair.

The arrangement and care of the little girl's hair has long been a source of anxious thought to the loving mother. A wise woman no longer clips her little daughter's hair, nor keeps it short all through her school days. She lets it grow in the natural soft ringlets that seldom come in after years, and relies on her skill and care to maintain a luxurious growth. She brushes the tender hair carefully every day, making it soft and glossy by this process. The beauty points are trained by painstaking labour. If the hair is scant about the brow, then a little cocoa butter is rubbed in. She uses no washes or bleaches, but lets Nature take care of the colour herself.

It is a mistake not to change the dressing of a child's hair frequently. A parting must not be allowed to become too wide, yet the hair must be parted at times to prevent its becoming untractable.

For very little girls the "granny curls" are about the daintiest way of arranging the tresses. The hair is parted, and a curl on either side is tied with some delicate shade of ribbon. The curls fall furward over the ears, forming a most delicate and fitting frame for the wee baby face.

Often a very plain little girl may be made quite pretty by a studied arrangement of her hair. If her hair is dressed quaintly it will improve her immensely.

A child's hair should be washed every two weeks, at least. A good shampoo and a simple one is made as follows:—

Melt a cake of pure olive oil soap in a quart of boiling water. When the soap is dissolved the result will be almost a jelly. Take of this jelly, say, two large tablespoonfuls, and a small lump of common washing soda about the size of a filbert. First wet the hair thoroughly with hot water, then rub the shampoo mixture well into the roots. Rinse thoroughly in several waters, and then carefully dry.

Colour and Its Influence.

Not many people perhaps understand the importance of a wise selection of colours in planning a scheme of home decoration, yet there are sound scientific reasons why very careful consideration should be given to the subject, for so much has the value of colour come to be recognised in the scientific world, that prominent psychologists have made extensive study of its effects on the minds of school children and in many places lessons are given designed to teach the students chromatic harmonies. It is found that color may not only be attractive and produce a pleasing, restful or quieting effect, but may serve the opposite purpose of exciting, irritating or wearying. Edgar Allen Poe in one of his noted tales, "The Fall of the House of Usher," used the color effect of the rooms and of the lightning to produce the wierd, ghostly effect of his story. Many color effects have been tried on folks, sick and well; and while yellow proves merely cheery and sunny, colors that are strongly red have been found to be somewhat exciting and those that are strongly blue to be depressing. Consciously or otherwise we react to their influence and confess to this in such expressions as "red with anger" and "having the blues"; while a thoughtful mood we characterize as a "brown study."—Exchange.

Making Home Pleasant.

How many mothers realise the full meaning and importance of those words. It should be the aim of every mother to make the home pleasant for all; the one place to which each and every member of the family may return with feelings of happiness.

The place where the little ones may safely bring their little companions, knowing well mother will not care, but will take an interest in their childish sports, even perhaps joining with them in a quiet way.

The place where the daughter can come with her little troubles and confidences, always sure of mother's ready ear and mother's gentle words of comfort.

The place where the young man, just starting out in life, meeting with so many temptations and discouragements, can come, where the mother, with her kind words of sympathy and wise council can do so much toward helping him in the right way and strengthen his character for the coming years.

The place where the husband and father turns as to a haven of rest, where all the vexatious care of the day are thrown aside, and with his wife and children gathered round him he is content. Pleasant indeed is such a home, and no one in the home is so loved and reverenced as the dear mother who makes it so.

About Rhubarb.

Natural salts which are supplied principally in fruit and vegetables are of very great importance in the preservation of health and strength.

In speaking of salt, a compound of acid with alkali is meant. This is a chemical salt. Chemists supply these compounds of acids and alkalies when they sell fruit salts as specifies to restore the blood to its normal state of health. Nature can mix these fruit salts far better than the chemist, let him be ever so skilled. Nothing crude comes from the hand of Doctor Nature. Everything is delicately mixed in such sort that the tissues of the body can absorb and use them, not reject them by reason of over-keen disturbance. In apples, pears, oranges and similar fruits, the mixture is made in the juices where acids and alkalies mingle agreeably, but in measure not too strong. Where acids alone are found the mixture is made in the blood itself, which is alkaline and adapted to make the combination.

But in rhubarb the mixture is ready beforehand. Oxalic acid and malic acid, two very powerful ones, mix with potashes and sodas and form a strong purifying mixture. Nature gives this medicine in the rhubarb in her most powerful doses, hence the wry faces that are made over its sourness if the stalk is eaten raw.

Evil acids in the blood are neutralised and chased into nothingness by the acids of the rhubarb, then the ills they brought in the shape of outbreaks or skin-spots vanish. The alkaline constituents of the blood itself receive addition by the coming into it of the potash from the rhubarb, and the liquor sanguinis then is able to fully perform its mission in nourishing the system.

In spring, therefore, it seems the natural law that one should eat at least once daily of rhubarb cooked appetisingly by culinary cunning in some of the many different ways it may be used.

Too much of a good thing is as bad in its way as too little. People, knowing the beneficial results that accrue from eating plenty of rhubarb have been known to take it to excess. Then the blood, receiving too much of a powerful remedy, becomes too acid, losing its alkalinity, and showing its ill-treatment by a host of signs. One of these signs, luckily, is distaste, when the palate rebels against excess and rhubarb becomes an abhorred dish instead of an eagerly accepted one. This is a sure sign that too much has been eaten.

The writer knows of a case where enthusiasm for the splendid properties of rhubarb led a woman to use it at every meal for weeks. She grew quite skilled in finding new ways of preparing it, and she ate it till she sickened of it. Now she cannot be prevailed upon to touch it. One curious result of over-usage was that her teeth went on edge at the sight of anything sour, and for nearly a whole year she could not bear to taste any kind of fruit.

She had made rhubarb tea by infusing the leaf-stalk in water to make an acid drink. She had taken it in puddings, pies, tarts, and stewed with various flavoring in order to give it variety. She had turned the pure juice into shapes by means of gelatine and moulds, then eaten it as a jelly. She had, in fact, used the rhubarb in every way she could think of, and most immoderately.

Moderation is the keynote to aim at as well as variety in using rhubarb. It will, undoubtedly, revitalise exhausted blood and restore to it most of its depleted salts, and in doing this it will accomplish a grand work, for it will enable the blood to extract from other foods all it requires. This it is not able to do when exhausted and deficient in salts. Then food is partly wasted when it is eaten, for it passes away unused by the blood. If rhubarb is able to give the blood power to take from the food its complex requirements, this is a most salutary effect of eating it.

It will take any flavor. Cinnamon, lemon, ratafia, or any essential oil will go well with it, varying its flavor. It needs gelatine to give it a certain amount of consistence and body, and most cooks put a leaf or so of gelatine in with it when stewing it. Thick cream is eaten with stewed rhubarb, and served with any dish containing rhubarb. The cream gives richness, blandness, and softness to the tart dish. The rhubarb enables the cream to be fully digested, too, which might not be the case without its agreeable acid. In cooking rhubarb, excessive tartness departs if a pinch of carbonate of soda is added to the juice. This increases its solvent power and makes it very much more strongly a vegetable salt.

The Home should be a Social Centre.

The question is frequently asked, "What place does the home-maker occupy in the world?" and a writer in Wisconsin Horticulture answers it as follows :—

There should be no attempt made to place a cash value on the influence of the home or home-maker. Home is too sacred to come into the commercial world. It means mother, father, and the children. It stands for all that is lovable or worth living for. It is all that binds the human race together.

The home-maker has a work to do, a holy service to render to the world that is far above a money value.

Every home should be a social centre, where old and young can meet for a social hour and children should be helped to feel that there is no place where they and their friends can have quite as good times as at home. If that spirit was fully lived up to it would do more to close the saloon doors than all the political "Isms" together. There is an atmosphere of refinement, a feeling of cordial fellowship, about a home function that is never present at a public entertainment, however well conducted.

The home affairs should be so managed that each individual understands that he is a part of the whole with specific duties and obligations. That the material and social life of the home depends on the willing co-operation of the members.

Parents should understand the necessity of training the children to willing obedience of home rule; that the home is a small republic in which all have an equal right to work, play and share what comes in the way of success, or the reverse, and as all know that "into each life some rain must fall," children should be taught to meet disappointment bravely and feel that they can do much to comfort those who are in trouble.

Much of the discontent and dislike of work among children could be avoided if parents would go cheerfully about their own duties. Don't expect children to be willing workers when they constantly hear older people complain of the drudgery of work and wishing they might live without it, scrimping and denying themselves and families many pleasures that they may accumulate money enough to go into town to live where there is something doing.

There is good material in the bright boys and girls around you who ought to be kept busy and all they need is to be guided by someone with matured judgment who has not forgotten how to be young. Invite the neighbors to help plan the work so that there will be time and opportunity for parties, picnics and literary meetings. Organize clubs for culture and social purposes and when club evening comes don't imagine you are too tired to go. Take part in the entertainments and let the young people see that the old folks are alive and intend to remain so.

There is nothing that will spur on the mental activity of the young folk like a literary contest in which old and young meet in friendly rivalry.

We are too much given to cultivating that tired feeling as we draw near life's meridian and begin to think the new house with its fine furnishings is just a little too nice to give parties in and that there is no sense in the young people wanting parties.

The home should be as fine as can be afforded but there should be nothing too good for family use. There should be an abundance of real good reading, music and games that the home life be such that in after years when the children look back to the dear old home, their sweetest memories will be of the quiet evenings spent at home with the family.

Hot Food for Cold Weather.

The importance of hot food for cold weather cannot be over-estimated. The stomach requires blood with which to digest food, and if anything of a cold nature is partaken of the temperature of the digestive organs is reduced, and as a consequence no digestion can proceed until the normal heat is again established. In this way it is clearly seen that a loss of energy has taken place which it would have been well to avoid, and in cold weather, if we are to keep well, every precaution ought to be taken to maintain animal heat. Warm food, and warm clothing are the best preventives.

Liquid foods are more easily assimilated by the blood than solids; therefore nourishing soups ought during the winter months to enter into the daily dietary. Where rigid economy must be practised, soups may be made without meat, but it cannot be supposed that an equal amount of nutrition is to be had from purely vegetable soups. Yet cheap soups have their value. Lentils, peas, and haricot beans are rich in nitrogen, and deserve an important place in our bill-of-fare.

Child Life.

A child should be out in the fresh air and sunshine as much as possible, learning from things by handling them, and, above all, whether he learns or not, exercising his muscles. There are parents who worry because their child does not take readily to books, but prefers boisterous play. Don't think that this means that the child will not have a good brain later on. Mental power is the highest of human attributes. We do not look for fruit from orchard trees until after a long period of growth; so with the child. The fine fibres in the brain upon which mental power depends, have not all developed by the twelfth year. Don't compel a child to do much fine, minute work. If he is going to write, a big, coarse pencil to make big letters is the thing to start with. A six-year-old child ought not to read type in which the capitals are much under a quarter of an inch high. This is because there must be considerable nerve development before there is capacity for fine work.

Melancholy.

There is no doubt some selfish satisfaction in yielding to melancholy; in brooding over grievances, especially if more or less imaginary, in fancying that we are victims of fate. To be bright and cheerful often requires an effort, there is a certain art in keeping ourselves happy; in this respect, as in others, we require to watch over and manage ourselves almost as if we were somebody else. If we do our best, if we do not magnify trifling troubles; if we resolutely look, I do not say at the bright side of things, but at things as they really are; if we avail ourselves of the manifold blessings which surround us, we cannot but feel how thankful we ought to be for the "sacred trusts of health, strength, and time"—for the glorious inheritance of life.—Sir John Lubbock.

The following is a first class polish for furniture, cheap and simple, the best ever used: — Put some turpentine and candle ends in a small tin or delf mug. Place it on the range till the candle ends are melted; mix it up, rub on the furniture, and after leaving it on for one hour polish off with a woollen cloth. Furniture polished in this way will look like new.

Tried Recipes.

— Dutch Fritters. —

Twelve slices of rather thinly-cut bread, buttered; milk, eggs, sugar, and cinnamon. Soak the bread and butter in a little milk mixed with four well-beaten eggs, then fry in butter. Sprinkle with castor sugar and powdered cinnamon, and serve very hot.

— Sweet Cracknels. —

Mix a pound of flour with a pound of sugar, quarter of a teaspoonful of cinnamon, and a teaspoonful of potash; moisten with three well-beaten eggs. Roll out, and form into shapes like the figure 8, and bake in flat tins for half an hour.

— Apple Hedgehog. —

Two dozen of apples, half a pound of sugar, half a pint of water, a few sweet almonds, the rind of half a lemon, the white of two eggs, and three tablespoonfuls of pounded sugar. Peel and core half the apples without dividing them; stew them with the sugar and water. When soft, take up the apples. Slice the rest of the apples, and cook them in the same syrup till reduced to a pulp. Cover the bottom of a pie dish with some of this apple puree, then put a layer of whole apples, and so on, till all the fruit is used. Whip the whites of the eggs to a stiff froth, mix with the pounded sugar, and spread over the apples. Decorate with strips of blanched almonds, and place for a minute or two in a slow oven.

— Feather Cake. —

Whisk the whites of seven eggs to a froth with seven ounces of castor sugar; add the well-beaten yolks, the weight of three eggs in flour, twenty-five chopped sweet almonds and ten bitter, some chopped citron, and the grated rind of a lemon. Bake in a well-buttered mould.

— Dry Curry. —

Take three pounds from a leg of mutton, cut it into small squares and put into a pot; slice a large onion, lay the slices on top of the meat. Make a paste with two tablespoonfuls of curry powder, a tablespoonful of brown sugar, and two tablespoonfuls of vinegar. Put this paste over the onions and add some slices of sour apple. Cover the pot; let it simmer gently—no water or stock to be added. After an hour's cooking stir the ingredients well together and simmer gently for another hour. Before serving, if the curry be very dry, add a cupful of milk and a tablespoonful of tomato sauce. When hot, serve the curry with boiled rice.

— Macaroni Pie. —

Boil quarter of a pound of macaroni in water till soft, then strain off the water; add a cup of milk, quarter of a pound of grated cheese, a tablespooful of oiled butter, a teaspoonful of mustard, salt, cayenne, and white pepper. Boil for five minutes. Line a pie dish with puff paste, turn in the mixture, and bake for twenty minutes.

— Chicken Sandwiches. —

Chop tender, cold chicken fine, mix with cold gravy, and season nicely. Spread thinly.

— Cheese Sanhwiches. —

Grate one-fourth of a pound of cheese and mix with one half teaspoonful of salt, pepper, and mustard. Melt one tablespoonful of butter and add one of vinegar. Spread thin.

— Sardine Sandwiches. —

These may be prepared as above, using sardines rubbed to a paste instead of cheese, and leaving out the butter.

— Egg Sandwiches. —

Chop the whites of hard-boiled eggs very fine. Mash the yolks and mix with melted butter, pepper, and salt. If not smooth enough, add thick cream.

— Chopped Ham Sandwiches. —

Chop the ham fine as grated cheese. Add melted butter to make a paste, or butter and cream mixed, mustard, pepper, and a little pickle. Beaten egg may be used instead of butter.

— Lettuce Sandwiches. —

Nice bread and butter sandwiches may be made by putting crisp lettuce leaves between extremely thin slices of buttered bread, or use nasturtium leaves, young dandelion leaves, or pepper grass instead of lettuce.

— Oyster Omelet. —

Slect 25 good oysters and cook in saucepan until they are well cooked. Drain and save the liquor. Put in a saucepan one tablespoon butter and one of flour. Add to the liquor enough milk to make half pint. Stir until boiling; add oysters, salt, and pepper. Stand over hot water to keep hot. Make a plain omelet with six eggs. Put omelet on good sized platter. Pour oysters over it and serve immediately.

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

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Garden Notes.

Where soil is wet or sticky, there is only one thing to do, and that is—to keep off it. When it is just moist and mellow—keep working it.

Cyclamens are now, or soon will be, showing their flower buds, and will be benefited by occasional doses of manure water. If natural manure is used, let the infusion be quite weak. Guano which is a very handy manure in the garden and shadehouse, will do a lot of good at the rate of half an ounce to the gallon of water.

Where carnations have been raised from autumn-sown seed, they should be ready for putting out in permanent quarters. Let the soil be fairly light and fairly rich, and what is of more importance, let it be well worked.

Gladiolus, hyacinth, &c., will be showing flower, help them along with a good dose of liquid manure, but do not continue when they are coming into full flower.

The cold of June and Ju' has had a very acceptable effect on slugs and snails, but they have not all gone to glory, worse luck. The best way to cure the slug trouble is to prevent it. The advice to do away with all harbours is about the stalest thing in gardening, but it's good for all that.

Beds of bulbs must be kept entirely free from grass and weeds, and the hoe used between the rows after every rain. The keeping open of the soil is one of the chief points in the success of bulb cultivation.

A packet of ranunculus seed sown now, in a box or pan, will give enough plants to fill a fair-sized bed. They will flower a few months from the time of sowing, and may be recommended as giving a quick and splendid return for very little trouble.

The true gardener—the enthusiast—takes a great delight in overcoming all difficulties, and when he conquers them he only rests for a short time—a very short time indeed—before he tackles another subject, to be in its turn mastered.

Coal ashes are a very useful safeguard against the attacks of slugs. A sharp, gritty sample is apt to tickle up Mr. Slug in a tender place, and he generally refuses to face this simple barricade. Ashes do not require the constant renewal that lime or soot do, and are, besides, less conspicuous than the former at all events.

Never used tarred twine for tying up roses or any other plants. Even if the tie is loosely made the presence of the tar is harmful to plants.

One of the prettiest spring-blooming annuals is the rhodante, a native of Western Australia. It is an everlasting and the plants are easily raised, but the utmost difficulty is experienced in protecting them from ravages of the slug and snail when planted out in the open border. Keep them in small pots or pricked out into boxes until they are nearly full grown, and then transplant them to the border. Even then they must be protected by a zinc ring or a nightly dusting with the "lime bag."

Herbaceous sunflowers, or Helianthus, bloom profusely in the summer and autumn, and their gay flowers are useful for cutting. They do best in sunny places; but they are thirsty plants ,and if water is withheld they soon suffer. They soon spread, and this is sometimes an objection to their cultivation. Sometimes they are planted in boxes or large pots, and then sunk in the soil, so that their roots will not spread. They are all gross feeders, and delight in a deep, rich soil. There are many kinds, both double and single, and they are all yellow of various shades.

Don't forget the wisteria for this season's planting. What are its uses? Well, just a few: To cover a house wall ,to frame a window, to beautify a verandah, to decorate a porch, to clothe an old and useless tree, to form an arch, to make a shady walk, to make a screen, to train on a tripod, to ramble over a pile of logs, to droop over a bank, or, failing all else, to grow in bush form. It is hardy, quick growing, pliant to handle, and not at all shy of the knife or secateurs. You may possibly equal, but certainly not beat it.

It is quite useless to apply liquid manure to newly-planted Roses, because their damaged roots are not in a condition to take it up, and even if they did take it up they could hardly be in a position to properly utilise it. If liquid manure is given to recently-planted Roses, the recently-disturbed soil would be liable to become sodden, and therefore prove not only useles, but injurious to the Roses. Horse-droppings do not, as a rule, make a very strong liquid manure. Cow manure is more valuable in this respect. Liquid manure is of no definite composition, however, and gardeners regulate it by examining to see what colour it is when a small quantity is raised in the hand. If you desire to use it weak, it should be lighter in colour than pale ale.

Though a Cockscomb is a Celosia, a Celosia is not necessarily a Cockscomb, the latter name being given to a Celosia with a flattened flower head suggestive of the comb of the farmyard rooster. Both Cockscombs and the Celosia known as C. plumosa are splendid summer plants. The seeds are a fair size, shiny and black, so that if sand is placed on the surface of the sowing pan the seeds can be sown as thinly as desired.

Funkias, or "Plantain Lilies," have handsome foliage, and where foliage effects are wanted they are very desirable plants. The leaves, when the plants are well grown, are large, and they vary in colour from shades of green to bluish, and in some varieties are variegated with white or yellow. The flowers are pure white or bluish-lilac. The plants should remain in one place for a long time, and they like a deep, rich, moist soil. They are propagated by division.

The Rudbeckias, or "coneflowers," are easily-grown plants, increased by division, thriving in almost any soil, provided it be kept fairly moist in the summer. They flower very freely, and the blooms are most useful for cutting. Golden Glow attains a height of five or six feet, and it flowers for months in the autumn.

For early summer flowering shrubs the following are good:—Choisya ternata, Plumbago capensis, Spirea grandiflora, Deutzia crenata fl. pl., Philadelphus mexicanus, and Weigela rosea.

Johanna Sebus is a sweet and delicately scented rose. The colouring is a rich salmon pink with a yellowish suffusion at the base of the petals. The blooms are large, but a little inclined to droop. It is a very strong grower.

The bloom of the Crimson Flowering Gum is of a brilliant scarlet, and produced as they are in branching heads, make a striking display. They are produced from a cup-like receptacle, provided with a cap which falls off as the flowers expand. When the flowers are fully open the green interior of the receptacle is seen, adding to the beauty of the flower. The grey-green leaves with reddish midrib are handsome.

Though the Rose is universally acknowledged to be the queen of flowers, there is another aspirant to the title. This is Lagerstroemia Flos-Reginae, a showy and beautiful flowering tree. It is a native of the West Indies, and is locally known as the Queen of Flowers. It is, we believe, grown at the Botanic Gardens.

— Novelties. —

The true flower lover is never content with what he has—he is always on the look out for beautiful or rare plants he has not. And in these days of cheap seeds, novelties can be tried each season. We may not know them by sight, or even name, until found in some catalogue, but no matter, it is always the unknown, the unfamiliar, that lures us. Never mind if they are over-praised and over-lauded, we are going to find out for ourselves. It is one of those pleasant paths of gardening which even the most orthodox of gardeners would find it difficult to forego.

— Sweet Peas. —

The slug and also the snail will be paying their attentions with considerable ardour to the young plants. If soot, lime, ashes, or Pestend fail to protect them, there is nothing for it but regular evening visits with a lantern and the lime bag. It is quite certain that a very little lime will do for a very fat slug, the trouble is to get it on him. Sweet Peas are rarely grown from cuttings here, but in England it appears to be a fairly general practice. Slips of springy, woody cuttings, two or three inches long, root somewhat easily—it is said —in a light sandy soil, even in the open, but success is more certain in a propagating case or close frame. Cuttings of soft sappy growths are difficult to strike. The plants from which cuttings are taken quickly recover and send out fresh shoots. Sweet Peas are certainly slow during the first few weeks of their lives, when they appear to absolutely stand still. One consolation is that what they fail to do above ground, they make up for beneath the surface. One is tempted to try and hurry them on, both at this stage and when they are making growth, by liquid manure. If the ground has been well manured before sowing there will, however, be no need for this. In the first case it may sicken them, and in the second the result would probably be a soft and sappy growth. A point on which opinions differ is the pinching back of growing plants when they have made a foot or so of growth, to induce bushiness of habit. When well grown, however, most varieties naturally develope sufficient fullness; on the other hand, there are some which no amount of pinching will keep from a certain amount of lankiness. A good deal also seems to depend on the sticking.

—Training the Sweet Pea. —

Sweet Peas require some support from the time they put out the first tendrils. There is nothing better than short branching twigs, whatever other means may be adopted for subsequent training. There is no doubt that it adapts itself better to, and looks more at home on a more natural support than wire netting. Unfortunately suitable sticks are not easily procurable. They are often too straight and stiff and almost quite without the twiggy branching growth about and over which the Sweet Pea loves to climb, and which give a lightness, grace, and elegance to a row which is partly lost in a more artificial arrangement. Whatever support is used it must be well braced, for the wind pressure will be very considerable. Where full length natural sticks are used, a couple of strands of fencing wire, with a supporting stake every ten or twelve feet, should be strained along the rows, one at two feet and the other at four feet above the ground level. Even where full length sticks are not available a very neat and suitable support can be made of short growths laced on a foundation of fencing wire. This method has the advantage that it can be done as the plants grow, and the bareness of the tall unclothed sticks be avoided. If wire netting is used, it should be of large mesh, be well stretched, and if it has had a thin coat of boiling tar it will be very much less obtrusive in appearance than the plain, galvanized article. In fact, at a little distance it will be almost invisible. Formal arrangements of wire-work, such as umbrellas and vases, are favoured by some people, but if there is a less artistic way of growing Sweet Peas we don't know of it.

— Salvias. —

One of the most popular of summer flowering plants, amongst those who like big blazy displays of gorgeous colours, is the Salvia. It is of comparatively recent introduction in its present improved form, but it is now one of the flowers which many gardeners feel they must have, whatever else has to be passed. This is not surprising, for they come into flower early and last a long while in bloom The blue flowered Salvia is more at home in the Hills than on the Adelaide plains and similar localities, but the other varieties revel in the sunshine, and with a reasonable amount of water will stand a "hot week" without turning a hair. They are strong rooters and any bedmates are liable to go short, so they are best in a place to themselves or in generous-sized clumps. Sow the seed early in pan or box. Prepare a seed pan 10 in. in diameter; place in the bottom an inch of broken potsherds for drainage. Sprinkle a little dry moss over this to prevent it from clogging. Make up a nice light soil of good loam, leaf-mould and sand, thoroughly mixing the three ingredients together, and running them through a fine sieve. Fill the pan to within half an inch of the rim with this, and make the surface firm and level by pressing on it with a small board. Sow the seed evenly and thinly over the surface, and then sift some earth (leaf-mould for preference) through a fine sieve so as to cover the seed to the thickness of a penny piece. Shade the pan with a pane of glass and place where it may receive the full benefit of the sun. It should be looked to every day, and water given per fine-rosed can, when needed, that is to say, when the surface shows signs of getting dry, but not unless.

— Carnations. —

Carnations which have been undisturbed for the last few months will now be benefited by some assistance for the production of new growth and an abundant crop of spring bloom. A successful grower recommends top-dressing as the best means to this end. Prepare enough compost to cover your bed at least an inch deep in the following manner:—Take an ordinary garden barrow, full of the sifted product of the compost heap, or, if you have no compost heap, the scrapings from under some old tree around which the ground has not been cultivated for years (this is especially good if cows and horses have been in the habit of congregating under its branches for shelter); second, an equal quantity of sheep, or if that be out of the question, old cow manure. Mix these together thoroughly, and add a little soot and superphosphate. These ingredients must be so well stirred that the different parts are distributed evenly throughout the whole. When enough has been prepared to cover the beds the required depth scrape all the surface soil between the plants off an inch deep. This must be done with great care, that neither the plants themselves nor their roots may be injured. This discarded soil should not be wasted, but may be spread round small shrubs or other perennials in the open border. This done, the specially prepared compost may be spread evenly round the carnations, and if rain is not threatening should be watered to clean the foliage of the plants and to settle it firmly round the base.

— Hydrangeas. —

We do not grow enough of this beautiful flowering shrub in our open gardens. We cannot, perhaps, grow them in our hot districts to such perfection as they do in Melbourne, where they are shrubs in fact as well as in name, but much more can be done with it than is at present accomplished. Plants which were struck from cuttings last year can be put out in the open garden now, and will in a comparatively short time give an abundance of bloom. There are just two things to remember: One is that they require protection from the north; the other, that they will require plenty of moisture directly the weather becomes hot and the atmosphere dry. Plants may be procured quite cheaply from the nurserymen, or cuttings may be struck, which will flower this season. Make them six inches in length, cut cleanly above and below a bud, and set around the edge of a well-drained pot of sandy soil, and keep in a shadehouse or on a verandah.

— Virginia Creeper. —

The present is a good time to put in plants of this beautiful wall covering. An objection is sometimes made to growing climbing plants on the house walls. Even if there is any real ground for this objection (which we question) it can hardly apply to this plant. It appears to be free from any disease, it is never untidy, it is not subject to scale, it is in leaf when shade is wanted and bare when sunshine and warmth are at a premium. Wall plants generally receive the worst treatment of anything in the garden; first, because there is often a plentiful supply of bricks, stone chippings, iron trimmings, mortar and plaster remaining in the ground after a house is built, and secondly, because they are often planted in a pathway. To give them a fair chance, dig a hole 2 ft. square, fill with good soil, and keep the surface around the stem loose and open.

— Lemon Scented Verbena. —

This is a good time to trim up this pretty deciduous shrub. They do not require heavy pruning, but a thinning out of the centre, the cutting away of exhausted wood, and the shortening back of the stronger growths is advised. There is a dainty lightness about the bloom which makes it very desirable for decoration. For those who wish to increase their stock of this plant, the present is an excellent time for putting in cuttings. Ripe wood about six or eight inches long should be used, set in sandy soil, so that only a couple of inches show above ground level.

— Heliotrope. —

Seed of this fragrant perennial, which should be in every garden, may be sown any time during the next few weeks. They want no particular care and any ordinary sandy loam or good potting soil will suit them. The seed unless fairly fresh will take some time to germinate. Fresh seed should begin to show in a fortnight or three weeks. It should be sown thinly and not heavily covered. After firming the surface give a gentle watering and sift some old cow manure over the pot or box and cover with glass. When large enough to handle, prick out into boxes or small thumb pots.

— A Good Contrast. —

Plant Lilium croceum in close proximity to the blue Delphiniums, the strong contrast of the orange and the blue makes a bit of colouring of almost Oriental splendour, and that at the height of summer, when more than at any time we may welcome the most gorgeous and radiant colour schemes. Perhaps the effect of these Delphiniums and L. croceum in a very small garden might be too violent, but in ample surroundings and with a wide stretch of garden-scape beyond and around, it is a wonderfully telling combination.

— Summer Flowering Bulbs. —

Though we want our spring flowering bulbs by hundreds of this or that, with the summer bulbous plants we are often content with mere patches in the border or bed—and very effective they are too when used in this manner. For one thing, almost without exception, the flowers that spring from a bulbous root are intensely bright and clear in colouring, or, if white, then the white is singularly pure, so that they have a wonderful colour value. And it is at the present time that we can best set ourselves to look round carefully and ask ourselves if we are growing these summer bulbous plants in sufficient quantity and if we have them placed to the most advantage. The present is the time to plant or transplant many of these plants, as they are at rest now, and we have to realize that their resting period is sometimes brief. As soon almost as they are absolutely dormant they seem to begin to wake up again. Once they are planted they do not need frequent division and transplanting, and may be left undisturbed for some years, until, in fact, the clumps are overcrowded with bulbs.

— Salpiglossis. —

Amongst the whole race of garden annuals there are few, perhaps, which are more showy when in bloom than the Salpiglossis. The flowers are of various shades of colour, but are greatly enhanced by being netted and marked with lines of some darker shade upon the lighter ground. The plants like an open situation, and if the soil is of a light and friable nature so much the beter. The plant is a native of Chili, and for that reason delights in plenty of sunshine. Where Petunias grow with satisfaction, so should the Salpiglossis. It would be an excellent plant for cut flowers were it not on account of the clammy nature of the stems and flowers, which make them slightly disagreeable to handle. Unless great vigour is desired, much manure is unnecessary, as it encourages growth at the expense of flowering. The plants do not require excessive watering after they are established in a well-tilled soil any more than Petunias. Both of them being covered with clammy hairs, have the power of absorbing the dew during the night, and by that means they recuperate during the night, where various other garden plants would succumb on account of the drought. Rather dry conditions encourage flowering, it is said, to a much greater extent than rich soils and much watering.

The "A B C" of Rose Pruning.

In the first place, good pruning is not so important as good planting. Provided Roses have been properly planted in well-prepared soil, they will afterwards stand, without serious injury, a great deal of ill-usage from the most inexperienced pruner that ever handled a knife, whereas no amount of skilful pruning will ever impart to badly-planted Roses in poor soil that vigour and vitality which they missed through being improperly treated at the commencement of their career. In order to give the beginner greater confidence in the recuperative power of well-planted Roses than he usually possesses, writes an English grower, and make him less afraid of damaging his plants by following even a very moderate system of pruning, he should know that were a bed of dwarf Roses mown down level with the ground, a very large majority of the plants would produce a good crop of beautiful blooms during the same season; in fact, the results would be superior to those which would follow the efforts of the novice if left entirely to his own devices to deal with a similar bed.

The first consideration will be as to whether the plants about to be pruned are required to produce a small number of extra large flowers, or a larger number of comparatively small ones. If the former, the pruner, should he wish to become a successful exhibitor, will have to harden his heart and ruthlessly cut down to within about six inches of the ground (the writer is, of course, referring to dwarf or own-root roses) all the best shoots, after having previously removed all the old, sappy, and twiggy growths. To treat fine-looking Rose plants after this fashion always seems to the neophyte little short of destroying them altogether; whereas, on the contrary, the result will be that such plants will throw up shoots of greater vigour than if they had been less severely decapitated.

If, on the other hand, the plants be intended for the decoration of the garden or the production of a large number of cut flowers, the treatment need not be anything like as severe.

First, as to the dwarf, or bush roses, as they are sometimes called. It will be well to commence operations by removing all the dead wood, next the soft and sappy shoots (those which when cut are found to consist almost entirely of pith), then most of the small twiggy growths, and, lastly, some of the better shoots where they have become too crowded. This process is called thinning out the plants, and nearly every one of them will require to have some branches removed. In doing this each shoot should be cut clean out either to the base of the plant or to where it springs from an older shoot, as the case may be. If the thinning be properly done, none but the sound, strong, and well ripened (firm woody shoots) will afterwards remain, together with a few older and less vigorous ones. The idea kept in view should be to have a moderate number of shoots as far as possible equally distributed over the plant, and nowhere crowded together, and to leave the centre rather more open than the sides. If the plant under treatment be an old and vigorous one which has not been properly pruned in the past, a number of shoots may have to be cut out in order to bring it into proper form and to allow of the admission of light and air to the middle of it. On the other hand, a young plant of small growth may require the removal of scarcely any shoots at all. These two types may be regarded as representing the two extremes of the various kinds of roses that will have to be treated. This thinning out process is the one most often neglected in ordinary gardens, and yet it is far more important than shortening the shoots which are allowed to remain, which may be styled the pruning proper.

In order to make this pruning proper as simple as possible, the shoots which remain on the plant, after all the useless and crowded growths have been cut away, must be shortened back about half their length, whether they come from the base of the plant or from another shoot. In doing this care should be taken to make each cut just above a dormant leaf bud or a more forward bud, or a young leafy shoot as may happen. Of course, these examples are only different stages of the same thing. First we have the dormant bud, then, when that begins to grow the more forward bud; after that young leaves appear, and ultimately a young shoot.

The Foxglove.

It would be difficult to name a more suitable subject for what may be called, for want of a better word, the natural or wild garden, in our hills and cooler districts than this beautiful old English favourite. It is a woodland beauty, and never seems quite at home in the formal garden, though it does well in a cool and moisture holding spot. When grown as a garden flower it should never be planted in a dry, breezy, starving situation. To be elevated is quite to its liking, but often an elevated site is too arid for this moisture loving plant. A cool and shaded spot will promote a fine growth, and, at the same time, set off the peculiar beauties of the plant. It is never more happily placed for effect than in the wild garden, where its spires of purple, rose, crimson, and pure white flowers rise high above the surrounding greenery. In common with Lilies, Foxgloves associate well with Rhododendrons, but they appear to be well placed, no matter where they are. Therefore, when self-sown plants occur where they seem intrusive, it is well to leave them undisturbed if possible, for the chances are all in favour of a surprising success in the end. In any case, a good clump is better than a few single plants, and it matters not how the sorts are mixed. To raise a stock of plants the seed should be sown in pans or boxes, and the young plants should have a little nursing for they are slow growers at first, and be put out when large enough where they are to remain for flowering. A sowing of seed should be made every year, for although many of the plants will flower the second, and even the third time, a considerable proportion will die off after once flowering. To promote the perennial character, the seed-pods should be assiduously removed, and from the finest only should seed be taken for keeping up the stock.

Roses from Seed.

Roses are multiplied in a great variety of ways, but new varieties are raised from seed. It is an interesting process, but has the drawback of being rather slow, as two years at least will elapse before the first results are apparent, though afterwards one may have a bed coming into flower each season. If seed is procurable it may be sown at any time, preferably during the next two or three months. It can be placed either in a seed pan, or box, or in the open ground; the great objection to the latter being that slugs are likely to be troublesome. Prepare a suitable soil by mixing together some loam, leaf mould, some finely-sifted cow manure, and some sand, these ingredients being thoroughly mixed together, and before using run through a sieve of one-eighth inch mesh. The pan must have placed in it a sufficient quantity of drainage, best formed of broken pots, the pieces being of the size of peas; this may be kept open by placing on top a little dry moss. Fill the pan to within half an inch of the rim, and press the surface down, somewhat firmly, with the back of a trowel or a flat piece of wood. Then give a good soaking watering, and allow it to drain for at least an hour.

It is now ready to receive the seed, which, being large enough to handle, may be placed singly at equal distances apart, and arranging them in rows for the better convenience of weeding the pan. Cover the seed to the depth of half an inch with some of the finely-sifted soil, and give another watering. Cover the surface lightly with some dry moss, and over all place a sheet of glass. In all probability they will not need watering again, but should be looked to occasionally to see that the surface is damp. Some seedlings may be showing in a month, others may take much longer. One may, of course, raise a large number of seedlings without getting more than very ordinary merit, but there is always the chance of something worth keeping, and the remote possibility of an Edward Mawley or Lyon Rose.

Ornamental Fruit Trees

The Persimmon or Japanese Plum, properly speaking, is a fruit tree which was introduced from Japan (as the name implies) some years ago, but the beauty of the plant, when the branches are laden with brilliantly-coloured fruit in the autumn, suggested the idea that it would make a splendid addition to the shrubbery or back lines of the open border. The plants may be procured from the nurserymen, either in pots or out of a bed, but in the latter case very often breakings of roots, when digging them out of the bed, has a most detrimental effect upon them. Prepare a station by digging out the soil one spit deep and then mixing with the lower spit some very old rotten cow-dung, stable manure, or sheepdung. When planting, the roots should be spread outwards, and, as each is put in position, a trowelful of earth placed on it will keep it in place, whilst the next is being treated in a similar manner. Press the soil firmly on the roots, and fill the hole in three parts. Then give a good watering. Two or three days later the rest of the soil may be filled in, the tree tied to a stake, and a mulch of manure two inches deep placed round it. The tree will bear the second year. The fruit is not eatable until it is perfectly ripe, and is generally picked and stored for some weeks till ready for the table. Another fruit tree whose presence in the shrubbery or flower garden greatly adds to their beauty is the pomegranate. The tree is so hardy and of such an accommodating nature that it will practically grow in any position except upside down, requires no watering during the summer, does well under big trees, and when its limbs are bent by the weight of gorgeously-coloured but unsatisfactory fruit, it is a thing of beauty. The crab apple is another of the fruit trees which might well be added to the list of fruit trees worth a place in the front garden. It is beautiful in bloom and handsome in its small highly-coloured fruit. In large places, too, the handsome foliage of the mulberry and its abundant shade entitles it to consideration. The Figoæ is another tree which combines beauty with more practically useful qualities. The flowers are very handsome, and the fruit is not to be despised. Unlike the foregoing, the Vesuvius Plum contributes only the beauty of its gorgeous foliage for the fruit is useless.

Poultry Manure for Roses.

A well-known Victorian rosarian speaks highly of the value of poultry manure, and prefers it to commercial manures. When kept dry it is a very powerful fertiliser. He applies it three times in the spring, and three times in the autumn, just dusting it on the ground as you would use superphosphate. According to analysis, it is 100 per cent. stronger than any other animal manure, and it must be used with care.

He also has great faith in the use of cow hoofs for the production of champion blooms. Nitrogen is an important factor in the production of fine plants and flowers, and the hoofs contain from 10 to 12½ per cent. of available nitrogen. He prefers them to nitrates or sulphate of ammonia, as they are slower in decomposing. In fact, he considers chemicals as stimulants, and he does not use them. He is a firm believer in the efficacy of good liquid manure judiciously applied. As regards the manuring with the hoofs, the method adopted is to bury a few of them with each rose bush at the time of planting, but away from the plant a little, so that a good start in the growth of the plant may be effected before the new roots reached the hoofs. Comparisons made between plants which had the hoofs placed under them and those that had not showed a marked difference; the former were more sturdy in growth, and finer blooms were produced than by the others.

Hoya Carnosa.

Many people who thing they know this handsome flowering climber know its beauty only by repute, for as very often grown it is a truly saddening sight to the flower lover. There are probably more sick Hoyas on the verandahs around Adelaide than healthy ones. They are either covered with scale or yellow from starvation. They want a light, airy position, some moisture at the root, and in the atmosphere, and protection from direct sun. In England where it is considered one of the best of greenhouse climbers it is very popular. An English grower writing of the beauty of the Hoya says: "I planted a cutting in a large pot, and trained the shoots horizontally along four wires about one foot from the glass in the roof of the greenhouse, and with two summers' growth the four wires were completely covered with three or four shoots each, from one end to another, about sixteen feet in length. During the summer months they flowered most profusely, and constituted veritable floral wreaths which were the admiration of everyone who saw them. The odour emitted from these magnificent wreaths of wax-like, pinkish, white flowers was, however, the reverse of pleasant; indeed, on several occasions it evoked expressions of disapproval, despite their beauty.

The material used in the potting consisted of fibrous loam, peat, and leaf mould in equal quantities, with a liberal sprinkling of sharp sand, the pot being drained with charcoal instead of the ordinary crocks. The plant received several waterings with ordinary liquid farmyard manure, and judging from the magnificence and vigour of both foliage and blossom, these conditions suited its requirements admirably. Another important point, perhaps not generally known to amateur cultivators, is to allow all the tips or foot-stalks of the old flowers to remain on the shoots, and they will all flower again the following summer. Indeed, I noticed that a considerable number of the strongest tips on the plant flowered three times in two years, and I have seen the same foot-stalks on other plants flower four and five times at least."

Laughing cheerfulness throws sunlight on all the paths of life.—Richter.

Fruit Garden

Notes for August.

Spray.

Spray thoroguhly.

If rain follows, spray again.

The man who sprays has the vagaries of the season to contend with.

The man who does not spray may, and probably will, have a varied assortment of pests and diseases to worry him.

Success in spraying depends on attention to detail. The spray material must actually cover every portion of the tree it is intended to protect.

In buying a spray pump, see that it is of simple design, that the working parts are of brass, that they can be easily taken to pieces, and finally that it is of suitable capacity for the work to be done.

Power spray pumps are coming into general use, as they are found to be more economical for large areas and do better work.

Aphides are the most common form of plant lice and the treatment for them is an external irritant insecticide.

Fungi are low forms of vegetable life, which cause such plant diseases as curl-leaf, shothole, &c. Any fungicide is a preventive rather than a cure and should be applied before the disease or its effects are apparent.

Lime does not improve with age and it should be remembered that unless very carefully stored it becomes stale and useless as a spray ingredient.

Many orchardists are not too careful as to using exact quantities in preparing spray mixtures, or as to the purity of the materials. The result is ineffectual work or perhaps damaged trees.

Occasional damage to trees is reported in connection with a Bordeaux Mixture. It is quite possible that some of this might be traced to the use of inferior lime.

Bordeaux Mixture for curl leaf and other diseases is a preventive not a cure, or only so to a small extent.

Bordeaux Mixture and Arsenate of Lead may be procured in paste or powder form and Lime-Sulphur in concentrated solution.

In these days, when the trouble and cost of preparing spray mixtures has been reduced to a minimum there is no longer any excuse for the man with only a few trees who neglects to spray.

The time to spray for curl leaf, shot-hole, rust, mildew, and all fungus disease in apricot, peach, nectarine, and plum is just as the greatest number of buds are bursting, that is, when the first to open are almost fully expanded.

The primary object of pruning is to produce good fruit.

A shapely tree is good, a tree which produces heavy crops is better, but one which looks good and is good is best.

Young trees should be brought up in the way they should go, but old trees should be renovated on commercial rather than artistic lines.

Old apple, pear, and other fruit trees cannot be hacked about indiscriminately without throwing them out of their bearing habit, with consequent loss of crop and profit.

Any shaped tree which bears good fruit and plenty of it is a good tree, and in one sense a good-shaped tree, for "handsome is who handsome does" is quite as true in fruit growing as in anything else.

Whether a newly-planted tree should be pruned before or after may not greatly matter, but it should certainly be done before any growth is made. Either the tree should be cut back to a whip stick or if there are two, three, four well-placed shoots they should be shortened to a to a good outward growing base bud, and all other growth cut out.

For root grafting and for young trees, say up to three quarters of an inch in diameter, the whip and tongue graft is to be recommended. For larger trees the crown bark graft. The former can be done at any time now, but the last is best done when the sap is beginning to run strongly as the tree is coming into leaf.

Theoretically the proper place to make the cut in pruning the vine is through the node or joint above that from which the shoot is to grow, but in ordinary practice the cut is commonly made anywhere below it

— Pruning Figs. —

Beyond shaping the young tree, the only pruning a fig tree requires is to cut away any branches which grow in wrong positions or where they are too close together. In Smyrna, where the best figs are grown, practically no pruning at all is done after the tree has been trained to have a trunk five feet high. All suckers should be cut away whenever they appear.

— Liming Soil. —

The nature of the soil must be taken into account when using lime. On heavy tenacious soil it may be appled at the rate of up to 1½ cwt. per rod. On moderate stiff loams that have been heavily manured up to 1 cwt., whilst half the quantity should be sufficient for light sandy land.

— Stunted Trees. —

In pruning an old stunted apricot, such as one often sees in old, neglected gardens, the first thing to do is to remove altogether any branches which crowd the tree, with special care to open up the centre. Having done that it will probably be desirable to shorten back the main arms very considerably, perhaps up to one-third of the length, for the object is to throw the whole vigour of the tree into a portion of the former branch area. This refers, of course, to trees which have been stunted in growth by poor soil, lack of moisture, robber trees, &c., and not to well-grown established trees, which have steadied down, and naturally are now making much less growth than in their younger days. If such stunted trees are cultivated, watered and manured, with a thinning of the fruit when it sets, the result will probably be a good crop of fine apricots, whereas if left as they are the fruit from such trees would be hardly worth picking.

— Fungicides and Insecticides. —

The principal fungicides used are Bordeaux Mixture, Lime-Sulphur solution, and Ammonio-carbonate of Copper. The principal insecticides are Arsenate of Lead, an internal poison for leaf eating insects. Arsenical Bordeaux, a combined insecticide and fungicide, and Kerosene Emulsion, Resin Wash, Tobacco solution, and Lime-Sulphur are all external contact poisons for scale insects and plant lice.

— Labels. —

Where trees are to be labelled so that there will be no doubt in the future as to the name of the variety, pieces of flat galvanized iron, about four inches by one inch, will answer the purpose. Write the name and yearof planting with a black lead pencil, then put on a thin coat of white paint; this will prevent washing off, but will allow the writing to be distinctly seen.

— The Mulberry. —

Though the mulberry has been known for centuries, it is still a fruit that should be more extensively grown than is the case at present. Commercially it is a difficult fruit to handle, but there is no objection to it for the home garden. The leaves are large and handsome and as useful as vine leaves for decorating dessert dishes, &c. Many people consider the fruit delicious as dessert, and it is certainly useful for tarts, jam, &c.

— Peaches on Almonds. —

Though some growers state that the fruit on almond stock trees colours better, besides being of better flavour, especially where the soil is poor or stony, the general opinion is that under all ordinary conditions the peach seedling is the best stock for the peach. Under some conditions, such as poor stony soil, its hardier, stronger, and more vigorous habit gives it a better chance than the weaker peach stock. The influence of the stock on the worked tree has never been satisfactorily determined by careful experiments, and is therefore a subject on which very little is definitely known.

— Decay in Oranges. —

The common blue mould is always found associated with decaying oranges. This fungus was formerly considered to attack dead and decaying matter only, but experimental inoculation of sound oranges has, without exception, resulted in the characteristic decay. Investigation has shown that the decay is preceded by mechanical injuries to the skin, most of which injuries are so small as to be invisible to the inexperienced eye. The most common forms of injury are caused by the clippers in cutting the fruit from the tree, stem punctures, and scratches and bruises in packing.

— Draining. —

Though it is important to get plenty of water to soak in about the roots of trees at this season of the year, it must be remembered that whilst all soil should be in a damp condition during winter, it should never remain saturated for any length of time, as if so the roots will be injured, and the tree damaged more or less, either in its strength or bearing powers. Surface draining can be easily arranged for by means of the plough, and possibly the use of a spade or scoop here and there where any ridges occur to hold up water. Water should neither rush over land nor stagnate upon it. Careful thought of the actual requirements of various trees during winter months should furnish a clue to the safest method of working and arranging the surface soil.

— Burgundy Mixture. —

Burgundy Mixture is a good substitute for Bordeaux, is easily made, easily applied, and is inexpensive. The formula recomended is: Sulphate of copper (bluestone), 4 lb.; carbonate of soda (washing soda), 5 lb.; water, 22 gallons. Dissolve each ingredient separately in 2 gallons of water. When dissolved, add water to make up 22 gallons. Add the soda first, then keep the solution constantly stirred whilst adding the bluestone solution. The spray sticks better than Bordeaux, but it is advisable to add about ½ lb. of treacle to the mixture before use.

— Tree Stumps. —

The following is recommended for destroying tree stumps without blasting: "Bore holes in them 1 inch in diameter to a point somewhat beyond the centre. The holes should be three parts filled with saltpetre and then filled up with water and tightly corked. After three months have passed remove the corks, fill the holes with kerosene and then set on fire. By this means they will gradually smoulder away."

— Vine Pruning. —

There are two points to remember in vine pruning. Too early pruning may induce the buds to prematurely swell and break into leaf, with the risk of the damaging of the young growth by subsequent frost. This danger cannot, of course, be altogether avoided, but it is increased by too early pruning. On the other hand, too late pruning will lead to bleeding and exhaustion of the vine.

— Arsenic. —

Some orchardists think that the accumulation of arsenic in the ground at the foot of a tree which has been frequently sprayed, must tend to injure its roots; but the analytical examination of such soil does not reveal a trace of the poison.

— Bordeaux Mixture.

The Bordeaux spray, though it has been in use for so long, is somewhat uncertain in its action, and scorching cannot always be avoided. Many are under the impression that the addition of more lime is a preventive, but experiments show that every extra gallon of lime-water added above the minimum required for the precipitation of the copper of the bluestone means loss of efficiency, and lime in itself will cause scorching. A method of testing the mixture is to dip into it half the blade of a bright, but not greasy knife, or a wire nail. A deposit of copper appears like a stain on the steel if the precipitation is not complete.

— Grafting. —

All grafting, to be sucessful, is dependent upon the close conection of the two cambium layers and the finer and closer the cuts the more successful the operation. Woods themselves never unite; the cambium layers are what do the work. Plants that have been grafted for years, when split downwards, show that although the cambiums unite and grow around them and form a perfect outside appearance the small part of the woody tisue inside is never changed.

— Trees Injured by Spraying. —

Some varieties of apples are more susceptible to the action of arsenic than are others. Bismarck is very likely to be damaged, and so are Sturmer Pippin, Emperor Alexander, and Stone Pippin, whereas Five Crown is one of the most resistant. Therefore, an orchardist using arsenic sprays for the first time does well to spray a tree of a susceptible variety a few days before the general spraying, to ascertain what is a safe strength of arsenic to use. Damage is often due, too, to defective mixing. Perhaps too little water is used to dissolve the lead, and, as a result, there is insufficient of it to render the arsenic insoluble.

Season for Tree Pruning.

DeCurs in his admirable work translated by Professor Sargent, states that "a tree can be pruned at any season of the year and the best is that when it can be done the cheapest and the most convenient."

While attaching, and justly, great importance to the method of making necessary amputations, he attaches none whatever to the season at which this should be performed and which is certainly of equal if not paramount importance.

There is a well-established axiom that a continual struggle is going on between growth and decay; one of which will eventually gain the mastery.

Thus, when a surgical operation is to be performed the patient is prepared so that he may be in as healthy and vigorous condition as possible—vitality being necessary to a speedy and complete treating of the wound.

Reasoning by analogy, writes "Horticulture," a tree is in the most perfect state of vitality when its sap is in the process of elaboration and assimilation and then it will be in the best condition to produce the new tissue required to cover and heal the cut which may have been made. It is a well-established fact that sap has

a double action mounting from the roots through every ramification of the tree, to the leaves, in a thin liquid, where it is elaborated, and these having absorbed and decomposed the carbonic acid, the sap descends again in a changed condition and is deposited year after year in the successive concentric layers which form the bulk of the tree.

If that be so the sap cannot be said to descend to the roots, but to have been used up in its progress thereto, to fabricate the body of the tree. Now while this process is in progress it is easy to understand that important amputations are the least likely to cause decay, because the material required to heal them will be produced at once.

The practical results obtained by actual experiments fully maintain the correctness of this theory.

A number of fruit and ornamental trees pruned at a time of active growth were partly healed of their wounds in ten days, and in a month cuts two to three inches in diameter were completely covered with new bark. Now if these trees had been pruned in the autumn, after the elaborated sap had performed its annual functions, the wound could not have been healed and would have been affected by cold, and decay, instead of growth, would have had the first chance—the trees being dormant would have no latent force to repel this decay, which always commences immediately after all severing of parts when unduly exposed to cold, whether in plants or animals.

If the pruning were done at the proper time any application (even coal tar, which is no doubt the least injurious to vegetation) to prevent decay, would be avoided as in the course of the natural development of the tree the protective covering of the wound would be formed, and all applications are more likely to impede than to accelerate the new formation of bark.

In studying the mechanism of a tree the above facts as to the use it makes of the aliments with which nature has provided it wherewith to perpetuate its growth are easily observable, and are infallible guides as to that season of its annual development, when any artificial changes in its formation or character may be effected surely and safely, a matter of even greater importance than the manner

The Grape Fruit.

There are many tropical fruits for the eating of which, in the case of the unaccustomed consumer, directions for use have to be provided, but not many fruits have attained to the dignity of having had a pamphlet written on the subject of how to eat it. To the grape fruit, however, this probably unique distinction has been accorded. The writer of the pamphlet, giving her experience as to the best way to eat it, says that she "first divides it in half across the grain like an orange, then she removes the seeds, of which there are something like forty in a fruit. Then, with a sharp penknife she loosens each triangle of pulp and removes the core. Then she pours some sugar into the centre and all over the top. After letting this stand for some hours for the sugar to melt and combine with the juice, she then uses a teaspoon and digs out the juice in the same way as she would an orange. This she uses at various meals, preparing the grape fruit in time for the same." A much simpler plan with less ceremony for those who simply wish to eat and enjoy the grape fruit is to remove a piece of the top of the skin and then after breaking the pulp with a teaspoon place some sugar on it and commence to dig it out immediately. More sugar may be placed in when room in the skin allows of the operation. The amount of sugar entirely depends upon the taste of the eater, because some may enjoy it when perfectly sweet, while others could enjoy it while still retaining a considerable amount of its original sourness.

Pulping Raspberries.

The pulping of this fruit is a very simple process; the berries are, in as fresh a condition as possible, placed in steam-jacketed boilers and boiled only sufficiently long to kill the germs of fermentation—a few minutes only. It is while boiling placed in tins, which are immediately sealed by soldering in the usual manner. The sixed tins used by most preservers hold 1½ lb., 2½ lb., 7 lb., 10 lb., and 50 lb. respectively. Puly thus put up will keep in good condition indefinitely, and when boiled with sugar proves that it retains its original colour and flavour. Again, the method enables the putting-up in portable form for wide distribution, and that can be sold at a reasonable price, this delicious and popular fruit, which otherwise from its perishable nature is difficult to transport long distances while in its fresh condition without quickly spoiling by fermentation. At the same tiem it is equally as good as the fresh fruit for every purpose, whether preserving or culinary.

Results secured from the culture of the raspberry in a general way may be measured by the adaptation of the soil. It will not thrive in land that is very dry, shingly, or very sandy, or very heavy clay, nor will it succeed if at any time its roots are standing in water—though the land should be fairly retentive of moisture, water should at no time lie upon the surface or within 2 ft. below the surface; good drainage and aeration of the soil are essential to success. In short, it may be said that raspberries like deep, loamy, well-drained soils, rich in humus; therefore labour spent at the outset in deep plaughing and thorough preparation of the land always repays the outlay. It is an advantage if the land is cultivated at least one year with some such crop as potatoes before setting the canes—which leaves the soil in good condition for the reception of the plant, and assists to economise and facilitate the subsequent cultivation; for experience proves that intensive culture to secure a good physical condition of the soil, combined with the application of suitable fertilisers, secures the best returns. The ideal method of cultivating raspberries is to have the land at all times in about the condition it would be if worked with a garden rake, the work being done with a suitable implement whenever necessary to keep down the weeds and prevent the formation of a crust, thereby conserving the moisture of the soil, which is often lacking during the season of fruit-harvesting, the most critical period of the plants' growth.

There are two principal methods of setting out the canes and training—by planting in rows 6 ft. to 7 ft. apart and 4 or more feet in the row, usually setting two canes in a stool, or by the continuous-row system, the plants being set about 1 ft. apart in the row, leaving sufficient distance between the rows to allow the cultivation to be done by horse-labour, observing, with whatever implement is used, to work very shallow near the plants so as not to disturb the roots; though the later system has to a great extent found most favour with growers, the former method, in the opinion of the writer, gives the best results. The training of the canes for the second and subsequent seasons after planting varies with individual growers; most successful growers favour removing the old canes soon after harvesting the fruit and the cutting-back of the canes during the winter to 4 ft. or less, and the thinning-out of the young canes at the stools when about 6 in. high, leaving only the required number; this system, while giving excellent results, is, in the opinion of the growers who follow the method, beneficial in many respects, and generally should be followed.

Flour Paste as a Control for Red Spider.

The United States Bureau of Entomology reports in Circular No. 166, the result of some experiments with flour paste as a control for red spiders, and also as a spreader for contact insecticides. Difficulty had been experienced in obtaining an effective spreader for lime-sulphur, and it was observed that a mixture of flowers of sulphur 15 lb., water 100 gallons, and paste (as a "sticker") 4 gallons, spread over the leaves very readily. It was accordingly mixed with lime-sulphur solutions, and the result was a smooth mixture that spread over the foliage very readily. Experiments showed that with 698 mites (red spiders) present, 99 per cent. were killed when the flour paste was used with the lime-sulphur spray, but that of 360 mites present, only 37.5 per cent. were killed by the spray when no paste was added. Further experiments showed that flour paste, 8-100 and 10-100 strengths, was effective against red spiders on hops, and from the encouraging results of other experiments with mites attacking pears it seems "very probable that flour paste, 8-100, will give good results when applied for any of the small leaf-feeding insects."

To prepare the paste mix a cheap grade of wheat flour with cold water, making a thin batter, without lumps; or wash the flour through a wire screen with a stream of cold water. Dilute until there is 1 lb. of flour to each gallon of mixture. Cook until a paste is formed, stirring constantly to prevent caking or burning. Add sufficient water to make up for evaporation. It may also be prepared by stirring boiling water into a moderately thin batter, until there is 1 lb. of flour in each gallon of mixture, and allowing it to stand until the starch is all broken down.

If the paste is not sufficiently cooked the resulting spray will not be effective, and if over-cooked the paste will harden when thoroughly cool, and will not mix with water very readily. Usually, however, the paste is used as it is prepared, and over-cooking is not a disadvantage.

When mixed in the spray tank flour paste has a tendency to settle, and in order to do satisfactory work agitation is necessary. This is but a slight disadvantage, and is necessary with most materials.

Customer: "Do you keep a good corn cure?" Druggist: "Yes, sir. Here is an excellent preparation. One of my customers has been using it for the last fourteen years with very good results."

An Egyptian Date Plantation.

The following is taken from an article by Sir H. Rider Haggard in a recent issue of the London "Times." We believe the Arab proverb should have been quoted as "The date palm, the queen of trees, must have her feet in running water, and her head in the burning sky."

In April of the present year, whilst struggling back against a bitter wind from Sakhara, to the Pyramids, just about the spot where the Sphinx comes into view, I observed on the further side of a low bank lines of many small tent-like shelters made of the dried stalks of Indian corn. At the time I wondered what was planted here which needed such protection in that climate; but as the objects of my visit to Egypt were archaeological, not agricultural, and I was almost as weary as the jackass on which I rode, I did not stop to make enquiries. Some days later good fortune threw me into the company of Mr. G. L. Bailey, the manager of the farm known as the Pyramid Estates, and afterwards into that of Mr. F. Formby Back, the owner of the "Egyptian Gazette," who is its principal proprietor. Under the guidance of these gentlemen I made two visits to this farm, which proved to be the same that I had passed upon my ride. What I saw there was to my mind so remarkable that I propose to give some account of it to the readers of "The Times."

— Pyramids Estates. —

The property, which is about ten miles from Cairo, covers 750 feddans, or, say 800 acres of land, and lies in a long strip on the very edge of the desert. Its level is such that it can be irrigated during the Nile flood, and thus it annually receives the fertilising deposit that is the source of Egypt's wealth. Moreover, beneath its unpromising and sandy surface—for until a few years ago it was desert such as that without the bank—are ample supplies of good water, the infiltration from the Nile. On every two acres of the land, or rather of that portion of it which is devoted to the cultivation of date palms, is a well about 30 ft. in depth, fitted with a pump and a cement tank. Also there are three artesian wells sunk at convenient spots upon the property and equipped with powerful steam machinery. From these water can be delivered at the rate of 672,000 gallons per hour into cemented channels, of which a length of nearly five miles has already been constructed on the property. The proprietors are directing their attention to a more permanent return than is furnished by annual crops—namely, to dates, the "bread of Egypt," and the staple food of its population.

— Conditions of Date Cultivation. —

The date-palm can only be successfully cultivated under certain ascertained conditions. Thus, in the words of the Arabic saying, its feet must be in the water and its head in the sun. The roots need a constant supply of underground moisture, and the crown should enjoy continual and scorching sunlight. Also, it prefers a sandy soil, for which reason it does not bear so well in the clay of the Delta, or so I am informed. There is no disease which hurts the date, except that occasioned by an abnormal rainfall while the fruit is setting, an accident which has never been known to happen in this part of Egypt. Damp on its foliage is its great enemy, and therefore I believe it will not thrive in Ceylon and other places where the cocoanut flourishes.

Fertilizers for Small Fruits.

The fact that most of our soils by analysis show plant food content sufficient to last for a thousand years of continual cropping has helped us to arrive at an erroneous conclusion—namely, that the best soil management was a remote problem and well enough left to generations yet to come. We have too often lost sight of the fact that this great store of soil fertility has been mostly locked up in insoluble forms by a master hand and so preserved in reasonable proportions for countless generations yet to come, and hence the man who resolves to overdraw his deposit at the cost of others that come after him soon comes up against a divine law that says most emphatically, "Thus far shal thou go and no farther." While misuse and reckless cropping result in a rapid degeneration of any normal soil, the reverse method, we are happy to say, when thoroughly and timely applied is also followed by most encouraging results.

Soil management for the fruit crop requires greater care and closer oversight than do other farm crops. Small fruits, and especially those of a viney nature, are easily thrown out of balance by improper fertilising.

The possibilities of the small fruit area under ideal conditions is almost limitless. No one element has any more to do with the success of this venture than does a thoroughly congenial soil.

In a general way we must have a soil provided with enough humus or vegetable matter to make its mechanical condition perfect but not overdone in this line. The last state is often worse than the first. Closely connected with this vital supply of vegetable elements is a sufficient amount of nitrogen to run the fruit plants to their highest degree of fruiting excellence. To do this requires close observations in all lines to guard against an overgrowth of vines at the expense of fruit buds. Too much nitrogen is likely to throw the fruit plant out of balance and so produce an excessive amount of spindling foliage with a corresponding decrease of fruiting impetus, usually made evident by imperfect crowns, poorly developed fruit stems, and often few and unsatisfactory blossoms.

Stable manure may furnish too much vine producing food with comparatively little phosphoric acid and potash. In the case of the soil not having liberal quantities of the latter mentioned elements naturally supplied a liberal dressing of stable manure may be worse than no fertilising at all. In order to determine the amount of available phosphoric acid in the soil it is well to experiment in a small way with those foods to prove the soils.

By using these elements separately and in combination in experimental ways on small plats with ample space left for checks where no minerals are used, every fruit-grower can soon determine for himself, just the limitations of these elements on the different kinds of soil. A few experiments that this scheme naturally suggests can be developed and carried out by each fruit-grower for a series of years to the marked benefit of the operator. A ready mixed feriliser unless it has a formula especially compounded to reach one's local conditions must be regarded as unsuited for this kind of work. A little acid phosphate and potash in some form quite free from the other elements, used in connection with stable manure in varying proportions will give us definite results either for or against increased expenditures in this line.

Another element that vitally affects soil building and crop feeding is the character of the season. With the delicate structure of small fruits it is quite easy to over-fertilise in wet seasons and consequently under feed in dry seasons, hence in any system of experimental fertilising the character of the season must be taken into consideration. Again, in a cold, backward spring a very light application of a thoroughly soluble fertiliser may help the starting vines forward to an unexpected degree by simply furnishing a bit of available fertility at a period when, owing to unfavorable climatic conditions the plants make very slow progress for the want of available plant food at a critical time when but little natural food is in condition to be ertracted from the soil.

Arsenate of Lead.

Perhaps the reason that arsenate of lead was first used was the fact that Paris green, while it did the insect killing, settled so badly that it lost a great deal of its value in big spraying work. For a man using insecticides in a small way Paris green was very satisfactory, but when he began to use it in a big tank and big spraying outfit, it was troublesome, so the chemist and horticulturist looked around for some other poison, which would spray better, which would stand suspension better, and still kill, and among other things they hit on arsenate of lead. They ran over the other various arsenate compounds and finally the concensus of opinion decided that arsenate of lead was the safest and most effective. To my mind you can make a comparison between arsenate of lead and Paris green in this way:—Paris green when examined under a microscope appears like a hailstone, and arsenate of lead when examined in the same way looks like a snowflake; there you have the relative settling qualities of the hailstone and the snowflake, and if you examine Paris green under the microscope it is a perfectly round green sphere, a round ball; arsenate of lead has a soft, irregular, what we call amorphous condition, just like a piece of newly-fallen snow, and for that reason it was very much better in our spraying mixtures; it settles very slowly. You stir up arsenate of lead and it takes about ten times longer to settle down into the same density, the same space as Paris green will, and when it is settled down, it is very much easier to stir up, it never settles hard.

Another advantage in the use of arsenate of lead over Paris green is the fact that it is safer to use; you can use it in very much larger quantities than you can Paris green or any other insecticide that is known. Suppose you want to use a very radical amount of any other of these insecticides, you may run into serious trouble in burning foliage. That applies to Paris green or any of them, but arsenate of lead you can use under ordinary conditions in almost unlimited strength, and you do not risk the burning of the foliage. That is another great advantage of this material.

In regard to the use of this material, in combination with other spray mixtures or fungicides, arsenate of lead can be mixed readily with Bordeaux mixture, but cannot be mixed with lime sulphur. The use of arsenate of lead with lime sulphur spray almost always results in a black precipitate, wherein the virtue of both the sulphur and arsenate of lead are lost, chemical reaction takes place which makes an injurious mixture, but the combination of arsenate of lead with Bordeaux mixture is very satisfactory. The Bordeaux is made up in the usual way, and then use about two to three pounds of arsenate of lead, putt'ng the arsenate of lead with the lime, there is no chemical action takes place between the lead and the lime, and when the mixture is completed with the bluestone, no action takes place, but if the arsenate of lead is mixed with the bluestone, then there is likely to be trouble; it is not very definite trouble, but there is likely to be a little of it, but made up in the proper way, arsenate of lead gives splendid results with the Bordeaux mixture.—Exchange.

GRAFTING WAX.

" Alfalfa " writes:—Your lengthy recipe for making grafting wax reminds me of my own discovery in this connection—and as it is a fraction of the trouble and just as effective, I pass it on pro bono public. Plain beeswax placed in a tin, and melted on the stove in a pot of water, and painted on the graft after securely tying same is all that is required. This has never failed me in dozens of operations.

Vegetable Garden

Notes for August.

Finish planting Asparagus as early as possible. Try a late sowing of dwarf Broad Beans. Make sowings of French Beans, a protected position with a sunny aspect will suit them best. Sow Silver and Red Beet. Late plantings of Cabbages and Cauliflowers may be made but they will do no good in poor ground. Carrots may still be sown. Earth up Celery and keep the plants growing with liquid manure between the rows. Herbs, Salads, Lettuce, Parsley, etc., should be sown and planted out. A late planting of Onions may be tried. Sow a few Parsnips. Peas may be sown for the late crop. Plant Potatoes. Rhubarb roots should be planted this month in very rich soil. Seakale requires the same treatment. Make a sowing of Sweet Corn.

— Asparagus. —

Salt may not be necessary as a dressing for Asparagus beds, but it is an old practice and certainly does no harm. Use a good handful to the square yard. Also apply a good sprinkling of wood-ashes, together with, say, a handful or ½ lb. of superphosphate to each square yard, and lightly fork the surface. When the shoots begin to grow take 1 oz. of nitrate of soda, or sulphate ammonia, for each square yard, and dissolve it in 1 gallon of water, and apply with a watering can evenly. Thus for a bed of 18 ft. long and 3 ft. wide, you require 6 ozs. of sulphate of ammonia. This quantity should not be exceeded, but applications can be given at intervals of three weeks or a month. Keep the beds clean from weeds.

— French Beans. —

French Beans, like most other vegetables, delight in a rich, mellow soil. If a good supply of stable or other natural manure is not available, the ground to be sown should be given a good dressing of artificial manure. Apply from one quarter to one half pound of superphosphate or bone-dust to each square yard of the bed surface. Even where stable manure has been used, a supplementary but lighter dressing of artificial will be of use. For early crops the beds should be raised above the general level and should if possible, be protected from the south. A northern aspect or slope is best. Some gardeners run up slight ridges and sow the beans on the sunny side, others keep the surface dusted with soot. Anything which will increase and preserve the warmth of the ground is helpful towards an early crop. Later crops, on the other hand, are benefited by sunken beds or trenches and protection from the hot winds. The usual distances for sowing are six inches apart in double rows, each double row being 3 ft. from the next, or four inches apart in single rows 2 ft. apart.

— Tomatoes, Cucumbers, etc. —

Tomatoes, Cucumbers, and allied plants, will still need a hot bed to secure satisfactory germination and considerable care in hardening when they are up. Unless these seedlings make vigorous and continuous growth they seldom amount to much, and later sown plants usually overtake them. The same thing applies to Melons, Marrows, Pumpkins, Squashes, etc., especially the former, which are very easily checked. Egg plant, Capsicum, and Cape Gooseberry, are also growable with care.

— Table Maize. —

Sow a few rows of table maize at the end of the month where late frost is not to be expected. The soil should be rich, deep, light, and well prepared. Rows may be 30 to 36 in. apart, and plants 12 in. apart; or they may be in hills—three plants to a hill, and the hills 3 ft. apart. Hoe frequently, but not more than 2 in. deep. Soak the seed before sowing, and give each hill or row a good soaking with water directly after sowing. Table maize, or "sweet corn," as the Americans call it, is one of the most commonly used and highly esteemed vegetables in the United States.

— Potatoes. —

To get an even sample of good sized tubers to each potato root, the sets should be sprouted before planting and not more than two shoots be allowed to develop, for specially fine tubers only one should be left. If not done before planting the young stems can be thinned out when they showed above the ground. Those doubtful of the difference made should test the matter for themselves, and judge by results. The same thing applies to Jerusalem artichokes.

— Cape Gooseberries. —

When well grown, the Cape Gooseberry or Peruvian Cherry, as it is sometimes called, for it is a native of that country, though it has become naturalised in South Africa, is rather a handsome plant with large cool looking leaves. The fruit is the size and form of a small cherry, and is contained in a dry leafy calyx. When quite ripe it has an agreeable, refreshing flavour and may be used for dessert or for jam making. In South Africa it is a fairly popular fruit and large quantities are made into jam for export. It is quite easily raised from seed, and requires very much the same treatment as the tomato. Sow on heat now or in the open in September or October. It is worth growing unless one is very cramped for room.

— Digging Potatoes. —

Do not allow potatoes to remain in the ground after they are quite matured, for they are more likely to spoil than if lifted and stored in a dry cellar or shed. Any diseased tubers which there may be, will, if left in the ground, be very likely to infect others, and the sound ones may commence to grow on their own account. The careless digging of this crop often leads to after trouble. Every tuber, however small, should be taken out, otherwise it will grow and a crop of self-sown potatoes does not improve the appearance of a bed of French beans or other following crop.

— Brother John. —

John Chinaman is an accomplished grower of vegetables. Manure merchants and seedsmen will tell you that he will cheerfully buy fertilizers and seeds at prices which his Australian brother can hardly be persuaded to look at. John goes for quality, best value for most money, every time. A wise old bird is John. His tip is worth following.

— Thinning Seedlings. —

A point in which many home gardeners fail—and some professionals, judging by what one sees in the markets—is thinning. In the first place it is an error to sow thickly, and a greater error to leave the rows crowded. This mistake is perhaps most frequently noticed with root crops, beet, turnips, carrots, radishes, etc. It simply means failure, for it seedlings are checked at the start, they never grow into the sturdy plants they should do, for if a crop begins badly it generally ends worsely. Thin early, and if in your particular case, things are past the early stage, still thin if the plants need it. It is quite possible to get a heavier crop from plants which are twice as far apart as those with which they may be compared. It is after the plants really begin to grow and send out abundant leaf growth that the value of ample space will be most evident.

— Watercress. —

Watercress, though it is said to be one of the most healthful of vegetables is seldom cultivated. Indeed, many people have an idea that it will only grow in running water. In England, where it is a very popular "relish," immense quantities of wild watercress are gathered and sold, it is also largely cultivated. One watercress farm in Essex is said to grow £2,000 worth a year. A writer in "The Gardening World" makes the following suggestions for growing small quantities :—

"A good bed should be made up with half-rotted leaves and manure in about equal proportions, at least a foot in thickness and a foot wider each way than the frame it is intended to use. Great care must be taken to see that the bed is made firm, after which, a two-light frame is placed thereon. The bed must then be covered with a mixture of equal parts of loam and leaf-soil to a depth of six inches. Afterwards procure a sufficient quantity of cuttings to fill one light. Make them about six inches in length, and insert them in the bed at least eight inches apart, pressing the soil round each cutting. Keep them close-shaded from bright sunshine, and sprinkle with water each day until they begin to take root, which will be in about three weeks, when the other light should be filled in a similar manner. This will, of course, give a succession."

Some Garden Herbs.

The sweet herbs of the kitchen garden are by no means so generally or so worthily used as they deserve. Probably those whose business it is to use them do not have reasonable opportunities for gaining a good knowledge of their properties and ways and seasons of growth. There should be a small space of ground, easily accessible from the kitchen, where the cook may run out and gather her own herbs. If it is in the form of a little rock garden so much the better, for the greater number of the kitchen sweet herbs are either plants from the south of Europe, or at any rate plants delighting in well-drained banks and hot sunshine. It might even be quite a pretty place where the cook could go out and gather her "bouquet" for some delicate soup, sauce, or stew—a little sprig or two of this or that, varied according to her knowledge of the needs of her at.

The Thymes, Savouries, Basils, and Penny-royal are low-growing things, the variety of Thyme called bush or tree Thyme being a little bush only a few inches high. Tarragon, Balm, Burnet, and Marjoram, are taller. Sage is a handsome low bush. Balm, Marjoram, and Lemon Thyme come into stuffings and forcemeats that accompany white meats. Tarragon and Chervil (the latter an annual, looking like a thin uncurled Parsley and tasting much like Tarragon) are the best flavouring herbs for salads.

Thinning Young Vegetables.

There will be plenty of work at the present time in the vegetable garden. Weeds must be killed while they are in their infancy. It is a sad sight to see young vegetables in rows almost hidden from view by a forest of seedling weeds. No mercy must be shown the latter. The work of thinning out young vegetables ought not to be neglected; the timely thinning of the seedlings has such a grand effect upon their subsequent quality. If Carrots, Beetroot and Turnips were left to grow in a crowded condition in the rows, the roots would be very poor indeed, the Spinach and Lettuces practically worthless. The best time to do the thinning out is immediately after a shower of rain. Early thinning is advisable because it is such a difficult mattee to remove surplus seedlings without unduly disturbing those left when all have been allowed to attain to a fairly large size before the work is commenced. Carrots must be left about 4 inches, Beetroot 6 inches, and Turnips 5 inches or 6 inches apart. This may at first appear to be too far, but as the roots grow it will be found that they will nearly occupy the space allotted. Spinach seedlings must have ample room to grow in, and ought to be thinned out to 6 inches asunder at least. Lettuces, where raised in drills where they are to remain to grow to maturity, should be thinned to 10 inches; Parsley and herbs must also be duly thinned out.—"T.P."

Parsnips for Exhibition.

There is no doubt that people who grow vegetables for exhibition, and it is a pity there are not more of them, go to lots of trouble. Take the following from an English paper. "In an open aspect, take out a trench 4½ feet deep and as wide as will give sufficient freedom. At the bottom lay three pipes, with an outlet for water into a walk or drain. Fill in a few rough cinders. Follow with a foot of manure, filling the remainder with fine sifted light soil, with wood ashes and soot incorporated. Allow a week for this to consolidate, and then sow three seeds together at intervals of 15 inches. Cover with an inch of soil, and use pieces of glass as a protection to the seed, till they germinate. Thin out to one, as growth proceeds. Remove some of the mould from the neck of the Parsnip, and add sand."

Jerusalem Artichoke as a Screen.

In many gardens one is anxious to hide some unsightly spot, and in others to form a screen. Here the value of the Jerusalem Artichoke is soon seen, as when grown in well-manured land the growth is most vigorous. Not only is the plant useful for the purpose named, but it is valuable as a winter vegetable; indeed, the tubers contain such a little starch that they may be eaten when the Potato may not. The plant is not a favourite, and of course in a small garden the space may be too limited to grow it to advantage; but in large places much greater use may be made of the tubers, as they may be cooked in so many different ways, and are useful when there are few vegetables to choose from. The tubers, to do them justice, should be planted in the spring in rows 3 feet apart, and 18 inches between the sets, and they give a much better return in good land. They can be put in now. In cooking, they are much better if plenty of salt is used in the water, which should be boiling before the roots are placed in the pan. They are delicious with cream or milk and butter added when partly done, and a little juice of lemon over them when served up hot. These Artichokes are cooked as follows: Scrape or pare the tubers, place 2 ozs. of butter in a saucepan and lay the Artichokes in this. Pour over them a cupful of strong gravy or stock and simmer gently for half an hour. Turn out into a hot dish, add more hot stock, and serve as hot as possible. Artichoke salad is excellent. Boil the tubers, then slice some Onion over them, cover with boiling water for five minutes, drain, cool and slice them. Use salad dressing, placing in a bowl with a liberal quantity of Lettuce leaves, and garnish with cooked Beetroot.—Exchange.

The Spray Pump.

Mr. W. J. Allen, Fruit Expert of N.S.W., says:—

A spray pump, like any other machine, will do good work, and last, in proportion to its care. When a pump does not work properly, the cause of the trouble should be ascertained at once, and remedied, otherwise permanent damage may result. When a spray pump is first received, its working parts should be carefully studied. After the pump has been used, it should be thoroughly washed out with warm water, as most of the spraying mixtures are highly corrosive in their action. The hose should also be thoroughly washed out, and especially after using oil sprays. Always keep the barrel filled with water when not in use, to prevent the wood from warping and hoops becoming loosened. With proper care the pump should last several years; the hose, however, will probably have to be replaced after one or two seasons.

One of the most important parts of the whole apparatus is the nozzle. Good results in the application of the spray mainly depend upon its efficiency. For general use, the best nozzle is the Vermorel, or one of that type. The four most commonly used nozzles are as follow:—

The Vermorel.—This nozzle undoubtedly throws the finest spray of any. It should be held quite near the foliage or branches, as the liquid is not thrown out with much force.

The Bordeaux.—This is a splendid type of nozzle. It has the advantage over all others in that the character of the spray is readily changed from a solid stream to a mist-like, fan-shaped spray. If there is any clogging of the nozzle, it is easily remedied by turning the handle, thereby forcing out the obstruction with the pressure of the pump.

The Cyclone.—The spray from this nozzle is conical shaped, similar to the Vermorel.

The Friend.—This nozzle is coming largely into favour.

The ends of the hose should be attached to extension rods of suitable lengths for the work. For all lengths above 6 feet a bamboo extension rod is recommended. This consists of a small brass tube, supported by a bamboo rod.

On the extension rod a tap is generally placed for turning the liquid on or off. For this a ½ inch wheel valve is convenient.

All pumps should be fitted with good agitators. The proper agitation or intermingling of the spray liquid is one of the chief features in spraying, and unless it is thoroughly done, good results will not be obtained.

Spraying Don'ts.

The orchardist will do well to carefully consider the following points :—

Don't fail to spray every season. It is impossible to determine in advance whether or not the tree will be attacked. Proper spraying is never injurious.

Don't wait till the fungi have attacked plant or tree; the fungicides are merely preventives and should be used early in the spring. After the disease has developed, it may be too late to save the plant.

Don't spray during or just after a shower, or when there has been a heavy dew. Much of the solution will be washed off, or it will collect in spots. Wait till the leaves are dry. Poison is more effective when applied to the leaves when dry.

Don't spray on top of the leaves only; spray the under sides where the pests hide, and be particular to keep your liquid thoroughly agitated.

Don't give up spraying because you do not think you see any benefit from your work. Perhaps you did not spray early enough to prevent the damage; perhaps you did not use the right formula, or were not careful in its preparation; perhaps you did not spray thoroughly or often enough. Try again.

Don't buy a cheap sprayer. It will always be out of order. It will make the labour many times greater, and in the end will cost more than a good one.

Don't buy a bucket sprayer and expect to spray an orchard with it. Buy a sprayer large enough to do your work quickly and easily.

Don't put your sprayer away after using it, until you have thoroughly cleaned out all the spraying mixture. If this is left in, the pump will be injured, and the glands and valves clogged.

Don't start out to spray until you have carefully examined your sprayer to see that it is in good working order.

Don't leave your sprayer where it will freeze, unless all the liquid has been drained from it. If liquid has been frozen in the pump, it is liable to break iron cylinders or expand brass cylinders, so that pump will not work.

Don't spray only the trees from from which you expect to get marketable fruit. Spray all the trees, otherwise the trees you go to the trouble to spray early in the season may become infected later by the unsprayed trees. "An ounce of prevention is worth a pound of cure."

Readers ! **Can you write u something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.**

Poisoning Sparrows.

A Tasmanian farmer has found the following system successful in keeping the sparrows down. He uses vinegar to dissolve the strychnine. The amount of the poison required is 1½ ozs. to the bushel of wheat. He has two clean kerosene tins, with the tops cut out, leaving a selvedge of about a quarter of an inch, which must be hammered down so as to prevent any catchment. No handles are put in, so the cans cannot be used for anything else. Half a can of wheat contains a quarter of a bushel. The strychnine to be used would be a quarter of the 1½ ozs. for the bushel. It should be put into one tin, and the wheat into the other. Half a pint of vinegar should be boiled in a saucepan, and while hot must be carefully poured on to the strychnine, allowing it to trickle down the side of the tin, so as to avoid splashing. Then gently shake the tin backwards and forwards, until the crystals are dissolved, and pour on to the wheat in the other tin. Then the ingredients are to be poured from one tin to the other until all the liquor has been absorbed. It should then be carefully dried, placed in a bag, labelled poison, and hung up in a draught of air. The bag should be given a shake now and again to prevent mould setting in.

The Plum.

Regarding usefulness the plum may be ranked as next in importance to the apple, as it can be utilised for a great variety of purposes—either for cooking, for dessert, for drying, for preserving, or for preparation in the form of prunes. The plum will succeed on a wider range of soils than either the apricot or peach. It will grow well on either heavy or light soil, and thrives beside the peach and the apricot, or the apple and the pear. But, although the plum stands severe weather, the conditions most favourable to its successful growth are a warm generous soil, which with good cultivation will retain a moderate amount of moisture, and a temperate climate. Under such conditions the plum will produce fruit rich in saccharine constituents. One of the chief things to be considered in planting a plum orchard is the soil, for, though the plum

adapts itself to almost any soil, the stock upon which it grows may not.

The plum is quite similar to other fruits in regard to shelter, draining, subsoiling, bastard trenching, and preparation of the surface soil prior to planting, with subsequent cultivation, the latter for the purpose of furnishing food to the plant and the conserving of moisture in the soil during the hot, dry weather of summer, equally applies to the culture of the plum; likewise the operation of planting.

In the selection of trees it is best to select yearling trees. With such the head can be started at any desired height. The trees should be set not less than 18 ft. apart on the square, and 20 ft. is better. After the tree is transplanted it should be cut back to within 18ins. from the ground, and during the spring, soon after the buds push into growth, select three or four of the best-placed and rub off all others, being careful that they do not issue from a common point on the trunk. The shoots produced from the buds so left are cut back about two-thirds during the following winter. The second year each of these branches is allowed to push out from two to three shoots. The following winter—the third season—a repetition of the pruning of the previous year is performed.

At the fourth season's winter pruning shorten in each terminal branch to one-third its original length, and the following season, should three shoots be thrown out from the terminal buds on each shoot cut back at the last season's pruning, retain the outward shoots, shortening in one-third. The remainder cut clean out — never retain the whole number of shoots thrown out—and leave only sufficient, with plenty of space between them, to give proper shape to the tree. After this course of cutting back and thinning-out has been followed for about five years, allow the tree to go for a year unpruned, and it will in that case throw out fruit-spurs along its whole length, and only a short new growth will be made. Afterwards the plum requires little pruning when in bearing, except a shortening and thinning of laterals which intersect, and the renewal of spurs by occasionally cutting them back.—Exchange.

Feeding Fruit Trees.

Irregular nutrition leads to irregular crops. We must feed a balanced ration to secure a balanced product. The ration must be balanced in available plant food. Many plant foods are so nearly insoluble or in such chemical form as to be available only after the lapse of 50 to 100 years. The surest way to know the correct ration is to experiment with potash, nitrogen, and phosphoric acid in varying proportions.—" From " Fruitgrower."

Co-Operation in Marketing Fruits.

The subject of marketing covers a wide range and many details and points of interest enter into its final successful consummation. The question of marketing is a most important one with the fruit grower. We are confronted with a condition and not a theory and one that must be solved if there is to be profit in growing fruits, and at the same time not forcing prices too high for the consumer by intervening expenses. How to do this is the question. There are obstacles in the way that must be overcome in the solution of the problem and conditions that must be improved. In discussing the subject of marketing, it is vitally important that the responsibility of all the parties interested be pointed out including the growing, the packing, the transporting, the marketing. To start right, we as growers must not shirk our responsibility. We must grow good fruit before we can pack good fruit. We must pack good fruit in an honest way so that the marks and grades put upon the package truly represent its contents.—Exchange.

The plum requires more liberal manuring than either the apple or pear; therefore, if good crops are expected annually, the soil of the plum orchard should be well fertilised, always aiming to produce in proper proportion wood and fruit.

The Raspberry.

Where raspberries are grown they should now receive immediate attention in the way of having the old canes cut out. Raspberries often suffer severely in times of drought, and a great many of the canes die. These are not easily distinguishable at the first glance, but on close examination are readily found. All dead and weakly canes should be removed to make room for the stronger ones, that are to be left to produce the fruit. No plant should be allowed to carry more than six or seven canes, and in tying them to the stake, they should be put around it at equal distances apart. If tied in a bunch it prevents the proper development of the fruit-bearing shoots, and thereby the crop will be materially lessened. The fruit of the raspberry is grown on the side shoots of the current year's growth, so it is, therefore, essential that the top of the canes be cut off to induce them to break freely. The spade should be used as sparingly as possible in the cleansing of respberry beds, in fact, these under no circumstances should be dug, but should be kept clean by the use of the hoe, or at the most might be gone over lightly with a fork. All feeding ought to be done by mulching, with good rich manure, and occasional dressings of artificial manures, when the weather is showery. Before putting on the mulching, it is advisable to lightly point over the ground with a fork to break the hard surface, so that any subsequent rains may carry the full benefit of the nutriment down to the roots.

Indian Potato Sunflower.

(Helianthus subtuberous Bourgeau)

The sunflower is known to Australian gardeners as one of the most useful and ornamental of summer and autumn flowering plants, either annual or perennial. Its only economic use with us, however, is that it is sometimes grown and used as a poultry food. In other parts of the world it has many uses. Of the species referred to in this article an American exchange writes :—The roots bear fleshy tubers of a delicious flavor, greedily devoured by boys, and one of the original foods of the Indians, as was the potato and sweet potato, and is as different from either as each differs from the other, belonging to widely different genera. By the way, the name Potato properly belongs to Solanum tuberosum alone—the so-called Sweet Potato should be called Batata, which would save much confusion, and it should be expressly known that no variety of Sweet Potato bears any resemblance to yams, and Southerners make a grievous mistake in calling large, coarse Sweet Potatoes, Yams, the Yam being no more like a Sweet Potato than are Indian Corn and Sugar Cane, though it has a thickened, in some cases edible, root stalk, while Potatoes and Sweet Potatoes are tubers.

The name "Indian Potato" has been suggested for this Sunflower, as it is a standard Indian food, but it is clearly a misnomer, as the Indian Potato belongs to the common Potato, it also being an original Indian food. As the roots bear edible tubers that must be dug from the ground like Potatoes, it might be allowable to call it Indian Potato Sunflower, yet it would be better to have learned the original Indian name.

The plant forms clumps arising from tuberous roots, 4 to 6 feet tall, rough, coarse, bristly, hairy. Leaves mostly opposite, thick, narrow. Flower-heads not numerous, smaller than those of the Giant Sunflower, of a much paler yellow. While the tubers of the Giant Sunflower are as inedible as those of the Indian Turnip. The roots of this species have a sweet, delicate, aromatic flavor, highly pleasing to the palate of the average boy. It deserves attention as a possible food-plant, for our race as well as the Indians. Flavor much superior to that of the Tuberous-rooted Sunflower, barbarically dubbed "Jerusalem Artichoke," which is neither an artichoke, nor ever came from Jerusalem, it being purely American, the name Jerusalem in this case originating from the Italian "Girasole" Sunflower, as did "Strawberry" from strayberry, "Horse"-radish from Harsh-Radish, etc.

The Farm

Explosives in Agriculture.

— Subsoiling. —

By H. C. Coggins, in May issue of Agricultural Gazette of N.S.W.

The recent dry spell has brought home in a forcible manner the great necessity for conservation of moisture in the subsoil, especially in districts where the top soil is very shallow, and the subsoil a stiff and practically impervious clay.

Orchardists and market gardeners—in fact, most farmers—do not as a general rule vary the depth of their ploughing enough. Some don't go deep enough for fear of bringing too much subsoil to the surface; others don't believe in deep ploughing. But when we talk about deep ploughing we must consider the depth of the soil, for while in one case it may be a great advantage, in another it may mean bringing the subsoil to the surface, which is most undesirable. The great thing to avoid is continually ploughing at the same depth; this is where all the harm lies.

— Hard Pan. —

It stands to reason that constantly ploughing at the one depth creates a "hard-pan," and this hard pan acts as a water trap. Instead of the water percolating through the subsoil, and thus dissolving the plant food stored to a considerable depth, the moisture is practically confined to the top soil, and it is on this that fruit trees, root and all other crops are in a very large degree forced to subsist.

— Depth of Soil. —

When we speak of the depth of soils, we are prone to consider only the character and plant food available for crops in the top soil, but we most certainly should give a considerable amount of study to the subsoil also, for there should be the chief sources of plant food, and there also should be the home of the roots of plants. The reason we find so many worn out paddocks is that the top soil has been exhausted of plant food and organic matter, little thought being given to the fact that if the hard pan was broken and the subsoil stirred in some manner, the depth of the top soil would be considerably increased, the soil aerated to a great depth, and the value of cultivation enhanced by the capacity of the soil to hold more moisture. When we speak of the "depth of soil," therefore, we should mean the depth that might be made available.

— Root System. —

When we come to realise that the results of all crops, whether maize, wheat, fruit trees, or vegetables, depend on the root system, that the freedom of the root system is of vital importance, and when we pause to consider the depths that these roots penetrate if encouraged, one is often astounded that any result could be obtained from crops sown on top of a hard and impervious subsoil.

It has been proved that in a porous and open subsoil the roots of wheat have penetrated to a depth of 4 feet, potatoes 3 feet, lucerne 40 feet, and maize 4 feet.

It naturally follows that deeply-rooted plants are more drought resisting, for their root area is not confined; on that account the fertility of the soil is not depleted so soon.

Mr. W. J. Spillman, agriculturist in charge of farm management investigations, Bureau of Plant Industries, U.S. Department of Agriculture, in a recent bulletin, says—

"Plant food is dissolved in water. While a plant is growing a constant stream of water flows up through it and evaporates at its leaves. For every pound of increase in dry matter made by the plant, from 300 lbs. to 500 lbs. of water flows up through it."

One has only to go into the majority of orchards in the Cumberland district and examine the roots of the trees to find that they lie very close to the surface. The orchardist will tell you that he is afraid to plough deep for fear of damaging the roots, but the main reason for the roots being so close to the surface is that they have not been encouraged to go down by loosening of the subsoil. Of course, one will always find small fibrous roots near the surface, but I allude to the lateral roots. These lateral roots will go after the moisture every time, and if the moisture is confined to the surface there they will remain. Again, if the roots could penetrate down below, each tree would be dependent on its own area for its supply of food and moisture, and would not encroach on its neighbours.

— Storage of Water. —

It is estimated that in 1 inch of rainfall 23,000 gallons fall on one acre, and when we consider that it takes 400 to 500 tons of water to produce 1 ton of hay per acre, one can fully realise the vast amount of water that has to be stored and retained in the subsoil to grow crops with satisfactory results. It follows that it is of vital importance that, irrespective of constant cultivation, the subsoil should be brought into a condition necessary to enable it to absorb all available rainfall. If this is not done, and a good fall occurs, the top soil becomes waterlogged, overflows, creates a wash, and carries away valuable plant food, and, what is most valuable, good soil.

— Drainage. —

We all know what badly drained land is, and what it means to crops and to farmers. We also know that it does not necessarily follow that sloping land is well drained, or that flat land is badly drained. One may say that drainage is everything, and artificial drainage is not everything. An artificial drain often carries away water that should percolate and be absorbed by the subsoil, but owing to the compact nature of the subsoil, and the consequent inability of the water to penetrate it, this is impossible, consequently artificial drainage is resorted to.

(Continued on Page 120).

Breeding Good Dairy Cattle

Breeding good dairy animals is not yet an exact science. It is an evolutionary work in which the painstaking, patient, intelligent breeder is co-operating with nature for the production of the improved animals. And nature will not be hurried, so the work of a breeder is not, says a writer in "Hoard's Dairyman," the work of a few tentative matings of animals showing wonderful results in a few years. It is more nearly a life work for a man, and one man's life is often lamentably short for the length of the work.

For the encouragement of the new hand, I can unhesitatingly assure him that if he will, "by the exercise of a good degree of intelligence," mate cows of proven worth with suitable males, having good pedigrees in all that the word means, feed and care for intelligently and follow up a systematic and scientific course of breeding to definite lines, keeping a cow that, being bred right, should be right, and, of course, carrying no visible objectionable physical deformity till she is a fully matured animal, and then uncompromisingly rejecting all that do not measure up to the standard; remembering always that continued, uninterrupted good feeding is the hand maiden of good breeding, almost marvellous results towards the end of getting good cows can be accomplished in a few years.

— A Qualification. —

Let it be remembered that as qualification of my going on record as thus absolutely promising these good results, the use of pure bred animals is a pre-supposed condition for by such mating of pure blood only can we have any assurance of the definite character of results. If we cross breeds or use grades on grades we are working entirely at random and doing uselessly over again the primary work the first improvers did generation upon generation ago.

Having got good cows we need to keep them good, and as far as possible make them better. It is possible for a cow to grow in grace. We rail at and cry out against the robber cows, the ones that are making the disgraceful averages of the statistics makers, but it is my deliberate opinion that the cows of this land are much more sinned against than sinning, and before we say with condemnation to a cow, "Thou has been weighed in the balance and found wanting," let us by all means see to it, that our stewardship of her, our weighing of her, has been marked by a good degree of intelligence.

— Cows are not Machines. —

There are many so called dairymen who keep their cows just as we work with a gasoline engine. They think as the cow is a machine she needs have the current on only when she is working. When the cow is fresh she is at her best, and they save feed on her, as at that time she will do well any way. When this period of natural activity begins to wane and the flow of milk reduces itself to the level of its course, there isn't much use of feeding heavily then, for a cow that doesn't pay for generous feeding should not have it, and in consequence of such mechanical dairying, when milk is high, the cow is kept by sufferance and on mighty cheap feed against the coming of pasture. Then the cows will empty full udders into waiting pails, and the price of milk by the inflexible law of supply and demand.

It appears strange that the observing farmer, unless he, like the potato, has eyes and cannot see will not learn from his cows in full pasture the lesson that nature is trying to teach him, that the cow is an organism of wonderful construction, capable of taking from him the crude products of his land that he hands her as silver, and in a short time through the dairy, handing it back to him again as gold—sixteen to one a fair proposition.

— The Effect of Comfort. —

Why does this cow fill her udder and the milker's pail when the sun shines and the breeze is soft, and the clear waters run and the grass is green and plentiful in the pasture? Simply because the cow is comfortable, has sun and air to make her good red blood, has all the rich nutritious grass she can eat. Her nutrition is both balanced and abundant, and her environment such that the wonderful functions of her organism are in perfect normal operation.

There should be nothing spasmodic about the keeping of a cow. At pasture—at full pasture—all her needs are supplied, and when the pasture fails, either in quality or quantity and the earth is parched, "and the grasshopper is a burden," and when the nights and then the days turn cold, the needs of the cow for full nutritious feeds remains the same as when she did so well in the first flush pasture.

If we would not forget that the cow makes milk from her feed, and come into the clear understanding of the organic fact that milk making is a normal operation of the properly nourished functions of the cow, we would have more good cows well kept.

To me the reading of the law is plain. If my cows are to carry on through the fall the good work they inaugurated in the spring pasture, there must be no diminution in feed or alternation; if they are to keep at it all winter and spring, and even do their best at early pasture, there must be always the full and sufficient feed and unremitting care.

And so in outline, shall we get the good cow and keep her.

Milk and Beef.

The question has long been debated with, so far, no really satisfactory result, as to whether the quality of milk can be much improved by any system of extra feeding, some writers asserting that quality is solely an attribute inseparable from the breed of the cow. This dictum is a bit too ex cathedra, and, like most positive assertions, will be all the better for a little qualification. It is well known and admitted that the quantity can be considerably enlarged by feeding on wet brewers' grains, a larger allowance of roots, and a greater than usual supply of water, etc., but at the same time the quality of the milk is very much lowered, says a writer in the "Live Stock Journal," so that in milk prosecutions before magistrates, in which appeals to the cows are asked for, the important question as to how the cows are fed should be enquired into, for water can thus be introduced through the mouth of the cow into the milk as certainly as if the milk and water were mixed after the milking. No less certain is it that the quality of milk can be raised by feeding, "to a certain extent." This is demonstrated by the fact that there will be a greater quantity of butter when cows are feeding in one pasture, and that the weight will fall when they are removed to another field. So with regard to certain extra good feeders; the quality can be raised to a certain point, but once that point has been reached the animal then begins to put on flesh, there is no further increase in quality, and the quantity of milk gradually decreases; in the majority of such cases the cow becomes dry before her normal time. This was what was done by pedigree Shorthorn breeders during the big prices of the seventies of last century. Foreign buyers wanted beef animals, and beef only; it was immaterial whether a cow had a good, bad, or indifferent udder, and at the public sales reference was usually made only to the fleshing qualities. They required our best beef animals to cross with their scrub cattle, in order to supplement the British flesh-meat market, so our pedigree-breeders naturally fed with concentrated foods until they all but eliminated milk. During the intervening years, and consequent on the great fall in prices, they have been trying to get back the undoubted milking-power which is the natural heritage of the Shorthorn, and in some herds with considerable success. But a prejudice against pedigree Shorthorns as dairy cattle had been created in the minds of farmers, and it has not in the interval been wholly eradicated, though it is diminished. True, pedigree bulls have been purchased and used by farmers simply because they had a pedigree; but in the majority of cases the fatal mistake has been made of not satisfying themselves that such sires were from milking strains "on both sides." A beef pedigree bull will lower the milk-capacity of a farmer's herd, whilst adding to its flesh-qualities. This error on the part of so many farmers has been recognised and has led to the foundation of herds of pedigree dairy Shorthorn cattle, the chief object being the breeding of young bulls from sires and dams combining both milk and flesh.

— A Growing Business. —

Some pioneers of reform in this direction are already being besieged with applications for young bulls, not only from other pedigree breeders, but also from large dairy farmers who a very few years ago would have looked askance at a registered bull, fearing to use it in case it should "spoil the milk yield." These men, it should be said, refuse to buy "a pig in a poke," and are guided in their choice and in the price they are willing to give by the evidence laid before them of the milking powers of the females on both sides in the bull's pedigree, and this evidence can only be given by means of careful and long-kept records. The milk-book record has therefore, become as important as the pedigree itself, and as recommendations for a dairy bull they must stand or fall together. We have here the theory of heredity applied to practice, but in order to test its full value we must investigate the breeding for at least three or four generations. For a buyer to be told that a young bull is from a cow annually yielding 1,000 gallons is not enough, or nearly enough, to induce him to give a long price, because if that be all he has no guarantee of unbroken and concentrated hereditary powers. To ensure this he must have the milk records of the cow's dam and grand-dam, and also those of the sire's dam and grand-dam. At present there are indeed few young bulls in any herd whose pedigree could bear such a test, because the movement is so recent, and the regular weighing of milk is an extremely modern practice. A breeder tells me that he has sold no less than twenty-three bulls in the last few months, at an average of about £40 each, specially as dairy sires, and this is the strongest possible proof of the direction in which things are tending. With regard to milk records, we are now very much in the same position as were the compilers of the first volume of the Herd Book, that is, we are short of reliable materials. Recognizing their immense practical value, the pedigree dairy breeders will see to it that in a few years' time there will be an enormous increase of milk records, and breeding will be more and more carried on with an eye to the increase of total annual yields. This policy is quite understood to be that of those breeders who are cultivating milking herds, and is the only one which can be expected to succeed. Few, however, except the students of heredity, are likely to realize what it involves. Breeding exclusively for milk means an alteration of type and a steady widening of the difference of shape and character between the beef and milking Shorthorn. Although we have had a few eminent prize cows as evidence telling against this statement, they have been only striking exceptions to the rule that deep milking and the perfection of beef points in the same animal are incompatible with each other. There seems no sufficient reason for fighting against this natural law, which is apparently struggling for the unattainable, for why should we attempt to maintain in the Shorthorn the uniformity of type which naturally belongs to a one-purpose breed. For the future success of the breed as a whole, it seems to the writer that it would be better for every breeder to frankly recognize that if he wants abundant milkers he must be prepared to surrender the beef type as it is understood in the showyard.

(Continued from Page 117).

Not that artificial drains are not very valuable and necessary, but in a great numbec of instances subsoiling is really what is required, and where subsoiling is resorted to it has the advantage of not only draining the land, but of relieving it from what may be termed a constipated condition, besides enabling it to retain more moisture.

A further great advantage of subsoiling is that after heavy rains one is able to get sooner on the land, either to plough or to cultivate; the land drains quicker, and often valuable time is saved in this respect. How often do we see days and days wasted through not being able to get at important work on the land; and when we do get there, how many of us see "the wash" caused and gutters opened up, and have to cart soil back to its original place.

— The Remedy. —

When one is asked to consider any new proposition appertaining to farming, the first thought is: what is it going to cost? This most important item I shall deal with later, except for saying here that I have carried out a number of demonstrations in subsoiling with explosives in different parts of the State, and on different soils, and I find that subsoiling with explosives is by far the cheapest and best. One man can do the whole of the work; no horse and plough are required, only a few tools, consisting of one 2-inch bullnosed auger, one tamping rod, and one pointed crowbar.

The explosive I use and would recommend is gelignite or blasting gelignite; it is handy, less dangerous, and not expensive.

In deciding to subsoil a paddock, the strength of the ground must first be ascertained, and a test hole is put down, about 2 feet, to get this. One must not expect to see an upheaval; this is far from what is required. If the earth is displaced to any extent it shows that the charge is too strong, and is liable to bring the subsoil to the surface; this must be avoided. As a general rule, I test with one plug, and usually I find this sufficient for good work. Of course some soils required only half a plug; it all depends on the nature and strength of the subsoil and hard-pan.

After getting the strength of the ground, go ahead; bore the holes every 10, 15, or 20 feet apart, according to the strength of the subsoil, and about 2 feet or 3 feet deep.

— Preparing the Charges. —

In preparing the the charges it is necessary to use ordinary care and common sense; otherwise they may hurt. In cutting the fuse, cut square across the face, not slanting, and allow about 4 inches to project above the ground; insert the fuse into the detonator, making quite certain that no sawdust packing remains in the cap. Be careful not to push the fuse well home. Leave a space between the conical shaped cap, which contains fulminate of mercury, and the end of the fuse. Crimp the detonator on to the fuse at the end of the cap, and use the proper crimper for this purpose. Do not bite it on; it might bite you.

Gelignite is in a soft condition like soap. Bore a hole in it with the handle of the crimper, specially designed for the purpose; insert the detonator and tie the end, paper and all. This keeps the cap from slipping out. Lower the charge into the hole; tamp gently at first, but more strongly as the surface is reached, making the hole compact and tight, which is very important to get a good result. Then cut the fuse in a slanting direction and insert a small piece of gelignite. This will save matches and temper, if there should be any wind about.

As the fuse burns at the rate of 30 inches a minute, there is plenty of time to stand back. If one man is doing the job, it is advisable not to charge and fire more than 25 shots at a time; otherwise he may lose sight of a possible misfire.

— Effect of the Explosion. —

There will not be a big report, as some expect; neither will there be a displacement to any extent of the top soil. Where a number of holes are fired together, the effect for a fraction of second resembles porridge on the boil.

The vibration of the shot will be felt from 10 to 15 feet away, and this is practically the distance shattering of the subsoil extends. If one could take a section of the ground the fractures could be easily seen.

— The Cost. —

The following table will give some idea of the cost of subsoiling with explosives. I do not include labour, as this will depend on the rate paid, and also on the strength of the ground. Where conditions are easy a hole a minute should be done; but where the hard pan is tough and the subsoil very compact, it may take five minutes. Preparing the charges and tamping the holes will take nearly four minutes per hole.

— Dont's. —

There are several "don'ts" to be observed, and it may be well to note a few:—

1. Don't smoke on the job.

2. Don't tamp with a metal tamper; use a wooden one — a broom-handle is excellent.

3. Don't tamp hard at first.

4. Don't, in the event of a misfire, untamp the hole, but put down another hole about a foot away.

5. Don't forget that you are using explosives, and get careless after firing a few shots.

6. Don't clinch the cap on to the fuse with the teeth.

I would advise intending subsoilers, if they have not had previous experience, to attend one of the demonstrations that are given

— Table Showing Cost of Subsoiling with Explosives. —

Distance of holes apart.	Charge.	Number of holes per acre.	Number of lbs. per acre.	Number of feet of fuse per acre in 3ft. holes.	Number of detonators per acre.	Total Cost per acre. £ s. d.
Feet.	Plug.					
10	½	435	21¾	1,305	435	2 12 9
10	1	435	43½	1,305	435	3 14 6
12	½	302	15	906	302	1 16 6
12	1	302	30	906	302	2 11 6
15	½	194	10	582	194	1 3 10
15	1	194	20	582	194	1 13 11
18	½	128	6¼	384	128	0 15 4
18	1	128	12½	384	128	1 0 7
20	½	109	5	327	109	0 12 9
20	1	109	10¼	327	109	0 18 0

from time to time by the Department, under the auspices of the various branches of the Agricultural Bureau, for, although the method is not difficult, ocular demonstration is always better than printed instructions.

Dry weather is the best time. Results are better then. When the soil is wet, the subsoil is liable to pug, and instead of shattering downwards and outwards, the explosive is liable to have an upward effect.

— Advantages of Subsoiling. —

Some of the great advantages of subsoiling land are—

1. Conservation of the rainfall in the subsoil.

2. The drainage will be far more satisfactory.

3. It is possible to get on the land quicker after rain.

4. Air and atmospheric heat can get to the subsoil and sweeten it up.

5. Roots of all crops are encouraged to go down, instead of spreading unnecessarily near the surface.

6. Increased growth and fruition of all crops on account of the lessened fight for moisture.

7. The fertilising elements of the subsoil are made available.

8. All trees and crops are better equipped to face a dry spell.

A Good Dairy Animal.

She doesn't belong to any breed exclusively, but is found in all breeds. In experimental work it has been found that it is not the breed that determines the value of a cow as a money maker, nor is it colour, size, or her score on the scale of points of that breed. For the scale of points of the different dairy breeds is misleading; the cows scoring the highest are not necessarily the best cows. The score of a dairy cow should depend upon her ability to convert raw material into dairy products economically. Great dairy performers of all bceeds have similar conformation. The first requisite of a dairy cow is large feeding powers. The more raw material she can make use of, other things being equal, the better the cow. An animal's feeding capacity can be closely ascertained by its conformation, it depending largely upon the size of the middle or barrel. The first and most important point in determinating the size of the bazrel is depth of body through the middle; then comes the length of the body from shoulder to hook points, and its breadth through the middle. A broad muzzle and strong jaw are also desirable.—Farm and Home.

The Jersey cow, says an American authority, is essentially a machine for producing milk—buttermaking milk—and may be considered worthless when she ceases to give milk. The owner should depend for profit solely upon the produce of the cow while she is alive. Yet Jersey steers and an occasional, non-breeding female have been found to take on flesh at a profit, and make small butchers' beasts with fine-grained, high-flavoured flesh, very rich in colour. The bulls have the reputation of being fractious and difficult to handle after attaining maturity. This is largely a matter of early training and judicious management. Owing to greater range, variation and rigour of climate, and perhaps including rougher usage, the animals of this breed, reared for generations in America, have become larger, stronger boned, and more robust than on their native island.

The Farm Home and Its Surroundings.

Many people endeavour to so adjust their grounds and buildings that they may serve their real ends in as attractive a manner as possible. They not only arrange and plant, but they are untiring in their efforts to maintain and to preserve. In this class the farmer has many representatives. Sometimes he is particularly successful. Yet most frequently he fails to secure much of the pleasure which is to be derived from country life. Is this not a pity? He ought to share bounteously in all the things of life that are worth while. In his surroundings there is an absence of many of the limitations and hindrances which beset the dweller in the city, or even in the village. The 'natural beauty of land, sky and vegetation are about him. He is free from the vexing sounds, unsightly scenes and limited spaces which are a part of the present city life.

— What is the Value of Such Improvements? —

Our surroundings will be more wholesome and sanitary. There will be greater convenience. Conditions of work will be more comfortable. There will be a real increase in the valuation of the farm. Then is there not a distinct joy in beautiful surroundings? Every successful attempt to make the country home more attractive, makes happier the lives of those who dwell within. Our natures respond to harmonious scenes. Order and beauty delight the eye. Disorder and ugliness displease the eye.

— Means by which Farmers can make surroundings more Pleasant. —

First we must free ourselves from the error that this pleasure depends solely upon the planting of trees and shrubs about our buildings and on our grounds. Although judicious planting is essential and does contribute very largely to beauty, there are other factors more fundamental. If we are so fortunate as to be in the act of planning our farm, we will want to consider the kind of buildings best adapted to our particular purposes, the best sites for them, and their proper grouping; the location of the house, and finally the connection of our buildings with one another and with the highway by drives and walks. When we have carefully thought out all of these problems it is time for us to discover where we shall plant our trees and shrubs and what shall be their character.

— What are the Principles that should govern us in the selection of our Sites? —

These are the questions relating to health, to convenience, and to attractiveness. Health may be ill-affected by a contaminated supply of water, by the existence of unsanitary conditions, by a natural dampness of the site, and, to some extent, by a lack of protection from the elements. Therefore, to ensure good health our water supply should be reasonably secure from sources of contamination. It should not receive the surface flow from the stock yard nor seepage from place of sewage disposal. The area itself should be somewhat elevated and its drainage should be good. While advantage should be taken of natural shelter whether of land formation or of vegetation.

For convenience there should be first of all a near and abundant supply of water. Then the spot should be easily reached. There should be no obstacles requiring a devious way of approach. Nor should the grades be uncomfortably steep. To save energy and time the farm buildings should be most convenient to the areas under cultivation. However, this location is not necessarily the centre of the whole area, but the centre of gravity as it were of the present and future farming operations. In general it is well to be near the most important highway. For not only is the maintenance of an unnecessary length of private way an expense, but there is a corresponding loss of time and energy.

For attractiveness it is desirable to secure shelter from prevailing winds and storms. If there are no natural features adapted to our purpose, we can at least do our best to select a site where some degree of artificial protection may be provided with the greatest advantage. Then it is desirable to enjoy as much sunlight as possible throughout the year. Even in the heat of summer it is very welcome for a part of the day at least. Another factor immediately involved in our happiness is the character of our views. We may not be able to secure noble views, yet we can always strive to avoid unsightly scenes. As to beauty, it is our obligation to select as attractive a spot as possible, or, in the absence of such a natural feature, to choose such a one as we can best make beautiful.

— Grouping. —

After we have selected our general site we will want to insure the advantages to be derived from the good grouping of the farm buildings. They should be grouped so that there will be a logical relationship between them. Thus there will be greater compactness with a marked increase in the sum of convenience. There will be economy of construction, better protection and greater attractiveness. Not only will the structures themselves be better but they will enclose and provide for the concealment of unsightly features. Coming to the most important member of this group, the farm house, we cannot urge too earnestly the necessity for its co-operate planning with the home grounds, for there is a vital relationship existing between these two. The arrangement of the rooms is influenced by the possibilities of the grounds while in turn the arrangement of the grounds is influenced by the disposition of the rooms.

The entrance itself should be attractive and hospitable. The garden should surround at least two sides of the house. It should be so placed as to retain the best relationship to the points of the compass, to procure the best breezes and to include the best views.

— Walks and Drives. —

On our farms walks and drives are necessary to connect the buildings with one another, with the highway, and with the farm lands. It is essential that they should be included in the comprehensive farm plan. They should be studied in relation to the sites and to the grounds. What are the requisites of good walks and drives? First of all the location should be logical. They are for use. They should be placed where they are needed. They should be direct. They should have no unnecessary meanderings or meaningless curves. In the main they should follow the topography. The grades should be easy and comfortable. If the grounds are small and the land almost flat it is usually best to have straight walks and drives. For in such cases straight lines are most economical of space, most agreeable to use, and most satisfying to the eye. On larger places where the house is situated at some little distance from the road and the ground is more or less irregular, curving drives are usually best. Yet here there must be some reason for a curve. This justification may be a matter of grades, a projecting ledge or hillock, but never a mere flower bed or a group of shrubs. There must be a real obstacle. The curve itself should always be free, flowing and graceful. In all this matter the topography should be our guide. We should follow it, adjusting our lines so that they may be as graceful as possible while conforming to the facts of grades. Never should the length and width be greater than utility requires. For a walk or a drive which has an unnecessary length or width exacts a waste of time and energy in passage and requires an uncalled for expense in construction and maintenance. With regard to construction, local cooditions play a considerable part. If there is good native road material at hand it is desirable to use it. For it will usually be most economical as well as most harmonious with our grounds. There should be a compact mass, good drainage, and a uniform surface. Then there should be careful maintenance. The surface should be free from stones, the ruts should be filled and good drainage maintained. The lines of demarcation should be sharp. These definite edges and grass free surfaces do more to give snap and distinction to the grounds than almost any feature.

— Planting. —

Now it is time for us to discover where we shall plant our trees and shrubs and what shall be their character. For successful results planting must always be done with a definite object in view. If there is no reason for it then it should not be done. The principal purposes of planting are as follows: to secure protection from sun, wind and storm; to screen unsightly features; to unite a building with its site; to enframe the lawn or grounds; and finally to secure the fulfillment of those pleasures which plants so abundantly bestow. This matter of protection is pretty well understood. There are formal rows of trees, tall hedges or irregular masses of trees and shrubs to shield from wind and storm. The house should have some shelter from the sun's rays in summer. The trees should not be too close to the house nor should the shade be too dense. Nor should they be so planted as to shut out an undue amount of the sun's warmth and cheer or to hide pleasant views.

The concealing of objectionable features by means of planting is not so well understood nor so commonly practiced. In spite of our very best efforts, irritating or ugly scenes sometimes persist. Even if we have been successful in obliterating our own we may still have with us those of our neighbours.

Then the lawns or grounds should be enframed. This character of planting gives unity to the scene, enclosing it in much the way that an appropriate frame does a good picture. Then it secures a certain privacy and seclusion and gives the feeling of security and repose. Thus the value of this planting is very real and very great.

Then plants may be used for the intrinsic pleasure which they afford. There is a charm of form, of texture and of color. Yet we must not permit these more obvious appeals to interfere with the realization of that greater, higher and more fundamental pleasure of good composition. There is a pleasure to be derived from the fitting arrangement of plants.

— Principles of Planting. —

This logically leads to an examination of the principles governing good planting. These may be assembled under the heads of simplicity, breadth and harmony. As to simplicity, it ought to characterize our attempts. When we have determined our needs we must meet them in as straightforward a manner as possible. Keep in view the fitness of the attempt. Avoid over-elaborateness. Likewise observe simplicity in the number of plants used. Do not crowd. Beware of an over use, particularly of evergreen trees and shrubs. Then choose comparatively few varieties.

As for breadth, what is it? It may be said to be the making of one feature principal and the keeping of subordinate features from obscuring or belittling it. The meaning may be clear when viewed in relation to some definite feature, as the lawn. This is the foreground of our scene and should be principal. It should have a fringe of shrubs or of trees and shrubs about its borders. Never should it be spotted with flower beds or cluttered and crowded with individual shrubs or groups of shrubs.

Harmony should prevail throughout. There should be harmony between the trees and shrubs and their surroundings. They should not be too small nor too large. This size-harmony should exist between the plants themselves. Usually a tall shrub and a low shrub should not be placed side by side. In the mass there should be a gradual graduation in height. There should be a nice transition from the grass to the tallest shrubs.

Now that we have seen what we ought to do let us renew our determination to better our surroundings, for what greater influence can affect our lives than their character? If our surroundings be mean, so will our lives be mean. If they be sweet and beautiful, our lives will mirror their very goodness. Nor is this matter of influence mere speculation. Everywhere examples of evil and of good attest its truth. Great men of all times have proclaimed its power. ' The first thing is to formulate our scheme. It does not matter if it cannot be carried out at once or in its completeness. The real need is for a carefully thought-out and a fully preconceived plan. It is to be expected that its execution will be gradual. There are other things to be done. Nor is this on the whole a disadvantage. This gradual and healthy working out of a scheme makes possible the avoidance of certain mistakes, permits of nicer adjustments, affords greater pleasure, and arouses a livelier interest. Thus we must say to ourselves what we would do to arrange our grounds and buildings to secure the greatest degree of comfort, contentment and joy, take on an abundant measure of courage, and do what we have to do steadfastly to the end.

Maize.

The original home of maize is now quite certainly known to have been in Central Mexico, and hence it is the only one of our cereals that is indigenous to the New World. It has been so long and so thoroughly domesticated that no truly wild varieties are known. In geographical ramge and elasticity of habit it probably surpasses every other cultivated plant. From its original tropical home it has spread to the temperate as well as the tropical regions of the world. Introduced into Europe soon after the conquest of Mexico, it finds a genial home only in the warm valleys of the south and central portions of that continent; it is extensively grown in Africa, and in India it thrives everywhere throughout the 'hill country; it appears to flourish as well in the temperate as the tropical regions, and at altitudes of from sea-level to 7,000 feet or more. Maize is, however, as it has always been and will undoubtedly remain, a distinctive and characteristic American product. It is cultivated from Canada to Patagonia, over 7,000 miles of latitude. It has been known to ripen as far north as 63 degrees, and has been found a profitable crop in latitude 51 degrees north. In response to the multifarious conditions which this great range imposes, countless varieties have been developed, there being more than 200 in the United States alone.

— The effects of Climate. —

The effects of climate on maize may be appropriately classified as immediate, intermediaee, and incidental. Prof. Storer has tersely said that the prime object of agriculture is to collect for purposes of human aggrandisement as much as may be possible of the energy that comes from the sun in form of light and heat. Now the working capacity of sunshine is, according to Kelvin, one horsepower for every square feet of surface. Measured by the standards of mechanics, how inefficient and wasteful an engine is our agriculture at its best. The atmosphere is directly the source of 95 per cent. of the material in the total plant and of 98 per cent. of the matter in the grain of maize. The plant is an elaborate machine that absorbs and transforms energy, utilising solar radiation to digest carbon dioxide in the leaves and to combine into vegetable organs and tissues the gases of the air with the elements supplied by the soil. When we remember that the amount of energy available, the food supply, and, consequently, the amount of matter stored, all depend directly upon meteorological conditions, we realise how overwhelming is the influence of climate.

— Growth. —

A grain of maize once matured is as inert as a pebble until heat and moisture are applied; then a sprout and a root appear, each for a separate function, the one for absorbing ethereal waves, the other for absorbing water. In addition to heat and moisture, oxygen is absolutely essential to germination, as well as to all subsequent growth. The importance of moisture will be appreciated when we recall that water performs at least four distinct offices: first, directly as a food, being united in the leaves with carbon to form the carbo-hydrates; second, as a solvent for the nutritive matters in the soil; third, as the vehicle which transports the soluble food through the roots and stems to the leaves; and, finally, as a cooling device, since, through evaporation, water largely controls the temperature of the plant. The "free water of vegetation," as it is called, or the water of the juices, comprises from 70 to 90 per cent. of corn in the fodder stage, while the "combined water of vegetation," or the water that remains after the plant is air-dried, is 12 per cent. in a kernel of corn.

— Immediate Effects. —

The immediate effects of climate will be better understood by glancing first at its intermediate effects through the medium of the soil and through the food supply. Climate originates soil and all the capacities of the earth for tillage, and it is at the same time more than soil or tillage. For in a really "good year" the worst tilled soil returns a more bountiful harvest than it is possible with all our industry to extract from the best tilled soil in a "bad year." The oasis differs from the desert only in the item of water suuply, and a given climate does not result primarily from the nature of the earth's surface; on the contrary, that surface is determined almost wholly by climate.

— The Soil a Reservoir. —

Primarily, the soil is a reservoir of moisture and plant food; but hardly secondary is its office as a vast laboratory, wherein during the warmer seasons countless complex chemical agencies and numberless microscopic organisms operate unceasingly. Indeed, the relations of climate to the plant through the medium of the soil are so intimate and vital that no just idea of their importance can be given here. These relations may be classed as physical, chemical and biological.

— Texture. —

The physical texture of the soil determines its conductivity for heat and its content of water and air, both of which in proper proportions are essential to the chemical and biological functions. Moreover, the water content, through its power to absorb, transform and conserve radiant energy, controls the temperature of the soil. Finally, soil temperature is far more effective than the temperature of the air. Heat is well known to accelerate diffusion, solution, osmotic action and evaporation. Now these physical processes are precisely those that perform the chief, almost the entire work involved in plant nutrition and growth. Hence, a high soil temperature is essential not only for the life of the plant itself, but also for the ventilation and the life of the soil, a healthy soil being very appropriately called a living mass. On an average 40 per cent. of the radiant energy incident to the soil is absorbed, conducted downward, and stored in the form of heat, 60 per cent. being lost to the soil by reflection, radiation and evaporation.

Oxygen is as indispensable to the chemical life of the soil as it is to animal life. Both oxygen and nitrogen are essential to the biological processes, and both the chemical and biological activities in the soil are as indispensable to the crop as are sunshine and showers.

— Right Proportions. —

The importance of right proportions of water and air in the soil is further shown by the fact that the process of decay, whereby organic material is turned into humus and made available to the plant, cannot go on without an abundant supply of oxygen. A soil that contains too much water contains too little air. The ferments thrive best at a temperature of 85 degrees to 95 degrees, and when the soil contains from one-half to one-third the amount of water required for saturation. The ultimate source of the nitrogen found in vegetable matter is the air, and plants are unable directly to utilise it in a free state. The bacteria, which are chiefly concerned in maintaining the available supply of nitrogen in the soil, are able to work only during the warm seasons, and their activity depends directly on the temperature of the soil. On the other hand, light is inimical to the life and activity of these soil bacteria, a fact that may have some bearing on the rapid growth of maize during hot nights, inasmuch as the work of the micro-organisms in feeding the roots is then facilitated. That maize germinates best at the high temperature of 98 degrees to 100 degrees is, undoubtedly, due to its tropical origin.

Granted that the soil is porous enough and dry enough to admit the air readily, ventilation is facilitated by the unequal heating of night and day, and by non-periodic temperature changes as well. As the air within the soil is heated it expands, and some of it is forced downward to the deeper layers; when it cools it contracts, and free air is drawn into the soil.

— Vital Processes. —

Having seen how heat, light, moisture and the supply of gases operate to control the supply of those ingredients that are furnished by the soil and that constitute in the main the ash of the plant, we return now to the immediate effect of these elements on the vital processes and assimilation.

While light is indispensable to the assimilation of carbon dioxide, it undoubtedly exerts a directly retarding influence on growth proper, or cell multiplication, but the beneficial effects of the higher temperature that accompanies daylight more than counteract this. This sensitiveness and response of protoplasm to light is the result of the chemical changes wrought therein by the light.

— Osmotic Action. —

By osmotic action the root hairs imbibe the liquid food that surrounds them; capillary and osmotic actions carry this supply to every part of the plant, to the tip of every blade, which is not only bathed in air, but has its microscopic interstices permeated with it. Here, in the leaf cells, the carbon dioxide of the air, which is practically an invariable quantity, comes in contact with the water that has been brought from the roots. Here, too, the energy of the ether waves, which we call light, but which the vegetable cell recognises only as force, or a mode of motion, causes the carbon dioxide to part with some of its oxygen in exchange for some of the hydrogen contained in the water. Thus, there is formed within the cell a substance composed of carbon, hydrogen and oxygen, the exact molecular structure of which is not known; in this process some of the oxygen is freed and thrown off by transpiration. Assimilation within the cells of the leaves perpetually destroys the equilibrium of osmotic pressure, hence this pressure creates a constant flow toward the seat of demand. Evaporation from the leaves, which is proportional to temperature and is accelerated by winds, as is the supply of carbon dioxide, operates in the same direction, viz., to destroy the equilibrium in the leaf cells and channels, and consequently the tiny streams from the rootlets are hastened onward with their precious stores of food. Cold not only stiffens the sap and retards its flow, but also slackens molecular motion and hinders the chemical reorganisation of the elements. The process of evaporation proper is, however, almost independent of the processes of nutrition, and is rather a "necessary evil." The most rapid growth frequently occurs under precisely those conditions that make evaporation least rapid.

— Water. —

The quantity of water that passes through the plant and is transpired and evaporated is enormous. The average is about three hundred parts of water to one of dry matter. According to experiments by Prof. King, of the Wisconsin Experiment Station, dent maize used three hundred and ten tons and flint maize two hundred and thirty-four tons of water for each ton of dry matter produced. This same experimenter supplied growing maize with water as fast as it could be used to advantage, and found that the crop consumed during its season of growth water equivalent to a rainfall of 34·3 inches, and yielded more than four times as bountifully as a very large crop grown under the best natural conditions of rainfall in Wisconsin. And he concludes that "large as this movement of water is, it is seldom great enough to enable a moderately fertile field to produce its largest crops."

— Effect on Seed. —

So sensitive is the plant to the changes of climate that even the ordinary seasonal irregularities have a strong influence; the general disposition acquired by the seed in a single dry or wet, warm or cold, early or late season prepares it by virtue of that experience to become the best seed for planting in anticipation of another such season as that in which the seed was matured. This tendency is illustrated by the well-known fact that dwarfed varieties of maize from northern latitudes, when cultivated to the southward, mature earlier, are hardier and more prolific than the native varieties. A corollary of great practical promise is that in a region habitually or frequently dry, maize raised in the driest years should be preserved for seed, as likely to be far better than any that may be brought from a distance. Hence the common, if not universal practice of using seed grown in the preceding year, is strongly condemned. By always utilising seed that has been raised in the driest years one may hope speedily to develop varieties whose vegetating period will be much shortened. And a similar rule would apply for any desired disposition we may seek to impress upon the seed.

In the light of these facts it was suggested that irrigation may come to be used as a temporary device to promote the evolution of new varieties that can be cultivated without irrigation. On the other hand, recent careful work in France has demonstrated that when the plants are forced to their maximum yield by irrigation the seed thereby suffers a marked deterioration, and that for continued maximum results the seed must be raised on dry soil.

Climate being inviolable and inexorable, what hope is there that the agriculturist shall be emancipated from the tyranny of frost and drought? Clearly, he must attain this by work on the soil and on the plant. By utilising vast stores of energy in the form of fuel man banishes the rigours of winter, thus creating artificial conditions of shelter and heat, by aid of which he has supplemented the process of acclimatisation. Thus, also, must he co-operate with Nature in behalf of the plant: he must combat her malignant aspects by intelligent selection; by scientific methods of culture he must supplement her beneficent efforts on behalf of the human race.—Nature.

What Farmers Should Know About Veterinary Science.

This would be a long story, should I attempt to cite in this paper everything that farmers might know about veterinary science. I will endeavour to outline only what should be known, and make a long story short, writes an American farmer.

The general hygienic conditions under which animals are kept plays one of the most important roles in health as well as disease. A properly ventilated barn together with good clean bedding where general sanitation prevails, is a health-giver and a health-sustainer. We must not overlook feeding, I mean proper feeding, for by this is understood not only the quantity of food given, but the quality, two different things which nevertheless must at all times be combined. A great deal of good judgment must be used in connection with feeding. One must take into consideration the general condition of the individual, his habits, temperament, size, weight, the kind and amount of work he does, and under what condition the latter is under what condition the latter is done. Care must also be taken when and how water should be given, especially to horses, for the injudicious drinking of water is a trouble maker.

— Care in Feeding. —

The number of diseases which might be traced back to careless feeding, as a primary cause, is great, henceforth care must be exercised. There are undoubtedly more animals dying from over-feeding than from want of food.

— Recognising Disease. —

Ask a stockman, or farmer, if he can recognise disease, and he will consider the question a foolish one. Nevertheless the majority cannot. Those unable to do so should aim to receive instruction with reference to the ways and means by which disease is recognised. Such teaching is done at the agricultural colleges for the benefit of those interested. If you find out that your horse is sick, just about the time he is almost dead, the "almost" will be of a very short duration, and you will have the "remains." Thus the importance of being able to detect from the start any deviation from the normal, and to seek remedy and relief right from the beginning. Many diseases may be averted when cared for at the outset, and if not averted, its general course shortened, or many unfortunate and sometimes fatal complications avoided by proper treatment.

The cure of the sick does not limit itself to the calling of a doctor or to his repeated visits, or the administration of prescribed medicines, but includes every possible care and comfort available to the patient. Do not hesitate in many instances to use less medicine and to cater for better nursing, for the latter cannot be given to excess but always to the best advantage.

People owning animals should be versed in the art of giving medicines, and although its administration seems ordinarily very simple, yet very often it is done improperly and leads sometimes to disastrous results. There is much to be said with reference to the proper administration of medicines.

— Promptness. —

Owing to the fact that a great many diseases require immediate attention, for they might prove fatal otherwise, it is necessary for the stockowner to familiarise himself with the diagnosis of a few of the most common disorders met with: indigestion, colic, inflammation of the stomach and bowels. He should also enable himself to differentiate between colic and inflammation of the bowels, which is of the utmost importance when it comes to giving proper treatment for their relief.

Influenza, a disease which spreads rapidly, should be maintained under control and given close attention, for serious complications might arise, as a sequel of improper treatment and care.

— Accidents. —

Everyone ought to have some knowledge with reference to accidents which are liable to occur at any time and place. I would suggest to every farmer to have in his possession, besides a few other remedies, at least one antiseptic, so as to enable him to make antiseptic solutions; also a dusting powder, cotton, and a few good bandages. These things might not be used very often, but when they are wanted, they are needed badly and quickly.

The recognition of contagious, infectious, and communicable diseases among domestic animals is of such importance that it could not be sufficiently impressed upon the minds of people, to take quick action and remedy for same whenever their presence is manifested. This is best done by reporting immediately to the State veterinarian. But little can be done in connection with this, unless the authorities supervising the means by which it can be controlled, and its eradication established, have the support and co-operation of the community at large.

In conclusion I will say that it is in the interest of all veterinarians, as well as it is in the farmer's own interest, that the latter should have a general knowledge of the various diseases of domesticated animals most commonly met with. Whether or not the farmer knows anything about disease itself with respect to its symptoms or treatment, he should under no consideration be ignorant of the symptoms indicating the presence of the disease.

Every deviation from the normal should be considered suspicious, and consequently close attention should follow, in order that the trouble may be located. That an ounce of prevention is worth a pound of cure is true and always will be.

— When to Call the Vet. —

When an animal is considered sick, unless you are absolutely positive as to the nature of the trouble, and also that a certain remedy when applied will cause relief, do not take any chances by waiting; if a qualified veterinarian is within reach, do not hesitate in calling him for you cannot afford to rely upon your own judgment in this matter, nor can you afford to rely upon the opinion and the treatment (?) your neighbours will give you "gratis," for you might be the unfortunate one and pay a dear price for such "cheap advice."

Veterinarians should be consulted not only with reference to disease, but how disease may be avoided. The farmer should devote a part of his time to the study of the prophylactic (preventive) measures. He should also know how to keep the animals' quarters under strict hygenic conditions; briefly, he should know how to keep the animals in health, as well as how to care for them when sick.

Seaweed.

It is difficult to form an estimate of the money value of seaweed to the farmer. The question of availability of its constituents—i.e., of its decomposition under various conditions, would have to be ascertained by careful trials before even a tentative estimate of its money value could be made.

Seaweed more or less takes the place of dung, but there are several important differences. Seaweed contains no fibre, and, consequently, does not produce the black structureless material characteristic of the dung heap; in decomposing it forms soluble substances which easily wash away. For the same reason it decomposes more completely than dung. It is even said to facilitate the decomposition of dung on light soils and in dry districts, but there is no definite proof of this. A ton of dung and seaweed would break down in the soil more quickly than a ton of dung alone, and would therefore have less of a drying effect if put on late. The freedom of seaweed from weed seeds and from spores of disease organisms is of considerable advantage on light soils where weeds are common, or on soils liable to such diseases as finger-and-toe, the spores of which can hardly be kept out of dung.

Experiments to test the manurial value of seaweed have been made at Trondhjem, at the Rhode Island Experiment Station, and by a few workers in Great Britain. In Hendrick's trials seaweed proved fully as effective as dung for early potatoes so far as quantity of produce was concerned, but it somewhat retarded ripening. On the other hand, seaweed and superphosphate proved better than dung and superphosphate. It is, however, on such gross feeding crops as mangolds and the cabbage tribe that seaweed would be expected to show its fullest effects.

Reference has already been made to the fact that seaweed decomposes more completely than dung, and is converted into soluble or gaseous substances. It should therefoce not be allowed to rot in heaps by itself, but should be put straight on to the land, or, if this is not practicable, mixed with any dung which will absorb some of the decomposition products. The manurial value of seaweed has already been pointed out, and it is worthy of consideration whether it cannot be more widely utilized then it is at present, especially by farmers near the coast.—From the Journal of the Board of Agriculture.

Rust in Wheat.

In a work on the "Diseases of Cultivated Plants" Professor Kirchner, in referring to the extensive injury caused to the wheat crop by rust, writes that no direct means of fighting the disease are known, but that it may be warded off in a great measure by the observance of the following points:—

2. Everything that favours an even and quick growth of the seed and its proper development helps to check the spread of the disease, and therefore a good preparation of the soil and uniform depth of seeding by the drilling machine are useful.

2. Application of phosphoric acid by superphosphate or basic slag are helpful in warding off attacks; nitrogenous manures, applied liberally, seem, on the other hand, to encourage the disease.

3. Some varieties of wheat seem able to resist the disease better than others. This point should be carefully studied in districts wheze the disease has been rampant in previous seasons.

Durham and Shorthorn are interchangeable names for one and the same breed of cattle, the latter being more commonly used in recent years.

Farm Vegetable Gardening.

Though very many farms are of course provided with ample, well arranged and well stocked vegetable gardens, it is still true that generally speaking the Australian farmer prefers to go without vegetables or buy them from the hawker rather than take the trouble to grow them for himself and family. Not long ago the writer visited a farm on the Murray where the calling of the store boat was the only opportunity of getting this very important form of food. There were several children in the household, yet excellent onions, measly potatoes, and wilted greens were practically all they got in the way of vegetable diet. The extraordinary part was that the path by which the distressingly inadequate vegetable supply was carried from the landing place to the house, crossed a patch of beautiful alluvial, that a gardener would have given his head to possess; deep, cool, rich in humus and as easily worked as a patch of sand. Pumping arrangements in connection with the house and stock supply would have made watering by gravitation an extremely simple matter. Yet because once some years before, this area had been flooded, it was considered not worth the risk of putting the ground to its very obvious use. This of course is an extreme case and few country homes have a patch of ground so clearly made on purpose for vegetable growing, but any ground can, with the readily available labor and material on a farm, be made to produce most excellent vegetables.

The real reason why farmers, as a rule, do not grow vegetables, is that they will not be bothered pottering around a small patch with a spade and hoe. This is not laziness, merely habit, and a mighty bad habit. As for puttiog a hand on to do the job, well the average farmer reckons he can use any able bodied labour to better advantage.

— Difference Between Work and Play. —

Discussing gardening v. games a writer on the subject points out that it is just the difference between work and play the "One man," he says, "after a long day's work in the field is prepared to either knock a cricket ball about with a bat or chase a football for an hour. The absurdity does not strike him. Another finds it recreation to leave off the regular work of the farm and knock a golf ball about a paddock with various types of golf sticks. It does not occur to him that this is a 'fiddling' occupation for a man whose work keeps him in the open air all the time. The same time devoted to walking about a paddock with a grub hoe would do an immense amount of good in eradicating weeds, poisonous or otherwise, suckers and seedlings, which are detrimental to the farm. One, however, happens to be called work, does not cost anything and brings in a profit. The other happens to be called sport or play, brings in nothing and costs a good deal. Therein lies all the difference. Paying a doctor for advice and druggist for medicine costs money, but it enables a man to feel that he is entitled to certain privileges and attentions and the sympathy of all his friends. To spend his spare time poking round a vegetable plot, doing what he calls Chinaman's work, saves him the necessity of going to the doctor or buying physic, but although he saves money and time the ordinary individual does not obtain the same amount of satisfaction.

—The Importance of Gardening.—

After all it is largely a question of temperament, training and habit. There is no question whatever that the gardening habit is altogether a good one, and, as far as I know, not one single drawback. The men who attend to gardens do not neglect their field work. They are kept in better health, they save money, and life is much more pleasurable.

I know people say, "Oh, I know nothing about gardening," but when they started playing golf, billiards, or cricket, they knew nothing about these things. They did, however, find a pleasure in learning them, and the point I wish to make is that in addition to its value, gardening may, except in one particular, give all the pleasures of these other occupations without their drawbacks. The one exception is, companionship, social intercourse and so forth. As man is a social creature it is quite impossible to overlook this fact in regard to the average individual. Gardening, however, is so important to the home life and health of himself and his family, that no farmer should allow himself to neglect it for any other consideration.

The results of numerous experiments have established the fact that when a deep-milking cow is mated with a bull, the dam of which was also a deep milker, it is found that the female offspring yield large quantities of milk, while the males will beget deep milkers. It will be recognised therefore, that the milk records of a herd of cows form data of considerable value to a stockowner who is anxious to breed and rear animals of special value for dairy purposes.

Maize and Maize-Meal for Pigs.

For many years the Wisconsin Experiment Station has been testing the value of feeding maize in comparison with maize-meal (as the main portion of the ration) for fattening pigs. During this period eighteen trials have been made with 280 pigs belonging to various breeds. The amount of food required to produce 100 lbs. of gain varied from 360 lbs. to 820 lbs. The poorest gains were made when maize alone was fed to young pigs, averaging 84 lbs. in weight at the beginning of the trial. This emphasizes what is a common experience among pig-breeders: that an exclusive diet of maize is not desirable, and is especially to be avoided with young pigs. The evil effects of this kind of food were shown in diminished appetite and gains, and in the large amount of food required to produce 100 lbs. of gain. The best gains for feed consumed were made with young pigs where the grain, consisting of equal parts by weight of maize and middlings was supplemented by a small allowance of skim-milk. The pig-feeder is warranted not only in using a variety of grains, but will find it to his advantage to add skim-milk whenever it can be obtained. On the average of the ten years it appears that the pigs fed with whole maize consumed 501 lbs. of grain per 100lbs. of gain, while the pigs fed with maize-meal ate only 471 lbs. of grain for the same result. "Where there is plenty of time for maturing the pigs, and it is not necessary to secure the maximum daily gain, it is doubtful," says The Journal of the Board of Agriculture (England), "if it pays to grind maize for pigs, but the test shows that where quick maturity is an important item, better results are secured from the maize-meal. Pigs fed with maize-meal eat more grain and make somewhat larger daily gains. It can be used to good advantage in finishing pigs which were first fed on maize. Changing over to maize-meal near the close of the feeding period also furnishes a useful change in the character of the ration."

Captain Scott's Own Story.

— "Life's" Offer of Two Fine Scott Pictures. —

"Life" magazine has scored a distinct literary hit. It has secured the exclusive rights for Australasia to publish "Captain Scott's Own Story"—the full text and all the pictures as described in recent cables. This big magazine feature promises to be the most thrilling account of Polar adventure ever written, and few readers will care to miss it. It is a tale which, for pathos and splendour, is unequalled in literature—the splendour of human endurance at its highest point; of a courage that danger could not shake or death chill; of a great plan magnificently carried out; and of a great triumph not darkened, but heightened, by death.

"Captain Scott's Own Story" will probably run through five issues of "Life." This special feature will begin in "Life" for August—on sale about July 24th—with a finely illustrated introductory article by Dr. W. H. Fitchett, entitled "The Great White Battlefields of the World," in which he will tell the story of Polar adventure from the early days till the death of Scott. In succeeding issues of "Life" the absorbing story of the expedition itself will be told from Captain Scott's Journals. Any reader may enjoy this great tale of Polar adventure, as told by Captain Scott himself, by accepting "Life's" special offer below, and at the same time secure two fine art pictures of Scott and Oates free.

— "Life's" Special Offer of Gift Scott Pictures." —

To induce readers who enjoy a good magazine to act to-day and order the special Scott issues of "Life," the publisher announces that he has had two fine pictures made of Captain Scott and Lieutenant Oates, and will send them absolutely free of cost to new subscribers to "Life," either direct or through a newsagent. Each of these gift Scott pictures measures 15 by 20 inches, is printed on rich double-tone, on art paper, and is worth hanging in any home.

"Life's" gift picture of Captain Scott will be sent free to any reader who sends a postal note for 3/- for six months' subscription to "Life," beginning with the first Scott issue, and both pictures of Scott and Oates will be sent to readers who forward 6/- for a year's subscription. Orders should be sent to T. Shaw Fitchett, 376 Swanston Street, Melbourne, with postal note for 3/- or 6/- (cheque, 6/6) simply stating "Please send free Scott pictures, and begin subscription to 'Life' with first Scott issue." The gift picture or pictures will be sent at once, and "Life" will be posted to the subscriber's home each month as soon as published. In addition to the Scott feature, "Life" has bought the Australasian rights of the stories of Jack London and Rex Beach, and begins Jack London's big serial story in September issue.

The publisher states that, if readers prefer, subscriptions may be paid through the local newsagent, and the gift pictures will be sent to the subscriber by the publisher if the newsagent's receipt, showing that subscription has been paid for in advance, is sent to the publisher.

Readers! Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Milking Machines.

By F. Wigan, Daicy Instructor in the Agricultural Gazette of N.S.W.

Milking machines have of late years been very largely adopted by the dairymen of this State, and there is no doubt but that they will be more largely used in the future. The steady increase in their adoption is a practical indication that from the point of view of efficiency they are, to a certain extent, meeting the demands of the dairymen, although we hear of many who would prefer hand-milking if labour were procurable and reliable. It is not the intention in this short article to deal with the merits or otherwise of the different makes of machines on the market, nor yet as to their efficiency in milking the cows, but it may be wise to set out the chief points requiring most urgent consideration, not only by those about to instal machines, but also by those in whose dairy sheds they are already in operation. I trust that the farmers will follow this advice as closely as possible, and if this is done we can look for less second grade cream from dairies using milking machines, and thus effect a big financial saving to the farmers and the State as a whole.

The most successful users are amongst those farmers who have their own lads and girls to assist in the milking, and who take a keen interest in the whole business; for milking machines, like most other machinery, require intelligent and careful handling.

Milking machines may be classed under three main headings :—

1. Vacuum machines.
2. Air pressure and vacuum machines.
3. Machines not using vacuum.

With the latter I have had no practical experience, but the success of all vacuum-using machines alike, as compared with the original L.K.G. machines, is the admission of air into the vacuum line by different machines in different ways, some admitting through the teat cup, others on the claw, and others again through the pulsators ; and this has been the chief factor in making it practicable to milk the cows without injury.

Leaving the question of the effect of the machines on the cows for the farmer to decide before making his choice, we will go right on to what materially affects the dairying industry, and requires much more consideration than it has previously received, i.e., the effect of the machines on the milk or cream, and how to avoid inferior quality.

Unfortunately, a great amount of machine-drawn milk is not up to that high standard that it should be, and we frequently hear of complaints of milking machines tainting the cream and milk. A slight rubber taint may be noticed for the first few milkings, and I have noticed a taint from the oil engine when used too close to the milk or too carelessly, i.e., not kept clean, or when the engine exhaust is not properly disposed of by carrying the exhaust pipe clear through the roof. It is advisable that the oil engine and vacuum pump be partitioned off from the milk-receiving room, or room containing the separator and milk vat or milk releaser. These taints are physical ones, directly attributable to the machinery, and can be easily rectified wieh proper precautions when having the machines installed. More serious taints, however, are due to microbes of different kinds which accumulate and live in all seams, corners, etc., of any part of the machinery through which the milk passes, or comes in contact with, namely, teat cups, claws, rubber connections from claws to buckets, or overhead milk pipe buckets, milk releasers, or tanks, if these parts are not kept thoroughly clean at all times. Metal parts are fairly easily kept clean, but once the rubber becomes contaminated and neglected, it is very difficult to thoroughly cleanse it, and thus milk at all subsequent milkings, becomes contaminated with the particular germs which have fastened themselves in these parts. It is thus seen that the milking machine is an additional home for harmful microbes on the farm, if not systematically and thoroughly cleaned ; at the same time the milking machine is a means, when carefully and thoroughly handled, by which the farmer can produce an article of very high standard, as it affords a means of prevention of contaminations from foreign matter and germs. Unfortunately, milking machines lend themselves to the faults of the careless producer, and it is then that bad results ensue.

A brief outline of the way in which to handle the machines on the cows, and their care and cleansing after using, will be of value. We will assume that the plant has been properly erected, having due regard to facility in operating. That is to say, the piping should be placed in a convenient position, with a fall of at least 3 inches from the furthest end of milk pipe into the milk releaser, and the releaser in a milk room outside the milking shed proper and the engine in a room separate, or properly partitioned off from the milk room. I advocate the use of either double bails or the Echelon stall system : the former means two cows to each bail, and one machine to each bail ; in the latter the cows are behind one another and side on to the milking passage. In each instance there is no obstruction between the milker and his cows, thus facilitating changing of teat cups from one cow to another, and also the stripping. To prepare for milking, place a clean milk can with strainer in the milk room at the end of the bails to receive the strippings, as, of course, the cows require to be stripped after the machines are taken off, and the massaging the teats receive during this process is beneficial. Then, also, keep a couple of buckets of clean cold water in convenient positions in the milking shed, having a clean cloth in each with which to wipe down each cow's udder, teats, and flanks, before applying the teat cups. This not only removes dust, etc., from the teats, and thus prevents same from being drawn into the milk through the teat cups, but also makes a more satisfactory joint to hold the vacuum, and thus the cups hold on better when first applied. Having quickly wiped the udders as directed, take the set of cups and apply to the teats in the usual care, taking care that the teat goes straight into the cup and is not twisted ; also, in long-teated cows be careful that the point of the teat does not go too far down, and thus get temporarily a hard blue point to the teat, which may start inflammation in the quarter. When the cow is milked out, or nearly so, can be judged by experience, by noticing the condition of the cow's udder, and the milk sight-glass. Now make a kink in the main milk rubber to shut off the vacuum, and with the hand take hold of the teat cups and gently pull off same quickly, releasing the kink in main rubber to allow milk to be drawn out of cups instead of spilling on to floor; then turn round and apply the cups to the cow in opposite side of the bail, and strip out first cow. Heifers and short-teated cows, as a rule, milk out better and quicker to machines than aged cows.

Immediately the last cow has been milked, the cleaning of the machines must be started before any milk which is left in the tubes, etc., has time to dry and become hardened on. First take a bucket of cold or slightly warmed water, and a scrubbing brush, and wash the outside of each set of teat cups and any part which may be splashed by the cows, etc. Then with another bucket of clean cold or lukewarm water, and starting at the bail furthest from the milk releaser (in bucket plants it does not matter which one is done first) place the set of cups well into the water, then turn on the vacuum, withdrawing and immersing the cups quickly. A scrubbing motion is thus set up inside the teat cups and tubes, which will remove the traces of milk left in them. Having done all the sets in the same way, go over them in a similar manner, only this time using a bucket of clean scalding water with a little washing soda in it, and this will have the effect of removing any fat which is adhering to them. If steam is available the whole plant should be steamed through and it will then be found to be in a nice sweet and clean condition. This if properly carried out should be sufficient for a week, but at the end of each week all parts must be taken apart and brushed through, using cold water first, scalding water next, and steaming through; or if steam is not available, all rubbers must be boiled to make sure of removing the fat from them, which will help to preserve the rubber, since grease, oil or fat is deterimental to the keeping qualities of rubberware. In releaser plants a brush fastened to a cord and inserted in the end of the milk pipe line and drawn through by the vacuum and back again by the cord will be the best means of keeping this piping clean. In all rubber tubing use a brush larger than the bore of the tube, in order to stretch the rubber and thus force out anything that may have got into the pores or creases of the rubber. Between milkings, remove all rubbers, connections and teat cups from the bail and keep in clean lime-water, using sufficient water to thoroughly immerse all parts, and keep in cool place; also open up the milk line so that it may get well aired or ventilated when not in use. Before using again, drain out the teat cups, etc., from the lime-water and rinse in scalding water. Lime water requires renewing once or twice a week.

In the event of an inflation breaking whilst in work, and the milk getting behind it into the air line, it requires to be cleaned out as soon as milking is completed; this is done by connecting the two lines and pumping water through them.

Special points for consideration:

Take first the teat-cups—

See that the inflations are such that they can be easily cleaned.

See that the inside surfaces of inflations are smooth and therefore easy to clean.

It is essential that all rubberware should be of the very best quality, for if not, it will crack and fray, and create fresh seats for germs to accumulate in. The shorter the rubber connections the better, and in releasers I favour those which have large milk chambers and without floats inside, which make them difficult to clean.

In dairies sending fresh milk to Sydney, the cleaning of milking machines requires extra attention, and all parts want brushing and scalding every day, since for the milk supply the exclusion of all germs is necessary. Even the lactic germ which in cream is to a certain extent desirable, is in milk almost as undesirable as most others, being the germ which sours milk in the ordinary course of events.

Too much importance cannot be attached to the use of a scrubbing brush when washing all dairy utensils. Cloths and rags are not advisable.

If these simple means of handling and cleaning the milking machines are well carried out, we shall doubtless have much better reports from farmers and factory managers alike, with regard to the quality of the milk and cream drawn by machines, and also a big improvement in quality over the ordinary hand milking. Then milking machines will be recognised as a step in the advancement of the production of high quality milk, cream, and butter.

Weight of Milk.

Dear Sir.—In perusing your valued paper this month, I notice that it is stated on page 646 that "milk weighs about 8½ lbs. to the gallon." I wish to point out that this is not correct. The average weight of one gallon of fresh milk being approximately 10.3 lbs.—Yours, etc.,

H. J. Braund.

Sunny Brae Farm.

We are much obliged to our correspondent for drawing our attention to the above. The paragraph referred to was accidentally omitted from an article previously used, which was quoted and acknowledged from an American source. In its original context the statement was quite in order, for the American gallon is roughly four-fifths of the English. To be exact an American gallon (of milk) weighs 8.6 English lbs. In quoting American milk yields it is certainly better to express quantity in lbs. This is usually done unless it is made perfectly clear that the American measure is referred to. As the paragraph stood it was undoubtedly misleading.

Fattening Calves for Veal.

A writer in the Journal of the Board of Agriculture says that in fattening calves for veal the feed limits beyond which it is not advisable to go with an average calf are—16 lbs. per day by the end of the first week; 23 lbs. per day by the end of the second week; 28 lbs. per day by the end of the third week, and 30 lbs. per day by the end of the fourth week. Three gallons per day is as much as a calf can comfortably take at a month old, and in all cases the milk should be served to the calf freshly-drawn from the mother if at all possible.

Poultry Notes

An Important Discovery.

THE "KEY" TO THE LAYER.

We have from time to time expressed the opinion that excellent as laying competitions are in many respects they have quite failed to give any guidance in respect to breeding a layer, or only the negative result, that, contrary to all theory—breeding from heavy laying hens was in itself quite ineffectual in obtaining any permanent improvement in a flock or strain. One had only to look at the up-and-down performances of individual breeders, and the fact that general averages show no improvement for some years past to recognise how badly this theory had broken down. It is a cold, discouraging fact that selected hens of this and other States were just as good five years ago as they are to-day, and considering the thousands of pounds and the immense amount of work put into the job this utter failure to make any progress has no doubt been extremely disappointing to those most interested.

It is true that these results only confirmed the findings of experimental work in other parts of the world, but even amongst those who followed what was being done at Maine Experiment Station and elsewhere, the conclusion arrived at, that on the average an inferior layer was a rather better bird to breed from than a good layer seemed too absurd to be credited.

To those who have studied the question of inheritance it has seemed that there must be some, hitherto unguessed at, but dominating factor in breeding, which would, when found, prove to be the key to the breeding of consistently good layers, in which selection has so completely failed. It appears now that this long-sought-for key has been discovered by Dr. Raymond Pearl, whose report of the earlier work of the Maine Experiment we have been publishing in recent issues. In a word, this key is the cock bird.

It has, of course, long been known that the male exercised considerable influence on his stock, and more or less vague lines of inheritance have been suggested, but little or no experimental evidence even has been forthcoming. Dr. Pearl has, however, arrived at the conclusion, supported by an array of ascertained facts, that the male bird is solely responsible for the laying of the pullets got by him, and that their inherited capacity for egg production will not be influenced by the hen from which they are bred.

Dr. Pearl's work may be divided into three parts. First, he eliminated the good hen as a controlling factor in improvement. Secondly, he discovered that certain families invariably bred true to either high or low production. Thirdly, and incidental to this, he has satisfied himself that the transmission of fecundity (egg production) is an attribute of the male only.

A fact of additional interest and importance is that Dr. Pearl finds that the incidence of descent as shown by his results, closely follows the Mendelian laws of inheritance. It is not necessary at this time to refer further to this than to remind readers that expressed in the most simple language, this means, that male birds may be either pure dominants, impure dominants, or recessive in this quality. In pure dominants all the pullets will inherit from the mother of the cock. In impure dominants, descent will follow on Mendelian F2 generation lines; that is, 75 per cent. will inherit from the mother of the cock. In recessives none will do so. These figures are, of course, arbitrary and theoretical. They are confirmed in other Mendelian work, but in practical would be subject to apparent but not necessarily real variation, especially in the impure dominants.

— Fact not Theory. —

Poultry breeders generally are, we know, rather shy of the word Mendalism and all it means, for after one passes its most elementary stages, its nomenclature and phraseology are unavoidably cumbersome, and the possibility of its practical application, except in certain external and structural points, has been nil. Hence, the common and reasonable dismissal of the subject as not practical. The fact that Dr. Pearl's conclusions are based on the result of scores, probably hundrtds, of tests, in which many thousands of birds have been used, should clear the air of the "only theory" idea. It is a case in which independent experiment and ascertained facts lend confirmation to a theory, and not one in which a theory has been built up around a fact. Dr. Pearl has throughout dealt with "what is," not "what ought to be," and if the "is" and the "ought to be" happen to closely coincide, it is a happy accident rather than a sought for end. In other words, Dr. Pearl did not set out to prove the truth, or value, of Mendalism, but to discover the secret of breeding a layer, and from the evidence before us it appears that he has done so. It is not necessary to know Mendalism to take advantage of it. Briefly expressed, it is:—Find the dominant cock. The phrase reminds us that the term dominance was freely but loosely used in poultry discussions some few years ago. It is not, perhaps necessary to point out there is a very considerable difference between the two. In the one it was a case of sex, or individual dominance, in the present acceptation of the word, the bird is dominant in the characteristics of the hen from which he was bred. We should like to dissociate the theory we are now discussing, as much as possible from scientific breeding, which is such a bugbear to many breeders. It is of immense interest to the man of science, but do not let us forget that it is also of great importance to the man of the poultry yard and the breeding pen.

Dr. Pearl is first a scientist, and then a poultry breeder, and his first announcement has been made in a scientific journal, of which article we have merely an outline, but a full statement and discussion of the theory advanced, in its practical application, will shortly, no doubt, be submitted for the information of breeders, and this we shall receive in due course.

— How to use the Key. —

We have been writing against time, and the expostulations of a somewhat irate printer, whose ideas on the subject of sending in "copy" are not very elastic. We end our sermon, instead of beginning it, with a text. It is:—Find the dominant male—and again—Find the dominant male. To this end we can recommend the trap nest and the single testing pen with a clearer conscience as to their real utility, than has been the case for the last few years. The following occur to us as pretty obvious first steps in finding him. Test every pullet, irrespective of the hen she was bred from, provided you know her sire was from a good score bird, and that you still have him. If you find all the pullets from one sire lagging behind the others, mark him for soup, you may be doing him an injustice, but the chances are not. At best he is not what you want. If you find good and bad amongst the pullets from one bird hang on to him and his stock (this season's) till you find a better. Finally, if you find all the pullets from one male doing well, hang on to him tighter. Breed from him up to his limit. He may not be the dominant male, but at the worst he will be equal to the previous bird. At least he will be in the same class. The second step is to test every cockerel you have which was bred from a good score hen, by mating him with one or more females either of good, mixed, or poor laying capacity. The poorer the layer the better the test of her mate. Keep all these cockerels, but the females can be passed out in the ordinary way, and when stock from these matings comes into lay, test every bird and in time for next year's you should know whether you have the right kind of males or not. This should be good business, for if this theory holds good, the man who can, in time to come, put out a line of pure dominant males, that is, males which will get heavy laying pullets every time, and with any bird of whatever individual capacity, is going to make a lot of money. A point which breeders will not overlook is that this theory explains, as none other that we know of does, the hitherto inexplicable variation of competition scores and other experimental work.

— Boiled Down. —

We should be loath to overstate this theory. Boiled down, Dr. Pearl claims that certain males will invariably beget good stock, however mated; that certain males will invariably throw mixed stock, and that certain males will invariably throw poor stock. Further, he believes that the class two birds will follow the Mendelian laws of inheritance, and that, therefore, it is possible to breed or "segregate" a family or male line in which the character egg production will be dominant. He claims that his experimental work demonstrates the soundness of his theory. Certain points should be remembered. His figures may be wrong, his conclusions may apply only to the breeds he has worked with, he may not have used a sufficiently large number of birds to exclude experimental error, his assumption that winter laying is a true index of total laying, on which basis he has worked, may be wrong, and finally his results may be a curious agglomeration of coincidences. We believe that none of these objections will prove to be sound. On the other hand, it must not be for a moment thought that this or any other theory of breeding will over-ride the ordinary necessities of successful poultry-keeping. No amount of dominance in the sire will make up for neglect of the ordinary rules of rearing and maintenance of the stock. No impossibilities are claimed. We hope to go more fully into this subject next month.

Moving Eggs in Incubator.

When placing eggs in an incubator many people make the mistake of filling, or packing, the drawer as full as ever it will hold, writes a correspondent. As the temperature is naturally somewhat lower—in many cases it is a great deal lower—in the corners than in the centre of the drawer, the packing of eggs into the corners results in their receiving less heat, and consequently it takes longer for the germ to develop. If these eggs were left in the corners the damage done would not be so great except to those particular eggs, but when they are moved, during the process of turning, into the centre of the drawer, and the eggs thus displaced from the central position are relegated to the corners, harm may be done, to many of the eggs so moved, if there is any considerable variation, for it may mean that for twelve or twenty-four hours, or possibly much more, these eggs are subjected to a heat of 104 deg., and then are placed in a position where the temperature only registers 100 degrees, or perhaps less. This is not at all beneficial to the development of the germs, and is the cause of many of them perishing after a few days' incubation. It is better to put only 85 eggs into a 100-egg machine than to cram in 105. One may, if they are fertile, hatch perhaps more chicks from the lesser number of eggs.

Another thing often done is to put cold eggs into a drawer containing eggs—sometimes in an advanced state of incubation—in order to fill up a vacant space. This is a mistake; cold eggs ought not to be introduced into a drawer containing warm ones in any stage of incubation, after the third day of working. The germ contained in the egg commences to grow and develop, as soon as the egg becomes subjected to the requisite degree of heat, and the sudden addition of eggs fifty or sixty degrees lower in temperature, cannot help but have an effect the reverse of beneficial on the delicate germ. Besides, the cold eggs reduce the temperature of the whole drawer very considerably, and the particular degree of heat to which the machine is adjusted is not completely regained, until the fresh eggs are warmed quite through, a matter of some hours.

If it is necessary to place fresh eggs into a drawer to fill it up, they should first be warmed to within a degree or two of the temperature at which the machine is working, and by placing them in the drying box, close to the holes by which the heat is admitted to it from the tank, and covering them with thick flannel, the desired warmth may be easily obtained.

It is advisable not to turn the eggs again after they have been turned on the morning of the twentieth day, for the reason that if they are left unmoved for the last twenty-four hours or so, the majority of the eggs chip on the upward side, and the chick has little difficulty in freeing itself from the shell. If the eggs are turned within a few hours of the chicks beginning to break the shell, the head of the chick is turned downward, and should it chip when in that position it is apt to be smothered, and when the eggs are again turned over, and the dead chick is discovered, the operator remarks: "Hullo! here's another one dead in the shell."

Bits for Beginners.

The reason why many fowls will not sit steadily on the eggs entrusted to them is just—vermin. A stitch in time saves nine and a dusting of insect powder applied with equal promptness may save a great deal of trouble.

There is no better safeguard against illness and the troubles of chickenhood than plenty of exercise, whether they are raised on a few square feet or a few square acres. As good birds have been reared on the one as the other.

Never overcrowd a foster mother, many deaths are due to this. Always put fewer chicks in a foster mother than the number the machine is said to be capable of holding. Observe scrupulous cleanliness; the only safe plan is to clean out a foster mother every day, and this rule applies to coops also. Dirt and disease always run cheek by jowl.

When water is given to chicks it must be good. It must be frequently renewed, and when there is much sun it should be placed in the shade. Sun warmed water is very bad for chickens. A drink of milk is a fine thing for the youngsters, but never leave it standing in the runs, and be sure and scald all the drinking vessels that have had milk in them, or diarrhoea may result. In any case, all the vessels should be washed daily.

Incubators must be watched carefully. Run a machine for at least a day before trusting eggs to it. If it keeps an equable temperature for 24 hours it may be trusted to continue, but must still be watched with care. Be sure to have a couple of spare capsules or even more if necessary. Many a good hatch has been spoilt for want of this. A capsule may break down, but in most cases it can be remedied without any serious consequences having resulted if the new one is at hand.

Be careful to avoid chilling the eggs whilst airing them—a prolific source of dead in shell. Do not have cast iron rules as to how long eggs should be aired, such as five minutes for so many days, 10 minutes for so many more, then 15, then 20, etc. Use your common sense. So much depends on the weather. Judge by the touch. Never go away from the incubator room when the eggs are out. If they feel cool enough place them back at once, never mind the regulation time, and whether it is "up" or not.

When eggs are aired for long periods during the end of the hatch, any draw fitted incubator gets very cool by the drawer being out so long, and frequently takes a long time to get its heat up again. It is, of course, a good thing for the incubator to air, but remember that in the natural state, when a hen goes off her nest for food, and the eggs cool, it does not take her a long time to heat up again. Her heat is at once applied to the eggs again, and it takes a very short time for them to return to their former temperature. It is well to remember this, and it is advisable to have a dummy front made to fit into the aperture of the incubator shortly after the drawer is withdrawn.

One often sees good fowls beaten at shows by others much inferior on account of being put down in poor condition. They may be badly washed or out of sorts, and in either case it would have been far better to have not shown them at all. When we show fowls in a dirty condition, we alone are to blame, and we have no cause for complaint if they return home cardless.

Fowls require a balanced ration in order to produce eggs. They require a certain quantity of food to be taken into the system to keep up the constitution and to supply heat, the balance or surplus food going to make up that which is produced. Poultry should, therefore, be fed that class of food which contains the ingredients necessary to make up the egg.

Lucerne is one of the very best foods you can give to laying hens, for many reasons. It is bulky. It contains the proteins and the carbo-hydrates in excellent proportions for the nourishment of the fowl. It is rich in mineral constituents. Compounds of lime are abundant, such as are required for shell formation.

Do not allow the fowls to gorge themselves, as it makes them lazy. A hen should be active—always busy. Such are the best layers.

Fowls lay better in spring than in summer. The reason for this is that they are able to get the proper kind of food which goes to make up the egg. They get animal food in the shape of grasshoppers, worms, grubs, flies, etc. If, therefore, you feed the same kind of food in the winter as they themselves gather in the summer, and have a warm, comfortable house, you will surely get a good supply of eggs in the winter months when the price is high and winter eggs is where the profit comes in. Be sure, therefore, to feed plenty of vegetable food.

Plenty of fresh water should always be given to poultry. Plenty of grit should always be within reach, also lime for the formation of shell. This can be supplied by placing old plaster where the fowls can get at it.

If a chick does not thrive it is always well to examine it for live-stock, and, if it is infested, to clear them out at once. The dusting of the hen beforehand is a great preventive. And another is to provide a dust bath so that the sitting hens can dust themselves daily when they come off their nests. Also be careful to lime-wash each coop before using it, and again after each batch of chickens has finished with it. Mix a little kerosene with the lime-wash, for it is a fine germicide.

It is never wise to have more than, say, 25 chickens in the same brooder. The younger ones get trodden upon, bullied, and robbed of their food by the older chickens, and go to the "wall," frequently getting sickly and dying, if not removed. Look out for this, and if half a dozen or so are not thriving, take them out, and place them with some younger ones.

— Exercise. —

Exercise is the best of tonics and it is perhaps specially good for the youngsters. From daylight to dark a chicken should be doing one of two things, either eating or getting ready for the next meal. It is sometimes said that constant exercise does more harm than good and that chicks which are continually on the scratch simply waste energy and consequently food, and that they run the flesh off their bones. Possibly they do, but they are building up a strong and vigorous framework which it will be easy enough to cover with flesh when they begin to turn in. For the little chaps in confined coops, there is nothing better than dry food on a good bedding of sweet chaff and sand. You don't want to have the chaff so deep that the chicks get discouraged or get too much exercise and too little grub, but you do want to keep them busy. For those with more liberty a patch of freshly turned earth is all they want.

— Possibilities. —

Anyone who has travelled around even within a ten mile radius of the G.P.O. cannot fail to have noticed the possibilities which exist for a tremendous extension of the poultry business. If the farmer, and more important still, the farmer's wife and daughter are dropping poultry, as apparently he, she, or they are, there is all the more reason why the smaller near-to-the-market land owner or holder should take a bigger hand in what at present prices is an extremely profitable possibility. We are not referring to the big poultry plant, but to the hundreds of instances where one or two hundred head could be kept with little additional cost in capital or labour. Within this area there are many hundreds of acres of neglected orchards, small holdings and poor unprofitable land, just hungry for attention and improvement, and there is no better way of increasing the value of such unproductive spaces than by utilising them for poultry keeping. Such land can be manured and cultivated practically free of cost by poultry, which at the same time will be making a more or less substantial addition to the income of occupiers. It is just a question of interest and knowledge. No matter how often the subject may be brought to the notice of some people they take no interest whatever in poultry stock, and many more, think that to give serious attention to such a trifle as a fowl would be 'beneath their dignity. One can spend hours explaining the facts of egg production to some people and they merely reply that they are too much trouble, don't lay, always sick, sometimes die, etc. which is mostly unadulterated rubbish and always mostly the fault of the owner. A fowl which costs 6/- a year and returns 12/- stands out as one of the best money making propositions open to the producer to-day. It is mostly a matter of handling and the man who gets on to it, and does the handling with a reasonable amount of common sense can hardly fail to make good.

— Maize. —

The question of feeding maize is not of very great importance with us for the simple reason that, as compared with wheat, which is and always will be the staple poultry food, it is a comparatively expensive food, and has little of special value to make up for this. At this time of the year it is probably more serviceable than at any other, as it is without doubt a heating food. It is rich in oil and carbohydrates and tends to keep up the temperature of the body, which is of great advantage in cold weather; but if given in excess it causes a large accumulation of abdominal fat, which is a frequent cause of death to laying hens, as the egg organs become so obstructed by its presence around the lower intestines that the eggs cannot be laid. Given to birds that are intended for use as table fowls, no grain is more objectionable. The soft, oily, yellow fat that is secreted from it accumulates under the skin and round the intestines, and disfigures the birds. A great portion of it passes away in the process of cooking, but that which remains is not attractive. Neither whole nor ground maize should be given to fattening fowls if top quality is what is desired.

— Testing Eggs. —

Testing eggs for fertility is not a difficult matter. Take a stout piece of dark-coloured cardboard, and cut a hole in the centre the shape of an egg, but a little smaller in size, the broad end of the egg, of course, being held upwards when testing. The eggs are placed against the hole, one by one, and held up before a bright light in a dark room, with the result that the infertile eggs can at once be distinguished from the fertiles. A bull's-eye or a bicycle lamp will be found to give a satisfactory light for the purpose in question, and if a dark room is not available the eggs should be tested at night. White-shelled eggs are easier to test than those with brown shells, the dark colour obstructing the light, and on this account such eggs are frequently tested on the eighth or ninth day of incubation instead of the fifth. On being tested, infertile eggs will appear quite clear, like those newly-laid, whilst fertile eggs have a darkened centre surrounded by a clouded substance, and if the light is very strong, small blood vessels will probably be visible. Eggs should again be tested on the fourteenth day of incubation, and any addled eggs should be removed.

— Turkeys for Breeding. —

To raise big, robust turkeys, it is necessary to get the chicks out and running about as early as possible in the spring. Turkey hens cannot be considered prolific winter layers, and, as a rule, they do not commence to lay eggs until milder days give an indication of better things to come; but they are amenable to management, like most creatures, and eggs may be had a week or two earlier if warm food is given in the morning, with a generous supply of cooked meat at mid-day. If the breeding stock for the coming season has not already been selected, no time should be lost. It is not satisfactory to breed from yearlings if it can be avoided, and by purchasing two-year-olds, one gets the birds just at the commencement of their prime, with the probability of a long period of usefulness before them. A vigorous turkey cock may run with as many as ten hens, and will fertilise the eggs satisfactorily. As he fertilises a hatch at a time, there is no necessity to keep him constantly with the hens, and in the case of an old bird it would be better to put him in a run by himself during the greater part of the time. See that there are plenty of suitable places—in sheds or among scrub—where the hens can make their nests, for they much prefer a quiet spot.

— Stock Birds. —

All the skill and care in the world bestowed on chickens will never make up for defects, deficiencies, or matters of neglect in regard to the parent stock. This is the rock and bottom of a really successful breeding season. Health and stamina in every bird is the first thing to secure. This has a lot to do with the strength of the chickens. Weakly chickens are troublesome, prone to disease, difficult to rear. Strain and parentage of breeding stock is another vital point. "Like begets like." Stock birds should all be fully matured, and usually the best results are to be obtained from hens in theiz second year mated to a vigorous, early-hatched cockerel. Breeders should have plenty of exercise, and a free run, if possible, should be allowed. Hens that have been laying for some time are not the best to breed from now. Stock birds should not be over fat, and should be sparingly fed: no forcing should be resorted to at all. Soft food should not be given too freely: three mornings a week is often enough. Good short, fat oats and wheat are the best grains to use, and a little meat meal and fresh green food should be supplied daily. And, lastly, care as to the male bird is very important. "The cock is half the breeding pen," and needs to be kept in fit condition all along. "Strength goes in at the mouth," and some cocks do not eat enough to maintain their full strength, being over-anxious about the hens. Such birds should be fed apart daily; bread and milk scraps of lean meat, hemp seed are all good as an occasional treat for such birds. There is still another point that calls for mention—breeding stock should be dusted with insect powder when mated up, and kept free from vermin.

— The Fertile Egg. —

When a fertile egg is placed under a hen, or deposited in an incubator, and subjected to a temperature somewhat above 100 degrees, the germ undergoes a remarkable series of alterations, being gradually developed into the perfect chick. During the period of incubation, various changes occur. The air-vesicle at the end gradually becomes larger in proportion as the water of the albumen evaporates through the pores of the shell. During its development the chicken derives its nourishment from the yolk and albumen, and shortly before birth the remainder of the yolk is drawn into the abdomen, and, passing into the digestive canal, constitutes the first food of the newly-hatched animal. During incubation, the blood of the chick is aerated by passing through a series of vessels in a temporary respiratory membrane which lines the porous shell; this makes its appearance on the third day, and gives rise to that opacity of the fertile egg which may always be observed. It is not until the nineteenth day of incubation that the beak of the chick ruptures the enlarged air-vesicle, and it then only commences to breathe by means of its lungs. This is accompanied by a peculiar sound known as "tapping," which is merely respiratory, and is not, as is sometimes supposed, caused by contact of any kind between the beak of the chick and the interior of the shell.

— Dry Feeding. —

Feeding chickens from their hatching on a mixture of small, sound, dry grain keeps them singularly free from diarrhoea, formerly so troublesome and deadly, always providing that the mixture is made up of sound grain. This comparative freedom from the illness must not be placed wholly to the credit of the dry food, but to the fact that using dry instead of soft food, or food which can be affected by moisture, has removed the cause of the diarrhoea. In many cases this was started by the chickens picking up fermented, sour pieces of soft food, which inevitably would be within their reach, unless the most scrupulous and troublesome cleanliness over the feeding was incessantly adopted. Thousands of chickens are still reared on soft foods, yet to do so successfully the greatest care is still requisite that no sour food is eaten by them. Those rearers who yet follow the old plan of moist food should be very careful how they feed the chickens; a short, wide board well dusted with earth or sand may be laid down for the day, and when the last feed is over everything can be removed and thoroughly cleaned. With the dry food such precautions are unnecessary, unless there be any coarse flour which absorbs moisture; this is liable to ferment and sour in the same way as any kind of finely-ground meal.

— Comb Picking. —

Idle birds very soon get into mischief, and when they once have acquired bad habits, it is most difficult to break them off. One of the vices most prevalent is that of comb-picking. When hens are noticed to pick the cock's comb, they should receive immediate treatment, otherwise they become very fond of the blood they draw in this manner, and, if allowed to continue, they soon acquire the habit of comb-picking, which is even worse than feather plucking; yet both vices originate from the same source—idless or lack of occupation. Whenever a hen is noticed to be picking the male bird's comb, she should at once have her beak blunted either by cutting or burning, cutting being the most preferable. If blood has been drawn from the comb of the cock, he should at once be taken from the pen, otherwise the birds will continue to pick at him. After washing the comb in a weak solution of permanganate of potash, a liberal application of carbolised vaseline should be made to the affected parts. If the comb bleeds freely some ointment should be used, which will stop the bleeding and help the wound to heal up quickly. He must, however, not be returned to the pen until it is perfectly healed. In the meantime, occupation must be found for the hens.

— Feeding Troughs. —

Soft food should never be thrown on the ground. It is bad enough to throw down grain, and even this should not be done except where the birds have ample room, or where, as in the case of birds housed on the scratching-shed system, the sheds are, or ought to be, cleaned out and freshly littered regularly. Even when picking up dry grain from a soiled floor the birds are sure to swallow more or less undesirable matter, but in the case of soft food the quantity swallowed is much increased, as the birds in their eagerness trample the food into the ground, the result being that they bolt both the food and whatever else may become attached to it. The feeding troughs may be of the simplest character, provided they are there. A piece of spouting cut into convenient lengths, with a bit of board nailed across each end to keep the food in, makes a very useful trough, and one that is easy to clean; or a cheap tcough can easily be made with a couple of straight-edged boards of equal length nailed in the shape of a V, a shorter piece across each end forming the feet, and to prevent it from being upset. If time or skill permits, a revolving or even a fixed guardrail fixed along the top would prevent the birds from standing in it when feeding, and thus soiling the food. Enamel ware or earthenware troughs are, of course, the most suitable, and the easiest to clean, but they are expensive, so where a quantity of troughs are required something cheaper must be obtained.

Attention is directed to the advertisement in this issue of Messrs. C. A. Smith & Co., Engineers, Wakefield Street, Adelaide. The firm are the sole makers of the well-known "Don" Centrifugal and double action pumps, horizontal and vertical. Repairs to all kinds of machinery are undertaken, and satisfaction guaranteed.

Breeding Good Layers.

If the best results are to be obtained, writes W. Hindes, in Queensland Agricultural Journal, fowls must be bred to lay, and only the individual best should be used for breeding from. The "trap nest" is a sure means of finding out the best layers, but, as it means a certain amount of labour to attend to these, single-test pens, or houses, would be best for the purpose. A row of small houses, 4 ft. square for each bird, would make ideal places. Litter or stable manure should be put on the floors to a depth of 3 or 4 in., and all grain buried in this to give the birds plenty of exercise and keep them in good healthy condition. If, say, twenty of the most likely pullets are tested for twelve months, and their individual records kept, the best can then be used for breeding from in the following year. It is only by this individual selection that the best results can be obtained. The selection of the male bird is just as essential (perhaps more so) as that of the females. It is a fact well known to our best breeders that a good laying hen transmits her qualities to her sons, and therefore the greatest care should be taken in selecting the male bird for the breeding pen, as he will transmit his qualities to his daughters. His ancestors should have good laying records for several generations—the longer the better. Only healthy birds with good strong constitutions should be used for breeding purposes. Quick maturity is a good sign in this respect, also width between the legs. Never breed from narrow knock-kneed birds, as there is a weakness somewhere. It will be best for the beginner to go to some reliable breeder and purchase a pair or trio of birds, properly mated, the best procurable. It is better to buy a first-class pair or trio than to pay the same amount of money for a larger pen of inferior quality, as the former will always pay best in the end. The best months for hatching chickens are August and September for the heavy breeds, and September and October for the light breeds. Chickens hatched at these times should, if properly fed, commence to lay in the following March ,and continue throughout the autumn and winter months, when eggs are at their highest price. This fact should be kept in mind if the most profit is to be made. A few chickens could be hatched in March and April, if desired; these would commence to lay about October and keep up the supply of eggs at Christmas time, when the other fowls are commencing to fall off in their laying. Care should be taken never to overcrowd the birds, especially the chickens, which double in size in a very short time, but if overcrowded they never make fine birds.

About Spurs.

"Cocks have spurs," writes a contributor to an English paper, "and this fact was brought home to me with considerable force the other day. Bent on handling a moulting bird, I put an arm tentatively within his pen, whereupon the fierce old gentleman, at once attacking, got in one good blow on my bare arm; I withdrew it hastily with a complete spur still sticking in the flesh! This incident, coupled with the fact that two other yearling birds in moult each lost one during the moult makes me think that at this season of the year the spur becomes rather loose in its socket.

The length of spurs varies considerably in individuals, even of the same variety, and is by no means a very certain indication of age; some cocks possess exceedingly sharp and long spurs in their second year, while in others these appendages are short and thick, and those of the latter type do not usually lengthen very greatly even at an advanced age.

It can readily be seen what dangerous weapons in the breeding-pen the sharp spurs of a weighty bird must be. In my novice days I have ferquently lost hens through inattention to this point (or points). To shorten spurs efficaciously is no difficult matter, and may be acomplished in two ways—by sawing off or by burning-down. The first operation requires an attendant to hold the bird firmly, and before commencing a poker or other iron should be thrust into the fire to get rod hot. A sharp, fine-toothed saw is best, and the spur should be removed about half an inch from the shank; bleeding will ensue when the "core" is reached, and immediately the point is off, the hot iron should be pressed against the stump, and this will stop the flow at once.

I have frequently burned down spurs single handed, but it takes longer thus because the irons must be reheated continually; with patience, however, it is easily accomplished and the only danger is that of allowing the iron to slip and so sear the shank; if this should occur it will be well to smear the part with vaseline. Spurs shortened by either method will eventually grow again, but an entirely lost spur is never replaced, nor have I ever succeeded in getting a partially loosened one to adhere again to the shank, though I have kept a bird up for months with the damaged member bound tightly into its socket."

A Feeding Point.

Carelessness in feeding is, without doubt, the chief cause of much unsuccessful poultry-keeping. The chief mistake is in the method of serving the morning meal of soft food. This should not be scattered on the ground, as so many people think, but should be given in long, triangular troughs. If scattered about, the old, dead grass and other decayed matter sticks to it, and is then eaten by the fowls, afterwards causing an objectionable stoppage in the crop, and very often death. The best and safest method is to provide troughs as before mentioned, with a rail running the whole length, to prevent the fowls getting into them, and thus conveying impure matter into the food. If the food is spread evenly in the troughs, each fowl will get an equal quantity with the others. Of course, such troughs must be kept perfectly clean and sweet. The result of the old method of feeding is seen in the inactive, dull-looking fowls one so often meets with. The best method of dealing with such stock is to thoroughly sweep the old feeding-ground and sprinkle well with lime; follow this up by making the necessary troughs, afterwards catching the affected members of the yard and giving each one a teaspoonful of warm castor oil. Knead the crop well, and leave for three hours; then mix half a teaspoonful of Epsom salts to each fowl (be quite sure that this is fully dissolved) in teacup of warm water, and give to them. They should have nothing to eat for twenty-four hours after this, when good wheat may be mixed into the sand or straw of the scratching shed and the fowls compelled to scratch for every grain they get for three or four days. The result will be a clear system, bright eye, and a generally active bird. The same advice applies to chicks, but the dose must of course be smaller.—E.J.

Sending Birds to Shows.

One of the things often overlooked till the last moment, is the provision of suitable coops or hampers in which to send birds to shows, and then in the rush and hurry any old box is pressed into service, often with disastrous results. It is well worth while taking a little trouble in this matter. If more than one bird is to be carried, and the owner is certain they will travel amicably (the sexes, of course, to be separated), three or four birds may go into one cage. This cage must be lined on the inside with calico, canvas, or other similar material. The lining will prevent other birds near them on their journey offering to have a round or two, and being accommodated, to the detriment of their plumage and the absence of all chance of a prize. The lining will also be the means of protecting the plumage from damp, dirt, dust, or draughts. It will also prevent the breakage of the plumage, which may frequently happen if the bird is carried in an unlined cage. The hamper or cage should open at the top, and, needless to say, the bottom should be well covered with clean straw or other suitable material. Before sending off, the basket must be properly secured, fastened, and legibly and fully addressed.

If the owner does not go with his birds, the proper show tickets should be promptly posted, and information given as to the penning of the birds. This penning is done carefully and well at all properly conducted shows, so that the owner, although miles away, may rely upon his birds getting a good run for his money. Most shows now pen the birds the evening before judging day, which is an excellent plan, for it gives the birds time to settle down, and become accustomed to their new quarters. birds nice and quiet, and fit to The judge in the morning finds the be handled as occasion warrants.

Hens that Laid When Eggs Were Dear.

Writing to an American poultry paper, a man who appears to be satisfied with himself and his fowls, says:—

I kept close watch of my flock, and the hens that began to lay first after molting I put into separate pens. From these pens I gathered my eggs for hatching, and by so doing I have wonderfully improved the laying qualities of my flock. This mating has also been the means of rearing birds with stronger constitutions—more hardy and vigorous.

I never crowd too many into one house; six square feet of floor space for each bird is about right. I keep plenty of straw on the floors and throw the grain in this so they must work to find it.

I think dropping boards are indispensable; they keep the house so much cleaner and give more scratching room. It is only a few minutes' work each morning to clean them off. This frequent cleaning makes it more healthful for the fowls, and, also, by close inspection of the manure each morning, one is enabled to judge the condition of the stock, and determine the kind of food they need.

In this way, and from close observation and experience, I have built up a flock of grand winter layers. I have been getting lots of eggs all winter, and selling them at a higher price than I ever got before.

I am sure that the utility fowl is the one for the farmer. I am down on in-breeding with "both feet." I think sooner or later it will impair the constitution and render the hens unfit for breeding. Strong, vigorous and healthy fowls are the kind to breed from to make winter layers.

Man's taste and character are in part fashioned by his surroundings. The better tendencies of head and heart draw new life from environments marked by purity, taste and refinement. Beautiful surroundings render the home itself more attractive and serve as a silent reminder, that they should be kept neat and attractive.

The "£. s. d." of Laying Competitions.

Though our much respected Poultry Department may not be destined to make history in the matter of the laying competitions, it evidently intends to make money out of any which may be held in the future. At least that is the only apparent reason for the proposed alteration from six to ten pullets per pen. Possibly, of course, it may be thought that the doings of ten birds may be a better test of a breeder's capacity, but it would certainly be a little difficult to demonstrate this. The only alternative solution, suggested by a correspondent, with a pungent and quite unprintable sense of humour, is that it is a deep laid scheme to disguise the mysterious "lead" which was the subject of a recent self-congratulatory departmental cackle. The disguise presumably being considered necessary lest friendly rivals elsewhere should become discouraged and quit the game.

The acquisition of wealth is of course a highly laudable proceeding. There are, however, certain conditions and limitations, failure to recognize and abide by which, is in polite society, variously described as anything from petty larceny to robbery under arms. There are, of course, some people who act on the principle summed up in the saying, "Get money—honestly if you can, but any way, get money." Quite a lot of them, however, live at the Stockade, and so may be dismissed from the discussion. It is perhaps interesting to consider how the financial account stands as between the Government and the competitors.

— What the Government Gets and Gives. —

It is not as easy as it should be to get at the £ s. d. of the competitions, the quaint explanation that this is because it is an educational undertaking being given. Taking the last Roseworthy for example, it would appear that roughly the account between the Government and competitors stands somewhat as follows:—The Government received £663 for eggs laid in the competition pens. £67—a fair estimate of the entry. £20 is manure. Thus the grand total is £750. The Government pay £227 for food. £52 prize money. If we allow 25 per cent. on the gross value of the eggs (£663) viz., £165 for packing, carriage, commission and returns, we certainly cannot be considered otherwise than liberal. Labour is rather a ticklish point but lots of people would be glad to take on the job of actual attendance at 50/- per week (£130) with an allowance of £50 for clerical assistance, records, etc. Total, £624, leaving a balance of £126 for rent of ground, interest, depreciation, incidentals, cartage of birds to and from Roseworthy Station and profit. If these figures are correct and they are at least substantially so, it would appear that each party to the transaction is doing a reasonably fair thing by the other. This being so why tax the average competitor another £2 each! He does not at present make a particularly fat thing of the competition, there is, of course, always a chance of a tall score and a scope, but is he not already paying a fair thing for this chance? For the Government to demand more for services rendered seems a little over the odds. Four extra birds means that they pay several ways, in actual cash outlay, in cash which would otherwise have been received, in use of breeding stock and in opportunity of sale. On the whole, to insist on this rule without consulting the other party to the contract, does, as the amount involved is small, seem to smell rather like petty larceny, and as individual breeders are quite helpless, also of robbery under arms. It may be said that breeders can leave the competitions alone. Quite so, but we imagine they are not organized to be left alone.

— How is it Done. —

It is no secret that there is a good deal of objection felt amongst those who support competitions by their entries, towards the proposed change in numbers required but poultry breeders are quite reasonable people and have no more desire than other folk to get more than they pay for. If it is shown to be necessary we have no doubt that they will submit to the extra charge quite willingly, though some, we know, would have preferred that it should have taken the form of a slightly increased entry fee. It is said that the Government lose money on competitions as at present conducted. That they should lose money is not, of course, surprising. It will be remembered that in their other poultry venture, they put up an easy world's record in this respect. The question is should they do so in connection with competitions, it is one on which the public interested in poultry could stand a little enlightenment. They get 800 of the picked birds of the State, which have cost, say, £120 to produce, they make a few pounds difference between entry fees and prize money, they keep the birds for the best year of their lives and—they lose money—or so it has been said. In the face of this they talk about poultry keeping for a living, which in effect, is saying—we lose money, you come and lose some, too. It is said that the trouble is labour. Well, it will take a whole lot of labour on eight hundred birds to explain, say, £500, which is about the amount to be accounted for: less commission, overhead charges, incidentals, etc. As we have already said, poultry people are entirely reasonable mortals, but they may be excused if they would like to know how it comes about that it costs about 12/- a year to look after, not feed, a fowl, and pay a few expenses on her behalf. To lose money on that extremely liberal tariff is—well, unexpected.

The early morning meal should consist of a warm mash, containing two parts pollard to one part bran, with a pinch or two of salt, to which add house scraps such as potato peelings, turnip eops, cabbage leaves, etc., boiled and mixed with pollard and bran, and given hot. Plenty of green food should also be given, and a few onions sliced up occasionally will add to the egg yield. In the evening feed wheat about a handful to each bird. A good plan is to have a scratching shed thickly covered with leaves or chaff, and throw the grain amongst it and let them scratch for it; the exercise will keep them in good health. Begin by feeding the birds on the ground and when they seem a little lazy in running after it give no more, in this way you will soonlearn the quantity required for a certain number of birds, after which you can feed in troughs, but in all cases rather ander-feed than over-feed. Always keep them supplied with a liberal supply of grit, so that they can help themselves; they are the best judges of what they require in this respect.

Home Notes.

The Worst Variety of Fool.

The greatest fools are those who cannot take advice. Next come those who are too ready to take advice. There are men who have played the fiddle for forty years who yet are not musicians; there are men who have followed the plough for forty years who are not yet farmers—and yet both are honest in their belief that no one can teach them either to "fiddle" or to "farm." There is a great deal more to hope for in the case of a boy just going on to a farm than from a man who has been there a whole lifetime and can grow nothing but wheat or hay. The farmer can, if he chooses, produce everything he wants for food or clothing within the four lines of his fences, and the less he buys of these things the better and the more prosperous farmer is he. No man has a right to say, "It can't be done," whilst any other farmer is able to do it. Before wheat was first grown in this colony there were plenty who said, "It can't be done," and wheat fought its way northward mile by mile against cries of "It can't be done." "Can't" is the cry of cowards, and is a bogey which flies before honest effort. "I will try" has effected wonders. Before "I will do it" "Can't be done" melts away like dew at mid-day.

Don't Get Fat.

The amount of food one eats really has very little to do with one's weight. The heartiest eaters I have ever known were the slenderest people. If one has a tendency to put on flesh, all food is assimilated, and there is nothing to do except avoid starches and sweets. Fresh air in the sleeping room, and walking or exercise in the fresh air will help. Also a cold sponge bath in the morning, with the hot tub bath at night. Eat fresh fruits (except bananas) and green vegetables, stale bread, drink plenty of water between meals, but no liquids while eating. This will keep you from gaining any more flesh.

Youth and Age.

Between youth and age there will be found many differences of temperament, the youth sympathising more with the gladness, fulness, and magnificence of things, and the gray hairs with their completion, sufficiency, and repose. And so, neither condemning the delights of others, nor altogether distrustful of our own, we must advance, as we live on, from what is brilliant to what is pure, and from what is promised to what is fulfilled, and from what is our strength to what is our crown, only observing in all things how that which is indeed wrong, and to to be cut up from the root, is dislike, and not affection.—Ruskin.

Advice to Young Women.

"In order to investigate oneself," says Ruskin, "it is well to find out what one is now. Don't think vaguely about it. Take pen and paper, and write down as accurate a description of yourself as is possible, and if you dare not, find out why you dare not, and try and get strength of heart enough to look yourself in the face, mind as well as body.

Always have two mirrors on your dressing table, and, with proper care, dress mind and body at the same time. Put your best intelligence to finding out what you are good for, and what you can be made into. The mere resolve not to be useless, and the honest desire to help other people, will, in the quickest and most delicate way, help to improve oneself.

All accomplishments should be considered as means of assisting others. In music, get the voice disciplined and clear, and think only of accuracy; expression and effect will take care of themselves. So in drawing, learn to set down the right shape of anything and thereby explain its character to another person; but if you try only to make showy drawing for praise, or pretty ones for amusement, your drawing will have little or no interest for you, and no educational power.

Resolve to do each day something useful in the vulgar sense. Learn the economy of the kitchen, the good and bad qualities of every common article of food, and the simplest and best modes of preparation.

One should at the end of every day be able to say, as proudly as any peasant, that she has not eaten the bread of idleness.

Get quit of the absurd idea that heaven will interfere to correct great errors, while allowing its laws to take their own course in punishing small ones. If food is carelessly prepared, no one expects Providence to make it palatable; neither, after years of folly can you expect Divine interference to bring round everything at last for the best. I tell you positively, the world is not so constituted.

The consequences of great mistakes are just as sure as those of small ones; and the happiness of your whole life and all the lives over which you have power, depends as literally on your common sense and discretion as do the excellence and order of a day."

Tomatoes are most helpful to the system when eaten raw, as the volatile oil they contain is dissipated by the heat of cooking. Green vegetables, such as spinach and cabbage, are invaluable as medicinal articles of diet, as they possess blood-purifying properties, and act indirectly on the liver.

Money an Indicator of Character.

Perhaps there is nothing else which reveals one's real character like money or the lack of it. The moment a young person begins to get money, he shows his true metal by the way he uses it—by the way he saves it or by the manner in which he spends it.

Many is a great revealer of personal history. It brings out all one's weaknesses. It indicates his wise or foolish spending, or wise or foolish saving; it reveals his real character.

If you should give a thousand pounds to each member of the community, and could follow each in disposing of it, without knowing anything else about him, you could get a pretty good idea of his probable future, and judge whether he will be successful or will fail, whether he will be a man of character and standing, or the reverse.

One boy would see in the thousand pounds a college education for himself or for a crippled or otherwise handicapped brother or sister. Another would see in money a "good time" with vicious companions.

To one the money would mean a chance to start a little business of his own. Another would deposit it in a savings bank.

A poor girl would see, in her money a dear old mother's comfort or that of a dependant brother or sister.

In no two instances would the money mean the same, perhaps, or develop the same traits of character.

To one it would mean nothing but selfishness, to another an opportunity to help others. To one it would mean a chance to secure precious, long-coveted books, constituting a fine library. To another it would suggest a home of his own.

To the boy who is naturally selfish, hard, grasping, mean, and stingy, the making of money simply emphasises his characteristics It makes a small man smaller, a hard man harder, a mean man meaner. A boy who is naturally grasping and mean, if he wishes to be a power in the world, must discipline himself by systematically helping others, in some way, or his life will become harder and meaner, his affections will become marbleised, and he will be of no earthly use to the community in which he lives. In fact, he will make every foot of the land poorer and meaner despite his acquisitions, even if they mount into millions.

On the other hand it makes a generous man more generous, a magnanimous man more magnanimous. His presence raises the value, and he is the pride of the community, no matter how much money he possesses.—Orison Swett Marden, in "Success."

Take Care of Children's Eyes.

Any small affection of the eyes is apt to develop dangerously, and should receive prompt attention. A child suffering from a chronic headache, which cannot be traced to any other cause, may be troubled with defective sight. This is often noticed in school children; close application of the eyes to the printed page will bring out defects in vision unnoticed before, and strain weak eyes. An oculist should be consulted, and proper glasses obtained. The smallest railway journey will upset a child and make him sick, no matter what precautions be taken — and this, again, may often be traced to defective eyesight. If the eyes be simply weak and sore, try bathing in lukewarm water, and do not allow too strong a light to enter the nursery. If possible, every child should have a bed to itself, and the sleeping room should contain nothing more than the necessary furniture, and very little drapery. The bed should be placed in such a position that the light from the window does not fall directly on the eyes.

Drinks for Invalids.

The craving for something to drink is strong during sickness, and the nurse is often at a loss to give the patient that which will most pleasantly satisfy the thirst and yet not prove injurious. In all cases the doctor's opinion must be asked as to the advisability and the manner of satisfying a patient's craving, but the following recipes will afford a choice: In any illness, except diarrhoea, barley water is a soothing and refreshing drink if properly made. The primary cause of its dislike by the sick is the inefficient washing of the barley before it is boiled. Put an ounce of pearl barley in a basin, fill up with cold water, allow it to stand a minute or two, and then carefully pour off the water. Repeat this operation three times, and you will then have got rid of several impurities that too often are boiled with the barley and render the drink distasteful. When cleansed in this way put the barley into a saucepan with a quart of water, sugar to taste, and a few drops of essence of lemon. Boil until it is of the required consistence. Do not oversweeten or it will not be liked. Orange whey is delicious when cold. Put a pint of milk into a saucepan, squeeze in the juice of two oranges, boil, and strain. Serve in a cut-glass jug. The reason why toast water is not liked is because the bread is invariably overtoasted and burnt. Toast several pieces of crusty bread a nice brown, put into a quart jug, and fill with boiling water. When cold strain thoroughly, and serve in a fine china jug and cup. Cream of tartar whey is often advised in kidney trouble. To make it, stir a teaspoonful of cream of tartar into a pint of boiling milk; boil, strain, and sweeten.

Nursery Hints.

Regular habits, proper food, and long hours of sleep, are necessary conditions to a healthy infant.

The three prime essentials in a nursery are fresh air, good food, and pure water.

Never put a bottle nipple into your mouth and then into the baby's mouth. This will often prove dangerous.

Always hold a baby in your arms when feeding it in about the same position as if nursing it.

Feeding in the night after the third month is both inconvenient and unnecessary. Sleep at night is better than food.

Do not feed the baby because it cries; its restlessness may be due to pain, and it is hurtful to fill an infant's stomach at such a time.

Have a rule for feeding the baby and do not vary from it. Without regularity the mother becomes a slave.

More infants' lives are taken by over-feeding than by starvation. Never liken an infant's digestion to your own.

An infant's thirst is not quenched by milk. It needs clean water to drink with regularity.

Plain boiled water given between feeding will often aid the digestion and satisfy the child when restless.

Make yourself nests of pleasant thoughts. None of us yet know, for none of us have been taught in early youth, what fairy palaces we may build of beautiful thought—proof against all adversity. Bright fancies, satisfied memories, noble histories, faithful sayings, treasure houses of precious and restful thoughts which care cannot disturb, nor pain make gloomy, nor poverty take away from us—houses built without hands, for our souls to live in.—Ruskin.

Tried Recipes

— How to Cook Pigeons. —

Roast pigeons should be filled with highly flavoured stuffing, trussed, and a slice of thin fat pork laid on each. In a good oven three-quarters of an hour will be required, with frequent basting, with the drippings or with butter, if needed; tenderness depends much upon the attention given in this respect. A brown gravy, made in the pan, the same as for turkey, and chopped livers added should be made to serve with the roast.

A nice pigeon pie is made by splitting the pigeons in halves and cooking slightly. Fill a deep pie-dish, after having lined it with a rich paste, season with pepper, salt, mace, and the grated peel of one lemon. Add three hard-boiled eggs, cut in quarters, to every dozen pigeons, also butter, and the little broth in which the birds were parboiled. Bake at least one hour. Green peas are considered the proper accompaniment for pigeon pie.

The stuffing to be used for pigeons is much a matter of taste, but parsley is usually considered a necessary ingredient. A plain dressing with onion flavour is generally liked, made with bread crumbs, butter, an egg, and all highly seasoned. It draws its richness from the bird while cooking.

When the stuffing has been mixed, make an incision on each side of the pigeons. Through these drawn the legs: stuff and sew them up. They may be stuffed with veal or chicken forcemeat or chestnut puree. Pigeons are often served on an oblong platter around a mound of rice. The rice should be boiled about five minutes, and after draining returned to a saucepan and cooked slowly with the pigeon broth, until soft, but with the kernels unbroken. Butter should be generously added.

— Cocoa Blanc-Mange. —

Take half a box of gelatine, three tablespoonfuls of cocoa, one quart and one cup of milk, and one scant cup of sugar. Put the gelatine to soak in half a cup of cold water; let it stand for ten minutes; then add to it the cocoa and a cup of boiling milk. Stir until all is well dissolved. Put the sugar into the milk, and add it cold. The great advantage of using cocoa instead of chocolate is that the whole mixture is very much smoother than chocolate blanc-mange is apt to be, for that readily separates or curdles, and has to be stirred until it is nearly cold to keep it smooth. This is much more quickly made, and is very delicious.

— French Pancakes. —

Six ounces of flour, two eggs, about half a pint of milk, jam. Sift the flour into a basin, add a pinch of salt, break in the eggs, and add the milk very gradually, stirring all the time to prevent lumps forming. Beat for a few minutes and leave for an hour. Have a perfectly clean, small pan; melt a little butter in it, and pour in sufficient batter to barely cover the surface. Loosen the edges with a knife, and either toss or turn the pancakes when one side is done. Put the pancakes as they are cooked on a very hot dish, spread with jam, and pile them one on top of the other with jam between. Keep them covered, and serve very hot.

— Calf's Head. —

Wash half a calf's head, bone it, tie into shape, roll it in flour, and boil in a quart of water, to which a tablespoonful of vinegar has been added, with an onion stuck with cloves, a bunch of savoury herbs, a piece of carrot, a turnip, a bay leaf, and six peppercorns. Boil the head till tender. Make a pint of white sauce; add to it a tablespoonful of very finely chopped parsley and a squeeze of lemon juice. Cut the meat into convenient sized pieces, heat them in the sauce and serve.

— Braised Sirloin of Beef. —

Choose a piece of sirloin weighing about five and a half to six pounds. Bone it, and lard with strips of fat bacon about an inch and a half long. Roll, tie securely, and put it in a braising-pan with a pint of stock, a sliced carrot, a turnip, an onion, a bunch of herbs, pepper, and salt. Cook for two hours, basting the meat from time to time. Free the stock from fat; add a gill of tomato and a gill of brown sauce to the stock, and cook the meat for another hour. Place the meat on a hot dish, remove the string, strain the sauce, boil it up, pour some of it over the beef, and send more to table in a tureen.

— Berlin Pudding. —

Four ounces each of flour, castor sugar, and almonds, four eggs, half a pint of milk. Blanch and peel the almonds, shred finely and dry in a cool oven. Put the flour in a basin, add half the milk, and beat well. Melt the butter, add the rest of the milk, the sugar and almonds, and add all to the batter. Stir till it begins to thicken, then leave till cool. Beat in the yolks of the eggs one by one; beat the whites to a stiff froth and add. Pour the mixture into a buttered mould and steam for two hours and a half. Serve with fruit sauce.

— Beefsteak Pudding. —

Cut a pound of beefsteak into slices; roll in flour, season with pepper, salt, and add an onion. Cut half a pound of ox kidney into thick slices. Line a basin with suet crust, put in the meat, and three-quarters fill the basin with stock; cover with crust. Tie a floured and scalded cloth over all, and boil for two hours and a half. Serve in the basin with a napkin pinned round.

— Fricassee of Cold Beef. —

Cut the beef in slices; put it in a stew-pan with a tablespoonful of chopped parsley, an onion, and half a pint of stock. Simmer for a quarter of an hour. To season add the well-beaten yolks of two eggs and a teaspoonful of vinegar. A glass of port wine is an improvement.

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

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Daffodils.

I wandered lonely as a cloud
That floats on high o'er vales and
hills,
When all at once I saw a crowd,
A host of golden Daffodils;
Beside the lake, beneath the trees,
Fluttering and dancing in the
breeze.

Continuous as the stars that shine
And twinkle in the Milky Way,
They stretched in never-ending line
Along the margin of a bay;
Ten thousand saw I at a galance
Tossing their heads in sprightly
dance.

The waves beside them danced, but
they
Outdid the sparkling waves in
glee;
A poet could not but be gay
In such a jocund company;
I gazed and gazed, but little
thought
What wealth the show to me had
brought.

For oft when on my couch I lie,
In vacant or in pensive mood,
They flash upon that inward eye
Which is the bliss of solitude;
And then my heart with pleasure
fills,
And dances with the Daffodils.

Wordsworth.

Garden Reminders.

September once again.

The most pleasant month of the year.

Dame Nature is donning her daintiest attire.

This is a time of fulfilment and of promise, let us enjoy it to the uttermost.

It is a time to be busy, too, straightening up here and tidying up there.

Time lost in the early spring time is hard to regain, however hard one tries, so don't get behind.

There are annuals to be sown, roses to be planted, shrubs and climbers to be set out, bulbs to be tended, lawns to be top-dressed, beds to be weeded, paths to be made, peas to be staked, hedges to be clipped, shrubs to be pruned, plants to be fed and flowers to be picked. It is certainty time to get busy and to keep busy.

Spring or early summer is the time when we do our sowing and preparation for the best and brightest of our flower displays. All the hardy friends, such as phlox, sunflower, marigolds, zinnias, dahlias, amaranthus, salpiglossis, asters, arctotis, balsams, cockscombs, dianthus, hunnemania, and a host of other beautiful things come into service, to see us through the longest and hottest time of the year.

Do not delay in getting sowings of the summer flowering annuals. Boxes about four inches deep are just the thing, kerosene boxes or tins cut in half lengthways are excellent, easy to handle and of little cost. The joins at the bottom should be fairly open for drainage. An inch of old manure at the bottom, some light sandy soil for filling and there you are.

Keep the surface of the rose bed well stirred, not with the fork, certainly not with the spade, for the rose strongly objects to root mutilation or even disturbance. The hoe is what is wanted and it is just as well to remember that it is wanted pretty often, once a week at least.

It is not any use trying to hearten up a recently planted tree, shrub, climber, or in fact any plant whatsoever, with liquid manure, even if it does look very much off colour. Quite possibly is is having rather a bad time but if it was properly planted and is not allowed to sway about in every breeze, it will pull through all right. Anyway, manure won't help it.

Established roses will be all the better for a weekly dose of thin manure water. Many people make a rule of beginning this as soon as the new growth begins to make headway, slightly increasing in strength till the first buds appear when it is given twice a week but always and only after rain or watering.

Even the best pruned roses will be all the better for a thinning of the new growth. In doing this keep in mind the shape of the plant and the preservation of the strongest growths. Shoots which will cross each other or which will crowd the centre should be the first to go.

Roses have many human friends, also, unfortunately, many insect enemies. Aphis are one of the first and one of the most persistent. They come in countless thousands and many a promising rose bed has been converted into a sort of dismal cemetery of beautiful blooms which might have been. There are a few things aphis don't like and kerosene emulsion is one of them.

Briars may still be set for budding. Selected shoots should be firm, ripe, straight, and of course of the required length. They should be planted six or seven inches deep.

When planting out Penstemons, Delphiniums and Perennial Phlox, it is a good thing to remember the old adage. "The fatter the land the fuller the flower," and to be liberal with the manure. There is another thing to remember, and that is—don't put them too far from a tap. Carrying all the water this trio will stand would be rather too much joy.

Hedges and lawns are both apt to go short when the manure barrow is on its rounds, yet the former usually has the worst position in the garden and the latter certainly gets the most usage. Try a pound of super or bone dust to each ten feet of established hedge and each ten feet square of lawn.

Make a nursery bed in some fairly sunny corner, in which you can grow on the seedlings for a few weeks. It saves trouble in the long run and once having tried it you will not be anxious to go back to putting them straight out into the garden, especially if they are to go into a mixed border.

The soil for a nursery bed should be a little richer than for the seed boxes but only made so with very old rotten manure. Some sand and leaf mould will be helpful in getting the texture and condition wanted, which is that when fairly moist the soil will not fall away when the plants are lifted or, on the other hand, be the least sticky.

Lawns will want a little help if they are to be at their best during the coming summer. First a close cutting with mower or scythe may be necessary, than a scant inch of sandy compost if you have it, this to be well brushed in. If the compost is not available use one-third old manure to two-thirds

good garden soil, adding a five inch pot of super to each barrow load.

Trim the edges of lawns and use a line and sharp spade to do it with. There is nothing gives such a finish to a grass plot as well defined true margins. Where the edging is of tile or jarrah run the clippers round. Keep the weeds down, renew worn patches, build up any depressions and keep the roller going after every soaking rain.

Keep the pansy bed in good heart by stirring the surface, and a weekly watering with some weak manure water. They seem specially to like soot as a stimulant, a queer taste, perhaps, but one which it is quite easy to satisfy. A thin dusting all over the bed now and then is a good way of doing so.

Anyone who has kept over a few Salvia plants through the winter, may easily work up a fair stock of plants by taking cuttings of the shoots an inch or two long. Use a very sandy soil kept moist for striking them, they will be more certain on bottom heat or under glass. They should be ready for putting out in a month or five weeks.

For northern dry country some of the saltbushes make rather fine hedges. When growing they should be kept cut back so as to build a good foundation right from the bottom. Where water is a scarce commodity there is a lot to be said for the saltbush for this purpose. Seed or cuttings can be put in now.

Canterbury Bells are one of the old fashioned flowers which should have more friends than they appear to possess. They are not for dry and exposed positions where the soil is thin and rather poor but under cooler, moister conditions their delicate colouring, profuse flowering and graceful growth make them worth a place in any garden.

Aquilegias which have occupied the same position for some time will be grateful for a little assistance towards perfecting their crop of bloom. Liquid manure once a week, frequent surface stirring (not too close to the roots) will help and, like the pansies, they repay a top dressing of compost with plenty of leaf mould and a dusting of soot.

Balsams are not particularly popular but they are nevertheless very beautiful with a wide range of very delicate colouring. Give them a rich bed in a not too sunny position with lashings of water and you won't regret it. Sow the seed singly ten inches apart where they are to grow and keep them on the move right from the beginning.

There is one very good way of preventing weeds from growing big and tall and that is to pull them up when they are little. It's quite a sure cure. Considering the very large number of invited guests one wants to provide for in the garden it is poor policy to have any uninvited ones making free with the food and water.

Don't leave the getting of that packet of sunflower seed too late. There may not be room for many of the big fellows in the front garden but a few at the far end of the yard will make a pretty background and screen. The miniatures will be at home anywhere. They are real cut and come-againers.

This is the time for putting in evergreen shrubs and climbers, also native plants generally. There are some beautiful but little known garden beauties amongst the Hakeas, Eriostemons, etc. Naturally they are just as easily or more easily grown than many of the more popular introduced plants.

The variety of Scabiosa, known as The Bride, is a great improvement on the old form. It's pure white flowers are much larger and are borne on long wiry stems, this with its lasting qualities make it very useful for all sorts of bouquets, wreaths, and house decoration.

Celosia (feathered cockscombs) are delightful things for big areas. The plants will grow nearly two feet high. Thompsoni varieties run from very light yellow to deep orange, and from light purply crimson to dark, purply reds. Seed grows easily, and plants stand shifting. Celosia will last right through to the autumn.

Cyclamen are very easily grown. The work is rather slow, but the game is worth the trouble. Sown in shallow, well-drained seed boxes, placing each seed so as to give it an inch of free room. When the first leaves appear, try and remember there is a tiny bulb underneath that will need careful treatment.

Garden Notes.

— Moving Trees. —

It is surprising to some what large specimens may be shifted with safety, and how easily it is done if the work be gone about in a practical manner. Evergreens, to be moved, must have a good ball of earth removed with them. This can be done by opening out a trench about a foot or more, according to the size of the ball required, from the stem of the plant. Lift the ball, which must then be wrapped around with canvas, and this securely tied to prevent cracking. All this being properly done, the plant may be then conveyed to its destination. In replanting, use some fine soil for the plant to start new roots into; any old roots that may have been bruised in lifting should be cut cleanly before replanting. A good watering to settle the soil around the roots will be necessary before the hole is quite filled in, and allowed time to settle down.

— Robbers. —

Serious injury is frequently done to shrubbery borders by the proximity of large pines, cypresses, and other large growing trees. Pepper trees are also great robbers. Many people think that if the trees are a distance away that they do no harm, but the roots travel readily a very long way and rob all the surrounding soil of moisture and nutrition; in addition to the amount of shade given, which is oftentimes very injurious to the small plants in the border. The best way to give the smaller things a chance is, if the robbers are outside one's own boundary, to dig a trench three or four feet deep and as narrow as can be managed, just inside the fence, cutting all roots as they are exposed. The trench may be left unfilled, in which case it should be covered or the soil may be returned, in this case the check will of course only be temporary. Overhanging branches may be cut at the fence line. This question is always a difficult one and it is much better to put up with a little inconvenience in this respect than to appear unneighborly. Trees in adjacent gardens are in a sense, common property, and as one enjoys their shade and beauty it is only reasonable to be willing to contribute a little room, food and water towards their maintenance.

— Salvia Patens. —

Though this beautiful blue flowered Salvia is not considered very suitable for ordinary garden conditions around Adelaide, it can be grown without much difficulty if given a bed or border which is shaded from direct sun during the greater part of the day and also protected from the worst of the hot winds. Fortunately we have had so little of these during the last few years that one is beginning almost to forget what havoc they can do in the garden. Seed can be planted now or during the next few weeks and the plants pricked out as soon as they can be easily handled. They should be left in these nursery beds till they are sturdy little plants, then set in their flowering quarters with plenty of room for they show to better advantage when not crowded. The bed should be well dug but not heavily manured and the surface needs to be kept quite free and open. In the cooler districts they should be one of the first on the list for this season's sowing.

— Mina Lobata. —

Have you a fence or out building for which you require a quick growing but temporary covering? If so just buy a packet of Mina Lobata seed during this month. There is nothing which for quick growth, neatness and beauty will give you as much satisfaction. Plant one seed, which is fairly large, in a three-inch pot and grow on till the roots are showing around the ball, then put them out where they are to grow. The seed can, of course, be put directly in the open ground, two or three where you want each plant, but keep a watchful eye on them or some fine morning you will be minus lobata, if there are any slugs about. If you have no fence or other suitable support already in existence you will find it well worth while to rig up some bamboo, brushwood, or wire supports for this climber is in full flower for many weeks and is quite a gorgeous sight.

— Topping Gum Trees. —

Where gum trees are to be topped or "pollarded" the work should not be delayed. In cutting a horizontal branch, make the first cut from underneath at or about the place you wish the branch severed, then cut from above otherwise the weight of the falling branch will do a lot of damage. Let the slope of any cut be such that any rain is thrown off. It is not necessary to tar the cut surface, but it is better to do so. Gums may be cut to the ground line, they will throw up a number of sprouts, of which as many as are wanted should be retained and the others suppressed.

— Iceland Poppies. —

The growth of the poppies reminds us that spring has come again. Soon the egg-shaped buds borne on erect stems appear above the leaves, waiting for the first real warm day to burst open. From now on the Iceland poppy bed is one of the most attractive features of a garden. It will be literally aglow with the brightest tints of white, sulphur yellow and red-orange in wonderfully pure solid shades. Light frosts seldom prove seriously injurious to flowers of Papaver nudicaule. The next day usually sees them again swaying in the light breeze. Their petals possess the same silky lustre as those of the larger flowering annual Shirley poppies. Stems are of good substance, long and thin. Iceland poppies are very useful for table decorations and for filling vases.

— Green-Fly on Roses. —

If there is one thing more annoying than another to the Rose grower it is the visitation of green-fly or aphis, which seem to come from every quarter until the trees are covered with them. How disappointing it is after long hours of labour in preparing the beds, planting, pruning and hoeing to find one's efforts checkmated by these tiny little marauders!

Surely something may be done to check the aphis nuisance, and it is not too soon to think about it. Go over the plants about twice a week and spray them well with quassia solution. It should be given warm, as it mixes better with the water. Have a fine spraying syringe, and direct the liquid well on to the points of the young growths. Do not wait until the aphis are there, but do it to prevent their coming. Kerosene soap is another excellent article to use. Use it at the rate of 4ozs. to a gallon of soft water. Timely applications of such remedies will check considerably, if they do not quite cure, the nuisance.

— Rosemary. —

Rosemary may be increased by seeds, by cuttings in suitable soil and by the layering of shoots during the summer months. Propagation by seeds is a very simple and easy means of raising a large batch of plants. Half an ounce of seed will sow a row some 50 feet in length. Seeds, which take rather more than three weeks to germinate, should be sown in drills half an inch deep in a sunny border outdoors, and when the seedlings are a few inches high they should be transplanted in a small, specially prepared bed of nice light soil, observing a distance between the seedlings of six inches either way. When the seedlings become well established and are represented by sturdy little plants, they should be planted in their permanent quarters about 3 feet asunder. When treated in this fashion, plants of the Rosemary invariably do well.

The most popular method of increasing the plant, however, is by cuttings. This is not difficult. The cuttings may be better known to the novice as slips, and slips are young shoots that are pulled off the old plants with a heel of the old wood adhering. The cuttings should be some 6 inches in length, and should be inserted in sandy soil in a shady border, the leaves should be removed from the lower half of them. The cuttings should be inserted to the depth of the bared portion of the stem and special care taken to press the soil firmly at the base of each one.

By the succeeding spring the rooted cuttings or slips will have formed nice little specimens, and will benefit by being planted in their permanent quarters 3ft. apart. Bushy specimens are much to be desired, and that each young plant should partake of this character, the point of the growth may be pinched out the first season. It is an old custom in England, when gathering a bunch of flowers for a friend, to add a sprig or two of Rosemary "for remembrance."

— Growing Lavender. —

There are some plants, not particularly showy ones, that we have come to look upon as indispensable. Our gardens have, as it were, an underlying sense of sentiment about them, and there are some flowers and plants that delightfully emphasise this feeling, so that a garden without them loses something of its charm, and in a vague manner we are aware that that which should lie beside, and behind, its beauty is lacking. Take the case of the Lavender. That surely adds to the garden a pleasure out of all proportion to the mere beauty of the plant. Lavender has little of showy decorative value, and yet we enjoy it more than many a gayer blossom. Why? It is an old-fashioned flower, it has its sweet homely fragrance, the poetry and sentiment of the ages have grown up round it, and for these things we hold it dear, at any rate if it is our aim to achieve gardens that yield us, beside their gay, flaunting beauty, those subtler beauties and delights that we feel rather than see.

— Campanulas. —

The bell flowers should be popular, for there is amongst them a great variety of form, many of them being of tall pyramidal habit, of great beauty, while others are of the dwarfest possible nature, covering the ground with a carpet of bloom. They may be divided into two classes, i.e., biennial and perennial, the great majority belonging to the latter class. Among the biennials are the well-known Canterbury Bells, of which there are several forms and colours, the doubles and those with cup and saucer flowers. Nearly all the Campanulas make beautiful plants and some are very stately, notably C. pyramidalis, the Chimney Campanula, which often rises to a height of from four to five feet. C. persicifolia of both single and double form are also very useful for growing as single plants, while for hanging baskets, window boxes, etc., C. fragilis, C. isophylla, and C. isophylla alba are the varieties generally grown.

Campanulas are all easily raised from seed sown in well-drained pots or pans, in a compost of equal parts of loam, leaf mould, and sand. Cover lightly with finely-sifted soil and shade from strong sun.

— Planting. —

Trees add much to the comfort, beauty, and value of the home, whether it be in the country or town. The value of shade trees about the house is appreciated almost every day from October to April, and more especially in places where the native trees have been cut down, and all is left bare and open to every wind that blows. The cost of a few peppers, grevilleas, Cootamundra or other wattles, gums, or pines, is but trifling; but a little labour is required to prepare the ground for their reception. Good-sized holes should be thrown out, three feet each way, and a couple of feet deep would not be too large; then filled in with some good surface soil. If the ground be very poor a little rotted manure may be mixed with the soil; but it should not be put in the bottom of the hole in a lump, as it often is. The tree or plant must not be planted any deeper than it has been growing; fine soil should be worked in amongst the roots, no large clods used; a good watering may be necessary, and mulching would do good. After attention in watering in dry weather will be necessary if success is required.

— Labels. —

The man who takes a pride in his garden should always know the names of the varieties he cultivates, and this not only for his own sake but for the pleasure and benefit he may impart to his friends, who, on inspecting his garden, are almost sure to ask the name of the better or more striking kinds. The value of plants appears to be enhanced when their names are known, whether roses or any other class of flower or tree. The nurseryman always labels his plants, usually with stout paper or cardboard. Very often these labels are allowed to remain on until they become so defaced that the reading is obliterated. It is better to remove the label when the plant is first planted, and have some kind of permanent label placed in the ground in front of the plant. A large staring label in a private garden is offensive; it may be necessary in the nurseryman's for convenience sake. Some growers make a point of not labelling their plants, but instead, they register in a book the names of their plants, indicating their positions; this may be done when the plants are in lines, or when there are only a few of them; but the method is not to be recommended. Labels are made of wood, zinc, and sometimes of copper and porcelain. The wooden ones are easily made at home, and may be bought cheaply. To prevent early rotting the part to be inserted in the ground should be dipped in creosote, and if a dash of varnish be placed on the upper part after the front has been painted white and the name written on it, the label will last a considerable time. Zinc labels may be written on with indelible ink. The lettering should be clear and distinct, and of course should be correctly spelt.

— The Scented Geranium. —

It seems a pity that this old-fashioned plant is not more often met with than it is nowadays. The commoner kinds of this Geranium are of the easiest culture. Not only are they valuable for their delicious fragrance at all seasons of the year, but they are also very useful at all times for mixing with cut flowers, the foliage of some being so light and feathery as to rival Ferns. The scented-leaved Geranium has extremely pretty blossoms of varïous colours and markings, and the scent of the leaves is also very varied, — the sweetest being the citriodorum section. There are scores of varieties listed in English catalogues.

— Rudbeckia, Golden Glow. —

Transplanting may be done just as the plant is about to recommence growth. It can be done again with equal success after flowering has finished. In autumn the flower stems should, of course, be cut down, leaving nothing but the leaves springing from the root. The best pieces, that is, the youngest, should be selected for making a fresh clump or plantation. This transplanting and breaking up of the plant is highly beneficial, as it gives fresh encouragement to growth, and plants that are so treated, always flower better and continue showy for a longer period of time. The Coneflowers are so named on account of the elevated disc which, in some species, projects like the point of a finger. In this one it is merely convex or rounded and of a rich brown or nearly black that contrasts beautifully with the golden-yellow rays. Propagation may also be effected by cuttings and seeds, but by dividing the plant, sufficient can be obtained for the requirements of any garden in a short time.

— Single and Double Flowered Stock. —

It is not possible to pick out single-flowered from double-flowered Stocks whilst in a small state of growth. Nothing indicative of the character of the flowers each plant will produce is to be seen until the flower buds are formed. Then when sufficiently developed single-flowered buds are narrow and pointed, whilst double-flowered buds are broad and rounded. Many years ago a theory was propounded that all plants having straight or tap roots produced single flowers, and those plants having forked roots produced double ones. That was, however, a false assumption. The proportion of double flowers found in any race of Stocks depends on the strain, and we believe somewhat cramped root growth in pots or poorish soil is more productive of double flowers than is free-rooting generous growth. Sometimes under the latter form of culture double strains become single entirely.

—To make Oval and other Beds.—

Oval beds can be marked out by driving in two stakes in line with each other, the length of the oval required governing the distance apart. A long piece of string that will go right round the two sticks, and a bit over, the amount over depending on the width of the oval, should be joined at the ends. Pass the string over the stakes, slip a marking stick inside the string. Pull tight and walk round, keeping the rod hard against the string, at the same time marking the ground. A pretty bed in the trefoil, which is made by placing three stakes at equal distances apart, say 4 feet. A two-foot piece of string should be used as for making a circle. By treating all three stakes similarly, one gets three circles overlapping each other. The outer lines give the shape required. The crescent is very simple. Drive in two stakes, say 2ft. apart. Use the string as for making circles. The result will be that the points meet before the circle is completed. A little experimenting will soon give one an idea as to the length of the string

required for marking a bed of a certain size.

— Wireworms. —

These pests, which may easily be recognised from their bright yellow colour and tough, wire-like covering, soon play sad havoc with plants if they are not destroyed. They are fond of Carnations. They are especially prevalent in gardens where the soil has been undisturbed for some time; indeed, one of the best methods of getting rid of them is to stir the soil frequently. Many may be caught in this way. When, however, the bed is planted one cannot stir the soil so effectually. When a Carnation shows signs of withering it should be immediately taken up, and if wireworms are in the soil most probably one will be found in the extreme base of the stem. Sometimes they may be found some distance up the stem, eating out the heart of the plant as they go upwards. Perhaps the best means of trapping them is to insert cut Potatoes and Carrots about 2 inches below the surface, having a piece of stick attached to each one so that it may be examined daily. Numbers may be caught in this way. When the baits are examined the wireworms will be found half buried in them busily feeding. Applications of soot and lime tend to keep them away.

— Fuchsias. —

Fuchsias are easily grown, but to obtain the best results close attention is necessary when the plants are young. They are readily propagated by cuttings. When the young shoots are 3 inches or 4 inches in length they can be taken off with a slight "heel" of old wood. Insert in pots filled with light sandy soil, placing a layer of sand on the surface; six to ten cuttings may be inserted in each pot according to the size. Water them in, and put them under a bell-glass in a shaded frame. Look over the cuttings occasionally, removing any damp leaves, and shade from the sun. In two or three weeks they will take root. About a fortnight later they can be potted off singly in small pots. Repot the plants as they need it, and keep them growing freely.

The stopping of the plants depends on the shape and size of the plants desired. To obtain small bush plants pinch out the points of the shoots when the young plants are 8 inches or 10 inches high. For pyramids the side shoots, and occasionally the leading shoot, must be stopped to keep the plants in shape. Standard Fuchsias are very effective. Grow the young plants on with a straight stem to the required height; 4 feet is a useful size. At this stage the point of the shoot can be taken out to encourage it to form a head, pinch the resulting shoots at every second or third pair of leaves till a good head is formed. The Fuchsias delight in a fairly rich soil, consisting of fibrous loam, leaf-mould, well-decayed cow manure and plenty of sand to make the soil thoroughly porous, as the plants require abundance of water in summer.

— Carnations. —

The drooping habit of some at least of the perpetual flowering carnation appears to be a fault of increasing frequency in American show rooms. Commenting on this, "Horticulture," in a recent issue, writes :—

"Whether it is the excessive size of the blooms of the present race of the fine American and English carnations and consequently their great weight, or that inter-breeding has produced weakness of the stems, the drooping poise of the blooms is very noticeable among those exhibited at the recent show of the Perpetual Flowering Carnation Society. Some of the varities shown had excessively weak stems, and some of them were broken where they touched the edge of the vases. We seem to need greater robustness of growth if the blooms are to remain as large as they now are. Or failing that improvement, a reduction of size of the bloom Perhaps the addition of potash, or lime to the soil in which the plants are grown, might impart strength and rigidity to the stems, as these substances do in case of wheat and other crops. A drooping carnation may do for plants standing on a window sill, to be observed from below, as we see them in the Tyrol and Italy, but such flowers are out of place in a vase placed on a level with, or below the eye."

— Statice Sinuata. —

The striking features of this plant are the white corolla and large blue calyx, together with the leafless but winged stems. Most of the leaves spring directly from the crown of the plant and lie upon the ground. They are not much in evidence when the plant is in bloom as it grows 2ft. high and produces a large number of branching stems, each branch and branchlet terminating in a dense cluster of flowers. Besides the ordinary form with blue calyx and white corolla there are others having rose, rosy-purple and white calyxes. The stems may be cut when the flowers are in perfection and dried for use in the same way as everlastings. The Sea Lavender, as it is called, is a very old favourite in English gardens.

The Amaranthus are brilliant foliage plants that do well for any position where bold, striking contrasts can be used with safety. High feeding makes this plant gorgeous. Sow seed in boxes or beds and transplant, or broadcast a little where you wish the plants to grow.

Cannas can be grown from seed. With good stock there is always a chance of striking something particularly good. Soak the seed in hot water for a few hours before sowing to soften the thick outer skin, but the best way to get these plants is to buy small roots from the nursery.

The Wistarias.

Wistaria blossoms of purple and white
In spring-time are truly a beautiful sight.
The Vine is ambitious, and spreads far and wide,
But in it is nothing expressive of pride.
Just note how it hangs down its beautiful head,
Thus teaching humility's lessons instead.

Japanese Poet.

Among the stronger growing climbers none excel the best members of this genus in the gorgeousness of their flower beauty. The old Wistaria chinensis is, of course, the best known of them all, but, beautiful as it is, it has a rival in W. multijuga.

The name perpetuates the memory of Caspar Wistar, an American scientist who lived about the end of the eighteenth century. It is often wrongly spelt Wisteria, in which form it is fairly popular, as a name for a "cottage" or "villa," where, as a rule, no other evidence of its presence exists.

Whilst Wistarias are not particular in their requirements, a few conditions are requisite if they are to be seen at their best. They like a rich soil, plenty of moisture, and abundant sunlight. Wistaria chinensis is usually grown on the side of a house or wall; and in no other position can it be seen to better advantage. It is, however, very attractive trained in other ways, as, for instance, on a pergola.

Wistaria multijuga is the fine Wistaria that is so popular in the Japanese tea gardens. Many pictures of remarkable specimens in Japan have been published, but often they are described as W. chinensis, in spite of the racemes streaming down 3 feet or more in length. This length of raceme is the chief distinction between this species and W. chinensis, but the flowers, instead of being closely set together, are arranged more sparsely. What they lose in number they gain in elegance.

It requires the same conditions and may be trained in the same way, except that an arrangement which allows of the racemes hanging clear is to be preferred. The favourite Japanese way appears to be to train it on an overhead trellis.

Feeding Roses.

The giving of liquid manure is the best of all ways of building up the fine flowers one desires to obtain. When the soil has been well saturated with rain, liquid manure finds its way to the roots more effectually. If rain, as it often is, is conspicuous only by its absence, then watering with tap water must be done. A good plan to apply liquid manure is to draw drills between the rows, then fill these with liquid two or three times before filling in the soil. To old established roses I have never found liquid manure too strong even if used almost undiluted. A good plan is to have one or two casks of liquid near at hand or a barrel mounted on wheels is even better. Into these house slops, cow manure, and soot may be put and then filled with water. Where poultry is kept the manure will make an excellent liquid food for Roses.—E.J.

Nothing But Roses.

"Just for that reason you should rather grow nothing but roses" was a rose lover's reply to a friend, who complained that he could not grow roses "because his garden was too small." There is a lot of sound garden sense in that reply, for from what other class of plants can be obtained, in any similar degree, the bewildering variety, the grace and beauty of form and colour, the decorativeness of the mass or the perfection of the individual bloom, the adaptability to varied positions, and withal the length of the flowering season that is covered by the different types of the rose.

The house-wall, the verandah, the fences and the sidewalk in many small gardens, are simply calling out for covering and what can be better or more profitably and beautifully used than the rose. There is one position in the small garden and above everything to be avoided is the placing of standards, sentinal like, round or on a small lawn. In fact, standards, when kept to a small head, as they must be in such gardens, are usually most satisfactory when planted in a border against a background which lends invisibility to the tall stem and its necessary support.

Though the pergola is a somewhat ambitious proposition for the small garden, since in its strictest sense it implies a certain massiveness which would not be appropriate in such a situation, it may in a modified form be used with good results and planted with any of our rampant growing roses (which can still be safely planted) would soon become a delightfully shady walk. For such a construction the timber employed should not be too heavy, pine poles in the rough not more than four or five inches in diameter, with cross pieces of considerably less dimensions would be suitable. The width should not be less than six feet and the uprights should be about that distance apart. In height, 7 feet or a little over would give a well proportioned appearance to the whole.

Weeds and Their Utilisation.

How very pleasant it would be if someone would tell us how to exterminate weeds, once for all. This is, however, an impossibility, and consequently let us make what use of them we can. And, first, what is a weed? "Well, a weed is a noxious plant," says one. But all weeds are not noxious, many of them are useful to mankind in one form or other. No! it is only the fact that they are in the wrong place, when growing in a garden, which makes many of them noxious. For we all agree that in a garden the legitimate occupiers of the soil ought to enjoy all the benefits of possession, while if these other occupants are crowding in like the camel in the old story, they will in time starve out the lawful residents. Many of these weeds are most beautiful flowers when in their proper habitat, and all have their own peculiar beauty; but the fact remains that they are not in place in our gardens. There they are, however, and we must do the best we can under the circumstances and make the robbers disgorge something for the good of the cultivated plants if we possibly can.

— What to do. —

Never allow a weed to seed in the garden. An old saw says, "One year's seeding, seven years' weeding." Therefore, remove all weeds before the shedding of seed has taken place. Annual weeds should be collected off the ground in which they have been growing, and from which they have been removed by pulling or hoeing. Place them together in a heap in some out of the way corner, and make additions from time to time.

Turn over the heap at regular intervals to assist decomposition. Whenever house slops are available tip them on the heap and thus strengthen the manurial properties of our ertswhile enemies. But there are biennial and perennial weeds as well as annuals. Do not put these on the heap as many of them will recommence growth instead of decaying. Do not leave a weed growing any longer than the first time you see it large enough to be pulled up. Even if there is not time to pull many, every one taken out allows more room for the proper plants to spread into the light and air, and in addition the moisture contained in the soil can be utilised for its right purpose. If by chance a weed should escape notice until the seed is ready to disperse, grasp the whole head of the plant and burn at once to prevent further mischief. An important point is that, the contents of the heap, when scattered on the garden at the time of digging, will enrich the soil by providing the very elements necessary to promote the healthy growth of our vegetable and floral friends; thus we can follow the golden rule and return good for evil.

Origin of the Gladiolus.

(From Horticulture).

Comparing the wild species with the modern hybrids one could hardly believe that the latter were offsprings of the former. Of the wild species referred to there have so far been discovered 140 or more, a few being natives of Europe and Western Asia, a few from the mountains of tropical Afr ca; most of them, however, are from Cape Colony and Natal.

The gladiolus is quite an old flower, for we find as far back as 1596 Gladiolus segatum was cultivated, and in 1629 Gladiolus Byzantinus was quite popular; also during the last half of the eighteenth century many species were introduced, causing a great deal of interest in this flower. At one time Gladiolus segatum and communis were highly prized for their medicinal properties, but for what ailment I have been unable to ascertain. The starchy bulbs of some African species were also used by the natives as food. In 1823 Mr. Colvill, of Chelsea, brought to notice the variety Colvillii, a cross between cardinalis and tristis, and which by later breeding has shown some beautiful hybrids especially adapted for early forcing, although the flower is quite small. It seems, however, to have been left to Van Houtte to start the ball rolling, when in 1841 he introduced to the trade the Gandavensis type, said by some authorities to be a cross between psittacinus and cardinalis, while others claim it is the result of crossing psittacinus and oppositiflorus. I am inclined to the former theory, although in some so-called ganadavensis hybrids the blood of oppositiflorus is recognized, especially is it most prominent in that old variety Ceres.

The Lemoinel type, a hybrid of purpureo-auratus and Gandavensis, was first introduced in 1878 by Victor Lemoine, and the Nanceianus, a hybrid of Lemoinel and Sandersii, was introduced in 1889 by the same hybridiser. About this time or perhaps a little ealier, a cross between Gandavensis and Sandersii was obtained by Max Leichtlin, of Germany, which strain came to America and was named Childsi.

About the year 1887 I happened to see a small planting of gladioli in the garden of a personal friend, which, comparing quality, vitality, and multiplying functions were a revelation to me. I found upon inquiring that they were hybrids from the trial grounds of Mr. H. H. Groff, of Canada, and immediately I made it my business to stock up as rapidly as possible from that source, so that to-day I have between 15 and 20,000 seedlings of exceptional merit, the result of crosses made by that hybridizer.

— Cultural Methods. —

The methods employed in the successful cultivation of the gladiolus are too well known to all of you for me to go into full details hence I will touch lightly upon this subject. One of the principal points is to select proper soil, for although this bulb will bloom in most any kind of soil and under adverse conditions, still the same as most flowers it has its choice of soils. Sandy loam is preferable, but if this cannot be supplied, heavy soil may be much lightened by the application of sand. The soil also should be well drained, for the gladiolus will not thrive well where there is excessive moisture. The soil should be well fertilized in the fall and thoroughly ploughed, and again in the spring should be well pulverized, at which time the lightening process with sand should take place if required. The planting can be made in rows or en masse, according to the uses which are to be made of the flowers. If space is limited the rows may be as close as eighteen inches (18 inches) apart; such planting, of course, is intended for cut flowers.

Four inches (4 in.) is shallow enough to plant in any soil for the bulb to take strong root and permit of sufficient space for the new bulb or bulbs to form on top of the one planted. By planting this depth and even a little deeper in especially light soil, the spike from the old corm to the top of the ground is a help toward supporting the mass of flowers which are sure to follow proper cultivation and as a general rule no stakes are required except under extreme conditions, such as continued high winds sometimes accompanied by driving rains.

— Propagation. —

The multiplication of the same variety is accomplished in two ways, first, by division, the old bulb producing from two to as high as ten new blooming bulbs. Second, by offsets or cormels which are formed among the roots between the old bulb planted and the new bulb or bulbs, which form on top. A large percentage of these cormels require two years' planting in order to secure blooming bulbs, and the first year may be sowed in rows one inch (1 in.) deep about twelve inches (12 in.) apart. New varieties are secured only from seed, and there is no argument which would convince the modern grower that chance seedlings (by bees, butterflies and other insects) are as good as those produced by hand hybridization, especially when hybridized by one whose experience and knowledge of the habits and constitution of the parent plants as well as the proper methods to secure colour results, has taught him when and how to make such crosses. Sports now and then appear in my fields, but so far, I have been unable to establish and reproduce them.

— Decorative Value of the — Gladiolus. —

With its new forms and coloring there is no decoration for which it is not eminently adapted and the absence of perfume as well as the odour from decomposition, which takes place with many other flowers, place it in the lead for table decoration. Beautiful and artistic designs can be made with the individual flowers while the spikes can be arranged with green foliage in sprays, and other forms lasting much better than roses, carnations, in fact, any other flower, which by reason of such use must remain some time without water.

English Names for Plants.

A recent writer on the subject of flower names, deplores, says The Gardener, the growing habit of calling old favourites by their botanical equivalents, and expresses a hope that "the day will come when we shall free ourselves from the tyranny of hideous names." The question arises, how are we to gain such freedom? It is certainly true that we may nowadays hear an old cottage dame proudly declare, as she points to her fine Snapdragons, "We calls 'em Aunt Trynums now." And as we look into the kindly wrinkled face we think — sadly enough, perhaps— that surely "'the old order changeth." Nevertheless, the problem of garden names, simple and suitable for our garden plants, is not readily solved. There is little fear that the hallowed names of Marygold and Honesty, Forget-me-not, and Heart's-ease, Columbine, and the rest which are woven into the warp and woof of our current English tongue and literature, will ever die out in good earnest.

But what of the multitudes of new plants, unknown to our forefathers, with which we are enriched to-day. There is scarcely a garden, however small, which does not contain some flowering shrub or herbaceous perennial for which no English name can be found, which is not as yet recognised, in fact, as a naturalised British subject. Many attempts have been made during the last thirty years to coin new English names to fit some of these desirable aliens whom we wish to welcome and to domicile, but it has been more or less so far a failure. There is no real objection to such modern names as Foam Flower or Plantain Lily, but they have not taken root in our every-day speech as freely as in our gardens; and, when we have to characterise the different kinds of Plantain Lily, we have no choice but to fall back upon a scientific nomenclature.

Possibly we might have taken more pains to enquire after the local names of imported plants, so that both root and name might have been translated together. Local names are generally significant and sometimes pleasing. Yet other-landers have not always been entirely happy in their choice of flower names. Take, for example, the Rose des Alpes. Have we never, in former days, met tourists in the Swiss mountains with hands full of the little Rhododendron so named, while they sought in vain for the alpine Rose which they expected to find. Of course, we are all too clever now to make such a mistake, but it may serve as an instance of the uselessness of a vernacular name which applies to two totally distinct plants. In our own language it is still a moot point whether the old name of Gilly-flower belonged formerly to Stock or Carnation. The weight of evidence rests probably with the latter, yet that the name was indiscriminately used may be fairly concluded from the fact that in country districts one may still occasionally hear the old folk speak of the Stock as a Gilly-flower.

In passing we may remark that those who have made a study of the derivation of words tell us that hardly any of our common plant names belong in truth to our native English. Most of them come either from a French or Latin root, and nothing goes to prove more strongly the mixed character of our common speech than these time-worn names which we cherish as purely English. Most of us would be ready to credit the Rose with an English name, yet Rose was borrowed from the Latin. The true English name for the plant lingers in the word "hep" or "hip," which we now use solely for its fruit, though once it meant both plant and flower. It becomes us, therefore, to be modest in speaking of the name-origin even of our national flower.

But, taking our conglomerate tongue as it is, how hard to find a name—short, descriptive, and apt—for a new plant. Anyone who has tried to coin such a name that will prove both altogether fitting and likely to live in our garden vocabulary knows the difficulty. We can scarcely revert to the old doctrine of signatures upon which our ancestors drew so freely; and crisp, representative words are comparatively limited and fail to hit the mark when we come to apply them. Here, then, is a task worthy of greater intellect and fuller knowledge than has of late been bestowed upon it. There are numberless plants in our gardens of which we are obliged to confess that they have no English names, and the botanic Greek or Latin compound falters upon our lips, for, as a rule, we can discern that it is absolutely meaningless, leaving no impress upon the enquirer.

Winter Flowering Sweet Peas.

Though somewhat inferior in decorative value to the best type of spring-blooming sweet peas, the winter-flowering section is useful because of the rapidity with which it comes into bloom. The habit of growth of the two classes is quite different. So marked is this distinction that when first introduced, it was thought to have originated as the result of a cross between the spring blooming type and some dissimiliar but allied family and one of the vetches was widely credited with being one of the parents; indeed, we remember reading some correspondence in the American horticultural press, in which a commercial grower claimed to have made the cross for the express purpose of shortening the period between germination and time of bloom.

The winter-flowering type is more dwarf in growth, more sparse in foliage, and unlike the spring-flowering section, it does not indulge in that exasperating halt when a few inches high, but grows right ahead till it reaches what will be practically its full height when the first blooms are produced. Side shoots are then put out and the plant settles down to its main flowering.

In America the winter-flowering sweet pea, as grown under glass, is a fairly important commercial crop and the question of its origin, culture, and variental forms has been investigated at Cornell University, the results being reported in Bulletin 319. In this experiment seventy-three varieties from five sources in England (Englemann's Praecox type), Algeria (Arkwright's Telemly type), and America were tested. The writer of the report before us states that not the slightest relationship to the vetch was observed, though several varieties were, for comparative purposes, grown and observed at all stages of development. The probable origin of the type is traced back to the variety known as Painted Lady, so common in the gardens of not so many years ago, which was sent to England from Ceylon in 1737 and then described as "a new species. The first step in the transformation of the ordinary spring to the winter flowering type is an interesting instance of the effect of environmental conditions and is thus described. "Some forty years ago a woman in northern New York noticed and saved seed from a particularly bright flowered plant of the Painted Lady. She planted them in her garden and each succeeding year saved and planted seed from what she thought were her best plants. She did not raise many, some years not more than a dozen. The garden was over limestone ledges, where the soil, though fertile, was often not more than a foot in depth, and gradually her plants became more compact and sturdy until after some ten or twelve years she ceased to train them, simply letting them support themselves. After about 25 years of this treatment she sold a hundred seeds to a nurseryman, and from those seed came the variety Blanche Ferry, which is the more or less direct ancestress of the present race. The average number of days taken by the earlier varieties to come into bloom is seventy days, whilst the flowering periods is given as from five to six months. In one experiment plants of the winter flowering type had been in flower for this length of time before spring flowering plants sown on the same day showed their first bloom. It should be remembered, however, that the spring flowerers might have been sown many weeks later and still flowered at about the same time.

Vegetable Garden

Notes for September.

September may be said to mark the beginning of summer vegetable gardening. Many people will, of course, have raised seedlings already, but for the majority who buy their seedlings or wait till summer stuff is sowable outside this is a very important month. It is the nature of the season rather than the date on the almanac which should be the real guide. It is not of much use planting melons, cucumbers, etc., till there is some life and warmth in the ground, nor on the other hand is it good to waste any time when once the soil is right, rather risk a few perished seeds. All the beans, except the broad bean, all the cucumber tribe, tomatoes, Cape Gooseberries, egg fruit, capsicums, sugar corn, New Zealand spinach, etc., will want pretty prompt attention now.

— Melons. —

More heat than the cucumber, but less manure and less water, otherwise just the same treatment about sums up the melons' requirements. Though very much liked by some people it does not seem to be a generally popular fruit. It is by no means difficult to grow first class melons, but it wants more care than others of the same group. A well prepared rooting place, with a fair quantity of old manure, dug in also some sandy road sweepings, if the ground is very stiff, is the first step towards good melons. A nice pocket of well-decayed leaf mould is an excellent help to starting the seedlings thriftily. There are a number of good varieties, red and green fleshed, heavily and lightly netted. Amateur gardeners will not be able to find much fault with the following half dozen: Long Island Beauty, Banquet, Champion Market, Rocky Ford, Hackensack, and Paul Rose. They may not be the best six but they are at any rate a very good six, with plenty of variety.

— Tomato. —

Tomato seed may be sown in the open during this month, and with care should come along and quickly make fine thrifty plants, but one must be on the look out for late frosts. If you do not want to be bothered with transplanting, etc., just sow a few seed where you want each plant to grow, and afterwards weed out to the strongest seedlings. Tomatoes usually come up as thick as grass, so you do not want to put in many seed at each place. The plant likes a rich and firm root bed, but one which is quite sweet. A good way to prepare a bed is to take out a trench about a foot deep, lay in a covering of 3 inches of old stable manure, turn this over to full depth of the fork, tread it down firmly, add 6 inches of earth and another layer of manure, mix these well, and firm it, return the rest of the earth and lay on a thin coating of manure, turn this over lightly and leave in the rough for a week. At the end of that time turn the top spit over lightly with a fork, rake smooth with a dishing towards the centre. If the surface soil is not to your liking a small potful of sandy earth put at each place you are going to sow and pressed firm and level with the ground will rectify that. On this sprinkle half a dozen seed, cover with less than half an inch of the same soil and give one more pat with the foot or spade. A further thin covering of manure will be an improvement, especially if the weather is dry. Eighteen inches to two feet apart in the row is a satisfactory distance. As to varieties, there are many and most of them are good, it is really more a matter of growing than of naming. If you want a very large tomato there is Ponderosa, or better still, though not as large as Large Red. Seed grown under this name gives very varied results. At its best it is a very fine fruit, large, rich in colour, comes early to fruiting, is solid in flesh, and of good flavour and a heavy bearer. Burwood's Prize is another very fine variety, we have had some very even sized heavy tomatoes of this sort, of better appearance but not so prolific as Large Red. The plant is of very leafy growth, which is sometimes an advantage. Earliana is of course well known as one of the very best. Wilding's Early Prolific is not largely grown, we had some seed from Mr. C. French, of Victoria, some two or three years ago, and a very strong recommendation of its all round excellence. It is certainly a valuable variety. Dwarf, compact, early, holds its bloom well, fruits in large but not tight bunches, fruit of good colour, averages fair medium size, flesh firm and of nice crisp flavour. Some friends to whom we gave some of the seed reported very favourably. "The best I have grown," said one amateur, and a large grower who saw a few plants, remarked, "It looks good, it probably is good, and I am certainly going to give it a trial." After selecting one's varieties and sowing the seed there is of course a good deal to be done before picking a crop, but any of the above will do their share if the grower will do his.

— Cucumber. —

The cucumber is another subject with which culture counts for much more than kind. It does not, in fact, matter much how you spell its particular variental name, as long as you do not forget the manure barrow when sowing it or the water tap when growing it. Within reason one cannot make the bed too rich or keep it too moist. If you bear this in mind and act on it, cucumbers will grow riotously and fruit prodigiously. If you want to grow really handsome cucumbers, Telegraph is as good, or perhaps a little better than any we have tried, and it is top quality. Goliath and Giant of Arnstadt are also heavy weights. Stockwood, Long Green, Prickly, Cardiff Castle, are not so large but productive and of good flavour. Japanese is a climber and makes a handsome screen. One of the white varieties may be a novelty, but the colour somehow gives rather a shock when one sees the first fruit amongst the green leaves, kind of looks as if it hadn't got its clothes on, but it tastes all right. The apple or lemon cucumbers are small fruited sorts. They have no particular recommendation as far as we know, but no disadvantages for the home garden where they certainly add a little variety. Pickled cucumbers belong to another part of the paper, but as Mrs. Beeton, of immortal memory, said about the hare, you have to grow your cucumber before you can pickle it. The gherkin is very prolific and easily grown. We forgot to mention that the apple cucumber comes into fruit early and so does Jewel of Koppitz. There is no best cucumber but no one could reasonably object to meeting any of the above at table, either with oil and vinegar, salt, aunatural or in a salad, unless of course they happened to be bitter, which is a dispensation of Providence or Nature, which is as mysterious as it is unpleasant. The trouble comes to the old and the young, the green and the white, the long and the short, the smooth and the rough, the well grown and the ill grown with quite distressing impartiality and unfortunate frequency.

— Stable and Artificial Manure. —

Stable manure or artificial manure the better? is a question often asked by the suburban vegetable grower. Like many other questions it cannot be answered in any definite fashion, a great deal depends on conditions. If it were only a question of convenience and the supplying of a certain quantity of plant food, the answer would be simple, but it is not. Plant food in artificial manure is as cheap or cheaper than in most natural manures. The manure itself is easier to buy, easier to cart, easier to store, easier to apply, sometimes quicker in action and free from the objection which stable manure has, unless very carefully stored, that of forming a breeding ground for flies innumerable. The question is, are these advantages outweighed by the fact that in almost all cases natural manure improves the mechanical composition or texture of soil whereas artificial manure is either without effect or may occasionally be harmful. A fair general answer would be, in heavy, sticky loams and clays, use stable manure. In medium free working average garden soil use both. In soils which have been heavily manured in the past and are losing body and mellowness use artificial only. In naturally light sandy ground, use sheep, cow, or pig manure in preference to ordinary stable manure and supplement this with artificial. All natural manure contains phosphoric acid, potash, and nitrogen. In artificial manures, bonedust contains phosphoric acid and some nitrogen; it is a very safe but rather slow manure. Mineral super is safe with any ordinary care, and is quicker in getting to work. For potash one must look to sulphate or muriate of potash and for nitrogen to nitrate of soda or sulphate of ammonia, both of which act at once on plant growth. One mistake often made with artificials is to use too much. It is well to remember that a bucketful of artificial manure contains more food than a load of stable stuff and that a dusting which makes no particular showing on a bed is equal to some cwts. per acre. Nearly all artificials are injurious to the leafage of plants and require to be carefully applied either dry or in solution.

— Manure for Root Crops. —

Do not use much stable manure when growing beetroot or any other root vegetable for that matter, as it invariably causes the plant to put out a lot of fibrous roots which are not wanted. Let what stable manure used by the oldest you have and never sow or plant in freshly manured ground. The beet is one of the potash hungry crops. It is said to want three times as much potash as it does nitrogen and nearly three times as much phosphoric acid.

— Clubbing in Cabbages. —

The symptoms of clubbing are easily noticed. The leaves of the plant flag, turn yellow, and drop off, and when the plants are pulled up it is always found that the roots are knotted or warty, and curiously deformed. This disease is most troublesome on spent, sour, and sticky soils. The attacks are attributed by some to the work of an insect, but though maggots of several kinds are very often present in the diseased roots, they are not the cause of the large knots on the roots.

Though Cabbages like good soil, the disease is worst in over-rich soil. Where cabbages have been planted out on land that previously yielded a crop of onions, it is said that clubbing is not nearly so prevalent. A dressing of lime is a good preventive. Those who use night soil or other sewage should not use these too frequently on ground where cabbages or other plants of the Brassica tribe are to be planted, as their frequent use tends to clubbing. Cabbages should never be planted on the same ground twice in succession. The following mixture has been found to be very efficacious in checking clubbing: Three parts of soot, half a part of common lime, and three and a half parts of clay, should be mixed up in liquid form. This done the roots of the plants should be laid in it for about one hour before planting out.

— Cabbage Aphis. —

If aphis is left unchecked, it will speedily destroy the plants, and a season will be lost. There are numerous remedies for this kind of blight. A common, old-fashioned, and simple remedy is to pour soapsuds over the plants, thus watering the soil and destroying the insect life; if a little soft soap be mixed with the ordinary suds, so much the better. It is a good plan to dip the seedlings, roots and tops, before planting, in warm soapsuds. Tobacco, either infused or in any other form, is an excellent remedy for aphis, and so is tar-water, sprinkled on to the infested plants. The best preventive of this and most other kinds of blights is to keep the plants growing vigorously by means of an abundant supply of moisture and manure, but immediately aphis makes its appearance, some kind of insecticide should be used. Our seedsmen keep a variety of blight-resisting materials on hand.

— Cabbage Moth. —

Another pest which often causes much damage to the cabbage or brassica tribe is the "cabbage moth," sometimes called the "diamond moth," and the "green worm of cabbage." Owing to our greater knowledge, chiefly diffused by means of Mr. French's valuable work, entitled "Handbook of the Destructive Insects of Victoria," this "cabbage-worm" pest is less common than it used to be. Spraying the infested plants with kerosene emulsion, say, one part of emulsion to 25 of water, is an effectual remedy. A cheaper method of destroying the pest, and one which is strongly recommended where a large area of ground has to be gone over is as follows:—Take 1 lb. of coal-tar, and boil it in a couple of gallons of water, and, when boiling, dilute in the proportion of two gallons of the liquid, as taken from the boiler, with 100 gallons of fresh water.

— Carrots. —

Carrots, if left in the ground after maturity, are apt to split, and become practically worthless. Cut off the tops, and rub off any soil adhering to the roots, but no attempt should be made to clean them; store only the sound ones in coal ashes or sand in a cool place; or if the crop is heavy, and there is not room under cover, Carrots will keep very well if stored in covered heaps made in the garden, as for Potatoes. Beets can be treated the same way. They must be lifted and handled with great care, otherwise the roots may get bruised, when bleeding will ensue, and when boiled the colour is very inferior. Do not cut off the tops, but twist them off with the hand, leaving 2 inches or 3 inches of the stem attached.

— Parsley. —

Few plants grown in the kitchen garden are more in request the whole year through than the above, both for flavouring and garnishing; and there is no nicer looking border plant for the kitchen garden. When planting out it should be remembered that to attain the best results over-crowding must be avoided. The plants should be put out 1 foot apart all ways, the ground being deeply dug and well manured. It is well to remember that Parsley roots very deeply, and enjoys a good depth of broken soil. The young plants will require to be damped over during the evening should the weather be dry; and the finest stimulant, when they begin to make growth, is a dusting of soot now and again.

— Beetroot. —

In lifting beetroot, care must, of course, be taken not to bruise or injure the roots in any way, else the colour when the beets are cooked will be pale. In lifting and preparing Beetroots for exhibition select those of even size and good shape, and carefully sponge away all the soil without injuring the skin. Any very fine roots that are present may be removed without any harm accruing, but judgment must be used in this operation.

A Substitute for Sea-kale.

A correspondent to an English gardening paper, writes:—To those who are fond of Seakale and have not the means to grow it, the following hint may be useful. Get some Swede turnips and put them in a dark place with a temperature anywhere between 50 and 60 degrees. Stand them in a single layer, with the crown uppermost, and if the floor is damp they will need no soil around them; all that it is necessary to do is keep them perfectly dark. In a few weeks they will have long shoots on them similar to Seakale, which may be cut and cooked in the same way. If a few roots are brought in each week a succession may be kept. When properly prepared, it is not unlike Seakale in flavour. White turnips may be treated in the same way.

Fruit Garden

Notes for September.

Oranges, not forgetting the mandarin, lemons, loquats, guavas, feijoas, are all plantable during the next few weeks. Get the ground well prepared first, it is time saved in the end.

The planning and planting of a new fruit garden is only the first step in the successful production of fruit. The subsequent care is sometimes neglected even by the commercial grower.

Many people have got in the habit of thinking that when trees are planted our work is done and that Nature will do the rest. So she will, but all the more quickly for a helping hand.

Young trees are as susceptible to care and cultivation as are any other young things. It is a mistake to think that a well grown, profitable tree just "happens" because it doesn't.

There are three essential points in fruit growing; first is pruning, the second spraying, and the third cultivation and fertilization, and each without the others is incomplete To spray without pruning would be a waste of material on dead branches and superfluous wood. This extra wood also hinders the development of the fruit by shutting out the sunlight and air, which are essential; also rendering the trees more liable to insect and fungus attacks, for when disease gets a strong foothold in an orchard it will get into the older wood and also affect the fruit spurs for the following crop and this point accounts largely for crop failures.

The first spraying for codlin moth is very important, and under some circumstances, may be the only one necessary. In most cases, however, three sprayings should be given, the first when the petals have fallen is the one which counts for most, and it is time to be thinking about it now.

All grafted and budded trees should be gone over and all bandages loosened if necessary, to prevent girdling. Rub off all growths which are below the buds or grafts. Tie up the young shoots as they grow, to stakes to prevent their being blown off. It is often wise to pinch out the end of the shoots to cause them to strengthen and to assist the development of side buds and sometimes to make them fotk.

As a tcee is trained so it will grow. As the growth develops go over young trees and remove or nip back all shoots except those required to form the tree. Many growers say this is profitable work in a large orchard; it is certainly so in the home garden.

Not only the commercial fruit-fruit for home use should have grower but everyone who grows some knowledge of combating insects and diseases as they are always present in a greater or less degree.

Spraying pays, but it pays best when it is done thoroughly, with the proper material, and at the right time for the fungus diseases you wish to subdue. The results are not always immediately apparent. It often means all the difference between a good crop and an inferior one or no crop at all.

Progressive and intelligent orchardists are those who, when they become convinced of the necessity of manuring, ask themselves the preliminary questions: what substances are removed from the land and sold in the crop, and if these substances are essential, how may I most economically return them to the land, in order that its fertility may remain undiminished, and that I may continue to gather full crops? The answers to these questions should be known to and realised by every orchardist who would spend money to the greatest advantage in manuring his trees and the answers are not difficult to arrive at.

Bonedust is a very good manure but it is not a complete manure. Many people, however, appear to think, writes an exchange, that as long as they give their trees "bonedust" they have done all that can possibly be required. They rather crudely argue that as the trees want manure, and bonedust is a good permanent manure, the giving of a sufficient quantity of bonedust is all that is required.

If the crop is heavy, it is absolutely necessary in the case of apricots and peaches to thin out the superfluous fruits, if an even sample of good quality fruit is wanted.

Most people believe in the theory of fruit thinning though they sometimes fail in the practice. If it is good to thin, it is better to thin early, for by so doing the tree is spared a considerable waste of energy.

Even when a tree only appears to be carrying a light crop, it is in every way desirable to remove all defective small fruit, and especially one of twin fruit, for unless this is done, either both are dwarfed or one at least remains very inferior.

Budding, though usually left till somewhat later, may be done as soon as the sap is flowing freely. Where as much growth as possible is desired this season, the earlier it is done, under suitable conditions, the better.

— Old Trees. —

This is a good time to take in hand any old trees which are becoming exhausted. Dig in a liberal ammount of stable manure and in addition, give each tree, say, five pounds of superphosphate and one pound of sulphate of potash. Scrape off all rough bark and cut out all dead and superfluous wood.

— Red Spider. —

Red spider is a very persistent enemy, it begins early and works long hours. If you find young almond trees or older ones, for that matter, showing a frost-bitten appearance, the trouble is probably due to this cause. You may be quite sure of this if the trees show a slightly reddish tinge, which will be caused by myriads of insects, which are too small to be seen individually, except by the strongest sight. The red is not of course sufficiently pronounced to infuriate a bull, but it is sometimes unmistakeably present. Kerosene emulsion or other contact insecticide will make an end of them.

— Sprays and Bees. —

Though it may not be an easy matter to bring direct proof that spraying whilst a tree is in bloom is particularly harmful, either to the tree itself or to the bees which visit it, writes an Amerilan horticultural paper, there is no doubt that the general opinion is against the practice, and for the following seasons. In the first place, spraying during blossoming time is unwise, because instead of doing good to the trees it is harmful, as it prevents fertilizarion of the blossoms, and thus spoils a good harvest. In any case it is useless, because while in blossom, the petals of the flowers form a screen and practically prevent the wash from reaching the parts to be protected. It is therefore a loss of time to spray at this time. Lastly, it is to be absolutely condemned, as it poisons the bees and prevents their fertilizing the flowers. This is a very important matter for the bee-kepper, whose interests are closely allied with those of the fruitgrower.

Trees by the Roadside.

One reads a good deal of the extent to which fruit trees of various kinds are used for shade and decoration in the public highways of continental Europe. In Germany in particular this attractive and beautiful practice is very common. It appears that there is little difficulty experienced either in the maintenance of the trees or the protection or disposal of the fruit. Sometimes such plantings are in the public ownership, sometimes in that of private individuals. Possibly the German small boy, not to mention his elder brother, is built on different lines to our Australian variety, but we should certainly prefer any fruit trees in which we were interested to be on the inside of a wire fence, well barbed. Such conditions would, we imagine, be healthier for the crop. There are, however, several other reasons why the imitation of this theoretically—and it must be admitted, practically successful custom—is not in this country very feasible. For instance, climatic conditions will have an important bearing, not only upon the life of road-side fruit trees, but upon the practical question of their appearance. In many parts of the country the intense heat of a few weeks of summer will at once condemn the general run of fruit trees (under roadside conditions) for ornamental purposes, because it burns up their beauty, and their leaves will dry out and fall long before the trees of the bush show any signs of trouble. Another reason is that it would be more or less impracticable to give roadside fruit trees the cultivation and care necessary to best results. On the other hand the blossoming and fruiting periods of fruit trees along the roadside would be attractive beyond expression, but these periods are of comparative short duration and would hardly compensate for months of expressionless existence.

Shall we Give the Birds a Chance or not.

There are many people who believe that reckless and uncontrolled bird slaughter is one of the chief causes of the enormous losses suffered every year through insect ravages and the overwhelming spread of weed pests. De Montaigne, over three hundred years years ago, said, "Let us a little permit Nature to take her own way; she better understands her own affairs than we." In the wanton destruction of birds and small wild animals, the laying waste of forests and other interferences that modify and obstruct the operations of Nature, thoughtful observers have long discerned the presage of evil days to come. These apprehensions are no longer limited to a few but are becoming widespread.

At the same time it must be confessed that the commercial orchardist may well be excused if he fails to recognize the beauty or, at all events, the equity of Nature's adjustments. The philosophic calm of bygone centuries is somewhat out of place perhaps in these bristling days. The whole system of fruitgrowing is now more or less artificial and the one touch of Nature which bird lovers advocate does not in practice appear to be a very workable proposition. It is not everyone who can regard the bird versus fruit situation with the same cheerful tolerance that a Hills cherry grower expressed, who, when on finding his trees half stripped, merely remarked, "It's all right, they keep the fruit down but the prices up."

It is of course different with the suburban fruit grower, and in this case most people's sympathies will be with the birds. The man who grows a few cases for family use, does not as a rule spray, and is in himself something of a pest to his neighbours, so as long as the birds do the work, or some of it, which he leaves undone, he has very little cause to grumble. In any case he can always protect his fruit and often does. He is not usually as broad minded as an English amateur fruit grower, who wrote to "The Garden," as follows :—"The correspondence respecting sparrows is an illustcation of the curious disposition people exhibit of desiring to interfere with the ordinary course of Nature. I live on the side of a river and grow fruit, I live in an atmosphere of birds, but I preserve my fruit. I had a gardener once who set to work shooting birds because an army of tits stripped a cherry tree of its buds in a single morning. I stopped him and explained that no amount of shooting would mend matters. You must protect the fruit and encourage the birds to do their office of protecting the trees from grubs. The water brings the birds, and I feed them on the principle that when birds cease to be hungry they cease to be mischievous. I have blackbirds, thrushes, the whole finch tribe, the wagtail and innumerable sparrows. The thrushes clear my lawn of worms. I have not a slug in the whole place, and the fruit flourishes because the birds do their office, and I protect the fruit. It is far easier to protect than to shoot, and while protection is effectual, shooting is ridiculous. Blackbirds and thrushes like Strawberries, and Strawberries I protect by erecting over the entire bed a tent of netting 6 feet high. Once arranged it is good for years. Pears I protect with bags made of mosquito net. When properly grown Pears cluster, and a bag may enclose half a dozen. No birds touch them; the fruit is the more delicate in the result; and the string of the bag being passed over a neighbouring twig, if the ripe fruit falls it hangs in the bag. Those who know nothing about it, and want to shoot sparrows, exclaim, "What a cost and what labour!" Nothing of the kind; a few shillings and a few hours, and the bags last for years.

Another correspondent takes a different view of the question, especially with regard to the sparrow, for he writes:—Though it is a moot point whether or not the sparrow always deserves the hard things that are said about him, we own that he is a rascal, a thief, that he actually beats his wife, indulges in unseemly brawls and revels in ripe fruit orchards and newly sown gardens. But his master passion is a love for those very insects that do more harm than the whole bird creation, and as his appetite (especially that of the young brood) is a voracious one, he destroys great numbers of these pests. Still he is a pest," and adds, "we caught over 2,000 sparrows and finches in a very short time. Make a feeding place by spreading some chaff and grain on the spot where it is intended placing the trap behind some bush fence or wall. In a day or two place the trap in position; allow the birds to pick up grain undisturbed for a day or two before putting it into use the cord being attached to the top of the stick and long enough to reach the fence or wall as the case may be. By giving a slight jerk at the cord you set off the trap. I have often caught as many as fifty birds and more, in one haul."

The following account of another method, except for a possible objection on temperance grounds, seems almost as effective. Steep a few handfuls of wheat in sweetened Brandy and strew it about. It is recorded that when the sparrows found the dosed wheat they thought they had got to a picnic, and so they had; but in 15 or 20 minutes they were the tipsiest lot of sparrows ever seen. They rolled about the ground falling on their sides and backs, and kicking their heels in the air, all the while uttering the most comical squeals. Their squeaking did not last long for the boys gathered them up and threw them into bags, gathering in the first day two bushels of inebriated sparrows. Three or four days later the experiment was repeated with almost equal success and from time to time afterwards till the sparrows finally tabooed the plantation. Poisoned wheat would, after all, be quite as effective, though less amusing perhaps; a poisoned sparrow has no use for comical squeals.

Manuring Fruit Trees.

According to experiments carried out by the Cornell Experiment Station in America, a crop amounting to 125 bushels of apples removes in the fruit and leaves alone on the average of 20 years, 94¼ lbs. Potash, 15½ lbs. Phosphoric acid, and 66¾ lbs. Nitrogen per acre per annum. It is shown by comparison that apples remove three times as much potash, twice as much nitrogen, and half as much again of phosphoric acid as is removed in an average crop of wheat yielding 15 bushels of grain to the acre. It will thus be seen that the apple crop is a very exhausting one, which removes large amounts of plant food from the soil, and these must somehow or other be replaced if the orchard is to continue productive and profitable.

The fertilisers employed by the apple grower are various kinds of bone dust and other organic manures. How much potash, phosphoric acid and nitrogen do manures of this class contain? It is now almost popular knowledge that bone dust contains only a very small percentage of nitrogen and a somewhat higher amount of phosphoric acid, to particularise, about 3 per cent. nitrogen and about 22 per cent. of phosphoric acid. A man therefore who applies 6 cwts. bone dust per acre gives about 20 lbs. of nitrogen and 145 lbs. of phosphoric acid. This, it will be noticed, supplies the last mentioned ingredient, and actually returns no potash whatever, the ingredient which is removed in largest quantity. This is obviously not rational manuring. All three ingredients are essential, and all three perform important functions in the plant. The nitrogen is of special importance for the production of healthy foliage. Phosphoric acid, among other things, is of importance in the setting and ripening of the fruit, while potash is essential to 'the production of healthy active foliage, and exerts paramount influence on all that speaks for quality in the produce, size, colour, flavour and aroma.

How, then, may we best supply these ingredients?

Firstly, in regard to the nitrogen, which is by far the most costly; there can be no doubt that the method of green manuring is the most economical and satisfactory. All the most successful fruit-growers are now adopting the practice of sowing in their orchards some leguminous plant—grey peas and tares are specially suitable—and ploughing it under for green manure. By this means not only is the expensive nitrogen obtained at a minimum cost, but the supply of humus in the soil is maintained, and this is of the very first importance for the conservation of moisture in the soil and the preservation of a proper degree of porosity. The writer has frequently heard growers and experts assert that they had obtained better results from green manure than from bones, etc., and that this should be so is easily understood, but in order to obtain the very best results from green manure it is necessary to manure the green manure plant. The plants grown for green manure are, or ought to be, legumes, i.e., plants of the bean and pea family, which, by the help of the bacteria in their root nodules, are able to derive the nitrogen they require from the free nitrogen of the atmosphere. But they are, like all other plants, dependent upon the soil for the potash and phosphoric acid, which are to them no less essential than to all other plants. This is a point too often lost sight of, and it is a fact no grower should forget, that if the soil be deficient in either potash or phosphoric acid, a full crop of the green manure plant cannot be grown.

— Experiments. —

An experiment some years ago showed this, and the greatly increased growth on the plot manured with muriate of potash and superphosphate is the more astonishing when it is remembered that the rainfall throughout the period of growth was small.

In this instance the crop grown was cow-peas, but perhaps the most generally useful plants are grey peas (sown mixed with oats for preference) and tares. These have the advantage that they are hardy enough to be sown in early autumn, they attain a good autumn and winter growth, and can be ploughed in in spring, thus leaving the land clear during the dry summer months, and so conserving every available drop of moisture for the benefit of the fruit trees.

Of course, when a green manure crop is manured and grown in the manner above suggested, there is

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Improved Orchard Harness.

It is during the next few months, when spring and summer cultivation work will be the order of the day, that the unsuitability of ordinary harness for orchard purposes will be most forcibly brought before the notice of fruit growers.

Everyone in a general sort of way recognises that a great deal of damage is done each season by the teams, but to really get a grip of the position it is necessary to carefully note the amount of wood destroyed or damaged in once going over the orchard, and then multiply it by the number of times the cultivator is run over the land. It is quite obvious that one cannot pick the same fruit twice over, and, in other words, if one picks it (or, to be more exact, hooks off the fruit-bearing wood) with harness or swingle bars in September it won't be there when the pickers come round, later in the season.

It was probably this aspect of the case which led Messrs. Wicks Bros., of Balhannah, and who are recognised as leading occhardists of our State, to consult Messrs. Holden & Frost, of Grenfell Street, regarding the improvements which they considered necessary for cultivation purposes in the orchard. We may mention that Messrs. Holden & Frost have been very successful in producing a first class substitute for the present-day unsuitable harness and swingletrees, which have hitherto been the cause of a great deal of exasperation on the part of the orchard owner. We have no hesitation in stating that the "Orchard" harness as manufactured by Messrs. Holden and Frost will prove extremely beneficial, and a boon to the fruit grower, who in turn will appreciate the efforts put forth by them.

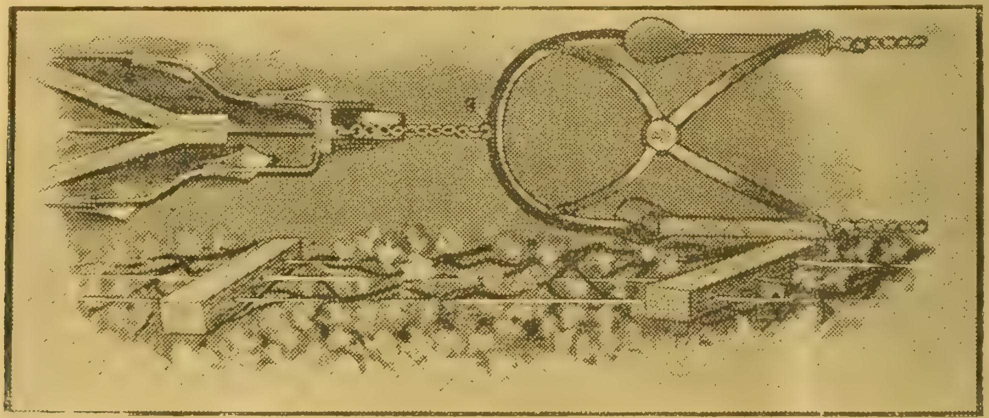
The following interesting testimonial has been handed us, having reference to "Orchard" harness, which we are pleased to publish for the benefit of our readers:—

Renmark,
July 11th, 1913.

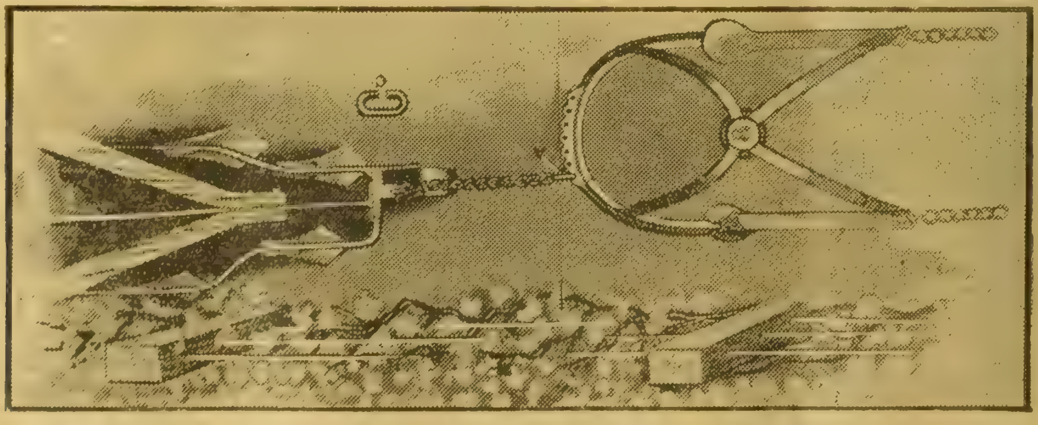
Messrs. Holden & Frost,
Adelaide.

Dear Sirs.—We must express our regret that we did not report before. Mr. Basey is visiting Adelaide shortly, and intended to make an early call upon your good selves. However, we have now decided to forward you a few lines concerning the harness.

We tried the new pattern as soon as it came to hand, and are pleased to be able to tell you that we regard it as A COMPLETE SUCCESS. By adjusting the draught on the bow we found the swing-out of the latter entirely done away with. As far as we could see the "one-sided" draught had no ill effect whatever on the



Original Patented Orchard Harness, with draught in the centre, showing horse working near to the trees and implement not close enough.



Improved Patented Orchard Harness with movable draught, showing horse working quite free of trees or vines and cultivator quite close up to the roots or trellis.

horse. At the same time we should like you to understand that we only had a trial run—we shall not be doing this work in earnest until the spring. But meantime we feel no hesitation in advising you to adopt the new pattern.

We don't think there is much to add to what we have now reported, nevertheless Mr. Basey will do himself the pleasure of calling upon you.

With kind regards and congratulating you upon the simple, yet effective device which has so decidly improved the orchard harness.—We are, Dear Sirs,

Yours truly,

BASIE & HOWIE.

P.S.—Think that the range of draught is ample; we had the S hook in the hole next the outside one and don't think we should ever need to go further out (i.e., to the outside hole).

To the fruitgrower who is still doing unnecessary damage to his trees we may be excused for suggesting that he would be wise to compare the cost of a set of "Orchard" harness with the value of the fruit which, under his present conditions of working he unavoidably destroys. The "Orchard" harness has been patented by Messrs. Holden & Frost.

12 Dont's for the Orchard !

Don't forget to scrape the stems and limbs of all pear, apple, and quince trees, to prevent codlin moth breeding.

Don't forget it will soon be time to spray; have a look at the pump on a wet day.

Don't waste time and spray on old useless trees, spraying mixture and labor are too dear nowadays.

Don't forget to keep the ground well worked in the orchard.

Don't think that an orchard can grow a crop of hay (or other crop) as well as apples; it won't.

Don't let the orchard look like a forest, prune it and plow it, and keep it tidy.

Don't forget that that a well kept orchard improves the look of a place.

Don't forget to danage the stems between October and November for caterpillars.

Don't forget to get hold of the best recipe for a spray before it is time to spray.

Don't miss the first good day to spray, after the blossoms fall.

Don't forget the second spray about ten days later, and a 3rd spraying four weeks after.

Don't forget the mixture: Not less than 1lb. of arsenate of lead to 20 gallons of water; and finish pruning first.

(Continued from page 161).

not the same necessity to apply manures directly to the trees. This is, however, the almost universal practice, and that there is a right as well as a wrong way of doing this has been proved by experiment times out of number.

This experiment was carried out in a block of trees of a cooking variety of apples known as "Beauty of Auradell." The soil is a sandy loam of good depth, and so far as careful inspection will show seems to be very uniform throughout the block. The trees are uniform in size, healthy, and fifteen years old. Previous to the commencement of the experiment in 1904 they had received an occasional dressing of bone dust, and had yielded good average crops. In the spring of that year the block was divided into three lots, each containing 28 trees, and the various plots were treated as follows :—

— Plots. —

Plot 1.—Unmanured.

Plot 2.—2 lbs. bone dust, 1 lb. superphosphate per tree.

Plot 3.—1lb. sulphate of potash, 2 lbs. bonedust, 1 lb. superphosphate per tree.

In season 1905-6 the manures were applied uniformly over the whole area on the 11th August, and were immediately brought under by ploughing between the rows and by hoeing round the trees.

Next year, partly because the manures were applied somewhat late, and partly on account of the extremely dry and unfavorable season, no definite results were obtained. In the following season remarkable results were obtained.

The exact yields were as follows :—

Plot 1 gave 175 bushels 1st grade and 37 bushels 2nd grade fruit per acre.

Plot 2 gave 300 bushels 1st grade and 75 bushels 2nd grade fruit per acre.

Plot 3 gave 600 bushels 1st grade and 37 bushels 2nd grade fruit per acre.

— A Question of Figures. —

It is seen from these figures that, taking the first grade fruit into consideration, the increase per acre produced by the addition of 1 lb. sulphate of potash per tree to the mixture of bone dust and superphosphate, amounted to 300 bushels of apples. This is an increase which would at almost any prices show a good return for the money spent on manure, and at the price now ruling for fruit cannot be regarded other than as profitable in the highest degree, when one considers that it was obtained for an outlay of 13/6 per acre per annum. Further, the results of this experiment afford an additional proof that potash not only increases the yield, but also improves the quality of the fruit. The fruit from the potash plot contained exactly half as many second-grade apples as that from the plot without potash, and this although the total yield from potash was nearly twice as great as from the other.

— Sulphate of Potash. —

Attention has been repeatedly called to the importance of applying manures which return to the soil the ingredients removed in the crop sold off the farm or orchard. No more striking illustration of the truth of this argument could well be found than that afforded by the experiment here reported. It has been pointed out that apples remove large quantities of potash from the soil. Bone dust and superphosphate, either alone or in combination, contain no potash, and no application of these manures, however heavy, can possibly make up for a deficiency of potash in the soil. It is evident from the results of this experiment, that the trees lacked potash badly, and this is no exceptional condition in the orchards of Australia. It is no use applying bone dust and superphosphate alone to soil deficient in potash unless these manures be supplemented by others supplying that important ingredient, and orchardists who have not yet tried the addition of sulphate of potash to the fertilisers usually applied, should not fail to do so. Apply to trees in full bearing with the other fertilisers as a top-dressing over the whole area of the orchard, and brought under by a light hoeing immediately after application. From 1 lb. to 2 lbs. per tree in bearing, according to age and size, is the correct quality of sulphate of potash.

Canning and Drying Fruit.

Every fruit grower who supplies fruit to the market, whether he has one or one hundred acres under fruit trees, should very carefully consider the matter of co-operative canning, drying, and preserving fruit by various other methods, for in this co-operative work lies the surest hope for the prosperity of the individual, and the progress of the industry. A good deal has been done in recent years but there is room and opportunity and soon may be urgent necessity for greatly extended work in this direction. Every fruitgrower should support existing associations where possible or actively assist any movement in this direction in his own district.

The advantages of co-operation may be briefly summed up as—

1. A large establishment with a large output would justify the engagement of a thoroughly qualified

manager at a good salary. This would protect the interests of the growers by insuring that the finished article would be properly graded in size and quality, carefully prepared, and finished in a neat and attractive manner.

2. The handling of a large quantity of fruit would justify the purchase of the necessary machin- for the manufacture of the tins required, thus effecting a saving that would considerably enhance the profits.

3. In disposing of the crop of one season and preparing for that of another there would always be sufficient work to occupy a number of men, insuring the constant employment of a trained staff for the principal operations.

4. There would be no difficulty in securing the necessary labour for preparing the fruit for the tins during the canning season.

5. The fruit systematically graded and of one brand, would be marketed in sufficient quantity to attract commercial notice, and furnish a constant supply.

On the other hand, small concerns could neither afford to give permanent employment to a qualified manager; nor to put in the best modern labour-saving machinery; neither would they be justified in purchasing machinery for the manufacture of tins for a comparatively small output. It would be impossible to keep a trained staff from season to season; and during the summer months, when all hands are engaged in gathering the crop, the necessary labour for preparing the fruit for preserving in the factory would not be available, except at such high wages as would materially affect the profits. Under such conditions a number of different grades of fruit under different brands, each of comparatively small quantity, would be placed on the market, possibly in competition one with another, and neither of sufficient bulk to command attention.

— Some Advantages of Growing Canning Fruits. —

The grower of suitable varieties of good size and equality is independent of the fluctuating fresh-fruit market.

A perishable crop that must otherwise be disposed of immediately in the local markets is converted into a product that can be conveyed to any part of the world.

The fluctuation of prices is so trifling that the grower is practically assured of profitable returns.

The grower can extend operations with confidence, knowing that if he selects the best canning varieties his annual crop will be preserved in a profitable, marketable form.

The establishing of co-operative preserving factories will tend to bring about a co-operation among growers in every branch of the industry, and enable them, by providing another means of disposing of their crop, to regulate the selling price of their fruit in the local markets at a price profitable to themselves.

Canning would do much to establish the industry on sound business lines, enabling growers to systematize the working of their orchards by devoting their attention to some special class or classes, and endeavouring to produce the best fruit of each class.

Orchards would not contain all the different classes of fruits and a large number of each class; but with one or two classes of fruits, and perhaps three or four varieties of each class, growers would be able to devote far more attention to the study of their trees, the diseases, insect or fungoid, to which they may be subject, spraying when necessary, and thus maintaining clean, healthy trees, producing fruit of high quality.

— Some Disadvantages of Growing Dessert Fruits Only. —

To consider the other side of the question—i.e., where all growers are supplying the dessert-fruit market:—

Each grower is necessarily working for his own interests alone, in keen competition with his neighbours and friends, endeavouring to market his fruit a few days earlier, to secure fresh untouched markets, to plant a fruit that is earlier in ripening or more attractive in appearance, so that he may secure the best prices; in fact, trying to make fruit-growing pay by work that is largely experimental and speculative.

Orchards are planted with all classes of fruits, and a large number of varieties of each class, entailing constant labour during the summer months in picking, packing, and shipping alone; anxiety in endeavouring to secure markets that will give profitable returns, often followed by disappointment when good fruit, carefully picked and packed, reaches a glutted market and returns little or no profit.

Ostrich Farming

Ostrich farming has been more or less seriously considered in Australia for a number of years, and there are throughout the Commonwealth several farms on which ostriches are bred in fairly large numbers. Port Augusta and Poltalloch in this State being well known. It is, however, only in South Africa that the industry has really taken hold, and its value to that country greatly exceeds that of any other industry. In the United States there are many large concerns, but the quality of the birds and their product are said to be somewhat inferior. In Europe there is at least one farm of this description. It is situated near Hamburgh, and the quality of the birds bred there is said to be very fine.

Very glowing accounts of the fat profits to be made go the rounds from time to time, but some at least of the figures sometimes published might not be any the worse for a little pruning. Without going to extremes, however, there seems to be abundant evidence that very good returns are obtained by the majority of those who take to the business.

In a recent issue of the Agricultural Gazette of New South Wales, Mr. T. J. Herbert, Advisory Expert in Ostrich Farming, publishes an interesting account of what has and is being done. He writes—

" For a number of years ostrich farming was confined to the Cape Colony, with the exception of an attempt by the French to establish it in Algiers. Later on, people of other countries began to turn their attention to the ostrich, and a number of birds were taken to North and South America, India, and Australia. The Cape farmers became alarmed at the prospect of much competition from outside, and a Bill was introduced and passed by the Cape Parliament, imposing an export duty of £100 on each ostrich taken from the Colony, and £10 on each egg, which has since been amended to " total prohibition of ostriches and their eggs from the Cape." This afterwards became law throughout the South African Union States, and spread from there to German West Africa and the Portuguese territory of Mozambique.

Several shipments of birds have from time to time been imported into Australia. In 1873 the Melbourne Acclimatization Society imported some; and later, in 1881, Mr. W. Malcolm set about establishing ostrich farming in South Australia, and imported a number of birds. A farm was started at Gawler, and a large number of young ostriches were successfully hatched and reared. About this time an Act was passed by the South Australian Government, with a view to encouraging the industty, by offering the fee-simple of 5,000 acres of land to the party who first placed 250 ostriches over one year old upon the land. Mr. Malcom's venture was formed into a company, and ultimately the required number of ostriches was reared and placed upon the land near Port Augusta. The conditions of the Act being complied with, the fee-simple of the 5,000 acres was granted by the Government.

The country in the neighbourhood of Port Augusta, with an annual average rainfall of only 9 inches, must be classed as inferior pastoral land. Yet the birds have thriven, and a flock of 700 birds is now pasturing on the farm without any artificial feeding, except the chicks. These are fed, until they are a few months old, on lucerne and bran. One and a half acres of lucerne are grown on the farm, watered from the town water supply. The farm is greatly handicapped by not being able to produce more green fodder, otherwise a greater number of chicks could be reared.

Mr. W. H. Williams, the present manager of the company, came from South Africa with his parents when five years old. His father, the late Mr. Thomas Williams, served his apprenticeship to Mr. A. Douglas, the pioneer of ostrich farming in South Africa, a high premium being demanded in those days to learn the management of ostriches. The company secured Mr. Williams' services, and he came out under contract to take the management of their farm at Port Augusta. The knowledge of the father became instilled in the son, who afterwards became manager.

Mr. Williams, like many other breeders of ostriches, prefers letting the birds do part of the incubating of the eggs, removing them after the birds have been sitting from two to three weeks, and placing them to an incubator. Four Cyphers machines of 40-egg acpacity are in use.

Birds from this farm were, with one or two exceptions, the origin of all the ostriches now pasturing on the various facms throughout the Commonwealth.

To make a test as to what extent lucerne feeding will improve the plumage of ostriches, Mr. Williams sent eight birds to Melrose, to be grazed in a lucerne paddock. The feathers were clipped and sent to a Melbourne manufacturer, realising £7 per clip each, more than double the amount realised from the same birds when grazed on the scantily grassed paddocks at Port Augusta, thus affording a good object lesson to the man who can grow lucerne for this purpose.

The executors of the late T. R. and S. Bowman have a flock of 400 birds running on their station near Lake Alexandrina, the nucleus of which came from the farm at Port Augusta.

Ostrich farming in New South Wales to-day can be considered well beyond the experimental stage. For a number of years the industry comprised only a few birds owned by Mr. J. Barraclough, of South Head, near Sydney. Under adverse circumstances these birds throve well, and in a few years Mr. Barracluff had over 100 head, but owing to the limited area of the farm little expansion of the flock was possible. The feathers are made up and sold on the farm, and realise good prices.

In 1900, a pair of ostriches was placed at the Hawkesbury Agricultural College, and they and they progeny have been the admiration of the thousands of visitors to that institution ever since. The feathers have always found a good market; and a few years ago an exhibit was sent from the College to the Franco-British Exhibition and was awarded a Gold Medal. This is proof enough that even on the indifferent land of the College farm the birds will thrive and furnish remunerative returns.

A flock of twenty-four adult birds, the progeny of the College stock, was taken to Queensland, where attention is now being paid to the subject of ostrich raising.

In 1905, Captain J. E. Cairns, now of Nardoo, 17 miles from Coonamble, started ostrich farming with a partner, Mr. R. B. Sanderson, at Gilgandra. The beginning was made with six pairs of birds purchased from the South Australian Ostrich Company. In 1907, when the flock had increased to sixty-seven birds, they were removed to Coonamble. The ostriches now number 550, and the aim is to still further increase them.

The farm comprises 7,500 acres, of which 2,500 are devoted to ostriches and the balance to sheep. Captain Cairns intimates that he receives a greater net profit from the ostriches than from the sheep, though the area occupied by the latter is double the size, and the returns from the ostriches are on account of sales of feathers only. No birds have been sold from Nardoo, as the number has not yet reached the total to be kept. It can thus be seen that this industry is capable of increasing the value of the production of our great western lands.

An artesian bore provides abundance of water. The country consists largely of dark sandy loam, with belts of timber and some "black soil" plains. It is known as "herbage" country, and carries very little grass. The chief winter pasture plants are crowsfoot, trefoil, wild carrot, parsnip, and a plant known locally as lamb's tongue. In summar, tar vine, bull vine, and salt weed are plentiful. This "herbage" country always keeps stock in condition even when there is no feed observable to the untrained eye. At Coonamble Captain Cairnes was not compelled to hand-feed his ostriches at any time, not even during the drought of last year, until a fortnight before the drought broke.

It is roughly estimated that land will support three times as many sheep as ostriches. This country is considered capable of carrying a sheep to 2 acres; thus on 600 acres 100 ostriches can be maintained without difficulty, running on natural pasture alone. But to grow fodder for the birds will certainly enhance the returns, not only by increasing the carrying capacity of the land, but also by giving a better quality of feather, and a greater increase of chicks. Lucerne does very well on the dark loam under irrigation with bore water. This fodder is rich in protein, and its advantages for the production of feathers are indicated by theory and supported by practical experience. Captain Cairnes has 30 to 40 acres under lucerne, on land which appears to be very suitable for the legume. The crop was sown three years ago, and gives a cut about every six weeks in summer.

But Captain Cairnes grows lucerne merely as an insurance against drought. The hay is being stored in a big shed, and will only be used in case of necessity, the ostriches deriving their subsistence from the natural herbage. When lucerne is to be fed it is chaffed, damped, and then mixed with a little bran or maize.

The soil at Nardoo, to all appearances, seems to be free from stones or gravel, yet it is not found necessary to give the birds any grit; the keen eye of the ostrich finds sufficient of this for mastication.

Artificial incubation is practised at Nardoo, but Captain Cairnes is of opinion that natural hatching has some advantages.

At Coonamble the birds begin to lay when from 2½ to 3 years old. Nesting commences about July, and the hatching season runs on to March.

The writer became intereeted in ostrich farming in South Africa in 1902, and remained in that country until 1908, returning then to the Commonwealth thoroughly convinced that Australia is equally as well adapted, if not more so, than South Africa for the raising of ostriches and production of plumes. After making several enquiries as to where ostriches could be obtained—the prohibition embargo had already been placed on the export of ostriches from South Africa,

(Continued on page 170).

Improvement Through Breeding.

In his uncreasing condemnation of markets, prices, dealers, and agents, does the farmer stop to consider often enough, that possibly if his steers had somewhat "shorter" legs they might have brought "longer" priees; that if his pigs had been smoother in flesh covering, finer in bone and nearer the desired size, they might have sold for more money; that if his horses had possessed more muscle, and more good, dense, flinty bone, they would have been capable of doing more work, and consequently have been worth more to the buyer. Many farmers do realise these facts and are striving to improve their live stock as rapidly as possible; others do not.

Live stock improvement can be effected in two ways, the first through breeding; the second through care and feeding. Neither can work great improvement alone, but when combined in the right proportions produce amazing results. The origin of all permanent live stock improvement, however, must be breeding.

The principles of animal breeding and systematic live stock imurovement, is a subject which in centuries gone by has received little or no attention, and during the past two centuries has received attention from a very limited number of men only. However, just at the present time no subject is attracting more study and investigation upon the part of thase interested in modern live stock improvement than this one.

There are two sides of live stock breeding, an extremely scientific and theoretical side, and a very practical side. The practical side is the side concerning the farmer, and, therefore, the side dealt with in this article.

What are the fundamental principles or laws of animal breeding? If we thoroughly understand all of these and could answer this question correctly, the problem of improving our live stock would be an easy one to solve.

Some principals are:—

1. The need of a standard of excellence, or an imaginary ideal type.
2. Continued careful and intelligent selection toward this type.
3. The influence of inbreeding.
4. The value of good feeding.
5. The value of pedigree.

In the improvement of live stock of any description, the first essential qualification of the breeder is that he have a standard of excellence. That is, that he know what a good animal should look like. If he be breeding Clydesdales, he should know what a good Clydesdale horse should look like. If he be breeding Shorthorns he should know what a good animal of the Shorthorn breed should look like. Therefore, the first requisite of the breeder is that he be a good judge. Secondly, the breeder, knowing his ideal, must select constantly and vigorously toward tnat ideal, by mating together animals that conform nearest to that ideal, and particularly discarding everything from his breeding herd that does not conform to that ideal type. It may at first seem that the average breeder cannot afford to do this, but he can afford to do it and must do it, if he is to keep up a reputation as a good breeder and a safe man from whom to buy breeding animals.

There will always be some inferior animals produced in every herd, some that vary so widely from the ideal type that they should be sold to the butcher, and no breeder should attempt to "soak" his fellow breeder by selling him these animals as breeding stock, and above all else he should not "soak" himself by retaining them in his own breeding herd. Get rid of the poor male, get rid of the poor female, and get rid of both as quickly as possible, the quicker the sale the more profitable it will be. The reason why a great many breeders do not get rid of their poor animals is because they do not know how poor they are. They think they are breeding good stock, when, as a matter of fact they are breeding really inferior animals. Therefore, in mating animals, practice vigorous selection.

In his selection towards his ideal type, Robert Bakewell became so enthusiastic and selected so closely animals that resembled each other, that he unavoidably did a great deal of inbreeding or mating of animals which were closely related. He soon observed several valuable rules in this connection. First, that inbreeding increased the rapidity with which the type became fixed; second, that it produced finer quality; third, that it produced early maturity, and fourth, that if continued for too great a length of time, it also produced some evil results, such as loss of size, constitutional weakness, impotency and barrenness. The practice of inbreeding has been of untold value to many of our best breeders of live stock. It has been of value chiefly in the early histories of the breeds during their formation period, in producing a fixity of type more quickly, and by improving quality and increasing early maturity. It has also

Keep the milk-pails, strainer, and other utensils clean if you expect to produce good milk.

worked injury and loss to many breeds and breeders by being practiced to too great an extent, and producing constitutional weakness. After the type has been well fixed in a breed, inbreeding should not be practiced except on rare occasions, and then only as a means of reproducing some very desirable characteristic found in two animals that are related, and then should not be practiced unless both animals possess kery strong constitutions.

Another important factor influencing to a certain extent the rapidity and certainty of improvement in the herd is pedigree. The value of a pedigree is based upon the idea that like produces like, by knowing what the ancestors of an animal have been like some idea may be gained as to what the offspring may be like. Too many inexperienced breeders get the idea that all pedigrees are of the same value, and, so long as they have a record of the name of the ancestors bearing the seal of a record association, they think they have a guarantee of individual merit in the animal. It is not the mere tabulation of a list of the ancestors of an animal that gives a pedigree its value, but the merit and quality of the animals in the pedigree. A poor pedigree will lower the value of a good individual as much as a good pedigree will raise the value of the same individual. In selecting animals for the breeding herd, some men lay too much emphasis upon pedigree, and others lay not enough. Pedigree should be given due attention, yet individual merit should be the determining factor as to whether an animal is to be purchased or not.

Colic in Horses

It is not often that horses which are lying out are attacked by colic, but occasionally, when there is not much food for them to consume and they drink large quantities of icy cold water, they may suffer from it. Un.ortunately, as the attack usually comes on suddenly, there may be nobody about to attend to the sufferer, but there is no mistaking the symptoms of colic, as the horse will usually lie down and roll, whilst very often he will try and reach his belly with his hind feet in order to reduce the pain by kicking. The best emergency treatment is a good stiff dose of warm whisky, or any other spirit and water ; but most farmers possess a store of colic cures, and if they do not they should do so. Inflammation of the bowels is a far more serious affair, and requires professional treatment. It usually shows itself by quick breathing, shivers, and signs which show that the belly is painful. As the discomforts increase, the horse becomes more restless and sometimes screams in its pain. Pending the arrival of the veterinary surgeon, hot fomentations may be applied to the belly, and these usually ease the pain, though not invariably so, in which case they should be discontinued. A dose from one to two ounces of tincture of opium, according to the size and age of the patient, may also be given in cases of emergency.

Why is It?

Two cows stand side by side. To both the same ration is fed, yet one will extract from that food as much again butter fat as the other. The butter product of the food is 100 per cent. greater with one cow than the other. What is the inner quality whereby one cow can produce so much more than the other from the same food? It is hard to find the right name for it, but it may be called "dairy quality." Now certain breeds of cattle are distinguished for this quality. They have the power to accomplish this work in greater proportion and perfection by reason of having been bred to that purpose from long lines of ancestors of like quality. One would think that there would not be a dairy farmer in the land who would not be keenly alive to the necessity and economy of using such cattle for dairy purposes.

But the so-called general-purpose notion has destroyed in not a few men the power to look into this question in an economical way. They seem to be unable to take the same advantage in their choice of cow machinery that they do in choosing their mechanical machinery. They cannot be fooled into taking a plough for a cultivator, yet thousands of farmers will spend their lives in trying to make cows of beef-breeding do dairy work. If they were close students of "cause and effect" they would not be beguiled this way.

Why should not the farmer be a close student of cause and effect.—Hoard's Dairyman.

Remember, and never forget, the moment a colt rears, slacken the rope, loosen his head ; then there is little danger of his throwing himself. Many a colt has been injured for life by rearing and going over backwards.

Just down by the stream where the bracken grows she placed her easel and sat by it, sketching from nature. "Please, ma'am, is that me you're drawing milking that cow in the pasture?" "Why, yes, my little man, but I didn't know you were looking." "Cos if that's me," continued the boy, unmindful of the artist's confusion, "you-ve put me on the wrong side of the cow and I'll get kicked over."—Credit Lost.

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otherwise an effort would have been made to bring a few birds from there—he decided upon a purchase from the South Australian Australian Ostrich Company of Port Augusta, where nine birds (four cocks and five hens) from 2 to 3 years old were secured, and transported by train to Temora, where some land had previously been purchased. The locality was not considered the most suitable part of the State for an industry of this kind, but the price of land was tempting at that time. The ostrich industry here was coupled with wheat-growing, and sometimes a few sheep were run with the birds, which it was found all worked well together.

The birds could be turned on the forward crops in the winter, and run until the middle of the spring, and do well also in the stubble paddocks after harvest. The property at Temora was disposed of last year, and the birds removed to the Yanco Irrigation Area. The prssent farm consists of 408 acres, of which 108 are irrigable. It is intended to lay all this down with lucerne. One paddock of 12 acres was sown wieh rape in the spring, and carried forty-five ostriches right through the summer. This fodder is well suited for rearing young birds, and is to be pre.erred to lucerne for very young chicks. The flock at Yanco now numbers ninety birds.

Last year twelve Soudanese ostriches were imported from North Africa and brought to the Yanco Experiment Farm, where they are being mated with a South African strain purchased in South Australia.

— Management of Ostriches. —

The ostrich reaches maturity at 4 years of age, although they often breed, as stated, at the age of 2½ and 3 years. They will continue breeding to a great age; in fact, the older they are the more steadily do they sit, and hatch out a larger percentage of chicks. The age to which an ostrich lives has not been fully determined. Some scientists maintain that this bird lives to the age of 100 years, though others have put it as low as 40 years.

Breeding birds are generally confined in small paddocks from 1 acre upwards, according to its carrying capacity. The larger the area is, the better, if no provision is made for feeding on lucerne or other artificial grasses.

In fair-sized paddocks they will lay and hatch out their chicks without any artificial feeding except in winter or in dry seasons, when a little grain, such as maize, wheat, or barley, should be given —3 lbs. of either of these, if fed daily, will keep them in good condition. A pair of birds is usually put in each paddock, though two or three hens may be run with one cock, and an increased number of chicks obtained, but in this case it will be necessary to have an incubator, as more eggs will be laid than can be covered. The hen does not sit at night time. The cock bird takes charge of the nest from about an hour before sunset and remains sitting until the hen returns the next dayo, which is usually from about 8 to 9 a.m., according to the temperature. If the day be cold she will be later; if warm, earlier. If it should be raining, the cock will sit right throughout the day without leaving the nest.

The best position for the paddocks is where there are no public roads near, and where the birds can remain undisturbed as far as possible. When they commence pairing the cock becomes vicious, and on entering the paddock it is well to be armed with a good strong stick to keep him off. The most suitable weapon for the work is a polo stick—Indian cane; it is light and can be used on horseback or on foot. If the bird should make a rush, give him a smack on the neck. It will probably knock him down; but it will not be required to be done very often, as he will soon learn who is his master.

The nest is generally found in the open, and if made in a spot where it is likely to be swamped during heavy rain, the eggs should be taken out and the level of the nest raised, so that the water from the surrounding ground may not flow into it. A shallow trench dug 'round the nest will effectually prevent this, and the birds often throw up this protection round the nest themselves. They generally lay from twelve to fifteen eggs before they begin to sit, and in a favourable season lay two or three hatchings. The period of incubation is forty to forty-two days, though during artificial incubation, when temperatures are run above normal, they will hatch out in thirty-eight days. The date the birds begin to sit should be noted, in order that the time when the chicks appear may be known, as sometimes they will leave the nest before the hatch is quite complete, going off with what chicks they have out. The remaining eggs, in the absence of an incubator, should be brought away and placed between several thicknesses of blanket or feather pillows, when they will generally hatch out successfully. The chicks after being kept warm for a couple of days, can be returned to the remainder of the brood with the parent birds, if they are not to be brought up by hand. The subject of rearing will be dealt with later.

Where a number of birds of mature age is kept in large paddocks it is necessary to keep a good lookout for the nest, as if the chicks hatch out and get a week or two old before they are found, it is rather a difficult matter to catch them. If allowed to grow up with the old birds, they become very wild and, consequently are much harder to manage than birds that have been reared about the house. The best plan to adopt is to allow the birds to sit about three weeks on the eggs, then bring them to an incubator, where they can be finished off equally as well as though the birds were sitting on the nest; thus the birds do not get run down by a long sitting of six weeks, and soon set about getting another nest ready.

— Artificial Incubation. —

Much has been written and said regarding artificial incubation from time to time. This is not generally practised by ostrich farmers in South Africa, as they much prefer to leave it to the birds. It is in the early period, during incubation, that the greatest risk is run. Variations of temperature, too much or insufficient ventilation, and moisture, all play their part on the health of the embryo, which is is but a few hours or day old inside the shell. The temperature can be measured, but the other elements—ventilation and moisture—are not so easy to control. Atmospheric disturbances also have an influence somewhat difficult to define. If the chicks can be given a good start, the hatch will most probably be a success.

To the breeder of ostrichs an incubator is an article which cannot well be dispensed with, as sometimes with young breeding birds the cock will occasionally refuse to sit, and if no incubator be at hand the nest of eggs will be useless. Sometimes, during severe weather, birds, when sitting on nests located in low-lying ground, will get swamped, and the eggs should be removed to an incubator. By the use of the machine, as compared with the natural process, a greater number of eggs can be obtained by taking them away as soon as they are laid, and keeping three or four dummies in their place. They will sometimes lay as many as forty eggs without stopping, then commence sitting. It is not advisable to force the birds laying in this manner too much, as weakly chicks will be the result. A far better plan is to let the birds lay a nest of eggs, and allow them to sit on them for three weeks, then place them in the incubators. Ostrich eggs will hatch out at various temperatures; the minimum I have known to hatch out at is 98 degrees, and the maximum 103 degrees. The best results I have obtained have been from hatches that were started at 98 degrees, and increased at the rate of 1 degree every six days, until a maximum of 101 is reached, and maintain that temperature until the hatch is completed. The eggs should be turned twice a day, night and morning, and ventilated for five minutes in the first three weeks, and for ten minutes in the second half of the incubating period. The progress of incubation can always be ascertained by holding the egg against a strong light in a darkened room. At about nine days a dark spot will be noticed, and this will gradually extend until about the twentieth day the egg becomes perfectly opaque, with the exception of the air space at one end. When properly incubated the air-space should be clearly defined by a dense, perfectly opaque outline. If semi-transparent below the line the egg is not likely to be good. A day or two before hatching, that is about the thirty-ninth day, the chick will be observed to fall in the shell, the air-space becoming considerably enlarged. It will soon rise again until the egg is quite full. When at this stage it should be marked; and if in twenty-four hours the chick has not broken the shell, it should be released by cracking it at the air-space end and breaking away some of the shell.

— Rearing the Chicks. —

When hatched in an incubator, remove all broken shells and leave the chicks in the drawer until next day, when they should put out in the sunshine, unless it is very hot, in which case the shade would be better. A small space should be enclosed with boards to keep them from roaming about, and plenty of gravel supplied them, so that they may peck at a little of it. Return them to the incubator at night for the first week. After that place them in a box with an empty sack at the bottom, and place another sack over the top of the box, leaving a small opening as access for fresh air. On the fourth day they will begin eating any soft green food, such as lucerne, rape, cabbage, etc., and will require a plentiful supply of bones crushed small. If the weather is wet or very cold they should be kept in a light room. After the first week they can be taken out by a boy, where there is any picking of the natural herbage, and if this is plentiful they will require no artificial feeding. A little grain such as barley, wheat, or crushed maize may be beneficial if fed to them when brought in of an evening. After the first month they can be housed in a warm shed, and at three months old left out in the paddock, unless the weather be wet and cold, when they should be put in the shed at night.

Young ostriches hatched in the natural way are sometimes left with the parent birds. This practice has little to commend it, as the birds when grown up are much harder to handle than birds that are taken away and artificially reared.

The age of the birds can be determined as follows:—At seven months old the first crop of feathers will be quite ripe—that is, the drab feathers can be pulled out without bleeding, and the long white or quill feathers can be cut. At twelve months the second crop of feathers will be well forward, and some of the cocks begin to get their black plumage, and show white on the front of the legs and along the edge of the beak. At two years old the cocks will be quite black, none of the narrow-pointed chicken feathers being visible except where the neck joins the body; the hens will similarly have lost all their chicken feathers, which will be replaced by drab.

Planting Trees on the Farm.

In the Victorian "Journal of Agriculture," Mr. A. Tatham gives some hints on practical sylviculture, from which we extract the following :—

— Planting with Balls of Earth or from Pots. —

A hole is usually cut, and this must be larger than the ball of earth attached to the plant. To ensure uniformity a special spade is, as a rule, used, which enables the nurseryman to lift each plant with the same size ball of earth. The spade is circular, with one side open ; it is also slightly conical. An excellent transplanter can be constructed from an ordinary one-pound jam tin. When lifted the plant should be placed in the hole at the same depth as it is growing in the nursery, and great care should be taken to press the earth well all round the ball attached to the plant, for should water get in the hole and lie at its roots it means failure.

— Planting with a Peg. —

This is an excellent system where the ground is free from stones and not too tenacious. It is usually best adopted for putting in plants with long tap roots. The usual method is to use a wooden peg ; this is pushed into the ground, the plant placed in the resulting hole, the peg is then inserted again on one side of the plant, but at a little distance off, and after it is inserted it is pushed towards the plant, thereby causing the earth between it and the plant to be pressed into the space first made by the peg. The roots by this means are firmly pressed, and hold a fairly natural position. This is undoubtedly a cheap and quick method of planting, provided the soil is free, but it is only suited to small plants.

— Notching. —

This system is done in two ways. The first is to make a V-shaped cut in the earth, into which the young plant is inserted, and the earth filled in and pressed down. This V can be cut in two ways, with a notching axe or with a notching spade. The latter is the easier of the two instruments to work. It is shaped like an ordinary spade, but of somewhat stouter build, and at the top is about 2-in. thick. It is driven into the ground similarly to a spade, and worked backwards and forwards till the cut is sufficiently wide. The plant is placed in the cut, and earth pressed in on it. This system of planting is employed in France to a large extent, where small plants are put out. The second method of notching is done with a spade. A cut is made in the ground, and at right angles to it another cut is made, forming the letter T. The spade is put in at the top of the T, and the handle is depressed, the blade is thereby forced upward, and, in doing so, opens the lower portion of the T ; into this opening the plant is placed, the spade withdrawn and the earth pressed down with the feet of the operator. This method is employed in some of the English plantations. It is, however, not considered a satisfactory one ; as, owing to the blade of the spade being in the way, the roots of the plant cannot be put down straight, or, in fact, naturally, unless the plant is a very small one, consequently when the earth is pressing down, as often as not the roots are turned upwards. There is nothing so conducive to utter failure, or, at least, to a serious check to the growing plant, as turning up of the roots.

Good dairy cows can only be assured by breeding sires and dams that have the qualities essential for good milkers.

The Evolution of the Horse.

Whilst all domestic animals have, through the tedious process of evolution, undergone wonderful changes, none of them have attained so great distinction in this respect as the horse. In the bovine of to-day we find a resemblance to the fossil remains of millions of years ago. The same is true with sheep and pig. There are changes in form and in the size of cattle, pigs, sheep, and goats, as well as of the dog, But still in a general way their anatomical structure resembles that which is found in the fossil remains of these animals in the eocene formation of the rocks. But not so with the horse.

It has been determined from fossils, of a reputed age of three and a half millions of years, that his form more nearly resembled that of the cat of the present day, and that his size was little above that of a large fox. A skeleton of this description has been installed in the American Museum of Natural History. Instead of having a one-toed foot with a shell, this specimen is furnished with a five-toed foot, not unlike that of the dog or fox.

Fossil remains of the prehistoric horse have been found in nearly every climate and country on the earth. As the years rolled on, and the conditions of the earth changed, the horse changed with them. At first his life seems to have been passed on the soft, swampy parts of the earth. As these changed to hard soil, and environment itself changed, it became necessary for this animal to have a shell or horn foot, and slowly the five-toed, spongy foot became a single-toed foot. Following on a change in the soil came a change in food, and about one and a half million years later the horse is met with closely resembling a short-eared mule. This was about one and a half million years before Christ.

About half a million years before the Christian era the creature had assumed the form known by scientific investigators as Prejevalski's horse. This animal is believed to have been about twelve hands in height, instead of about eighteen inches, as determined by the earliest fossils. The weight of this twelve-hands horse is supposed to have been about 400 lbs. It is this horse from which, according to general belief, all our present-day breeds and types of horse have sprung, or, rather, have been built up by man's skill in breeding, together with the influence of climate, food, and general environments.

It would seem that prehistoric man utilized the prehistoric horse only as food, or, possibly, used his skin for clothing. This is, however, bare conjecture based on deduction. It also appears that the horse was first used by man—other than possibly for food and clothing—previous to a few thousand years before the days of King Solomon, when he was employed for carrying on warfare. The horse of today in his present form is not the horse originally created. It was left for man as he advanced to create types of horses adapted to his various needs. Of all creatures on earth the horse may rightly be considered the most abnormal; all improved breeds are of recent origin, and their characteristics are not altogether due, as some believe, to heredity.

The ass and the zebra are believed to have had their origin in the original 18-inch cat-like creature, which to some extent had the stripes of the zebra. The wild ass and the zebra have simply been left to shift for themselves, while the other branch of the same genus, which is called the horse, has received particular attention from man, and become his servant and pet. As man has 'developed, so has the horse developed. In countries where there are no horses development in man has not been a predominating feature.

The Arab of the desert developed a horse adapted to his needs; and thus we find the horse all along down through the ages a creature developed to meet the requirements of man. The object in view is the same, whether it be in warfare, tilling the soil, hunting, hauling the carriages of the wealthy, racing or coaching; the horse has been evolved by the needs and whims of man from the original cat-like creature of 18in. high. 'As one calls to mind the little beast of three million years ago, and compares it with the modern Clydesdale, hackney, or racehorse, one might equally well expect the house cat of the period to become in the far-off future a beast the size of an ox, or one suitable to do the work of a gunner.' It indicates that as man has required the Creator has furnished the means to bring about his desires. No better expression of this sentiment can find utterance than that recorded by William Young in this work on the horse, published in England in 1831:—"Nothing can more clearly show the wise and benevolent order of Providence that man should exercise his superior intellect for the improvement of all around him than the ease and certainty with which it is seen that, by close attention, we can modify and ameliorate all organized existences in the animal and vegetable kingdoms."—Elder's Review.

The horse that contracts bad habits readily is generally one that can be taught the most useful traits with least trouble.

To Make Lime Concrete.

The following are recommended recipes for making a first class concrete. It may be thought to be unnecessarily strong for ordinary work, but will serve as a good guide.

Take one part of freshly burnt lime boiled (slaked carefully, so that it will boil) in a tub to six parts of clean, sharp river sand and gravel. Place the gravel and sand in a ring, run in the lime, and carefully turn the gravel into the lime and mix thoroughly, so that the lime is even distributed.

Or take one part fresh burnt lime, 4 parts of 2-in. metal, and 2 parts of clean, sharp sand, and mix as above.

— Cement Concrete. —

The following are the proportions for making cement concrete:—The best concrete is made of 1 part of cement to 6 of metal, etc., but the following is good enough:—

Take 4 parts 2-in. metal, 2 parts bulldog screenings (crushed quartzite screened to ¼-in.), and 2 parts good clean, dry sand.

Mix the sand and cement carefully and completely while quite dry. Mix the metal and screenings and put in a ring and thoroughly damp them without having them too wet. Now mix in the sand and cement, so that all the metal and 'screenings will be evenly covered. Keep the heap moist, but not too wet, lest the cement be washed off. Success depends on even mixture and in getting the concrete into its permanent position promptly.

To ensure the boar keeping in good service condition he should have plenty of exercise. To permit this a good roomy pen or large yard must be provided. In summer he should have at least a small pasture wherein to roam and root at will. Not infrequently returns of sows to service are due to lethargic condition of the boar rather than to sterility of the sows. Plenty of exercise, with the right kind of food, will almost entirely overcome this condition. The boar should be fed sufficient food to keep him growing rapidly, and in good flesh in any case. He should not, however, be fed such foods as are likely to make him fat, but rather flesh and bone-forming foods.

Artichokes for Pig-Feeding.

Artichokes are very similar in composition to potatoes, but are slightly richer in protein and fat. Mr. R. T. Archer, Senior Dairy Inspector of Victoria, in an article on the pig industry of that State, says that 30lb. of artichokes will produce 1lb. of pork, which at 4d. a lb. amounts at average crop rates to practically £10 per acre. Potatoes, says the same writer, have been proved to be valuable as a food for the production of pork when fed in combination with grain, and more especially with the addition of skim milk or whey, the most satisfactory proportion of all being 1 lb. grain to 3 lbs. skim milk and 3 lbs. of potatoes. Four lbs. of potatoes or of artichokes are equal to 1 lb. of grain in feeding value.

Of the culture of artichokes, Mr. Potts, Principal of Hawkesbury College, writes :—" This is a flowering perennial plant which has in the past been overlooked as a valuable food for pigs. It grows from 6 to 9 feet high, and, when in bloom, seen from a distance the crop looks like one of miniature sunflowers. The stalks are frequently used for feeding sheep, or conversion into silage, and the tubers afford a palatable and succulent food for pigs. The plant is very persistent in growth, and if raised in suitable soil is difficult to eradicate. Enough tubers, as a rule, are left each year to continue the crop, hence it is wise to set apart a permanent paddock for it, or the odd corners of a farm or waste places of little value for other crops may be used for growing artichokes.

The plant is extremely hardy ; it resists frost and drought. Whilst the best crops are raised on good mellow loams, profitable yields are secured on stiff clay lands, light sandy or gravelly soils.

The land is best suited where the drainage is good ; in fact, any soil suitable for potatoes will answer for artichokes. It is a crop that requires little attention when it is established. The soil needs thorough cultivation. It should be deeply ploughed about May or June. During the winter it may be harrowed occasionally, lightly re-ploughed about September, and well manured. The tubers are then planted by dropping them into furrows 3 feet apart with a space 2 feet between the tubers. If the sets are small, plant whole, while large ones may be cut. Cover by turning a furrow over them. About 4 cwt. of tubers will plant an acre. The crop matures in five months. Should rain fall immediately after planting, the harrow may be run over the land to fine the surface. It checks evaporation, destroys weeds, and will not injure the crop. Later on, the cultivator should be kept moving between the rows about once a month.

When the crop flowers and the tops droop and die, about April or May, it is ready for harvesting. The average yield will be from 7 to 8 tons per acre.

Two varieties have been tested here, and gave the following results :—Jerusalem, White 9 tons 1 cwt. per acre ; Jerusalem, Pink, 6 tons 16 cwt. per acre.

For feeding pigs, it is best to turn them into the crop to root out the tubers. It must be remembered that, where it is desired to continue the crop, the pigs should be removed before all the tubers are eaten.

Few foods are more relished by pigs. The tuber in the raw state is very nutritious, more especially for pregnant sows, and also sows reduced in weight and condition after sucking and weaning big litters. This class of food acts as a diuretic, or promotes a healthy action of the kidneys in secreting urine ; it relieves constipation and stimulates liver functions. One acre will support twenty sows from four to six months.

Young growing pigs evidence considerable growth on being fed with them for a short period. The exercise obtained in harvesting or rooting up the tubers has a beneficial influence. It is especially notable that artichokes are very digestible. The outcome of a number of tests go to show that for fattening purposes these tubers must be given with grain, and have a similar result to feeding with ordinary potatoes. 325 lbs. wheat fed with 820 lbs. artichokes gave 100 lbs. increase."

Teat Troubles.

One of the most common and annoying of the several troubles with the teats of cows is that due to relaxation of the sphincter by means of which the milk is retained. It gives rise to what is known technically as lactorshoea, which the dairymen recognise as loss of milk. The mechanism by which the milk is retained in the galactophors is variously described as an elastic ring or a sphincter of muscular fibre. The fact that the cow can retain her milk if an attempt be made to remove it by a stranger, or anyone she dislikes, seems to support the latter view. When this muscular substance is disordered a more or less free flow takes place, depending upon the amount of relaxation, and the time that has elapsed since the last milking. It generally arises, in the first instance, as a result of the practice of allowing an over-accumulation of milk, which, from its pressure, weakens the muscle. The amount of loss varies a good deal in different cases, but it generally less than is popularly supposed. A little milk, like a little blood, makes a much bigger show on the ground than it does in a bucket, but when a cow, especially those with a large udder and close thighs, squirts out a quantity of milk at every step she takes, the loss in the aggregate is not inconsiderable. A little leaking away as milking-time approaches is not important enough to call for interference, but with the extreme case there are three ways of dealing :—(1) To milk at more frequent intervals than twice a day. This is rarely resorted to unless in the case of the single or family cow that is kept near home. It simply would not pay, where a large herd is kept to bring the cow up, or go to a distant pasture to milk her at irregular intervals, since it would cost more in labour, to say nothing of the derangement of the routine of the farm, than the milk saved would be worth. (2) To palliate the mischief by artificially replacing the sphincter by an elastic ring or band, so adjusted as to compress the teat tight enough to close the duct or passage, but not to strangulate it. This plan, although efficient, is not unattended with risk, since the ring must be very nicely adjusted to secure sufficient compression without strangulation. If too tight the blood-supply by which the teat is nourished would be interfered with, of course causing atrophy. (3) To set the cow to rear calves. This is really the most effective and economical plan, since a pair of strong calves will keep the udder from becoming over-distended, and it is a weak sphincter indeed that allows any to escape while they are running with her and helping themselves on the little-and-often principle natural to young animals.—Exchange.

Climate and Crops.

The weather exerts a tacit, though relentless, tyranny over the labour and the thought of the agriculturist. The probable influences of the present and prospective weather upon the growing crops are seldom absent from his mind. It has been shown that the mean temperature of the mass of the earth cannot have changed in any appreciable measure during the entire period of astronomical calculation. The sun's heat is the leading element of climate; all other conditions depend in the long run upon that. Hence, the sun's heat being constant, all the changes we observe are periodic as regards the astronomical unites, the day and the year; and non-periodic in all other cases, the averages returning always to a line of permanency.

Climate is the average of seasonal atmospheric conditions, and as wheat is an annual plant, these fluctuating seasonal factors must affect its growth. No season exactly repeats itself; there are pertubations within relatively narrow limits; the plant strives perpetually to adjust itself to perfect correspondence with its environment. As this environment—that is, climate and food supply—vibrates now one way, now another, about a fixed mean, the consequent variations of the plant will be compensatory, and so there should be no final permanent modification of the plant in a given locality.

Aside from its direct control of the amount and quality of the crop, climatic variations, by vitiating experience, impede agricultural progress. This fact is most apparent in the agricultural history of a new country, where experience acquired in one district is in many cases not only useless, but positively pernicious, when applied to a distant district. Hundreds of thousands of pounds have been lost in Australia through the efforts of new settlees to learn by experience the climatic peculiarities of their adopted home. It is the province of agricultural science to teach how to profit by the experience that has been so dearly bought in the past.

Testing Individual Cows.

In testing the milk of individual cows the sampling of the milk is a very important factor. A correct sample cannot be obtained by milking from the teats into a bottle or small jar, or by taking some of the first, middle, and last milk drawn from the udders. All the milk from one milking should be thoroughly mixed by pouring from one vessel to another, and a correct sample immediately taken. This sample should be plaeed in the composite jar, to which some preseruative, such as bichromate of potash, has been added. A recocd book must be kept in which each cow's number or name, corresponding with her number or name on the composite-sample jar, is recorded. The milk of each cow should be weighed sparately and accurately at each milking, and at the end of the testing period the aggregate weight of milk of each cow is found, and the average yield per day calculated. The average number of pounds per day multiplied by the number of days in the month will therefore give approximately the total pounds of milk produced during the month. The percentage of fat is then found by testing the composite sample, and the total fat foc the month is found by multiplying the monthly total of milk by the percentage of fat divided by 100. At the close of the lactation period the aggregate monthly totals will show the estimated yield for the season. Lack of care in sampling and carrying out every detail in preserving the samples, and manipulating the test, will give untrustworthy results, and such carelessness might be the means of discarding the best cow in the herd.

If you want to get the full capacity out of your horses without injury, use moderation at the beginning of every task imposed upon them.

It is easy to come in and slam coats and hats on a chair in haste, but how much nicer to have special nails or racks on which to hang them and keep them neat and tidy.

If your land is too wet, and you're
burdened with debt,
And incumbrance begins to accrue,
Obey nature's laws—by removing
the cause,
Drain your farm—or it will drain
you.

The Good Cow.

There is an appearance about a good cow that is a pretty perfect indication of her worth; but it is almost impossible to convey the information to another, and make it possible for another to put into practice this intuition, or first-sight impression. The first sight of a cow should impress the buyer with her conformity to what might be called symmetrial femininity. The cow is a mother, and the good cow in appearance carries with her the look of beneficence, as though she were willing to bestow upon someone, whether calf or owner, her life's energy, which is in her case milk. The points of a good cow and the signs by which we may know her, are a little complicated, as cows are, in fact, individuals, and have their peculiar make-ups; so signs can be used only in a general way, as two cows doing equally well in milk production would vary somewhat in form. Four points are of special importance: — A bony, lean, but small head; with bright, prominent eyes, a prominent spiny backbone; depth of body and much width between the forward legs at the brisket, to denote capacity and strong vitality, and an udder of long abdominal attachment from front to rear, and well-balanced as to form. These points well-developed will govern largely the milk from the cow. It should be well borne in mind, that, to secure either profitable milk in a cow, speed in a horse, fine wool in a sheep, bacon in a hog, and eggs in a hen, this idea of getting an animal with little fat and much meat and nerve-power must not be lost sight of. To secure them, angular wedge forms must be obtained, and just as we broaden them out, square them up, and get the blocky form we get fat instead of milk, strength instead of speed in the horse, mutton and coarse wool in the sheep, lard in the hog, and a general-purpose fowl in the case of the hen. The making of milk is, while a mystery, largely controlled by brain, and so needs a bright, intelligent, and slightly protruding eye to indicate it. It is a fact that a cow of dull eye and low intelligence rarely is a cow of large or long producing power. She usually gives milk six months or so, and for the rest of the year "boards" with her owner at his expense. The strong, prominent backbone, well-developed vertebrae, slightly falling below a straight line, and rising to a noticeable pelvic arch, are the signs of a strong muscular and nerve development; wide hips, whirlbone joints well apart, and thin but muscular thighs, indicate well-built maternal organs so essential in a cow of large powers. As a rule, the udder of a cow should be slightly fleshy, so that it will not collapse when milked out; covered with a thin skin, soft and silky to the touch, and very elastic completes this sign. A body of large capacity, with sloping, sprung ribs, and large and crooked milk-veins, gives indication of capacity and digestive powers; large heart girth, with sharp shoulders uniting at the top tells of large heart, lungs, and liver; the testimony of strong vitality, large blood flow, and machinery to propel, purify, and elaborate. These are things closely allied to large and rich milk-making.

Early Breaking of Draught Colts

Opinions differ as to whether it is better to bring high-class draught colts into work at two or three years old. At first it would appear that the youngsters' growth would be checked by early working, and that full development of bone and muscle would be checked. It is, however, admitted by most thoroughly experienced men that is not the case, for two-year-old broken colts often make the finest specimen of horses, and figure most prominently in the show-ring.

The real fact of the case is that the youngsters gain more than they lose by the early breaking. Being brought early to work saves a good deal of galloping about in the fields, which tries undeveloped bone and muscle much more than light team work. After being broken there is never the wild buoyancy displayed again, and the days of play are past for ever. It is between the spring of the second and third year, when not broken at the former date, that so many youngsters lame themselves. They often get in high condition—indeed, fat—and then galloping and screwing about in their excitement and merriment tries the strongest limbs—at least, the strongest limbs that colts possess. If broken at two years old this trick is in a great measure saved.

Violent exercise is peculiarly liable to cause lameness in the hocks, much more so than any ailment in the forelegs. The result is often serious.

When brought into work, as before intimated, the exuberance of spirits is subdued, steadier habits are acquired, strange objects and the ways of man are made familiar, wholesome but sustaining food is provided, and the gentle strain on the muscles is useful rather than otherwise, as it gradually strengthens the parts. It is, however, necessary that only light work be given to the two-year-old, else some harm is very likely to befall. All that really should be done is to break the youngster to work, and to show what is expected of it in after-life.—The New Zealand Farmer, Stock, and Station Journal.

Humus and Moisture.

Soils require an abundant supply of humus to promote moisture-retention and render them readily penetrable by the roots of crops. The requirements of the latter in this respect must be considered, as crops like wheat and clover require a firm seed bed, whilst potatoes, turnips, and barley prefer one that is friable. Virgin soils are fertile because they contain much humus, but the subsoil cultivation exerted by the roots of trees must be considered. Tree roots go deep, and in the process of decay leave channels for water and the roots of crop to travel down. After a time these channels close; hence the conditions for ferility are later on not so good. Deep-rooting crops should be employed to imitate the action of tree roots as far as possible. Humus, in decaying, produces carbon dioxide, which, dissolved in water, increases the solvent action of the water. This depletes the soil of its lime, which should be regularly applied at proper intervals wherever high farming is practised. Humus is best furnished by ploughing in green crops, and lime should be applied at this time to promote decay of humus and correct tendency to acidity which freshly ploughed in vegetable matter exhibits. Leguminous crops should be used for ploughing in, because these supply nitrogen to the soil.

Powdered limestone is a suitable form of lime to apply when the soil is deficient in organic matter. For this purpose the purer the form of limestone employed the better, as the presence of silicate of lime retards the assimilation of lime by most plants. Powdered limestone improves the permeability of clay soils to water.

Draining is an important means for ameliorating the condition of soils, and is much neglected. Soluble salts of iron and acidity of the soil are connected with bad drainage and consequent sterility of soils.

A Bad Habit.

The bad habit calves have of sucking each other when the meal of milk has been taken is a threefold evil. It causes indigestion through pumping in wind, it creates sore places on the sucked parts, and it makes the whole herd restless. A remedy is simple (says a correspondent of the Farmer and Stockbreeder. Tie up the calves before pail-fed, and keep them tied for half an hour or twenty minutes after they are fed. In the interval that they are standing after drinking the milk, give them a little inviting hay or meal and chaff. Then, at expiration of the time, their mouths will have lost taste of the milk, and there will be no desire to suck each other. As to trouble of tying the herd, why, it is not worth speaking of, for I have tried a dozen in less than five minutes. This tying is, too, well repaid for otherwise, for it ensures weak as well as strong getting their share of milk, and saves all confusion and whacking to keep the headstrong back from the pail.

Charlock and Its Destruction.

In spraying charlock the strength of the dressing is usually 15 lbs. sulphate of copper in 50 gallons of water to the acre, but a stronger or weaker solution may be used, according to the growth and the more or less prolificacy of the weed. For instance, a 3 per cent. solution and a similar quantity (12 lbs. sulphate in 40 gallons of water to the acre) might answer the purpose. Clean soft water is preferable for making the solution, and the vessels used must be of wood. A paraffin cask, capable of holding a little more than 40 gallons, should be filled up to within a few inches of the top. The sulphate of copper may then be weighed out, hung in the water, and the contents of the cask stirred briskly for a few minutes with a stick until the sulphate has dissolved. Copper sulphate bought under a guarantee of 98 per cent. purity should be used, and to facilitate solution should be powdered and not in crystals. When the solution is ready for use, it should be strained into the sprayer, so as to avoid choking the nozzle. Several of these casks may be set up at convenient distances along the headland. and if two or three of them are kept ahead of the sprayer, no delay in the work need be experienced.—The Agricultural Gazette, Tasmania.

A Dangerous Practice.

Many teamsters have been injured for life through that common but foolish custom of riding on shafts. A waggoner does it ninety-nine times and nothing is wrong, but on the hundredth something happens: a horse is frightened and starts suddely, a rut in the road or a stone causes the fatal jolt, and the man on the shafts, not being on the alert perhaps, finds himself under the wheel, and there is another case for the coroner or the hospital. And what reasonable excuse is there for a waggoner to ride on the shafts of a cart or a waggon? If the vehicle is empty, it certainly is not a great task to climb into it and drive the horses by means of a pair of rains, and if the team has a heavy load behind it surely the duty of the carter is to walk. Apart from the risk run by the waggoner who rides on the shafts there are the horses to be thought about. They are apt to shy and start suddenly, and even if the man on the shafts is fortunate enough to extricate himself without injury ten to one he is too late to get to the head of his horse in time to stop the animal before some damage is done. Farmers and owners of teams would do well to make it a stringent rule that no shaft-riding be allowed.

Nitrogen can be added to the soil by the growth of leguminous fodder crops.

First Requisite for Successful Dairying.

The first requisite to successful dairying is a herd of cows that, when properly fed, will give rich, healthy milk in sufficient quantity to make the work remunerative. The quality of the cows as milk-yielding animals is more important than their number, for there are many small herds that make more clear money for their owners than others twice as large giving poorer milk, a smaller quantity, or having a short milking period. The breeding of the dairy cow is, of course, a matter that requires attention; but one of the conclusions reached by modern dairymen, both practical and scientific is that the individuality of the cow, so far as her own profitableness is concerned, counts for more than either breed or breeding. There are good paying cows in all breeds, and there are cows that pay badly or not at all in all breeds. A long pedigree may, and often does, disappoint the dairyman, even when it is studded with noted names; while many profitable cows have no grandmothers, so far as the "record" goes. The selection of the profitable cow, therefore, depends primarily upon what she can herself do, and this depends upon four points—the richness of the milk, the quantity of it, the length of her period of lactation, and the feed cost of its production; in other words, the cow is to be kept all the year round, and her milk is, for the most part, used for making butter or cheese, or both. The question, then, is not how much milk, or how rich the milk, or what she can do in a week; it is to what extent can she produce butter-fat the year round, and at what cost in food does she produce it? There are many considerable producers that are not profitable producers. There are many that seem to accomplish less, but the production is made at a sufficiently less cost to render them profitable, when other animals that seem to do more are maintained in the herd at a loss.—Farm and Home.

If growing leeks are short in the stem they may be improved by earthing up, but the soil must not be allowed to get into the hearts of the plants. The soil used in earthing up should be made rather firm.

Soils in Relation to Geology and Climate.

The result of investigations made in New South Wales by Dr. Jensen, under the direction of Mr. F. B. Guthrie, clearly indicates the relation between geological structure and chemical composition of soils modified by climate.

Granite soils contain a good percentage of potash, particularly where there is a minimum of leaching and an active evaporation of soil moisture. In wet districts the surface soil is much lower in potash than the subsoil.

Basalt soils are particularly rich chemically. Within coastal areas with rugged topography they are richest in organic nitrogen and poorest (as the result of leaching) in mineral plant food.

While the granite soils are of the character of light loams under all climatic conditions, basalt soils vary from friable loam to heavy clay.

Sandstone soils are mechanically, more or less, uniform, and though slightby better as regards mineral plant food in some parts, are of a very poor description and are only workable under special treatment, such as dry-farming, irrigation, and manuring.

Limestone soils, though they exhibit mineral differences due to climate, are rich in humus though containing less valuable matter than is to be expected.

In the case of alluvial soils though the effects of geology are somewhat obscured, they are not wholly clouded. The character of the soil is governed by the nature of the rock which contributes the detritus.

The effect of climate is more marked, inasmuch as the soils increase in mineral plant food as their distance from the coast increases—this being due to decreased leaching by rainfall. At the same time their moisture content and percentage of organic matter and nitrogen diminish.

— Experiments. —

It is recommended that experimental stations should be established on each important soil-type (e.g., granite soils, sandstone soils, &c.), and the strength and quality of the soil tested by growing crops demanding a large proportion of the chief mineral ingredients of plant food.

The bulletin referred to is replete with valuable information regarding many points of interest to the cultivator of the soil, e.g., colour, acidity, alkalinity, and nitrification; and accentuates the fact that fertility does not depend primarily upon the proportions of plant food present in the soil, but on a variety of contributing causes which have to be taken into account.

Milking Three Times a Day.

Experience has shown that cows which give very large quantities of milk will yield more milk if milked three times in the twenty-four hours instead of twice. If a cow is a large maker of milk, her udder becomes full long before milking time arrives unless she has great capacity in her mammary glands and hence the animal suffers a certain amount of pain if allowed to go too long without being milked. Under such circumstances a cow will give larger yields if milked three timee a day and the butter fat test will not suffer. In all the American records the cows that produce such high yields are milked three times a day. Mr. A. O'Callaghan, Dairy Expert, N.S.W.

Variety in Feeding.

After long continued experiments in the feeding of dary cattle a European dairy expert concludes that experience has shown that practically all fodders may be used with advantage if they are wholesome and the cows eat them with relish. The freer the choice given to the farmer the better, as the exclusive use of particular fodders is undesirable, and the practice of feeding cows with a mixture of foods is to be preferred. The main points, in his opinion, are that the cows should be kept in good health and sudden changes in feeding avoided; and also that great care should be paid to cleanliness and the prevention of contamination of the milk. Given these conditions, the best advice as to feeding is to see that the drinking water is pure and the straw and fodder of good and wholesome composition.

Abortion.

The New Zealand Division of Veterinary Science recommend the following treatment:—

1. Burn the aborted foetus immediately, search being made for it if necessary so soon as the cow is known to have aborted.

2. Thoroughly dig up the ground around the foetus, and disinfect with a liberal quantity of a non-poisonous sheep-dig.

3. Isolate the cow and keep her isolated for two months, using a temporary bail, if necessary, for milking purposes.

4. Thoroughly disinfect the cow by the following means :—

First, into an ordinary whisky bottle put two tablespoonfuls of a 1 per cent. solution of mercuric chloride, and fill up with ran water that has been boiled and allowed to cool to blood heat. The mercuric chloride can be easily procured from any chemist or direct from this labatory in taploid form, with full instructions.

Secondl procure about 3ft. of ordinary indiarubber piping of ½in. diameter, and, in one end place an ordinary tin funnel, or, better, one made of glass if procurable. If neither is handy, break off the bottom end of a large bottle and insert the neck into the rubber tubing.

Third, boil the tube and the funnel for five minutes.

Fourth, place the free end of the piping by means of the hand gently into the womb, taking care not to injure the lining of the womb.

Fifth, hold the end to which the funnel is attached about 6in. abive the root of the cow's tail.

Sixth, pour the contents of the bottle as described above gently into the funnel, and so thoroughly irrigate the womb. If the fluid does not run freely from the tube, the end in the womb need only be gently moved to and fro to secure a free flow.

Seventh, thoroughly wash down the parts from the root of the tail down to the bottom of the udder with another bottleful of the same solution as that used for irrigating the womb.

Eighth, allow the animal to stand quietly in the bail for two hours after treatment.

Note.—It is absolutely necessary to follow out the directions to the full, as if any be missed beneficial results cannot be guaranteed.

Rearing Calves.

In discussing this subject a New Zealand farmer writes :—" In addition to the skim milk from the separator, on which they have been mainly reared, the calves have received Sunlight oilcake mixed with the milk. This article, which is a cocoanut cake, not linseed, possessess the great adkantage over pollard, oatmeal, oils, and many of the patent mixtures for calf-rearing, that it does not scour the calves. In dissolves readily in boiling water. Calves are soon brought to take it, and after they become fond of it may be given with advantage from ½lb. to ¾lb. per calf per deim. When the cake is used with skim milk individual feeding is best, but where big calves are fed together in a trough it is necessary to keep on stirring the milk whilst the calves are drinking. Where this gilcake is used the calves soon show its good effects by their healthy skins and improving condition.

Dipping.

In many cases this part of the sheep-owner's duty is performed in a very perfunctory manner. The sheep are rushed through the dip, and little or no care is taken to find whether it is being kept at the proper strength, or that the sheep are receiving a thorough soaking. At every dip there should be the means of measuring and thoroughly mixing the dipping-material before it is run into the dip. No haphazard methods will do.

A New Zealand dairy authority maintains that the dairy industry does not primarily depend on the factory managers, the skill of dairy experts, on the breeding of the cow, but on the purity of the pasture and the crop. The hope of every dairyman is to get as much profit as possible from his cow. It is within the power of even a well-bred cow to materialise her owner's hopes if she is fed on bad, weedy pastures ? Many weeds are innutritious ; others are acid, and cause internal troubles others, and they are not a few, taint milk.

Ten Weed Commandments.

1. Good wheat cannot be grown from weed-seeds.

2. Like produces like.

3. There is no weed that cannot eradicated by proper treatment.

4. The effect of years of carelessness cannot be overcome in a season.

5. One weed allowed to ripen means thousands next year.

6. Pull those weeds and do it now.

7. Weeds, like the poor, we have always with us ; and, again, like the poor, they are most numerous in shiftless communities.

8. Weeds are a tax on machinery and on the temper of the operator.

9. Never sow dirty seed, or neglect to clean machinery before passing from one field to another.

10. Know what is growing in your fields.

Note.—Concerted action amongst neighbours is as important in dealing with weeds as with rabbit or other pests.

Control or Eradication.

Annuals.—Any method which will hasten the germination of seed, followed by the destruction of the young plants before they flower, is to be recommended.

Biennials.—Where possible, plough up, or cut down before they flower. Frequent cuttings will kill them.

Perennials.—These cause most trouble, and need frequent cultivation or cutting. Casual attention or cutting—i.e., allowing the plants to grow for some time between the cuttings — only stimulates the plants, just as pruning improves a tree.

Smothering-crops and hoed crops, are very valuable in controlling weeds: for, just as weeds are aggressive and crowd out ordinary vegetation, so they in turn may be crowded out by proper attention to heavy dense crops.

Weeds carrying mature seeds should be burned: never plough them in.

Fallowing.

Fallowing does not add plant food to the soil.

Fallowing aerates the soil, and favours the beneficial micro-organisms which live in its upper layers. The activities of these organisms tend to make soil reproductive.

Fallowing thus renders available the potential—but not readily available—plant food that is already in the soil.

Fallowing reduces the amount of nitrogen in the soil.

Fallowing depletes the soil of its humus or decaying vegetable matter. This depletion of humus lessens the water-holding capacity of the soil.

The application of commercial fertilisers does not add humus to the soil.

In dry districts, sound farming practice is based upon the very beneficial practice of fallowing, combined with—

(1) the use of commercial fertilisers to restore plant food, and

(2) the growth and consumption on the farm of fodder crops to maintain the supply of humus and nitrogen.

Farm Notes.

The general tendency of present day opinion is that the effect of food on the composition of milk is less than is often supposed, and that as long as the food is sound and wholesome and compounded in such a way as to keeo the nnnnn such a way as to keep the cows in thoroughly good health the milk produced is likely to be quite suitable for consumption by inavlids and children.

Haphazard, happy-go-lucky methods in the matter of date in breeding sows should be strenuously avoided. When a sows loses her proper time of farrowing with the others, she tends to keep out of time till a breeding period is passed. Keep the sows together and keep them where you want them.

Some object to the drudgery of farm work. There is drudgery everywhere when there is a lack of interest. Drudgery does not depend on the work to be done, but on what you have under your hat. If following the plough means only hitting stones and breaking ribs, it is drudgery; but if it is studying the great problem of soil culture, it is positive enjoyment. You can do a lot of things without money. What you do depends on you. The busy man always has time for things. Go home with a fixed idea to do something. To succeed makes a man of one. Produce a new variety of wheat and sell for a higher price than the old. Remember that "land has no value except in its relation to man's use." The use you make of it determines what it offers to you.

Fixing knobs on the horns of cattle has been practised for very many years in England. The original method was to saw off the tip of the horn and fix thereon a ball of wood 3ins. in diameter, with a nail passing through ball and horn; some used pitch instead of the nail, but this was less secure. Over a hundred years ago it was urged that "knobbing" should be made compulsory by law, having regard to the number of lives which were lost from tossing and goring by cattle on their way to market. Another reason for urging its general adoption was "the injury they do each other by goading with their sharp horns when in markets

In old days horsemasters believed that a raw egg had the most beneficial effect upon the coat of the horse; but superstition decreed that to derive full benefit from it the horse must swallow the egg whole. Very generally the horse succeeded in swallowing the egg, which of course had to be placed by hand in the entrance of the oesophagus, but if it slipped in the fingers at the critical moment, and entered the passage with its long diameter across, the egg was very likely to choke the horse. Delicate as the shell is, the muscular pressure exerted upon the egg evenly all round prevented its breaking, and experience showed that it was by no means easy to break the egg by pressure exerted outside. In such cases the only remedy was to use an instrument to pierce a hole in the egg, after which it was easily broken.

Poultry Notes

Bits for Beginners.

It has been said that chicks are heirs to nothing but health and enjoyment of life, while the ills come from mismanagement and there is a lot of truth in this, for it is the natural tendency of a healthily bred chick to grow and thrive.

Costly errors are often made by careless methods. One cannot give poultry too close attention. This is particularly so in the matter of feeding. Beginners are apt to be irregular in this. They do not have any set hour. The stock will soon learn to know when their feeding hour arrives, and will be in a more or less anxious state until they are fed.

A rooster is often capricious. There may be a hen that will attract all his attention. He will then neglect the rest, and, as can be easily seen, this will prove disastrous to the fertility of the eggs laid by the other inmates of the pen. Best remove her to a place where she can be kept by herself. If her eggs are wanted, let the male run with her every other day, which will be sufficient. A half-hour in the morning will answer. If the birds are laying well, then feed well.

When brooder chicks are four weeks old, the chick feed can be reduced, and they can be given a little whole wheat and cracked maize. Hulled oats are excellent if you can get them at a reasonable price. If possible, give the little chaps a fresh green run, or if not all the green stuff they will eat.

The result of a recent expesiment in the fattening of chickens by trough feeding are reported by a Canadian Station, which show that the average profit in three weeks' feeding was from 6½ to 7½ per bird.

It is by coddling and mishandling chicks that we make them delicate. We are afraid to give them fresh air, afraid to open the brooder, afraid to let the chicks be natural, forgetting that the mother hen, in natural brooding, has no such scruples, and frequently rises from her brooding position, forcing her chickens to take exercise and fresh air whether they appear to want it or not. She hardens her chicks to frequent and sudden changes, and when weaning time comes, declines in no uncertain manner to brood them any longer. Having become hardened there is seldom any trouble with hen raised chicks when Biddy finally quits her job.

In brooders with artificial heat, don't start too high, also lower the temperature gradually, but do not be afraid to open up the hoover regularly and give the whole of the inside of the brooder a good sun bath quite often. The chicks themselves will be a better guide than any thermometer. If they squeak and pack they are cold. If they sweat and droop they are too hot. If when you open the brooder at night you find them squatting comfortably over the whole floor area they are just right.

The rate at which a chicken will grow depends in the first place and to some extent on the breed, but much more on the feed. It would be difficult to define any standard of progress but the following record of a flock of White Wyandotte chickens is certainly extraordinarily good—New.y hatched, 2 ozs.; at four days, 2 ozs.; at ten days, 4 ozs.; at three weeks, 8 ozs; at four weeks, 12 ozs; at eight weeks, 2 lbs.; at 10 weeks, 3 lbs. Aside from the normal standing still for the first four days these chicks put on the pace from the start. The ordinary chick is doing very well to get within 30 per cent. of these figures.

It is at the time that chickens leave the mother, or more especially when they pass from the heated to the unheated brooder that trouble often comes. Unless they are properly handled at this time, they will fail to develop. They want to be kept growing right from the start. There should be no marking time, with no apparent gain. With a normal healthy chicken you should be able to almost see it grow, so continuous and rapid is the developmeat.

— Poultry Fattening. —

Farmers' Bulletin, 140, US.A. Dept. of Agriculture, publishes a lot of information on trough fattening. To very briefly summarise the results—it was found that the total cost of food per lb. of gain averaged just under 3½d. in an experiment where 43.944 birds were fattened for from 6 to 10 days, and in a second experiment in which 61.706 birds were fed from 6 to 15 days the cost averaged just under 4d. The average total cost of food and labour per pound of gain for all the birds in both experiments was just over 4½d. per lb., the average cost of food alone being 3½d. The cheaper gains were made in shorter feeding periods (7 or 8 days) and by light chickens.

— Sprouted Grain. —

Sprouted Grain is an old substitute for green food. The principle by the way, was adopted, it is stated, by old-time Arctic explovers to obtain green vegetable growths. Sow the grain thickly in a shallow box (such as galvanised iron case); cover with a little light horse manure, and water as needed. The case should stand in the shade; a straw thatch or shelter of boughs will do. When a few inches high soil and growth can be cut out in sections, and fed to the birds, or the growth only may be cut and fed to the bairds. In many sprouting grains and seeds there is valuable food material—this is not contained to such an extent in the older growths.

— To Drink or not to Drink. —

One of the questions which crops up from time to time in the poultry press is whether chickens should be allowed water to drink or not. Some of the most successful breeders, it is said, give no water to their young stock, while others give both milk and water. As the chickens will drink greedily, when offered water, it has been inferred that it is cruel to withhold it from them, but the young of many wild birds have little or no water.

Mr. Lewis Wright, who went exhaustively into this question, came to the conclusion that the preponderance of experience is on the side of withholding water. If the chickens are hatched later and the weather is hot and dry, a difference should be made, but, in the spring, if soft food is mainly given, one drink after breakfast and probably a few sips at night, will be found sufficient. Young chickens should never be allowed to drink an unlimited quantity of cold water after prolonged thirst, and those that have been accustomed to a constant supply of fluid from the first should have any change made very gradually.

— Feed Apart. —

There is no question but that chickens are reared much more satisfactorily when they are kept apart from the full grown fowls, so, if it can be managed, they should have separate quarters. In any event, they ought to be fed where they can have their meals without being ill-treated and tramped on. To enable this to be done, some wooden framework can be made of thin boards nailed together in the shape of a square and the top covered with wire netting. The size can depend upon the number of chickens and the dimension of the yard, but five feet by five feet with a height of fifteen inches will generally be large enough. A few holes should be made in the sides sufficiently big for the chickens to go in, but too small for the old birds. If the food is thrown inside these shelters, the youngsters can feed unmolested.

— Hot Weather. —

During hot weather, if the chickens lose their appetites to some extent, the supply of food can be decreased by giving less at each meal and giving fewer meals. Plenty of green food must be supplied, and it must be given fresh daily, all not eaten the previous day being removed. The soft food will soon get sour in the summer, so it should be mixed only as required and all feeding troughs must be constantly cleaned, otherwise diarrhoea will make its appearance, probably with many fatal results. If this malady is noticed, some boiled rice, well sprinkled with powdered chalk, will often stop it. Rice water to drink will sometimes affect a cure, and in the more serious cases, a few drops of chlorodyne (about half a dozen) three times a day, will prove efficacious. The chickens should grow fast during the warm weather, if fed and treated with ordinary care.

— How to begin. —

A great many people are under the impression that poultry will not pay. How often do we hear it said they are not worth the trouble, and after paying the feed bill there is no profit left. Poultry will pay, and are worth the labour bestowed if proper attention and housing. To those desirious of trying the venture a little advice will not be out to place. To those desirious of trying the venture a little advice will not be out of place. To beginners my advice is—go easy. Start with a few, and as experience is gained, increasef A novice cannot expect, if starting on a large scale without previous knowledge, to make an immediate success of the qusiness. Do not run away with the idea that all that is required is to erect houses and runs, put in your birds, and throw food to them. and all that is left to do is to go around and collect the eggs. In the first place you must have a liking for your birds, take an interest in them, and watch them when feeding. Often not enoagh food is given, and at othet times enoagh is left lying on the ground to be trampled over and exposed to the sun in a dirty yard. The result is it becomes sour and causes disease, the fowls naturally get out of condition, the egg yield is not up to expectations, the business is thrown up in disgust.

— How to Proceed. —

When building your houses a good plan s to have them between two and three feet off the ground w th a boarded floor, and roosts fitted up about two feet from the floor. A foot below the roosts erect boards about two feet wide to catch the droppings and under these you can erect your nests—t)saves space. Be careful to have the floor sprinkled over with fine sand or dry earth, and clean every day if poss ble. Paint the roosts occasionally with kerosene, and have them so thaz they can be removed for cleaning purposes. The space under the house, if boarded up about six inches in front, will provide a dust bath which is essential to keep your poultry frre from vermin. Fill up with dry, loose soil and mix with it a little coal ashes, as these contain a certain amount of sulphur. Haveyour runs as large as possible, and do not keep too many birds in them, you find them getting bare it is a sure s gn you have too many b rds in them.

— Housing. —

See that your roosting houses are free from draughts, at the same time provide top ventilation, so as to allow any foul air to escape. Have the temperatuee as near as possible same as the outside air, or else the birds, if crowded in a small house, are apt to take roup or other diseases when exposed to the cold first thing on a frosty morning.

Nest Making.

Perhaps a few practical hints on the best method of making a nest will be acceptable to the inexperienced at the present season, when any poultry keeper is, or should be, thinking about hatching. A broody hen should never be set in the ordinary hen house, where she is likely to be disturbed by the other fowls; it is advisable to have a small portion of the run reserved for hatching operations. The most natural nest is that made by scooping out a round hole in the ground, a few inches deeper than the finished nest is required. The depth of the nest will depend on the number of eggs set; the more eggs, the deeper the nest, but care must be taken that the outer eggs do not roll down on the others—this will be the result if the nest is too deep. The sides of the nest may be "rounded-off" by placing the heel in the centre of the hole and pressing down the sides of the nest with the other part of the foot. Any small stones, bits of glass, etc., must be removed, to prevent broken eggs. Having got the hole fairly round, sand should be sprinkled in until the nest is the right depth and perfectly smooth and round.

Captain Scott's Own Story.

The September issue of the Australian magazine, "Life," is a notable one. In its begins Captain Scott's actual story, and the opening chapters are given of a strong new serial story by Jack London, entitled "The Valley of the Moon." These two features alone make September "Life," a fine sixpenny-worth, but the 160 well-illustrated pages of the magazine are rounded out with many other articles, short stories, and departments that make the issue double attractive.

"Captain Scott's Own Story" runs through 23 pages, including eighteen pictures of rare interest, such as the interior of a cave in an iceberg, the members of the expedition at dinner on the "Terra Nova," a fine picture of Captain Oates with the ponies, and Scott himself on snow shoes and in his cabin. An actual photograph is given of a page of Scott's Diary, found beside him, and written when he knew death was inevitable.

The Key to the Layer.

— More about Dr. Pearl's Discovery. —

Following our reference last month to Dr. Pearl's reported discovery in regard to the inheritance of the laying habit in fowls in its broader conclusions, there are certain modifying and limiting factors to be considered, and as the subject is of great importance and, we believe, of interest to poultry breeders, we propose discussing the subject more in detail.

Dr. Pearl, as we mentioned last month, is a scientist of international reputation, and the theory now advanced is of engrossing interest in circles far more extended than those covered by the poultry industry. It is not, we believe, too much to say that this discovery marks the most important step forward in the application of the Mendel theory which has yet taken place as regards stock breeding. Hitherto animal breeders have not benefited to the same extent as have plant breeders, for the subject is for various reasons, more complex when applied to the animal than to plant life. Animal breeders have been able to control certain external characters, colouration, etc., on Mendelian lines, but so far they have not made a horse give speed, a cow milk, a sheep wool, a pig pork, or a fowl the one is proved to be possible there is no very apparent reason eggs with greater certainty, yet if why the othe(s should not be so.

— What it Amounts to. —

The Maine investigation has extended over a period of ten or twelve years, though Dr. Pearl has only been connected with it for about half that time, and it is interesting to ask ourselves what is the ultimate contribution to scientific breeding as a result of much work and some dollars. It may perhaps be best summed up, in its widest application, as the harmonizing of quantity the variation in animals with the principals of Mendel's law of inheritance, and in particular reference to poultry breeding as the determination of two Mendelian unit characters and their corresponding absences which, in corelated operation, govern egg production, and their mode of segregation and recombination. Not much to the general reader, perhaps, but it opens up immense possibilities. To understand its importance one has to get back to the basic facts of reproduction.

— A Link. —

For our present purpose we do not have to dip deeply into biology or stop there long. We merely want to connect, for the benefit of those not previously interested, Mendel's theory with the known facts of the genesis of each individual life. Very briefly put each new life originates in the fusion of a male cell, with a female cell, which united will contain in embryo the finished product, whether that product is an eel or an elephant, a baby or a bantam. Until Mendel's discovery was discussed very little was known or even guessed of the interaction of the two parts of the now united cell. That one did influence the other was of course apparent, but whether this influence was variable and spasmodic or perordained and constant in its essential working was not understood. As is well known, Mendel conducted a long series of experiments with common peas, during which he observed certain results. To account for these results he formulated a theory which is now known throughout the world as Mendel's Law of Inheritance, and is accepted as an integral part of scientific breeding. The essential principle of the law may be summed up by saying that he advanced the theory and demonstrated its truth, that each separate male and female cell is made up of pairs of contrasting characteristics, which he called "unit characters," that these pairs were never both present in the same original cell and that on union they followed definite laws. The governing rule was that one of each pair of unit characters would be dominant to the other, which he named recessive, further that when interbred, the ratio of dominants to recessive would follow certain definite laws, both as to character and number and do so for all time.

— Clearing the Ground. —

First let us clear the ground of any possible misconception as to practical application of this theory. It is not a royal road to excessive individual production. The amount of "Pearl" theory will add one egg to the result of the mating of any two birds, that is fixed and predeterminated, at least the measure of inherent capacity is, but it promises a means by which the union of any two birds in which this inherent capacity is either low or governed by mutually antagonistic elements, can be avoided and consequently the average flock production be greatly increased. As selection eliminates the physically unfit so will the Mendel-Pearl theory eliminate the organically incompetent, and the two working hand in hand will tend steadily towards raising the present average production to the plane of the present highest production. Put in another way, selection passes out the visibly incompetent, the barren, weakly, structurally faulty birds, this new theory when applied will pass out those which are apparently competent, but incompetent to transmit their capacity to their immediate descendents. These are the birds which keep down the general averages in laying competitions, which mystify a breeder by knocking down his 1,500 score of one year to 1,200 the next with birds of apparently, but not really, precisely similar breeding. From what has been written it will be seen that the owner of the very good hen stands to win, not so much because he can convert her descendants into better birds but because he can perpetuate her kind with some certainty.

— What the Trapnest Says. —

Dr. Pearl's announcement may be regarded from two distinct points of view. First as the experimental proof that (a) the male bird is the controlling factor in egg production; (b) his potency is fixed and definite; (c) that within certain limits some males will always beget good stock, that others will beget mixed stock. Others had stock (d) that each male (or family of line bred males) can be tested through his or their pullets; (e) that the testing of pullets for the first four months from the date the first comes into lay (provided of course they are of approximately the same age) is probably, but not certainly, a true index of total production. The above is, we believe, a fair statement of Dr. Pearl's findings, irrespective of any theory or Mendelian conception of breeding. The man who has "no time" for scientific breeding may, we believe, take them as indisputable facts. He can use them as his conditions or opportunities permit or his inclination dictates or—he can leave them alone. To the unprejudiced mind they would appear to be worth testing. We quote in this connection a few of the tests bearing on this subject from the summary of Dr. Pearl's paper in the Journal of the Board of Agriculture.

— A Base. —

It is necessary, at the outset, to have a clear idea as to what is meant by fecundity, and how it shall be measured. Mr. Pearl's conclusion is that the distinguishing differences in egg-production between good and bad laying hens occur in the winter period, October 1st to March 1st. In other words, he found (for the breeds with which he worked) that, on the average, there is little difference between one fowl and another in the number of eggs laid in the spring and summer, whereas the differences between strains (and individuals) in the number of eggs laid during the winter are very marked. Thus, the strain of Indian Game with which he worked gave an average winter egg production of less than one-third of that given by a strain of Plymouth Rocks. For the purposes of his investigation, therefore, Mr. Pearl adopted the winter egg-production as the measure of fecundity, and it should be understood that in all subsequent references to fecundity the production for the winter period only is meant.

It was found that hens can be placed in three distinct classes: (a) those laying no eggs whatever during the winter period; (b) those laying under 30 eggs; and (c) those laying over 30 eggs.

He found, then, that if he took hens of his third class (those laying 30 eggs and upwards during the winter period) and bred them to certain cocks, none of the daughters showed a laying capacity of over 30 eggs. In other words, hens of high productiveness (when mated with certain cocks) were unable to transmit their qualities to their daughters. On the other hand he found that hens of the 30 and over class, if mated with certain other cocks, gave sometimes all high producers, and, sometimes partly high and partly low producers. Again, he found that if he mated certain cocks with hens of zero or low producing capacity, he got all the daughters producing 30 eggs and over. As concrete illustrations of these statements the following figures may be given:—

(a) To show that a highly productive hen does not transmit her fecundity to her daughters. One Indian Game cock mated with six Plymouth Rock hens, all laying 30 eggs and over, produced seventeen hens averaging fourteen eggs and three hens laying no eggs.

(b) To show that a hen of low fecundity may produce daughters of high fecundity. Three Plymouth Rock cocks, known by previous tests to be getting high laying hens mated with six Plymouth Rock hens laying under thirty eggs produced nine hens averaging fifty five eggs and seven hens averaging nineteen eggs.

(c) To show that hens of high fecundity produce nearly all fecund daughters when properly mated. Nine Plymouth Rock cocks mated with thirty-eight Plymouth Rock hens laying thirty eggs and over produced one hundred and eleven hens averaging fifty-six eggs and six hens averaging twenty eggs.

(d) To show that certain selected cocks will produce practically all fecund daughters, however mated. One Plymouth Rock cock mated with ten Plymouth Rock hens of all classes from zero upwards produced sixteen hens averaging fifty-one eggs and one hen averaging thirty eggs."

The figures as they stand are, we think, undoubtedly interesting and instructive, though they may not be absolutely convincing as to the power of the male but it should be remembered that they are merely examples of many. For instance, in the case of the Indian Game, the objection might reasonably be made that it was precisely what a cock of that breed might be expected to do by virtue of his breed and irrespective of his theoretical breeding value, but the same results are reported, whether the two breeds, Indian Game and Plymouth Rock, were bred pure or crossed or crossbreds bred together. In any case it shows, as it was intended to do, the depressive influence a male can exercise on the egg returns.

— How the Theory Explains. —

Writing last month we did so assuming, from what we had read, that the theory was based on a simple Mendelian pair, such as "rose" and "single" in combs,

The following paragraph in the Journal of the British Board of Agriculture, throws more light on the subject :—

"The hypothesis is that high fecundity is determined by the presence of two unit characters (L2 and L1) with their corresponding absences (l2 and l1) ; that females are Ff and males f f ; and that, when L 2, l2, F and f are all present in the zygote, the gametes Fl2 and fL2 must preponderate, ence to FL2 and fl2. The allelomorphs L1 and l1, on the other hand, form gametes in accordance with the ordinary laws. The result is that hens laying over thirty eggs must all be taken as (Ff L2 l2 L1 L1), or (Ff L2 l2 L1 l1), that is to say, all must be heterozygous for L2. It follows (as in the classic case of Abraxas) that in gametogenesis the combinations Fl2 and fL5 must preponderate, and that, consequently, the presence L2 is transmitted to sons in preference to daughters."

— The Difference. —

Thus we have two pairs af contrasting characters, and they complicate the situation by acting on different but definite lines. It would appear that, in more ordinary language, good laying depends on the presence of two factors, tendencies, attributes, call them either. One, probably representing average laying, we can call L1. The other representing the difference between that and high average laying, we can take to be L2. When both are present the hen will be a good layer, when one is present she will be a medium layer and when neither are present she will be a very bad layer. One is a little puzzled why she should lay at all under those circumstances. From our knowledge of facts, it is evident that the number of egg standard will vary, not only in different breeds but in different strains. As an illustration, if, say, the average value of L1 in a flock of Leghorns is 100 eggs, it may be 60 eggs in Dorkings, and perhaps 30 in the Malay. Similarly the egg value of L2 will vary. Even in closely bred strains we should imagine that, though the value of say, L1, as inherited is the same, there will be rather wide variations in actual number of eggs laid even when care and feeding are the same for all. We don't pretend to know why L2 won't pray in the same yard, or rather cell, as F, it is certainly ungallant, because in Mendelian phraseology F stands for the factor femaleness, so we must accept the fact and merely deplore its bad taste and the unnecessary trouble it puts us to. In passing it may be mentioned that in up-to-date Mendelism, sex, which the ordinary person would imagine as constant and indivisable, is regarded with a good deal of suspicion as being of mixed, almost "mongrel" nature. What the breeder has to do, evidently is to get his birds pure to L1, i.e., average egg production and top up with L2 high production to be passed on through the cocks.

Readers! Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.

As there is no apparent reason why the result should not be the heavy layer with a reasonable degree of certainty instead of as a more or less sporting chance as at present, any one should be glad to know how to do it. Dr. Pearl, believes he can tell him how but we are under no such illusions —we mean, of course, as to our own ability to do so—but we can pass on a few explanatory crumbs from the Mendelian table. Just here it will perhaps be as well to say that we do not wish to father any of our ideas, interpretations or suggestions re Mendelism on to anyone else—they might not like it.

— Some Crumbs. —

When two or more pairs of contrasting units are present, in this case L1 l1 and L2 l2 (the dominant character is always expressed in capitals, the recessive in small type) each act independently of each other, that is, each pair follows its appointed course without reference to the other. Just how far the following standard illustration of these reactions will hold good in this particular case where sex distinction operates and the result is expressed in product, we do not know. A strain of peas is tall or dwarf, a horse is chestnut or bay, a fowl is rose or single combed, a cow is horned or hornless, barley is bearded or beardless, without respect to sex, but, as readers may have observed, egg laying is peculiar to the female fowl. We could certainly make a guess based on somewhat analogous but not identical cases, but as readers will understand, we are a little off guessing at present. In any case the exact proportion of "fixed" good layers in the third generation is not of the greatest importance. The main point is that a certain definite number will be so fixed.

— F_2 Generation. —

The result of crossing any two organisms, which together carry the two dominant characters, is, that all their offspring usually, but not always, show the two dominant characters, but the recessive qualities are latent. Cross any two of this generation and you will get results in the following proportions. Nine will show the two dominant characters, three will show one dominant and one recessive, three will show the other dominant and the other recessive and one will show neither of the dominants but both the recessives. This is the Mendelian F_2 generation, at which point the original units split up to their greatest variation. The nine double dominants will breed true from generation to generation as long as they are bred together, so will the recessives. The six, if bred together, will again split up into the same proportions. Applied to this particular case, purely as an illustration of the thing anyone mating two birds might in the first generation expect to get all L_1 L_2 birds, with l_1 l_2 latent, and on mating any two of these he would get in each sixteen birds the following proportions of laying power, nine birds having both L_1 and L_2, three birds with L_1, three birds with L_2 and one with no laying power. If we assume that each is worth 100 eggs, we have nine 200-egg birds, six 100-egg birds, and one no egg bird. This is the point where the trap-nest comes in to detect the L_1 L_2 birds which will breed true and of which the cocks, as we understand it, will throw good layers with any hen. As we have already written, we do not know what discoveries Dr. Pearl has made as to the effect of sex distinction, this is the first time in which product (in animals) has been measured in Mendelian terms. Horn and hide, comb and colour, follow those lines, but hitherto neither milk in cows or eggs in fowls have been tracked to their originating cell, but the ground work is the same, and the poultryman will, we believe, be able to work with the fullest confidence that within certain limits he can get equally as good results in egg production as in comb and colour "fixing." Just as the walnut comb of the Malay may be split up into single, rose, and pea, which will breed true, so with almost equal certainty can L_1 L_2 l_1 and l_2 be handled and fixed. Equal certainty there can never be for it is obvious that while a single comb will always be a single comb, and in its general type be unaffected by external conditions, laying power must always be so.

— Where Trouble Comes. —

It is at this F_2 generation that the utility man and the competition breeder strike trouble at present, for we see that birds may be of apparently precisely similar breeding, and yet be of quite different laying power, and the odds are heavy against, picking six from the nine to send to Parafield, and keeping the seven at home. It is here that we come to the explanation of the "better pens at home," which have no doubt been a worry to their owners and competition conductors.

As we have already written, we are not doing any guessing as to proportions, though the answer seems pretty apparent on the facts before us, but that they are fixed and definite may be taken as certain, for we read that Dr. Pearl reports that according to his theory the 996 pullets bred from his matings were expected to give 476 good birds, 464 medium birds, and 56 bad, whilst tested by trap-nest the actual result was 460 good, 459 medium, and 77 bad. Dr. Pearl "does not claim that his results are necessarily true, for all breeds and strains of poultry, and he recognises that different schemes of inheritance may apply to other breeds. In fact, he suspects that the two breeds with which he experimented—the Plymouth Rock and the Indian Game—may differ in the working of one of the unit characters he has postulated." This is the reasonably cautious attitude of the scientist and is not as we understood it to be taken to mean that the essential principle of the theory does not hold good for all breeds. In any case Dr. Pearl has opened up an immensely interesting field of experiment which we shall follow with considerable interest.

Weight of Eggs.

The Parafield competition birds got through the "weighing the eggs" ordeal very satisfactorily, apparently only four pens failed to pass the test, a very considerable improvement on last year. There seem, however, to be a fairly large number which got through by the skin of their teeth or the "bloom" of the shell. There is certainly need for the clause which is designed to keep up weight, but one can sympathize with the unlucky ones, who fail to pass, because the margin between them and those who just kick the beam is practically unnoticeable, certainly unnoticeable for all ordinary purposes. As underweight is penalized as undesirable, overweight, at all events to a moderate extent, is desirable and should be encouraged, at least one would think so. A safe 25 oz. is certainly better, of size of egg is inherited, than a more or less dubious 24 oz. It would seem to be possible to devise some sliding scale by which weight of egg over the standard, should receive some recognition when the numbers go up. There is one point often overlooked, and that is, that if a quarter of an ounce short weight to the dozen eggs is bad, a death in the pens is worse, yet as far as we know, there is no reason why a competitor should not win a competition with six quite different birds to those he put in. If we remember correctly the present S.A. record is shared and held by seven or eight birds and not by six. It would seem that to lay 200 eggs and live is better than to try to lay 250 and die on the job. If the owner of the 23¾ ounce egg gets a walking ticket, what about the dead bird trouble?

Meals, whether two or three in number, should be given with the utmost regularity.

Mating.

A question which often puzzles the new beginner is the difference between single and double mating. It is also rather complicated by the fact that the utility breeder uses the word single as applied to mating when he uses it at all, in a somewhat different sense to the fancier. The former would be understood to mean that he was mating one or several pairs of birds and keeping track of individual pedigrees. If the fancier used the word one would understand that he was trying to so mate his birds that he would get standard colour cockerels and pullets from the same parent pen and pair. Double mating in the fancier's sense is unknown to the utility man, though we know of some who believe that they get a better type of cockerel, more masculine and vigorous, from a certain type of hen and better pullets from another type, and following this idea, they do to some extent double mate, but they never, as the fancier in some varieties does, mate birds, half of whose offspring he is practically certain will be of no use to him beyond providing an occasional meal. Double mating in the fancier's understanding of the term, is where a different mating is required to produce cockerels for the show pen than that which will produce show pullets. It is a matter which appears to have been carried to extremes in England and America. Nearly all marked breeds are said to require double mating in a greater or less degree. Plymouth Rocks (the barred variety), Silver Wyandottes, and Brown Leghorns, are, because of their greater popularity, the breeds in connection with which it is most frequently spoken of. Generally speaking, a rather light cock with show pullets or hens is used to get standard colour pullets and rather darker than standard hens or pullets with a show standard male to produce cockerels. This is very crudely put, and there are refinements in the practice on which books have been written, and endless discussions in the poultry press of two continents. In Australia, except in a very limited circle, the necessity, or rather the suspicion of it, carries with it condemnation of any breed to which it is more or less justly attached. The fact that double mating is or may be necessary (and it has never been absolutely proved) does not in reality make the slightest difference to its utility value, but probably few people take up any breed for utility without some more or less vague expectation, if not actual intention of breeding up to the standard of that breed and the double mating bogie will consciously or unconsciously weigh in the balance against a breed to which the stigma apples. Hitherto and to a great extent the poultry world has been governed by the fancier to whom the maxim "the greater the difficulty the greater the honour" is supposed to appeal with peculiar force. It may be so and it certainly sounds very nice, but however that may be, it is only by the creation of new varieties and purposely adding to the difficulties of breeding, show birds by raising and altering the standard, that the interest in the fanciers' world has been maintained. Things are going to be different. they are different in Australia already. In England and America a breed is judged by its standard. In Australia it is tested by the produce merchants' sales account cheque.

This matter is one of great importance to those breeders who are interested in varieties to which the finger of suspicion on this account can be pointed. It is in a case like this that the need of a central Australasian authority is felt. The position to us appears to be (1) that the present standard, in so far as it encourages double mating, is injurious to certain breeds; (2) that as a live breed is certainly more important than a dead standard, if anything has to go it should be the standard; (3) that as there is no constituted authority to which the matter can be delegated, it is up to each club and individual to do what he can to bring about a general discussion and decision on the subject; (4) that as the Australian people trusted themselves to manufacture a national constitution, some small portion of them may be trusted to evolve a give-'em-all-a-chance standard."

Parafield.

Commenting on Parafield competition and the somewhat unexpected decision to confine the birds, we wrote some time ago, that it was possible that some competitors might have reason to rejoice because birds reared on the confinement system would be less likely to be adversely affected by the change to Parafield. Now at the end of the winter laying it appears more than possible that the non-confined birds were somewhat handicapped, at least the position of the Victorian contingent, some at least of whom are converts to Mr. Hart's theory, is suggestive. On the other hand it is quite possible that the Victorian birds are better than ours under any conditions for when discussing Parafield possibilities with Mr. Hart, when he was over here in March last, he was very emphatic about the quality of the Victorian contingent. "Right ahead of the bulk of your stock. Hard as nails. The best lot we ever sent over and bound to be handy at the finish," was about how he summed up the situation. Mr. Hart of course acknowledged that the Victorian success was largely built up on S.A. foundation. "We have good birds all right but we didn't buy all your good ones by any means, we made better use of them and that's all there is in it." There is probably something and perhaps a pretty big something in the theory of climatic outcrossing as it is sometimes called. South Australia got a pull in early competition days by using N.S.W. and Victorian stock and now Vic. appears to be getting a bit back. Quite possibly and quite apart from constitutional vigour the Victorian lot at Parafield owe a lot to change of air, which in poultry, as well as mankind, has the effect of temporarily at least speeding things up. This Victorian rivalry has certainly added to the interest of the competition, and Mr. Hart, who is credited with being the man behind the show, is probably carrying around a particularly happy smile. It's a long way from the finish, of course, but we rather fancy the smile will be permanent.

Costs of Laying Competitions

A correspondent, whose opinion we value, writes:—Much interested in what you wrote about Dr. Pearl's discovery. I cannot say that I am in any way convinced but shall certainly appreciate more information on the subject. With regard to your estimate of costs of running a competition I think you are all astray. Labour at 50/- a week is ridiculous. Mr. Day alone gets twice as much as that and there are assistants, also there are visitors who have to be taken round and that takes times. I like a fair deal and what you wrote did not seem to me to put the case quite fairly."

Our correspondent is not alone in doubting the "Pearl" discovery. There are probably thousands of people in all parts of the world who are doing precisely the same thing. To those who have not read of the many extraordinary successes which have been recorded of the application of Mendel's law, the theory naturally sounds like a fairy tale. Still facts are pretty solid things to bump against.

With respect to the competition costs we can say that we also like a fair deal. It was because we thought that each party was already doing a reasonably fair thing that we mentioned the matter. There is no need to refer to the Superintendent in the matter. What he may get, we do not know, but whatever it is, there is not the least doubt that it is well earned. We also know that if the added charge is to be made to give him a bit extra, ninety per cent. of the competitors would say, "Take it and welcome." Mr. Day is, as we understand it, superintendent of all the poultry at Roseworthy, now Parafield, and naturally has and is paid for other work than that connected with the competition. In passing we may mention that in addition to the 50/- a week, which excites our correspondent's sense of of the ridiculous, a proportion of the £165 would go to labour. However, lest there were any other ridiculous estimates and because the question of costs in poultry keeping is in our opinion a matter of importance, too often overlooked, we have looked up one or two points. Perhaps the following will not be without interest.

Interest.—The original 78 pens and yards cost just under £4 each, but were purchased by the Government for £250. Allow 25 per cent. increase in cost of the remaining 56 houses and yards, £280, add £70 for food storage and mixing room, bins, etc., and we get £600. As the Government get money at under 4 per cent. and do not belong to the house of Israel, we can put interest down at £24.

Depreciation—As the materials, galvanized iron, wire netting, and jarrah, are practically indestructable, it is difficult to fairly estimate this. Probably the pens and houses are worth more to-day because of the increased cost of materials than they cost, but we will allow 5 per cent. depreciation, £30.

Rent—Each pen was 40 by 10 ft., 134 of them cover just over an acre, with roadways, etc., call it two acres. The land cannot be more than £10 per acre and cost much less. Most people would be glad to get 10 per cent., £2.

Cases—We do not know what cases are used but 100 of the old egg circle design would be ample to move the 146,326 eggs laid. They cost, with fillers and packing, just about 3/6 each, £17 10/. Allow 33 per cent. for interest on purchase money and depreciation and we get cost of cases, £5 16/8.

Cartage of birds—Average weight of coops would be about ¾ cwt., call it 1 cwt., say seven tons to be shifted eight miles. Four pounds for the job would suit any carrier, but call it £5.

Cartage of eggs—Four hundred and eighty-eight cases at ½ cwt. per case weighs 12 tons 4 cwt., with returned empties, call it 15 tons to be carted four miles. One shilling per ton per mile ought to cover that, £3.

Food—The report says, that this is charged at average wholesale rates, but the wheat used is no doubt grown on the farm. It is said to cost anything from 15/- to 50/- per acre to grow a crop. Split the difference and call it £1 12/6 at Roseworthy. Average yield is somewhere about fifteen bushels, so it takes 40 acres to grow the 600 bushels which is approximately what they would eat, so that the actual cost of the wheat was about £65. We ought really to take £50 off that food bill on this account. In any case selling on the farm is a lot different to average market rates. Ask any farmer how much. He lives comfortably on the latter, but would get quite uncomfortably rich on the difference between wheat in the paddock and wheat in the market. The food bill would probably stand another £25 deduction, but we can leave it at what they charge, £227 3/2.

Railage—The railage charge is 1/ per case, with returned empties, say £27.

Clerical—In putting this at £1 a week one would appear to be liberal, £52.

Packing—Put at two cases an hour, which is not quick work, the 488 cases would take 244 hours, which at 1/- per hour is obviously £12 14/.

Postage—This one can only guess at but £10 would allow 10 communications to each competitor per year and 20 per week to sundry newspapers, etc., call it £10.

Labour—This is, of course, a difficult point, and one in which the competition differs from ordinary poultry keeping, but we know that a ceetain time has to be spent, a certain distance walked, and a certain weight carried. Each distribution of food, etc., means approximately a walk of half a mile. Six trips, food twice, water twice, green stuff once, egg collecting once make three miles a day. Take two pounds a day per hen to cover requirements of food, water, greenstuff, plus weight of egg, and we have varying proportions of ¾ of a ton to be moved over varying proportions of three miles. A Japanese lady of the coal lumping persuasion would do this for 2d. and rear a family on the profits; a Port Adelaide docker would do the job in his sleep and think he was at a picnic; a luggage porter does it in an hour and does not grumble at 8/- a day for doing it. If you double the time for circumstances and double the pay for no apparent reason, you get 4/- per day for 365 days—£73—which looks like fair pay for the actual labour, plus £27 for mixing mash and cutting green stuff, and £20 for cleaning houses—£120. Add 10 per cent. for luck, lice hunting, brooders, spray, nest renewing, etc., you get £132.

Deduct those costs, £530, from £700 receipts, and you get a balance of £170. Not a big sum but sufficient to amply cover anything which can be reasonably charged to competitors.

We have not mentioned commission, but if Mr. Pope handles the eggs, as he no doubt does, there is probably a nice little profit on the £663 income from eggs. Most people would like his chance with the storage facilities at his disposal.

Our correspondent mentions visitors, and the report says that hundreds were taken round the pens. This is evidently a mutual advantage. A fair way, perhaps, to look at this is for the competitors to have charged the College 1/- a head for making it attractive and also to allow 1/- a head for the trouble of being made attractive—additionally attractive, of course, we mean—and call it quits.

We are not charging anything for the—to again quote the report —" fine advertisement of the State as a whole . . . , of which one cannot sufficiently appraise their (the competitions) value." As the Government are always very willing to pay liberally for an advertisement the value of which they can measure, they ought certainly to recognize their indebtedness for one which is admittedly immeasurable. Perhaps if this view of the matter discreetly brought to the notice of the authorities, they would remit the entrance fee in the next competition. It would be a graceful act and much appreciated.

Hurry on the hatching. Spring is undoubtedly the right time to raise chickens, both from the health and economical points of view. Not only is the feeding cost reduced by the adbundance of natural growth, where the birds have liberty, but the food consumed appears to give better results, weight for weight, than later in the year. Recently a small flock of chicks was tested to find out the actual weight of food consumed up to killing age, 18 weeks, and it worked out at 14 lbs. 9 ozs. per head, to bring the birds to 3 lbzs. 12½ ozs. How does you feeding compare with this?

Poultry, Bees and Fruit.

It is generally admitted that poultry pays best when run in conjunction with something else, either general farming or some specialized branch of production. It is not so very long ago that most people held that poultry, on its own, was an impossibility, and at the prices then ruling, they were probably correct. Present prices make poultry a very different proposition to what it was when wheat went up to 7/- per bushel, and eggs down to 2½d. a dozen. Those are extreme figures, of course, but they did rule for a time. The 50 per cent. on the 8d. yearly average of four or five years ago has made an immense difference, and many people in Australia to-day are proving that poultry on it's own is a paying game. On the principle that it is not wise to have all one's eggs in the one basket, there is a good deal to be said in favour of a combination. Dairying and poultry keeping is a popular idea. In theory it looks excellent, but in practice it seems to be uncommonly like turning penal servitude into slavery. The cow is an excellent beast, no doubt, but a pretty exacting master, or should it be mistress, but multiply her by fifty and add five hundred hens, and things become lively, if both are run at their top. Their proud possessor may be able to call his soul his own, but he can certainly lay no such claim to his time. There are men who are doing this double shunt and doing it well. More power and good luck to them. Their's is certainly not a lazy man's life. If we were looking for something to run with poultry we should certainly try to hit on something that could take care of itself at least for 24 hours at a stretch. Naturally a fruit tree would suggest itself as meeting this requirement and also as being to remain where one left, for that space of time which cows and poultry do not always elect to do. There are instances where poultrymen have become orchardists through planting a few fruit trees for shade, and some orchardists have become poultry keepers through bringing a few fowls to clear out grubs, etc. Some men have worked up a fine poultry plant and a model orchard from nothing, and others have worked or slacked out of one or both. It always comes back to the man behind. To run any single business successfully, wants organizing and exectative ability, to run two may not require twice as much but it certainly wants more. What we started to do was introduce to our readers an American fruit-poultry-bee man who seems to be quite pleased with himself and his doings, and who puts the case for his treble event very fairly, we think.

The labor of both bee keeping and poultry raising is comparatively light work and to one not overly strong who feels the need f an open air life there are few occupations which are more attractive and fascinating and certainly few which require so little capital to be invested and yet are capable of furnishing one with a good living, if not something besides.

In keeping either bees or poultry it is essential that one apply themselves closely to the work. Although the work itself is not not heavy nor particularly taxing on one's strength, it requires constant and systematic attention to insure best results. Perhaps anyone very much disinclined to stay at home closely would not find them congenial employment, owing to this particular feature. This, however, would prove no objection to the many who have a natural fondness for the home life and its rural surroundings. In fact such would consider it rather a pleasure to stay at home and give these interests the care and attention they require.

Our farm consists of only ten acres and it is devoted to the breeding and raising of bred White Plymouth Rocks for d-ing purposes. Our busiest time is during the fall and winter, with the selling and shipping of breeding fowls and during the spring with the sales and shipments of eggs for hatching purposes. Thus you see our work with the bees comes at a time when other work is not so pressing.

We have quite an orchard of plum trees now well started on the farm to furnish shade for the poultry and incidentally fruit for our table and for sale. Bee keeping has been taken up as a side line and has been found to interfere very little with our regular poultry work. The chickens are allowed to run among the hives to the mutual benefit, we believe, of both bees and chickens. From the fact that the chickens frequent the neighborhood of the hives so much and we seem to have so little trouble from the bee moth, we judge they catch many of the millers and I am quite certain they catch a great many drones, although manifesting a wholesome fear of the workers. In many ways poultry and bees seem to be adapted to occupying the same ground.

The combination of poultry, fruit and bees is a unique one, each contributing to the well being of the other. Shade us one of the essentials on a poultry farm and nothing furnishes any more desirable shade for the chickens than an orchard of plum or apple trees and either makes a most desirable location for the apiary, especially a plum orchard, for the trees are of a low growth, thus preventing swarms clustering too far out of one's reach and in case of its being thought necessary to remove the branch on which the swarm clusters, plum trees are much less liable to injury from the unseasonable pruning. It is generally known that fowls are of no small benefit to the fruit trees, not only in consuming many insect enemies of the fruit, but in the increased fertility of the soil.

Home Notes.

How to Feed Children.

Impaired nutrition and general health are indicated by loss of weight and deviation from the normal rate of growth; thus, as a rule, during early teething the rate of increase in both height and weight is sub-normal. Children, then, should be very frequently weighed and measured, as an important aid to knowledge of their well-being is thus obtained. If it is found that weight is lost, inquiry must at once be made as to the cause of the loss. In this light it is important to know the normal rate of increase. During the first few days after birth the infant loses five or six ounces in weight; but, nevertheless, by the end of the first month it has gained 1 lb.; 2 lbs. are gained in the second month, after which the increase in weight is less rapid. The weight at birth should be doubled in the first four or five months, aad trebled by the end of the first year, during which time the child should have grown three inches in the first three months, 2ins. in the next quarter, and 2 or 3ins. in the other six months. A child at three years should stand 3ft. high, and weigh 32lbs. At five years it should weigh 40 lbs., and at eight years it should measure 4ft. At twelve years it should weigh from 72lbs. to 80lbs., and measure 5ft. Most children grow by fits and starts—perhaps 3ins. in one quarter, and not 1in. in the next half year. Rapid growth is an indication for care, much nourishment, and rest; loss of weight is a symptom of disease or insufficient nourishment. Care must be taken that growth shall not go on at the expense of nutrition, as it will do if the child is not properly fed. When this is the case, growth takes place without a corresponding development, and the general health is injured. People often say of a young person under these circumstances that he or she has "outgrown his or her strength." It is important to note that if girls do not increase their growth-rate during their eleventh and twelfth years, healthy development a year or two later is hindered.

— Milk. —

While the food of children should be high nutritive and abundant, it should also be very varied in kind. In order to properly nourish the system a great variety or food substance is required, and foods are more or less complete as they contain a greater or less variety of these food elements. Toe on.y food complete in itself, containing all the necessary materials for the support of the system, is milk, hence milk is the all-sufficing food for infants; but deprive it of some of its elements, and starvation is the result. Thus, although some people might think if they fed a bab-- entirely on cream they would be giving it most nourishing food, in point of fact they would be starving it to death quite as much as if they fed it wholly on skimmed milk.

— Older Children. —

An older child, or even an adult, might live for an indefinitely long time on milk only, but he would not thrive nearly so well as on a more solid diet. For as the system dekelops, the muscular coat of the stomach and intestines becomes powerful, and it cannot act upon liquids. Thus, if only liquid food is taken, part of the digestive system is idle, while too much work is thrown upon another part. In order to allow the muscular coat of the stomach to act properly, a certain bulk and consistence of food is necessary. The stomach must not be quite full, or the natural churning action is rendered impossible; but, on the other hand, it must be nearly full, or this cannot proceed. After the first year of life there should be a steady increase in the amount of solid food taken, and variety in diet becomes more and more important.

— A Mixed Diet. —

When the child is sufficiently developed to be put on a mixed diet, care must be taken that the diet is really varied. Parents insist on a sameness in their children's food which they would never tolerate in their own. Animal food should not be given too frequently at first, but by an active child of four years and upwards it may be eaten at once least a day. One of the first forms of animal food that may be given to children is that of good beef-tea, which, with a little judgment, may be given even as young as twelve or thirteen months if the infant seems insufficiently nourished. If may be given a tablespoonful or two at a time, or in larger quantities, as it is found to agree. When baby is well on with cutting his teeth, at about fifteen or sixteen months, he may have eggs cooked in various ways, and light farinaceous puddings, custard, and the like. To help in forming the teeth, and especially when the bones seem weak, food such as oatmeal porridge, which is of great value, may be sweetened with malt extract, which should always be used if sugar disagrees. This helps to digest starch, and it contains both flesh and bone-forming and heat-giving material. Children, as a rule, like it very much, and grow fat upon it. I may be spread on their bread instead of butter. For dinner, at about the last-named age, a little boiled white fish carefully picked over with the fingers to remove the bones, or cod, the flakes of which should be divided and shredded up to render it easily digestible, may be given, mixed with floury potato, squeezed from the skin in which it has been boiled, and with butter and salt. Mothers should be careful not to omit salt from their children's dietary, as it is an important food.

— Pure Water. —

Plenty of fresh, pure water should be allowed. It should be remembered that water is the most important food—no less than 79 out of 100 parts of the blood are water. Water is, of course, contained in all articles of food; but parents need not be so afraid as they sometimes are of allowing children to drink it neat. Dinner should consist of meat, vegetables, and fruit, or fruit-pudding, with water for a drink. At breakfast, fish, or an egg, or marmalade, or stewed fruit should be given as a change from the usual porridge or bread and milk. Both at this meal and at tea the drink should be milk only, cold or warm, or diluted with warm water and sweetened if desired. For tea, bread and butter, or bread and marmalade, or toast, with, perhaps a little stewed fruit for a change. If supper is required, plain biscuits and butter, with milk and water, may be given.

— Sugar. —

The craving for sugar in young children is a healthy and natural one. Physiologists have proved that both sugary and fatty matters are oxydised in the body, and during this process heat is evolved. Now the child just as much loves sugar as it abhors fat, and it is only reasonable to uppose the childish system demands more sugar. Firstly, because it loses more heat, and, secondly, because it cannot deal with much fat. Looking at the matter from this point of view, we see how wrong those people are who object to give their children sweet things, while trying to force them to eat fat, for which they have a supreme disgust. People are also apt to give children little or no fruit. They have not the slightest objection to giving them purgatives, but they deny them what will prevent the evil they desire to cure.

— What to Avoid. —

If a child shows a marked distaste for any particular kind of food, it is wrong to force it to eat that kind. Firstly, such enforced obedience creates ill feeling; secondly, food which is disagreeable is likely to cause indigestion; and thirdly, there may be some organic idiosyncrasy which renders that food obnoxious to the system. There is a case on record of a man on whom mutton seemed to act as a kind of irritant poison, and similar cases are not very rare. On the other hand, if a child has a strong deeire for any one kind of food it is unwise to deny it unless you can show a very good reason for so doing, when you should tell the child that reason as simply as possible; as, for instance, "No, dear, that will give you a pain in the stomach, or make you sick." Never be misled into saying, "Such things are not good for little boys and girls," for children do not see why grown-up people should have the good things which they are forbidden to enjoy. If, however, you give a reason which at once appeals to their own experience of the order of nature, they are ready to recognise it as a sound one.

Horticultural Department

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

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ADDRESS—85, Currie St., Adelaide. Telephone, 1284.

Nasturtiums.

Lightly lov'd and coldly nam'd,
By the roses' glory shamed ;
Left with penury of song,
To enrich some barren wall,
And receive no thanks at all ;
In thy burning loveliness,
I beheld the fire and stress
Of that beauty mix'd with life.
Whence such splendour hath its birth,
Like the fairest things on earth.

Wine-dark petals, amber fleck'd,
Orange cups suffus'd and streak'd
Lin'd with primrose, veined with red—
Fitting vessels every one
For the ichor of the sun !
Thou shalt drape the poor man's fence
In thy royal opulence ;
And, where roses rarely come,
Filling some dark court with flame.
Have, like them, thy meed of fame.

"Pall Mall Gazette."

Readers ! **Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.**

Reminders.

Plants of a kind should be massed together rather than indiscriminately mixed.

Some thought should be given to the relative height of plants when planning the garden.

Be generous in giving away the flowers and you will have more, as this will prevent seeding which checks the growth of the plants.

Most flowering plants do best in a rich soil and all are better if the soil is kept cultivated around them.

A loose soil mulch is a great moisture preserver but a hard surface gives it off.

Keep the sweet peas well watered and a dose of weak manure water twice a week will be a help. Keep the surface well stirred.

Hollyhocks are to be had in a great variety of shades in pink, white, crimson, salmon, purple and almost black. They are showy, stately plants and appear to good advantage against a back ground such as a building, fence, shrubbery or hedge. Try a packet where they are to grow.

Have you ever tried the annual aster as a pot plant in the shade or glass house. They will flower splendidly in a five inch pot. They like a fairly sandy sweet soil which has been well mixed with a third part of old manure. After the seedling bed, start them in a 3in. pot.

If your garden is without a root or two of perennial aster, or so-called Michelmas Daisy, you are missing a good thing for summer and autumn flowering. A nice-rooted plant can be bought at the nurseries for a few pence. It is one of the simplest things to grow and quite one of the hardy brigade.

Do not forget a sowing of the graceful and dainty Hunnemannia. This is one of the things which seldom replants well and sometimes refuses altogether. Sow thinly where they are to flower or in pots which can be transplanted without disturbance.

How about Delphiniums ? Fortunately it is not necessary to wait to raise seed. A few nicely-rooted plants, quite a nice collection in fact, can be bought at the nurseryman's. There is hardly anything which will give a better return.

If you are interested in native plants, shrubs and trees, now is the best time of the year to show the seed. Our native bush beauties deserve a great deal more attention than they receive.

Keep off the ground where it is wet is a very useful maxim, for it applies to all cultural operations of all flowers at all seasons of the year. Of course with light sandy soil it is not of much importance but be careful with the sticky ground.

Before planting we should have a definite object in view. If there is no reason for planting, then do not plant.

Bedding plants are usually employed to add color to the scene. Color enhances the beauty of formal designs, and so we will always appreciate the merits of bedding plants, properly used, because they add permanent color and pleasing design, to scenes that would otherwise seem dull and unattractive.

Anything that has a herbaceous top which dies down annually whilst the root continues to live is a reasonable definition of herbaceous perennial. A shrub is a much more permanent and woody plant and does not come within this meaning at all.

Verbenas are very desirable for masses of colour and are useful in bedding or to border large beds of other plants. The seed is rather slow to germinate. The flowers drop too readily to be of much use when picked for decoration. Some are pleasantly fragrant.

Penstemons will now be ready for planting out. They like a good rich soil and later on plenty of water. The nurserymen have any number of varieties to choose from or the seedlings which are much cheaper are often equally good. Cuttings can be put in now.

Separate and plant out small pieces of perennial sunflower. They will make big clumps by flowering time. They are one of the hardy useful sorts which will stand a lot of ill-usage, but like most other things, will respond to good treatment.

Trees and shrubs that are being planted should be watered when about half the earth has been returned to the hole. Let the water drain away and then fill in the remainder of the earth.

The following prescription is recommended to stop damp or rot in cuttings which are rooting. One pound of sulphate of copper dissolved in two quarts of ammonia and then diluted in thirty gallons of water. Keep the liquid stirred while using.

Either of the smaller bamboos make a pretty breakwind or do to hide an odd corner. They are useful things to grow for they make capital stakes. The white ants do not worry them much.

Never crowd flowers in a bowl or glass. Remove all leaves below the water line. Keep the glasses and jars free from slime or odour by frequent rinsings. Remove all bruised and wilted petals when you gather the flowers. Pick in the morning and as far as possible, let them be in the advanced bud stage.

The perennial phlox, especially for cooler positions, is really one of the finest and most generous flowers we have. They make handsome, bold clumps, and the colours are very charming. They should be put out now. Established clumps should be well manured.

In watering flower and vegetable garden plots, avoid sprinkling the surface but give the plants a soak at the roots. Sprinkling only induces a root growth near the surface, while the soak system sends the roots down to moister and cooler earth.

If not already in the Amaranthus seed should go in at once. There are plenty of varieties to choose from but a mixed packet of seed will make a beautiful display for the rich and varied colours blend together beautifully.

Fresh air is as important for cut flowers as clean water. Keep the flowers out of draught, but by all means let them have clean sweet air. Placing bowls on a sheltered verandah over night will help to hold the blossoms together.

Roll your lawns now, while they are fairly moist.

A screw driver or half-inch chisel is a capital tool for cutting weeds out of a lawn.

Buffalo grass will soon be making a start. Do any planting that has to be done during the next few weeks. When the hot days come the growing will begin.

Cut flowers last longest if you cut a little from the stems each morning and set the vase or bowl in a dish of water over night.

It is a mistake to neglect a lawn during the first few months of its existence for it is then that the young weeds get a footing. Begin by good treatment in the matter of digging, manuring and weeding and the rest will come of itself.

Rhododendrons are, unfortunately, not for the plains, but the Hills garden may rejoice in this very beautiful shrub. There are just two things to remember in planting and that is that they object to lime and new manure.

Bouvardias should be planted as soon as the weather gets warm. They want rich free soil with plenty of depth and in the summer require a generous supply of water. Any manure added should be very old. Shade till established.

Azaleas growing in pots will need some attention after flowering. Pick off all the old flower ends and stimulate the plants by scraping some of the top soil and replacing it with old cow manure. Get good growth and next flowering will be all right.

When ranunculus plants have ripened their seed, the heads should be cut and thoroughly dried before being stored away. Sown at midsummer they will flower the following spring.

Perennial candytuft is easily struck when the growths are young and soft. Pansies may be propagated from young tops which have not become woody. Snapdragons also. They take more certainly under a glass frame.

Watch all newly-planted trees and see that the roots are not allowed to dry out.

An essential thing in planting out from a pot is that the ball is loosened and softened. Soak a pot grown plant before lifting.

When flowering is over in rhododendrons, take away all old flowers. New shoots break away from the head where the bud developed.

It is a good time to begin hoeing now, supposing you have not already commenced and it will be time to leave off when you have finished.

Garden tools placed in a solution of soda for five minutes will stand a lot of exposure before they rust, also use an oiled rag. Stakes treated with creosote will last for years. It is just as well to know this.

Soil and drainage are great factors in tree growing. To plant a tree or hedge in ashes and tin cans with an asphalt pavement on one side and a garden path on the other and still expect it to grow is not an unusual thing. Nourishing food is the first principle of good health, whether it applies to vegetation or human life. Starvation means an easy victim to disease. As good soil is essential to success in tree culture so is drainage. Where nature has provided proper drainage artificial drainage is not only superfluous but dangerous to tree growth.

Flowers certainly have their likes and dislikes. One perculiarity of the pansy is said to be a fondness for gypsum. "If you have never used it on pansies you will be delighted; a little dusting will give wonderful results," writes a pansy lover, and he adds, "if you are going to keep your pansies in bloom, you must cut them before they go to seed, and there is this about the pansy, the more you cut the better your plants will thrive, and anybody that is stingy with flowers will not have many flowers; so cut them off freely and do not allow them to go to seed. As far as gypsum is concerned, just as soon as you have a plant started, encourage it. I have never found in cultivating a plant any time that is so valuable or critical or useful as so really when it is small. You want to take your baby plants and nurse them, as you do chickens, then is the time to do it."

For beetles and leaf-eating insects spray with arsenate of lead. It will not damage the plants. Ants have a very great objection to one-third solution of arsenic and two-thirds syrup sugar. A few drops about the beds will quickly make an end of them. Clear lime water will rid the lawn of worms. Cutworms can be killed by strewing the surface with soot and watering it in.

Garden Notes.

— Thinning the Roses. —

There is a trite saying, that "No man should hoe his own Turnips," and, perhaps, this might apply to thinning Rose shoots. One is terribly afraid of overdoing it; but, as a rule, more bushes and standards are spoilt each year by the want of judicious thinning of the young growth than is generally supposed. Those young growths in the centre of the plant that point inwards should be rubbed off, and where two or more shoots start from one eye, only one should be allowed to remain.

Before thinning, be very careful that those shoots which are to be preserved are free from insect pests, for often a fine growth is checked by these little black pests eating away the point. If we confine the work of the roots to the development of a few good shoots, the resulting bloom will be far superior. Not only is this so, but we check the ravages of insect pests by depriving them of their hiding places.

— Gaillardias. —

For a garden where the plants are expected to do a great deal without very much attention, there is hardly anything to beat the gaillardias. The seed germinates well, the seedlings grow quickly, they will put up with poorish soil, are quite reasonable in regard to water, within limits have a pleasing diversity of colour, remain in flower for a long period and the blooms last splendidly when cut. A packet of seed sown at once or a bunch of seedlings set out in a nursery bed and afterwards transplanted a foot apart will make a very bright display later on.

— Dahlias. —

If the dahlias are to do their best it will help them to have the bed in which they are to grow prepared a little time before the plants are put in. The dahlia is not very particular as to soil but it should be at least moderately rich. The texture should be nice and open, and if it is heavy leaf mould, sandy and old rotten manure will be helpful. The plant has to make a lot of growth in a few months. Where a number of plants are to be grown together it is best to dig over the whole plot at least eighteen inches deep, this will give them feeding room. With the bottom spit dig in a three inch layer of old cow manure if you have it, if not any animal manure you have. If you use sweepings from the poultry yard, which does excellently, unless it has already been well mixed with earth, considerably less will be needed. Add a dusting of bonedust or super at the same time and dig to the full depth of the fork, breaking up the soil thoroughly, afterwards return the top soil to which you can also add a little old manure and anything which will help to keep it free if it is apt to bake. If you are planting in odd positions about the garden take out a hole to the same depth and three feet across and prepare in the same way. The dahlia likes plenty of sun but for preference likes some protection for unless carefully staked they suffer a good deal when "the stormed winds do blow," which it usually does in March and other times.

— Ferns. —

Ferns dislike direct sunshine, hence their peculiar adaptability to indoor growth. Each pot should be slightly turned every day so that the light reaches every side alike, and they must be shielded from draughts of any kind.

The growth, or otherwise, of Ferns depends almost entirely on the correct amount of watering they receive. Ferns love water, as is apparent from the fact that in their natural state they are always to be found in or near a stream. They should have water fresh every day, for if once allowed to become dry throughout they will never regain their full lusty health, and it is best to cut them down entirely. Once a week give a bath; place them in a tub in water about the heat of a summer shower, and then spray them thoroughly for about five minutes or so, this removes all dust collected on the leaves, and gives the plant fresh life. A spray of tobacco water is excellent to remove insects from a diseased fern.

In dividing or repotting a fern, select a pot large enough to give the roots plenty of room, place a few bits of broken crockery at the bottom for drainage, and then fill the pot with good leaf mould. If a fern has overgrown its pot and it is not wished to use a larger one, simply cut off a portion of the roots sufficiently to enable its replacement in the same pot. This summary treatment never seems to hurt them in the least, and the more hardy kinds certainly gain by it.

Any imperfect fronds should at once be cut off close to the root; they are only a strain to the plant while detracting from its appearance.

Some gardeners recommend the placing of thin pieces of raw meat close to the inside of the pot between pot and soil, as a wonderful stimulant to the growth of ferns, when the other conditions of fern growing are observed.

The maidenhair fern is without doubt the most popular, and certainly no group of ferns is complete without it, but the Pteris also is a lovely little fern, closely resembling the maidenhair, and although of slow growth, it possesses a charm of its own, while the Hare's Foot, Aspleniums, etc., should not be passed over. Indeed, the only difficulty with a beginner is which variety to select, but when this obstacle is conquered, the pleasure to be obtained from the culture of these beautiful plants is immeasurable.

— Palms. —

There are two kinds generally grown, for house decoration, viz., Kentia forsteriana, K. belmoreana, characterised by more numerous leaflets and a rather dwarfer habit. Intermediate forms, however, often crop up in a batch of seedlings. Although they are generally grown and referred to under the name of Kentias, these Palms are by botanists placed in the genus Howea. This name is derived from the fact that they are both natives of Lord Howe's Island.

Kentias are grown in comparatively small pots, and this is an item in their culture in which the amateur is very liable to err, for the plant is often shifted into a pot much too large, and it consequently soon falls into ill-health and ultimately dies. It is far better in most cases to allow the plant to remain in the same pot, and, if necessary, give it an occasional stimulant in the shape of a weak dose of sulphate of ammonia. When thoroughly established the stout roots are apt to coil around the bottom of the pot and, by slightly lifting the ball of earth, allow the water to escape between it and the pot. The result will be a gradual starving of the plant. A good way to water the Palm is to stand it in a pail of water and allow it to remain therein for half-an-hour or thereabouts. Then take it out and let it drain before placing it in the saucer or other receptacle. On no account must water be allowed to stand in the saucer, as this causes the soil to turn sour and sets up decay of the roots. The plant should always be shaded from the direct rays of the sun, and the foliage must be occasionally sponged.

— The Show Rose. —

Out of the many thousands who grow roses for their own home pleasure, there are comparatikely few who take the trouble to make themselves familiar with the qualities which should be present in a flower before it is up to show form. Briefly stated, the points of merit are :—(1) Form ; (2) size ; (3) colour. The petals should be of good substance, regularly disposed within the circular symmetrical outline, free from blemishes and notched edges, and the colour should be clear and fresh. The larger the bloom the better, provided the centre is full and of a good shape, and all the other qualities are equal. Most of the hybrid perpetuals carry a fuller body, with more of the camellia type of outside petal formation. As a rule they are rather more stiff. Form, and size, and colour, then, are the three essentials for which the would-be prizetaker must aim.

— Chrysanthemums. —

It is presumed that the beds have been already heavily manured, deeply dug, and otherwise brought into a suitable state to receive the plants. And where not already planted, they should be at once set out in their 'permanent quarters. For decorative purposes they should be planted, as it will be necessary to prune out the points of the leading growths several times during the season of growth to produce a dwarf bush habit. The single varieties stand in the very first rank as artistic and lasting flowers for cutting purposes, and for this reason should not be omitted from any collection grown solely for decorative purposes.

— Roses. —

Roses are now last approaching the flowering stage. At this stage of development a good soaking of liquid manure twice in each week will be of material advantage, not only in sustaining them during the ordeal of flowering, but also in stimulating them to produce produce finer developed blooms than is possible without such assistance. The careful cultivator will in the case of roses, as well as all other plants, discriminate between a weak growing variety and those of more robust constitution. The powers of assimilation of any plant is just in proportion to the vigour of the variety treated. Consequently, in the application of liquid stimulants, different alternations are necessary in treating a collection which are of varied constitution and degree of vigour.

— Daffodils. —

Where raising seedlings is carried on, a daily watch must be kept for seeds ; in hot weather the seed matures very quickly and a pod which in the morning looks all right for a day or two may with a hot day burst before evening, and in that case the seeds—possibly the result of careful thought and work—will be all lost. Some people follow the plan of cutting the pods off with some three inches of stem as soon as the pod turns brown on top and begins to show signs of splitting. The stem is then pushed into earth in a pot of convenient size until the base of the pod rests on the earth, if then the earth in the pot is an inch below the rim the seed is pretty safe, and can be left to complete ripening, and as soon as this is the case the seed can be sown, a little earth sprinkled over the pot, and the pot then put aside in a quiet corner of the bush-house to the left until the seed starts to grow. The earth in the pot should never be allowed to get dust dry, nor should it be over-watered. Generally the seed will not start to grow till the following spring, but with Polyanthus (erroneously generally called jonquils in this land of misnomers), the seed will sometimes start in a month or six weeks' time, and these are best pricked out in boxes an inch and a half apart and grown right on. Treated thus they will not lose their foliage.

— Specimen Trees. —

To ensure success the ground where the tree is to be planted must be well prepared to a fair depth, and if the underlying soil is a stiff clay, it should be well broken up to ensure free drainage after rainfall. It is a good plan, if the subsoil is of a cold, raw character, to remove some of it and shovel in the adjoining mellow surface soil. The young roots will thus find themselves in a suitable environment, provided drainage is secured, and the danger of the hole filling with water and remaining in a stagnant condition guarded against. Nothing could be more detrimental to the young roots than simply making pockets in the ground where, after each rainfall, the atmosphere would be excluded, and the subterranean portion of the tree asphyxiated through standing water. The hole to receive the tree should be of ample size, so as to admit of the roots being normally spread out, and when filled in again the soil should be firmly pressed down with the foot, so as to give rigidity to the tree and ensure the close contact of the roots with the soil. A proper guard must be provided, whether it is a small fence or just three or four posts with wire netting. The tree is at its critical stage when first put out in its permanent location, and accommodating itself to its new environment is quite sufficient tax on its vitality without having to withstand the numberless buffetings unguarded trees receive.

— Picking Sweet Peas. —

For decorative purposes Sweet Peas are unsurpassed. Their delightfully refreshing fragrance, combined with their delicate, dainty tints, give one a feeling of rest and content, and inspire one with longing to be the possessor of them in plenty. They lend themselves to almost any floral device. There is a lot of truth in the following rhyme, as those who put it into practice will know :—

" The deeper you trench, the finer
 the Pea ;
The thinner you sow, the stronger
 they'll be.
Keep using the hoe, and take it
 from me;
The more blossom cut, the more
 you will see."

Those who do any exhibiting will know that although it is important to possess good flowers, it is also important to make the most of their merits. One point to remember is to pick them before the sun is on them on the morning of the day before the show. Where it is doubtful whether the requisite number of flowers will be to hand, advanced sprays may be cut even earlier than this, and kept in a cool place, and others can be cut on the evening before the show. A bud on the top of a spray will in a day become as developed as its fellows. There are some slight exceptions to this rule, for in some circumstances it may be found that a certain variety loses its colour rather badly if kept. In such a case the flowers should be cut on the evening before the show.

— Pot-Pourri. —

There is no limit to the number of sweet smelling flowers, leaves, roots, chips of wood, spices, and other things which may be employed for making this pot-pourri. The plan is to collect any sweet smelling leaves, etc., and dry them to a certain extent, so that there will be no fermentation. Needless to say, if collected from the garden, it should be done only on the afternoon of dry days. These materials may be spread on pieces of cloth or canvas and placed in some shed or similar place where the sun will not shine directly upon them, but where wind can play freely about them to dry them. As the process of drying goes on, the leaves should occasionally be turned to see that they are not getting into knots or becoming mouldy. Two or three days will usually be sufficient for such things as Rose petals, but it largely depends on the weather. When they have reached this stage of dryness, put the various materials in mixture in earthenware jars and place a sprinkling of table salt and bay salt between each layer as the filling proceeds. A weight should be put on the top of the leaves when the jar is full and this weight must be sufficiently loose to sink down into the jar with the leaves. If the jars are not sufficiently full, more leaves can be added later. Every kind should be dried separately to enable them to dry equally. Finally, all these things are mixed in one general heap, adding such spices as cloves, mace, orris root, violet powder, cinnamon, nutmeg, lemon peel, etc.

— Wallflowers. —

This is a very charming flower when well grown. To get good results the present is a suitable time to sow, they can then be put out in late autumn and will flower early. Prepare shallow drills for the seed, sow thinly and evenly, the rows being about four inches apart, apply water through a fine-rosed watering pot. As soon as the young plants appear, stir the soil between the rows and remove all weeds from among them. When they are sufficiently advanced to bear handling, prepare a suitable nursery bed in a not too sunny a position, and transplant them without delay. If allowed to get overcrowded in the seed bed they become weakened. Tread down the soil of the bed firmfy, level with a rake and plant nine inches to a foot apart. Plant firmly and apply copious waterings in the absence of rain. Where several varieties are grown, each should be carefully labelled, so that no mistake occurs when finally planting out in the beds or borders. Ply the hoe frequently, both to keep down weeds and also to prevent a hard, caked surface on the bed. Beyond this the plants will little attention, and nice strong specimens should be available for planting when required in the autumn months.

— The Camellia. —

The camellia is not often happy out of doors on the plains, or in fact in any northerly exposed position, where its foliage is apt to be scorched and unsightly. Yet we sometimes meet with fine healthy specimens growing in sheltered situations in suburban gardens. In the warm but more humid climate of Sydney, the camellia flourishes, and is sometimes used for making hedges. Apart from their magnificent flowers, the handsome shining evergreen foliage of these plants render them great favourites with most people. They may be grown in almost any ordinarily good garden soil, but a rich, fibry loam, well drained, suits them best. They may be grown with other plants in the shrubbery border, but care should be taken to prevent the roots of trees or large growing shrubs from interfering with them, but they do best in a bed by themselves where they may be more easily mulched and watered than they would be in a mixed border. The ground should be deeply worked, and, if poor, well-rotted manure should be freely used, or, in its absence, coarse bonedust may be added. Liberal waterings must be given in dry weather, and the hose freely used to plants newly set out, or in the spring time, when new growth is being made. The plants are chiefly of a compact habit of growth, but some are inclined to be tall and straggling; they bear the knife well, and even old and leggy plants may be pruned into shapely specimens. Camellias should be planted where they would be sheltered from the ill-effects of either hot or cold winds. In their native country, Japan, these plants assume an almost tree-like form, being found sometimes from thirty to forty feet in height. The time for planting out camellias is in the autumn or spring. A famous Cornish private garden has 1,000 Camellias, many of which are up to twenty feet high and thirty to forty feet in circumference.

— Coleus. —

Coleus are easily raised from seed, if little care is taken in handling the seedlings during the first month of their existence. Sow the seed, which is very fine, in a shallow box or pan of sweet, well-drained earth, and keep in a glass-house or frame until the youngsters are fairly well advanced. Prick the seedlings out as soon as they can be handled, and push them along.

— Begonias. —

Tuberous begonias of all sorts may be planted in pots or in rich beds, under a ti-tree or light shelter. In either place they do extremely well, making quick growth, and producing a profusion of exquisite blossoms. In any position the soil must be very light, and the drainage extra good. Bulbs or tubers all like to be above high-water mark. Where the surplus water cannot find an outlet, is no place for anything in the flower line. Use a third coarse sand, leaf mould, or very friable loam, and old crumbly cow manure. Let each tuber have a pot of its own. When growing in beds under cover ten inches of clear room will suffice. Keep the tuber top just above the soil.

— The Mock Orange. —

This shrub succeeds in almost any good garden soil, and when properly dealt with by the grower are really very handsome objects in the garden, both at close range and distant view. This is brought about by the quantity of flowers they produce. In some varieties the flowers are sweet scented, thus lending an additional charm to shrubs that are fairly popular both in gardens of large and small size.

The first to come into bloom is P. coronarius, the subject of this note. It is sometimes termed the Cucumber plant as a popular name, and this took its origin from the fact that the fresh young leaves smell very similarly to Cucumbers when freshly cut. Some other plants could be named that have a fairly similar odour, but they are herbs while this is a shrub. It is one of the smallest and therefore very suitable for gardens of small size. The flowers are pure white, fragrant, and when produced in quantity are really very effective from a distance.

The plant flowers on the wood made last year, so that cultivators should remember this when pruning, as this habit really determines when the pruning suould be done. After the flowers are past their best the bushes may be cut back if the desire is to keep them within narrow bounds. The young shoots made will then ripen up and flower next season. Propagation may be effected in several ways, such as lifting suckers some time before growth commences, and setting them out in nursery lines to form bushes to be used in the shrubbery when of suitable size. Branches may also be layered at any time in spring or summer. Cuttings may be taken of short side shoots just beginning to get firm at the base, removing them with a small heel of the old wood. Any good garden soil will meet their requirements, but should it be very heavy the addition of sand will do much to improve it.

— Flag Irises. —

Tall growing and handsome, these plants form a charming picture with their numerous large and lovely flowers of various shades of colour. They are among the easiest of plants to grow; established clumps produce a large number of flower stems, and keep up a succession of bloom for a considerable time.

Once planted in good sandy loam, or almost any good garden soil, these Irises will produce an abundance of flowers annually for several years. When necessary to replant, the best time is just after they have finished flowering; this gives time for the plants to become established again before the following winter.

— Asters. —

Asters are perhaps the most popular half-hardy annuals we have. They are of nearly all colours, and they range in height from about eight inches to two feet or even more. The plant needs a very rich soil. A deep, rich loam suits it admirably, if it is a little retentive, so much the better, provided it has been well broken up and freely manured. On poor soils the plants are stunted, the flowers are small and lack brilliancy of colour. While the established plant is growing rapidly plenty of moisture should be given, and doses of liquid manure may be applied with advantage as the blooming season approaches. The seed may be sown where the plants are wanted, but it is more usual to sow the seed in shallow boxes or in beds of finely-prepared rich soil. When removing asters care must be taken to lift all the roots, as a check in growth is injurious. The dwarfer-growing varieties may be planted about six inches apart, while the taller growers need to be about twelve inches apart. Of the numerous kinds of asters it is difficult to indicate the best. Some prefer the quilled German, others the paeony flowered, some again the ostrich plume, or the chrysanthemum flowered.

— Palms. —

In sowing seeds of Palms it will be found that germination is assisted if they are soaked for twenty-four hours previously in water at a temperature of 80 to 90 degrees, but not higher. Whether pots or pans are used, they must be thoroughly, but not excessively, drained, and a suitable compost for Palms in general may be formed of loam, lightened by an admixture of leaf-mould, peat and sand. This compost must be pressed down moderately firm, leaving sufficient space to sow the seeds. A good guide for the depth at which they are to be sown is that the seeds are covered with soil equal to their own depth. After sowing, enough water should be given to keep the soil fairly moist, but the saturation stage must be avoided. When the young plants make their appearance, a good time to pot them off singly into small pots is as soon as the first leaf is developed, as if done at that time the roots start away into the new soil and do not feel the check of removal, whereas if left longer they are apt to experience a decided check, particularly those that form very stout roots, as some of them do.

— Watering Sweet Peas. —

A good system is to form drills about 9 inches from the base of the plants on each side of the row and into these put the water, filling and refilling until it is certain that an abundant supply to soak well down beneath the roots has been given. In no case must water be given until the soil is approaching dryness, and after an application the necessity for more can be reduced by the judicious use of the hoe or by mulchings with short material ; in the latter case, when a further supply must be given, the material should be drawn back from the drills and replaced again when the task is completed. The same is necessary with manure. Hosing the plants in addition will be advisable when the weather is excessively hot, it is not always easy to keep the stems of the plants in the most satisfactory condition for producing fine flowers on stout stems of reasonable length, and, further, the blooms seem to lack substance and colour. Here will lie the advantage of hosing during the evenings following intensely hot, dry days. This will keep the stems in splendid form, and the probabilities are that the plants will develop far superior blooms to those which were not subjected to such a course of treatment. These occasional forcible washings will have the further substantial advantage of cleaning the plants of dust and insect enemies.

— The Maidenhair Tree. —

The Maidenhair tree (Ginkgo biloba) often named Salisburia adiantifolia, is a handsome tree, and none is better named, for the foliage is similar to the Maidenhair Fern, on a larger scale, of course. It is employed in America for town or street planting ; also in English towns. The leaves are tough and smooth.

— Watering Plants with Hot Water. —

In the case of Palms, Aspidistras, Dracaenas, etc., in winter, that have been in rooms for any length of time, the soil often becomes sour, and has a certain poisonous quality. This toxical quality is due to the presence of organic acid in excess, and which in ordinary open ground conditions would have been removed by bottom drainage. Plants growing in pots in rooms are under distinctly artificial conditions, and there are many causes which lead to the accumulation of acids. For instance, too deep planting, and particularly clogging of drainage. " The Gardening World " suggests the following :—Water at the high temperature of 120 to 130 degrees Fahr. can be applied, until it runs out in abundance from the hole at the bottom of the pot. The heat will dissolve and wash out the poisonous acids. After the plants have been treated in this way, it would be well to give a slight application of liquid manure.

— Rehmannia. —

Rehmannia angulata is an attractive flower from China. It attains a height of from two to three feet and is of good sturdy habit. Its flowers resemble those of Incarvillea delawayi. In colour they are rose purple with a bright yellow throat. Sow now or in autumn.

Hybridsising and Raisiug Dafiodils from Seeds.

The first thing to do is to get the necessary material to work with. Decide what bulbs you require, order in good time and plant early. What varieties are best for the purposes of seed and pollen is a question that may well exercise the minds of the keenest and most experienced raisers, and it must be left to each individual worker to use his own judgment as to which he will use as seed parents and which for pollen. The beginner must not think that every variety will seed, or that the pollen of all is fertile ; far from it. The good seeders are comparatively few, and there are many that produce pollen which is useless. So for the guidance of those who are only now commencing I will give the names of just a few which I have found to be good seeders : Emperor, Mme. de Graaff, Weardale Perfection, Duke of Bedford, Monarch, Beacon, Firebrand, Princess Mary, Minnie Hume and the Poeticus varieties. A few good pollen parents are King Alfred, Mme. de Graaff, Weardale, Perfection, the Poeticus and triandrus. These are only a very few, but there is plenty of work to be done in intercrossing them, and one could not go far wrong whichever way one tried them.

The process of pollination is simple. First determine which variety is to seed and be careful to remove the anthers before the pollen is ripe ; this must be done before the flowers are open. Then wait until the flower is thoroughly developed and apply the pollen from the other variety selected to the stigma of the one that is to bear seed. A pair of forceps is necessary for extracting the anthers from the flowers intended for seeding, and I use my forceps also for carrying the anther with the pollen on from one flower to the other; there is less risk this way of getting the pollen mixed than by using a brush. Mark the stem with coloured wool or a small label and give it some support so that it may not be broken off by rough wind (a coil stake as used for Carnations is as good as anything), make a note of the cross, and when the time comes watch for the seed-pod to begin to turn yellow. Cut it with a little of the stem before the pod bursts, and ripen in a safe place.

The seed should be sown after it is harvested in pots or boxes of prepared soil with thorough drainage. Cover the seed with about a quarter of an inch of soil and plunge the boxes or pots to the rim in a bed of ashes in a cold frame, only putting on the lights to keep off frost or heavy rain. They will require watering carefully during dry weather, and the seedlings should remain in the boxes for two years; then turn them out, but do not dry them off, and plant in the open in prepared and well-drained beds where they can remain until they flower. The young bulbs should not be planted too deeply, as they will work their way down to the proper depth as they grow to flowering size. A covering of about 3 inches of soil should be sufficient when planting. They will mostly flower in the fourth or fifth season from sowing the seed. A good stock of patience is necessary to get through this time until the first batch of flowers appears. It is then that the real interest begins, for one not only has the pleasure of perhaps finding some distinct and beautiful flower, but there is the further possibility of intercrossing and seeding these new sorts, and there seems to be no limit to what can be done when one thinks of the ever-increasing number of varieties there are to work with.

There is plenty of room for more really good Daffodils, and when working do not forget that there is something more wanted than the flower. Try to get a good stem and a vigorous constitution, and for this reason avoid, as far as possible, using varieties that have not these qualifications. But, I hear you say, "Why advise us to use triandrus?". I can only say that although the seedlings mostly have poor constitutions, there are exceptions, and even if one had to raise a fresh batch each season, they are so beautiful that it would be well worth the trouble. I have had some nice varieties from Emperor crossed with cyclamineus, but most of these have weak constitutions. The corbularia or Hoop Petticoat crosses do not give satisfactory seedlings; they are interesting, but of no value.

Seedlings generally show the characters of their parents fairly equally, although it is generally supposed that the pollen parent gives colour and the seed parent parent form. It is by raising large numbers that one is enabled to select the few really striking varieties. There may be just one flower in a bed of seedlings that stands out by itself far ahead of all the others in quality, size and vigour; this is the prize that will reward you for all your work and patience. The more seedlings you have, the more rigidly you can select and the more likely you are to get a really fine flower. Remember that you may not necessarily be out of the race because you cannot afford to buy the very expensive new varieties, although I grant you will have a better chance if you do possess some of them. Many of the best seedlings that are appearing year by year are produced by crossing comparatively cheap varieties, such as those I have mentioned above.—W. A. W. in "The Garden."

Delphiniums.

Delphiniums are such very beautiful plants, when well grown, that I am often surprised, writes "T.P." to see many good gardens either without them altogether, or to find them represented by a few very poor specimens all of the same shade and with very small flowers. This seems a mistake, when every shade of blue, from the palest sky-blue to the darkest indigo, can be produced from a packet of seed. Nothing makes a more beautiful group in the garden than from six to twelve Delphiniums, if all shades of them are planted together. As good blue flowers are so scarce, everyone should have, at least, one large group. I began with a couple of packets of seed sown in a hot bed and afterwards pricked out. They grew quickly and many of them bloomed that year. Most of them had exquisite shades of blue, or blue just tinged with pink; those of purple shades were thrown away, as I did not care for them, but they would make a handsome bed by themselves well away from the blues.

They were planted in a good soil, well enriched with farmyard manure, in distance about two feet apart. After being there two years, they had grown so large that every second plant had to be removed and planted elsewhere, and those left are still too close. I have three large groups of them, and when in bloom, and showing all shades of lovely blue, they are the admired of all beholders, and quite the feature of the garden. Some of them last year threw up spikes of bloom many feet high, and looked magnificent; but I consider this is really too tall; as it is so difficult to prevent their being broken in a high wind. So I intend lifting and re-planting them, as I find that after being moved they don't attain such a great height for a year or two.

I find it very easy to propagate from any of those I admire most. After they have flowered I pull up a few of the long stems, giving them a jerk from the roots; these pieces have two small white buds, just at the end, which, on being placed in gentle heat, root freely, and I daresay would root quite well outside, if no frame were available but the heat hastens the growth. When either the seedlings or offshoots are growing slugs must be carefully watched for. They are enemies to most growing plants, but quite ravenous when Delphiniums are to be had, either as seedlings or when the old plants are appearing above ground in spring, and will clear off a box of seedlings in a night, and, in spite of care and watchfulness, they have eaten down the old plants when starting to grow.

Points in Rose Culture.

The following article on rose growing is from "American Gardening." Readers will find in it some helpful hints on the subject. Roses with us grow and bloom most freely with but little attention, yet there is a "best," to which the enthusiastic grower may attain by knowledge and systematic treatment, and the reward is worth the effort.

The writer says:—

As early as the condition of the ground and the weather permits, I dig over the beds deeply, mixing well with the soil, and sometimes adding a dressing of bonemeal, the manure that has through the winter protected and enriched the plants. As the new growth progresses I frequently fork over the ground and keep it clean, loose and friable at the surface. As the buds develop I watch closely for the leaf roller, or green worm, which is so deadly an enemy to the flower, and perform without mercy the unpleasant duty of "scrunching" him in his 'leafy home, or picking him off by hand.

About this time I give my beds a top-dressing of guano, or other fertiliser, and lightly fork it in about the plants, and as the buds are swelling I give each plant, about once a week, if the weather is dry, a good bucketful of liquid manure, and see that the roots get the full benefit. It is wonderful how quickly and well they respond to this treatment. The liquid must not be too strong, and judgment, which comes by experience, must be used in its application.

— Liquid Manure. —

An easy method for small collections is to have a 50-gallon barrel sunk in the ground, in some out-of-the-way corner, and half filled with cow or chicken manure, then filled up with straw. I put in also a tin of concentrated lye, which prevents souring. After fermentation the mixture is ready for use, and about one-fourth of the liquid to about three-fourths water is about the right proportion. The barrel can be filled up continually with water, until the strength of the manure has disappeared, when a new supply can be put in and the process repeated. I never give my roses more than three or four applications during the season, and they never get watered on the foliage, except by the rain or the dew. The rose, in its growing season, is a good and hungry feeder, and we cannot have full success unless we satisfy its appetite with appropriate foods and stimulants.

And now our care and attention is to be rewarded, and as one by one our roses bloom, our hearts are filled with admiration and love for these most beautiful of nature's gifts to men.

"Earth hath no princelier flower than roses white and roses red."

But we have no time for rhapsody, for time of the rose show is at hand, and we must prepare to send our beauties to be judged. It is necessary now, in order to show our roses in perfection, to take care and means to protect them from the sun and weather. The dark ones (and I think they are the most beautiful) are very susceptible to injury from the sun, and quickly burn. I was much amused some years ago by the following incident:—A business friend who was coming to my home for the first time, on getting to the neighborhood found himself uncertain of the house. He asked a small boy where I lived. The reply was—"Do you mean Mr. ——, the rose crank?" My friend asked in astonishment what he meant, and was informed that I got up in the morning at daylight and put umbrellas over my roses—and I had to admit the soft impeachment.

— Shading. —

In order to protect my dark beauties from the sun I get some cheap Japanese parasols, attach the handles to long garden stakes, and as my roses are opening I place the umbrellas against the sun, and so save the flowers. The rose books tell us to use for this purpose zinc cans, painted green, but I think my simple and inexpensive plan equally as good. Try this with your dark roses like Jean Liabaud, Abel Carriere, Prince Camille de Rohan, Charles Lefebre, etc., and you will be well repaid in seeing their full and unscorched beauty, and shades of color, so rich and indescribable that you, like me, will, I feel sure, not mind being called a crank.

— Exhibiting. —

One point in regard to exhibiting I will mention, and that is the arrangement of the flowers in their blooms. The largest blooms should always be in the back row, and the size should gradually taper so that the smaller are in front. And see that the colors contrast effectively. I usually take careful survey of my flowers the day before the show, and jot down on paper the arrangement I intend to make. Let tubes and boxes be nicely painted green, and the latter liberally furnished with clean green moss, and a neat card, bearing its name, should be beside each respective rose. We now have about six weeks in which to enjoy the fruits of our tender care, with little to do except to gather the flowers. Even in cutting my flowers, I keep an eye to the future growth of the plant, and through this period continue rubbing off unnecessary and undesirable shoots as they appear. If I want a crop of autumn flowers, I cut my plants back after their first bloom is over. This, however, is seldom. I prefer them to make new wood for the next year, for it is on the new wood (that of the previous year's growth) that we get our finest flowers.

— Pruning. —

In the autumn, under favorable conditions, we have in any case some roses, and what I think more important, a good growth of new wood. These new shoots I pinch or cut back a few inches from the tip, and this causes the lower buds to ripen. Towards the end of autumn I spade the beds lightly, and mulch well with good manure. Then in winter I give the plants a systematic and thorough pruning. Now, in pruning, there are two principles. Briefly stated, they are as follows :—

For size and quality, prune closely—that is, leave only three to seven eyes, according to the habit of growth, upon the strong shoots and laterals, cutting out altogether all weakly, infirm, and old wood, leaving only the strong and thrifty ripened shoots of the previous season's growth.

For quantity, follow the same course as to weakly and old wood, but cut to eight or twelve or more eyes. The above are general rules, which must, however, be modified and supplemented by the following :—

Roses of weak growth require more severe pruning than those that are vigorous and thrifty. The latter must have the shoots left longer, but must be well thinned out. As one gets to know their roses and their habits of growth, the treatment each requires soon becomes apparent. In pruning, I make the cut clean and as nearly horizontal as possible, and always cut to an outside eye, so that the shoot that grows from the eye cut will grow outwards. And, further, I always bear in mind and keep in view the shape and symmetry of the plant as it will be, for that is formed in pruning. After pruning I usually spray the bushes with a weak solution of Bordeaux mixture, giving them another spray of the same after growth starts in the spring. I find this treatment helps to keep the wood and foliage clean and free from black spot, blight and mildew ; and it may also have some effect in keeping away aphis, with which my hybrid perpetuals are seldom troubled, unless the weather conditions are very unfavorable during the early growing season. If aphis appear, dust the plants with tobacco dust and spread tobacco stems about them. As a rule, however, I believe that good cultivation and healthy growth is the best preventive of aphis, and that when they are presene it shows something is lacking in these pacticulars. For mildrew, I also use Bordeaux mixture, and sometimes a concoction of lime and sulphur, which I find effective. After blooming is over I do not think a little mildew of much detriment, as with the treatment I suggest the plants come out clear and healthy in the spring. The teas, hybrid teas, Bourbons, Noisettes, and other varieties require the same general treatment, modified, of course, by different pruning of the varieties according to their class and habits of growth.

The Seed Bed.

A proper seed bed is a great convenience, if our sowings are to exceed the modest limits of a few odd pots and boxes. The soil should be light, mellow, and free from weed seeds. Good drainage is necessary, and it is certainly desirable that the bed should be enclosed with sides and ends to support calico covered frames, which are needed to keep the surface moist when the soil exposed to wind and sunshine would bake and prevent seeds coming up. Before sowing, dig the bed, and after raking smooth, water well and wait for the first crop of weeds to come up. Take these out, make the ground quite firm, tramping it thoroughly all over will do more good than harm, then stir the surface lightly and rake smoothly and the bed should be in good condition for all, but the very finest seed. A general rule is not to cover seed more than twice the depth of their own diameter, but as two grains of sand may exceed this, it is naturally one which it is difficult to adhere to strictly. It is better to sow the seed in rows for many reasons. Seeds which germinate in about the same length of time should be sown next each other or the bed gets to look very untidy and there are also more serious objections.

The Stag's-horn fern is one of the very best of room plants. Very few fine leaved plants will bear the confined atmosphere of a living room throughout the winter without showing signs of suffering, but this fern seems quite indifferent. It is quaint and distinct as a basket plant. In potting keep the crown well above the rim of the pot and do not over water.

Shrubs and Ornamental Trees.

In planning a home and garden we should remember that first impressions are lasting and that they should be pleasant ones. There is here a great opportunity for individuality to assert itself. No two individuals would equally approve of the same design. While tastes vary and different designs possess equal merit, there are some designs which would be bad, just as there are some pictures which are bad, as colours and effects may be made to literally swear at one another.

— Designs. —

Whether one wishes a design to be formal or natural is the first question to be considered. Nature has suggested many things and ways in which the planting may be made to appear natural, yet nature is careless, prodigal, and even wasteful in her resources, so that even she may be improved upon by judicious pruning here and there.

When you plant a tree or shrub, remember that it is planted with the expectation that it will remain for years and perhaps for generations, so the right place should be decided upon at the beginning, or transplanting will be necessary, making it expensive, perhaps even causing a loss of the plant itself. The modern spirit of landscape planting is to have it approach as nearly as possible, natural effects. Years ago, landscape designs were conducted upon a different principle. Then everything was formal. Even the hedge was sheared in fantastic shapes. Now, the desire is to make shrubs appear graceful, not over-crowding, not yet too scanty in the plantation.

In designing a garden the picture must be taken as a whole. Piece work cannot be made artistic. The pepper and salt arrangement of shrubs has had its day. The effective massing of shrubs and plants has come to stay.

Seeds.

In general literature and common speech a seed is that part of a plant which is the outcome of flowering and which is used for propagating the species. In the technical or the botanical sense, however, the seed is the ripened ovule. The seed contains an embryo which is a miniature plant. The embryo has one or more leaves (cotyledons), a bud or growing point (plumule) and a short descending axis (caulicle). From the caulicle or stemlet the radical or root develops. This embryo is a miniature dormant plant. Each embryo is the result of a distinct process of fertilization in which the pollen of the same or another flower has taken part.

The ovule is contained in the ovary. The ovary is the seed case or pericarp. The pericarp with the parts that are amalgamated with it is known technically as the fruit. In many instances there is only one seed in the fruit and the seed and its case may adhere and form practically one body.

Germination is the unfolding and the growing of the dormant or embryo plant. The first visible stage in germination is the swelling of the seed. The seed case will burst by the pressure of a tiny white shoot from beneath. We say that the seeds have sprouted or have commenced to germinate, and have taken the first visible step toward developing into a plantlet. At a suitable temperature the living cells of a certain part of the seed being to increase in size and to divide, causing the tiny shoot to burst through the seed case. Germination is completed when the young plantlet is sufficiently developed to live without further aid from the seed.

— Conditions Requisite for Germination. —

In order that seed shall germinate they must be supplied with moisture and be given a definite temperature. The requisite temperature and moisture vary with the different kinds of seed.

The seeds may be planted in any medium which supplies the requisite conditions. Although seeds are ordinarily planted in soil such practice is not necessary to germination. However, the ground may supply the necessaries for germination and it also supplies plant food for the young plantlet when it begins to shift for itself, and furthermore the plants are in the positions which they are desired to grow.

As a rule the sooner a seed germinates after it is planted the better for it is generally in danger of being destroyed by insects or fungi and the plantlet probably loses vigor by too slow development. Weeds may also be gaining a start if germination is delayed. We should, therefore, treat both the seed and the soil in a way that favors prompt germination.

Compacting the soil about the planted seeds hastens germination. When the soil is becoming drier day by day, as it often is in spring, compacting the soil about planted seeds naturally hastens their germination and often secures germination that without the compacting might be indefinitely postponed. The hoe, the foot, a board or the hand may be used to compact the soil over planted seed.

Planting should be deferred until the soil becomes warm. Seeds cannot germinate promptly until the temperature of the soil in which they are planted approaches the optimum for their germination.

Excess of water in the soil retards germination by exhausting the supply of oxygen and sometimes keeping the soil cold. Seeds should not be planted in soil wet enough to puddle about them, nor should the soil in which seeds are planted be so freely watered that the seeds remain surrounded with liquid water, thus shutting out the normal supply of oxygen.

Germination may be hastened by soaking seeds before planting. Soaking is most important with seeds having seed cases that do not readily transmit water at growing temperatures, such as the Canna. Germination may also be hastened by cracking or cutting away part of the seed case.

Seeds may fail to germinate from a variety of causes even when exposed to the proper degree of warmth, moisture and oxygen. They may be too old, they may not have been sufficiently matured when gathered, they may have been too dry or they may have been stored while damp and thus subject to undue heating, or may have been destroyed by insect or fungi, either before or after maturity. Defects of these kinds are not always visible.

Sweet Peas are one of the flowers that are best alone, to associate them with others usually detracts from the beauty of both.

Nasturtiums have a beautifully cool and light effect for table decoration and no green suits them as well as their own foliage. If the leaves are cut three or four days before wanted and kept in a dark place they will usually show some charming variation of yellowing shades.

Bedding.

This is most appropriately used in connection with buildings, formal drives and parks.

In connection with statuary there seems to be nothing else so well suited as bedding plants, because they add color to a scene that would otherwise seem dull.

Those plants afford opportunity for beautiful effects in formal gardening, but this is apt to be carried to extremes and thus excite the disgust which it merits.

There is one place where bedding plants are most inappropriate, and that is in naturalistic compositions of all sorts. We see nothing so formal in nature pictures. The lines and colors in an agreeable landscape should be harmonious, this harmony and blending is generally lost where bedding plants are employed.

Let us not overlook the importance of harmony in plant color. Remember that colors that would be bad in a carpet, a rug, a wall paper or a painting, are usually bad when combined in plants. Colors are usually stronger in plants, and this is allowable. When I see a building surrounded by spacious grounds, and what would otherwise be a beautiful lawn, but unfortunately dotted all over with little beds of every shape and color, it reminds me of the definition I once heard of the word weed.

The old gardener (after acknowledging that a weed was an undesirable plant) illustrated still farther by saying, that if a lettuce plant were to come up in the lawn, the lettuce would be the weed, and that if the grass were to become established in the lettuce bed, the grass would be the weed. Perhaps it isn't right to call these plants, in these out-of-place beds, weeds, but one thing is sure, they are undesirable.

Poppies that are cut in bud expan perfectly in water.

A very thin boiled starch is a very good way of cleaning palms and other house plants of scale. Spray gently or rub lightly over with a sponge. When the starch dries it will bring away the scale with it.

There are several forms of the beautiful Ladder-Fern, and all are lovely. Of course, the better the conditions under which they are kept the sooner they make specimen plants, but when overcrowded they should be divided, and this should be done when they re-start into active growth after being rested, as at this time the roots more readily take a hold upon the new soil. Many amateurs seem to err in the matter of compost used for potting Ferns, leaf mould only being very often utilised. For young plants or seedlings, a mixture of leaf mould or peat is quite the correct thing, but large plants like something more substantial, and some good sound turfy loam, with about one-third fibrous peat and silver sand, will keep them in good condition for a considerable time.

Interesting Vegetables.

THE CHOKO.

The Choko, as it is called here—this being one of its very numerous names—cannot be called a vegetable of the highest class. It is usually considered to be something between a marrow and a squash with no particular flavour or peculiarity of its own. It is however, an interesting plant for a variety of reasons ; it makes tremendous cucumber-like growth, and is thus useful to cover a trellis or breakwind, which, by the way, must be substantial, for the weight of a single plant, grown in rich and well watered soil is very great. The flowers are quite different to the true cucumber tribe, being white, and as far as they are conspicuous, ornamental, pleasant to the eye, and suggestive of a peachy fragrance.

The fruit, commonly grown here, is rough, roundish, and about the size of a closed hand, and encloses one large seed. In addition to the fruit the root tubers, which are perennial, are, in many parts of the world, esteemed as food of some importance.

Another item of interest in connection with the choko is that it is almost unique in its method of reproduction. Botanically, it is known as Sechium Edule, though this, by the way, is a matter of discussion. Speaking of names—spread as it is over a large portion of the tropical and semi-tropical portions of the world, it rejoices in a great variety, such as Mirliton, Pepinella, Tayote, Upopo, Vegetable Pear, One-sided Cucumber, Chayote, and a dozen or more lesser known ones. Choko, by the way, seems to have been a Queensland adaptation of one of its native central American names.

Hailing as it does from semi-tropical countries, it is evident that heat and moisture are both indispensable for its successful growth. Both in Queensland and New South Wales, as far south as Sydney, in which it is one of the recognised vegetables, it grows luxuriantly. As an instance, a case is on record of a vine planted in February, commenced flowering in May, but was killed down by cold weather, and did not résume growth until August, when it sprouted from the root, and by January it had covered fifty feet of a fence six feet high. From the end of February to June three or four dozen fruits were taken, or about fine hundred fruits for a season of three months—and this for the first year of bearing. As the perennial root continues to increase in size, the plant may well have been larger in subsequent seasons, and one observer claims to have counted three hundred fruits on a vine at once. In Algeria, where the fruit is grown for shipment to Paris and London, fifty thousand per acre with an average weight of one pound, is considered a good crop.

Very various opinions are expressed as to its quality, they range from "tasteless and insipid" to "the best of marrows." It is firmer in flesh than most of the squashes but not fibrous. In India it is popular as an ingredient of curries. In Florida it is used for tarts and as a substitute for apple sauce. In France it is largely consumed—unknown to the consumers — as the true artichoke, which vegetable, when properly cooked and seasoned and cut into discs to give it the same external appearance, it is said to greatly resemble. In Mexico the tender rapid growing spring shoots are eaten as a substitute for asparagus. in Queensland, in conjunction with the rosella, it is considered to make a satisfactory tart. If all other uses fail, pigs will not refuse the fruit nor cattle the vines, and the fibres of the ripened vines are woven into hats.

The large tuberous roots are largely used in Mexico as a food either boiled or roasted. Whilst in Queensland and New South Wales they are used for a stock food. The only other use we can find, is that it is an admirable honey plant. To establish it the whole fruit after or before it is sprouted, should be placed in the ground just under the surface. It is sold by some of the seedsmen for a few pence and is well worth a trial.

THE GUADA BEAN.

This is a well known Queensland edible gourd variously known as Snake Bean, Snake Gourd, Carpert Snake Bean, Indian Snake Vegetable—or most generally as the Solomon Island Bean, under which name it was considerably spoken of a year or two ago.. Botanically it is Trichosanthes Anguinea.

Though called a bean it is really a gourd, says the "Queensland Journal of Agriculture," but is in appearance something like a hollow cucumber. The fruit grows to considerable length, four to five feet, and up to seven feet. For table use it may be cut at any time, till it commences to ripen. When young it is slightly rough and if scraped has a very distinctive scent, this smell will disappear, but before cooking it is well to scrape the bean. When cut into lengths of three to six inches and sliced, it is very like a particularly fine dish of French beans both in appearance and color. An Indian method of cooking is to stuff three-inch lengths with minced meat, etc.

A bean five or six feet long would weigh a couple of pounds. It appears to object to very wet or very dry weather, on the other hand it will stand all the heat there is about. It seems to be suited by the same conditions as the Choko.

THE LUFFA.

The vegetable sponge is well known in the bathroom, but one may safely admit that the average gardener would be surprised to meet it on his dinner table. In its younger state, however, it is considered in many countries to be good to eat, for the interwoven fibres do not develop until attaining maturity. They grow readily with us, merely as curiosities, but in Japan and South Africa are grown largely for export. The vine is not particularly rampant, and is trained on a rough trellis. Five or six good sponges (or fruits) are considered a good crop, and this works out at the rate of planting at about twenty-four thousand to the acre. Its preparation is quite simple. There is a considerable demand for them and does not appear to be any reason why they should not pay commercially.

THE PIPE GOURD.

We have never heard of the true pipe gourd being eaten even as a second rate of vegetable but a variety known in Queensland as the Butter Gourd is sometimes called the poor man's vegetable marrow. When fully ripe and dry, says the Queensland Agricultural Journal, these gourds have a tough shell, and might be used in a similar manner to the Bottle gourd, but if cut quite young are excellent eating. This variety bears best on the ground when a vine will carry five to ten large fruit up to three feet in length, and six inches in diameter, it often assumes fantastic shape, sometimes forming a complete knot.

The true pipe gourd—Lagenaria Vulgaris—is another of the gourds grown as curiosities with us, but for which an extensive demand has grown up in South Africa from whence the Calabash pipes, as they are called, are largely exported. The vine makes a very satisfactory cover but its rather rank odour may be objectionable too near the house. The chief interest in growing the vine is, however, in the shaping of the gourds. The plants thrive in any rich garden soil, and cucumber treatment will satisfy them completely. The fruit should be allowed to lie on the ground or rather not be trained to a trellis, but it seems to induce a more perfect neck if when half grown they are rested on their big ends. They are brittle at this stage, but afterwards become unbreakable. The vine bears freely from ten to, maybe, twenty, but only a proportion shape up well. With a system of bending and training, on a board six or eight inches square, perforated something like a cribbage board, with suitable pegs, the neck can be manipulated in almost any desired form.

The manufacture of the pipe is a very simple matter, the necessary materials being easily obtained from a tobacconist.

Vegetable Beds.

In winter and early spring we slope our beds to the north, ridge them for the same purpose—to get light and heat—and raise them to get drainage, a quite unnecessary precaution, by the way, during the last winter.

It is often surprising what a marked advantage, an apparently little though really important difference, will make in the result of a sowing. Just lately, for instance, a planting of French beans came up quickly and evenly but another bed of the same seed, same soil, same manure, same everything, except that one was on the sunny side of a row of cabbages and the other the shady side, not only came up later, but mostly failed to come up at all and have long since rotted. In summer, on the other hand, we level the beds to prevent evaporation and sink them to save surface waste of water.

In making early beds of cucumbers and that tribe it is very general to dig out a trench or number of holes and concentrate the manure in them, covering with a light covering of earth. The object is, of course, to get heat and a quick start, which is accomplished if enough manure is used and it is sufficiently but not too new, that is in the "hot bed" condition. You get what you want but, as in most things, have to pay a price for it. Plants are tender and want watching, and so by the way, does the water bill if you do much of this trenching on some soils, say a sandy loam on gravel, or on shallow limestone, where the crust has been broken or taken out. Of course if you have a nice clay subsoil you can trench to your heart's content and not be afraid to look your water meter in the face. A friend of ours once took out some of these trenches, he made them big and beautiful, they only had one fault, which he discovered afterwards, they had no bottom. He described his experience as follows:—First I stopped home from church to water my cucumbers, then dropped going to cricket, next I took my summer holidays before I wanted them, then I asked my mother-in-law to stay with me to help on the job and she stopped till Easter and finally I had to sell the piano to pay the water bill. He's not perhaps as truthful as he might be, but anyway he serves to what is usually called, "Sound a note of warning." The hot bed is not necessary at this time of year and any manure you use is better distributed over the whole area of the bed and dug two spits deep. If you put three or four barrow-loads of stable manure on each five by twenty feet of bed, with 2lbs. of super and half a pound of sulphate of potash, you are being pretty liberal; anyway, you won't go short of cucumbers, melons, etc. Such a bed will hold three or four holes. Put half a dozen seeds at around each hole and thin out each hole to two soon after they are up. You can make up your mind to take the remaining one out when both have fairly started. It is quite easy to do so now, later you will think it seems a sinful waste. If you start with three holes in that space it probably won't make much difference one way or other other, you ought to get more cucumbers than an ordinary family can want during the time they are in fruit. Planting three holes of one plant at different times is better than three plants in one hole at one time for ordinary family use.

Readers! Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Vegetable Notes.

— Sweet Corn. —

A row or two of this should be growing in every garden, and no better time for planting will occur than the present. You can plant these rows of sweet maize as much as five feet or more apart, and grow melons, cucumbers, squashes, etc., between them. The growing corn will in a measure protect these from the wind, and as the vines travel over the surface they will shade the root of the maize from extremes of solar heat. It will be a capital association, beneficial to both. In working the soil near growing crops of table maize, be careful not to stir it deeply or you will undoubtedly injure all the best roots which are invariably found close to the surface. One other important point, never permit the plants to want for water at any time, or the grain will be irregularly placed on the cob.

— Sweet Potatoes. —

This fine vegetable is easily grown in any deep well-drained light or sandy loam. Lots of rotted manure is necessary to bring the tubers up to "concert pitch." Instead of planting pieces as is customary with the ordinary potato, small rotted cuttings are set out in shallow drills (trenches) three feet apart, each plant from 18 to 24 inches from one another. To get the young plants, procure a tuber or two of either the red or white skinned kinds, and take and plant them in a shallow, rich seed bed. The sprouts will soon come through the ground. When they are four inches high, scrape the earth from around the stems and gently tear them from the tuber. They will carry roots of their own. Plant straight out in the drills, watering each one after it has been placed in position, Some growers prefer to cut the shoots off just above the ground, and "strike" them in another bed, or pots. These shoots are no trouble to root. A 1lb. tuber will give all you want. Potash is very helpful in growing a good crop. Dig in a good supply of wood ashes. You can buy rooted cuttings.

— Lima Beans. —

There are two types, dwarfs and pole varieties. The latter are climbers and may be grown on sticks, mesh wire, fences, or any trellis. The labour and expense of supplying supports goes against the growing of many pole varieties. Where one has a suitable fence the expense is, of course, not great. Friable, sandy soils are the best for growing any of the bean family. The fertilizers should be of a quick acting kind, as the bean is a quick cropper, and comparatively a short-lived plant. avoid using raw, coarse manure. Commercial fertilisers that are rich in potash and phosphoric acid are necessary, but it is a mistake to think that they do not respond to nitrogen. Sow the seed in shallow trenches, after watering the trench, from 18 to 30 inches apart at about four inches between the seeds. Cover them with about an inch of soil. On the top of the soil throw a scattering of manure to prevent the surface hardening. The climbing Lima beans are best sown in holes, 4 or 5 to the hole, four feet from one another. Supports of some sort are necessary for these climbers. All the Limas require hot weather and plenty of it. Plant all Lima beans with the eye down.

Fruit Garden

Notes for Octocer.

All young trees should be staked, especially in exposed situations, and from time to time the lashings should be looked to to see that they do not chafe, and be renewed if necessary.

From time to time the soil within a few feet of the tree should be hoed, as this will keep down weeds, promote aeration of the soil, and retain moisture, with other beneficial effects.

Tobacco wash is at this time of year the best remedy for peach aphis. Spray every two or three days for a week and you certainly ought to get the upper hand of the pests.

No spray outfit is complete without an abundance of hose clamps, washers, and couplings for joining hoses, etc. Strictly speaking, a pump is not working perfectly unless the only avenue of escape for the spray solution is the aperture in the nozzle. When so working, discomforts and delays are avoided.

Clean smooth barked trees and ground free of rubbish unquestionably help the orchardist by depriving the codlin grub of their pupating quarters. They are merely supplementary to the spray pump, however.

The codlin moth is the most persistent insect enemy of the apple industry, but no insect yields more readily to defeat before a well-directed spray nozzle.

Wind, it is said, does not to any extent carry pollen; that pollenation is effected by bees (presumably all flower sucking insects). We have all observed, says an exchange, that when there was a cold rain several days in succession, when apples are in bloom, that there is but little fruit, but if the weather is very warm, the rains may be frequent and the fruit not injured. Bees do not work in cold wet weather but will work between showers in warm sunshine.

In combining the lime-sulphur and arsenate of lead, the following method should be adopted:—The required amount of lime-sulphur should be added to each 50 gallons of water. The dry-powdered arsenate of lead should then be thinned to about the consistency of rich milk, but should not be added to the 60 gallons of water and lime-sulphur until just before the grower is ready to start spraying operations—that is, the two materials should not stand mixed any longer than necessary, and, moreover, the arsenate of lead should always be added last. The reason for this is that there is a slight chemical change between the two materials, as will be very readily noticed by the fact that the lime-sulphur carries a cherry colour, but when the two materials are mixed there is a grayish drab colour.

Where grafts have been put in old trees, they must be tied to prevent their being blown off. To do this, a good stake should be tied to the branch grafted, and allowed to project a foot or more over the end; then as the graft grows, it can be tied to it.

Keep a strict watch on all refills and young trees, and if these show any signs of wilting, give them one or two buckets of water from time to time until they get a good start. Disbud all newly-planted trees, leaving three or four good shoots, at least 4 inches apart, along the trunk of the tree. Do not allow two or three shoots to start from the same place, but give each branch a separate hold of the main stem.

As the early fruits begin to swell and take on some appearance of full crop, it will be advisable to look over the trees. There will be a lot of thinning to do if fruits carrying a fair proportion of pulp are to be secured ultimately. The strain upon the trees comes with the development of the seed and the hard case commonly called the "stone" which encloses it, and infinitely more of these are carried usually than is at all wise. It is pulp, or flesh, we want, not the useless interior of many undersized and badly-flavoured fruits. Besides we need fruits every year. Then only permit your trees to carry a full crop (not an excessive one) if you wish them to furnish you with good quality fruits every year. Thinning is much too frequently neglected, and the result is a glut of very inferior fruits one year, and very little of any kind the following one, and so the game goes on.

Planting Orange and Lemon Trees.

Writing on this subject Mr. S. A. Cock, in a recent issue of the Victorian Journal of Agriculture, says :—

The trees are removed from the nursery after the winter's growth has hardened, and been balanced by a subsequent root growth. This is the condition for new head growth. Just before this starts, the fine roots on one side of the tree, and the tap root, at a fair depth below the surface, are cut with a sharp spade ; the earth is then returned to the cut surface, and 'the trees allowed to form crown growth on the cut rootlets and tap root. This usually takes a fortnight ; then the remaining roots can be cut, and the tree removed. This treatment prevents shock to the young trees in removal. The soil is then shaken from the roots, and the roots dipped mmediately into thin mud puddle, and then the roots of the trees packed tightly in the boxes in moist sawdust and despatched without delay to the grower. The grower, on receiving the package, should remove the hessian covering, and keep the packed trees in a cool shaded situation, occasionally sprinkling the trees, to keep the package moist, until ready for planting.

When planting is to take place the trees should be removed from the package as required, and the roots thoroughly washed of mud puddle ; all broken roots should be removed by cutting with a sharp knife, and the roots thrown into balance as much as possible. The trees should then be wrapped in a wet sack, and each tree kept covered till planted. The hole excavated for the reception of the trees should be large and fairly deep, 3ft. nearly in in diameter and 10 to 12 inches deep. The soil is then returned to the centre of the hole in the form of a mound and on this the tree is planted.

— Planting. —

The tap root of the tree should then be placed in the mound and earth returned, the small roots carefully placed, as equally spaced as possible, and more soil returned, until the roots are covered. If the tree is standing too low it should be gently worked up through the soil, returning more earth until the roots are covered. Planting a little deep and working the roots up through the returned soils is a system generally adopted in planting. The tree should stand in the hole, when planted, with the surface soil mark on the stock (indicating the depth it stood at in the nursery) standing 6 inches above the ordinary soil level. The tree should then be staked and tied ; the stake should be made of redgum 3 feet long and 1½ inches square. If hardwood stakes are used, they should be dipped in tar, for a depth of 1ft., before driving in the ground. The stakes are placed on the southwest, the windward side of the tree, about 6 inches away, and the tree tied to the stake with sacking or hayband, at a height of 1 foot from the ground, tying tight on the stake and loose around the tree. The hole should then be filled up with water, and when the water has drained away, the remainder of the should should be returned ; the soil will then assume the shape of a mound 6 inches high. This will compact to about 3 inches above the ordinary soil level, and will keep the scion well above any wet soil surface. The water placed in the hole at planting time consolidates the earth around the roots, and does away with the harmful practice of tramping with the feet, and the stake holds the tree firm in its position.

It requires two men to plant trees properly—one to hold the tree and fix the roots, the other to return the earth as required. Two men should dig the holes, plant, stake, and water, also return the earth on 1 acre of trees per day. Planting is work that requires care and attention, and it does not pay to rush.

— The Pot Ball and Method. —

Other methods of planting are the ball and pot system. The balled trees are removed with the earth undisturbed around the roots of the trees, and the ball of earth is tied in a piece of hessian, and requires to have only the string cut at the time of planting ; the hessian soon rots in the ground. These roots, if properly lifted, require no pruning at planting, as the roots previously cut and crowned with callus, receive no check. A potted tree is the ordinary tree lifted from the nursery with bare roots, placed in a pot, packed with new earth, and new root growth forced by bottom heat under glass for about three weeks, and then the growth hardened off under ordinary glass conditions for six or eight weeks, and still further hardened under ordinary cover, and sent out for planting. In planting out, the tree is simply removed from the pot and planted in the soil. These trees generally require no head pruning ing at planting, as they receive no root check. In commercial orcharding, nothing is gained by balling or potting. If the conditions of planting out bare-rooted trees are carried out as described and all wasty and weakling trees discarded at planting, there should be no failures. Lemons are more delicate than oranges, but both require equally careful treatment. Bandaging the butts of the trees with hessian or paper is not a necessity, and wire netting renders the orchard proof against rabbits. Potted and balled trees are suitable for persons growing only one or two trees, and who do not understand pruning methods.

Spring Work on Citrus Trees

Oranges and lemons of all ages should now be in a position to start into vigorous foot and head growth, and to ensure this the soil must be loose, rich, moist and perfectly sweet. Weeds are often an advantage to citrus trees during winter, especially where frosts and raw winds prevail, as the green covering of the soil tends to keep the roots warm. But now it is time that the surface be cleaned and prepared for a feeding, irrigating and mulching, so that the trees are placed in a good condition to meet the summer. Any green manure should be ploughed in at once, and not buried deeply, or it may cause sourness, and thereby injure the tree roots. This is a good season at which to thin out crowded living and dead wood from trees which are either too dense or dirty with scale or other pests. Both oranges and lemons can make good leaves, flowers and fruit in quite shady interiors of trees, and it is only where the leaves are seen to run very small or disappear altogether from the inside that we know more light and air are necessary. Hence the thinning is usually at the top of the tree, that the light may fall through and stimulate useful leafage in all parts. For economy in pruning citrus, light branches may be removed outright, as where snippings are made of every individual piece of small and faulty wood, no end of work is involved, without any better results than follows from what may be termed branch thinning. Don't allow strong sunlight to fall direct on to citrus wood, or it will be over-dried, and possibly burned and permanently injured. When trees have been thinned, smear all hard and dirty wood with a lime and salt wash, to which has been added sufficient cow dung to make a thick brown paint. If the trunks of trees are at all long and exposed, or the trees are old and make too little wood to yield useful fruit, then bandage the trunks with a good thickness of bagging. At the same time use a hand tool round the base of the stem to loosen and clean the soil, and place a heavy and moist mulch over the ground before it becomes dry and over-heated by the advancing power of the sun. Chemical manures of a quick acting kind are most useful stimulates for citrus but do not wholly supply the trees' needs, and a heavy mulching of good solid manure should be regarded as the chief means of keeping up the vitality and profit of a citrus grove. When the manure supply has been equally divided between the most needy trees, collect all weeds and free soil from headlands, outside paddocks, the banks of the creek, any ditch clearings and such other material as will prove at once a food and a source of protection during the hot, dry season. If irrigation is practised, mulching and feeding are equally necessary, for citrus very quickly exhaust soil where water is always present to liberate its food supplies. Citrus trees should never be flooded with broad sheets of water. The land requires close furrowing, and the water sent down in small sections or checks, and the surplus drained off as promptly as possible. A certain amount of surface grading should therefore be regarded as a necessity at this season. The age and condition of the tree should be well understood before applying irrigation water, as young citrus which have not obtained a free grasp of the soil are often ruined by over-dosing with water. A light ploughing or cultivating should follow closely on irrigating, that a loose surface may provide the necessary air, prevent a hard pan forming, and retain the water as long as possible. Where no water is available, free cultivating should be carried out as often as possible. Well furrowed is preferable to flat land for citrus, and if the harrow or cultivator smooths out all the surface the furrows should be reopened by the plough, so as to ensure sufficient air to, and a cooler summer soil, with better means of storing and utilising any summer rains. By following the foregoing instructions, in as as far as they apply to different soils and situations, the best will have been done to secure a vigorous and profitable growth during the coming season.

Cultivating Strawberry Plantations.

Free fruiting, health in the plants and fine size and quality in the fruit may be summed up in the words—a favorable soil and climate. The strawberry will grow almost anywhere, but it attains perfection as a fruit only in comparatively cool and protected regions. Young strawberry plants should now be rooting freely, and the main concern of the grower should be to provide a large body of free, sweet soil. Plants more advanced and capable of yielding fruit should not be deeply cultivated, as surface rooting is more conducive to fruitfulness than is deep rooting, and it is only where plants are young and weak that their roots should be encouraged to descend. Until the flowers appear the land should be freely worked and cleaned, the hand hoe being employed between the rows where cross working with a horse implement is not possible. Only weak plants should be mulched before the appearance of flower, for if strong plants are mulched early they are liable to run to leaf, and prove fru tless. It nearly always happens that in plantations of any size some parts bear much more freely than do others, and this should furnish a guide for the manuring, cultivating, and general treatment of the plants. Don't manure and cultivate all alike, where the varieties, soils and situations vary, but give each attention according to its own special wants. Lime should be freely used in all strawberry plantations at this season. Lime sweetens the soil and makes available all its inert food supply. It also creates new stores of plant food, is a necessity of itself, and does more to keep down rust and insect pests than anything else which can be employed. Slake the lime in small heaps under-ground, that is by burning in holes where soil is no more than damp, and when the lime is like flour sow it evenly over the strawberry land, taking care to well dust under the leaves of all dirty and sickly plants. A good liming before the leaves start will secure a clean, free growth, and go far towards securing an even crop of well grown fruit. Where mulching is practicable the material should be got ready at once. Many object to mulching, on the ground that it begets insects and disease, but that is absurd, for the plant must be fed, and if the mulching material is clean itself, and it ought to be, and placed in clean ground — and lime will secure cleanliness to both —then the plantation stands to benefit in every way. Fill all gaps with strong young plants, which can be lifted with a ball of earth to their roots. Cut off some of the leaves from excessively strong plants which show no signs of fruiting, and carefully note result, as it often happens that a little more or less foliage has a good deal to do with the powers of fruiting.

Spring Irrigatiou.

Water should be used in distinct accord with the condition and wants of the individual tree. We know quite well that water cannot often be kept under such complete control as to secure greatly varying supplies to a single plot of ground, but in a general way we lack system in irrigating our orchard and do not properly control the supply according to the land and the varying trees it carries. First of all make provision for getting rid of any surplus. This means that where the under drainage is not sufficiently sharp to secure a sanitary and free soil the headlands, ditches and main channels and depressions of the block should each and all be graded and properly prepared to carry off any surplus water as soon as ever it becomes a surplus. Prompt cultivating should always follow irrigating in spring, and this is seldom possible, unless the surface and under drainage are both elaborated before applying the water. Different soils, climates and trees call for different amounts of water, and somewhat different methods of applying, but in nearly all cases we over-irrigate and under-cultivate. The orchard work is of course to be judged by results, and where heavy watering is found to pay handsomely we do not say give less, but there are many who make more work for themselves and so regularly reduce the returns from their orchard by over-watering. A good deal of useful working knowledge is now accumulated in the best irrigated districts, but there is also room for a great deal of improvement, and growers one and all should make careful note of the effect of different volumes of water and applied in certain ways and seasons so as to obtain a safe working standard for every soil, situation and class of tree.

Thinning Blooms and Pollination.

As pears and apples come into bloom it will be easy to discern how far each variety or tree has been thinned and generally shaped, according to its needs. The spring is full of interest for the fruit grower, and though he may not find time—nor is there any need that he should—to pry into subtleties of plant growth, he will find it greatly to his advantage to watch the unfolding of leaves and flowers with the object of noting their value as they appear in open or close confined parts of the tree. The size and vitality of flower buds is largely determined by the leaves which gave birth to them, and which disappeared during the autumn or winter months, but even when a bud has been well formed and endowed with all the requisite qualities to yield fruit, it may still fail through receiving defective treatment in the spring. Apart from bad weather, space or the want of it, and insufficient sun heat, light and air, may prevent the elaboration of the pollen grains, in which case it is impossible for flowers to yield to fruit. An examination of the different parts of trees will show some flowering or setting most freely on the windy or well lighted side, whilst in the event of very boisterous and harsh weather prevailing the best results may be on the protected side. Again, trees bear throughout, or only in part, of their in or exterior, in which case the lesson should be easily learned. With many who have grown old in the orchard, bearing is supposed to be possible only on the outside of trees, but this shows want of insight and woeful lack of capacity for the business of fruit growing. Now, whilst the buds are unfolding, do some thinning of crowded spurs and their blooms. Soon it will be plain enough what degree of openness proved most conductive to setting and the even distribution of fruit. Naturally the most vigorous trees will bear with the most open branch and spur arrangement, and it will probably be an advantage to thin the new wood as well as the old—that is, when shoots have grown to four or six inches in length, as then they snap off easily and save a lot of winter pruning.

Careful Packing.

It is to some extent characteristic of Australians to depend a little upon the happenings of chance. But, where fruit that is to be subjected to a long journey and probably receive a deal of rough handling is concerned, it pays rather to take extra trouble and pack it firmly, than to err on the side of carelessness and trust to good fortune for its safe delivery.

— Handling and Grading. —

Considering the susceptibility of such fruit as apples and pears to bruise when carelessly handled, a little more than ordinary care should be bestowed upon fruit,that is being gathered and packed for the home market, than is given to fruit that is to be sold within a few days. An advantage gained by harvesting the fruit a few days prior to packing is that in the course of the latter operation all blemished specimens may be noticed and rejected. The less the fruit is handled the better, and for this reason the large sweat box is to be preferred for holding the fruit to the ord.nary bushel case, as, during packing, the various sized fruit may be more easily selected without submitting them to frequent turnings over in the boxes. Good grading is largely a matter of practice, for in a very short space of time the eye becomes accustomed to discriminating between the various sizes. It is also a matter of importance, for not only does it facilitate packing, but it enables the contents of the case to be more firmly secured in position than is possible when fruits of different size are placed in the one case. For export purposes the grades should vary from fruit 2¼ inches in diameter to that of 3 inches in diameter, a quarter of an inch separating the different sizes. Of course it is not possible to be absolutely accurate in this operation but an endeavour should be made to keep as near to the mark as is possible. An experienced man will perform the grading intuitively and without the assistance of grading rings, but those unaccustomed to the work will find that by adopting the ring method for a few hours they will attain a facility of selection that will enable them to discontinue its further use.

— Selection of the Fruit. —

It is usual to attach more importance to the manner in which fruit for the oversea trade is graded and packed than to any other consideration. Judgment in the selection of fruit is of paramount importance. There is no doubt whatever that many of the losses sustained each season are directly attributable to the lack of discernment shown by some growers in the selection of the fruit. Unless the produce is well and properly matured it is not fit for export. There are many young orchards just coming into bearing, the trees in which have not sufficiently matured to render their produce fit to bear such changes as occur in the refrigerating chambers. While the outward appearance of the fruit may be all that is to be desired, it lacks substance and tissue. As a rule the crops on young trees are light, and even should they be above normal, the fact of the trees being young and vigorous has a tendency towards forced development that makes the fruit unsuitable for export. Those orchardists who have plantations of young trees will be well advised to market their crops locally, and not utilise them either for export or storage purposes. There is also another matter to which attention should be given. Pick all fruit intended for the export trade several days prior to packing it for consignment to the wharf. If after picking the fruit is removed in cases or sweat boxes to the packing roo m and allowed to remain untouched for three or four days its condition will be much improved, and there will be much less sweating after the cases are eventually placed under the hatches.—Exchange.

Orchard Demonstration at Coonawarra.

A demonstration of "Harvey" orchard implements and "Bave-U" motor power spray pump was conducted by Messrs. G. A. Prevost and Co. (sole agents for South Australia) in the garden of Mr. Neville Graham, at Coonawarra, on Saturday, August 16th. The "Bave-U" spray pump is a model of completeness, being mounted on a two-wheel jinker. It is light in draught and very handy among the trees. The engine is a 3 horse power motor, simple to drive and keep in order. The vat, which is of 80 gallons capacity, and has an agitator which goes right through and is driven direct from the engine. Throughout the trial the spray pump did excellent work, throwing a full fine spray and maintaining an even pressure. The short time occupied in going over the large trees called forth commendation from the onlookers. The "Harvey" orchard ploughs, both double and single furrows, did good work ploughing on and off. Several of the growers present tried them, and were agreed that they were an ideal plough, and fully bore out all that is claimed for them (that they will work right up to the butts of spreading trees), thus saving the enormous expense of hand hoeing or digging. The "Harvey" spring tooth cultivator again proved its high standard of efficiency as a digging implement, and in its ability to go right in under the spreading branches of the trees, while the horse walks clear of same. For summer cultivation, while the fruit is on the trees, these implements can be used to advantage in that being so low in build they escape all hanging fruit. All present were very pleased with the work done, and were unanimously of opinion that it was the best cultivator yet shown in the district. The gathering included a large and representative number of orchardists, who all expressed their satisfaction and admiration of the manner in which the several implements had done their allotted work. These machines may be inspected at the North Terrace store of the agents, and full particulars of same may be obtained from Messrs. G. A. Prevost & Co., Steamship Buildings, Adelaide.

Using a Planting Board.

It adds much to the appearance of an orchard or even to that of a few trees in a suburban garden, if they are set out with almost mathematical precision. This is much simplified by the use of a planting board. This should be made of a piece of board four or five feet long, six inches wide, and one inch thick with a V-shaped notch about half way along one side and with two holes (one at each) through which iron pegs can be passed. To set the trees, first place the board with the peg—which already marks the position the tree is to occupy—snugly in the V notch and drive an iron peg through the holes at either end of the board; then lift one end of the board clear of the pin at one end, and swing it around, out of the way of digging a hole, using the other pin as a pivot, or hinge; when a proper sized hole has been dug about where the peg was, place the tree, and bring the board back in its original place by putting the free end over the pin from which it came; place the tree in the notch and set it firmly before removing the board. When the orchard is planted, if care has been taken, it will be found that the rows are absolutely straight and true, whether sighted lengthwise, crosswise, or diagonally, provided of course that the original marking out was done accurately.

Manure and Litter for Mulching.

Burn nothing but dangerous rubbish. All litter which is not infected by any insect pest, or disease, should be collected and placed where trees stand in need of mulching. Old hay and straw if they can be soaked with water, will decay sufficiently to make splendid orchard mulch. Sometimes a ditch or dam can be filled with dry straw or other litter, and so converted into a soil dressing. The man who keeps his eyes open to see whatever exists in the form of humus and a soil dressing, and regularly applies it to his trees, is bound to receive a good return for his labor.

What is Soil. ?

Soil is the home of the roots of the plant. Soil is the store-house for that part of the food which the plant takes in through its roots. Soil is the laboratory or kitchen where the food is prepared. And this work goes on unceasingly. Lastly, soil is a support to hold the plant firmly in its place.

But what is soil ? Soil is finely divided rock as can be readily seen with a microscope, clay being the finest and sand and gravel the coarsest of the divisions. In between the sand and the clay, we have what are generally known as loamy sand, sandy loam, loam, clayey loam, loamy clay and clay. These divisions are based upon the size of the soil grains and the different percentages of each size in a given soil. They are, of course, not arbitrarily fixed, there being unnumbered variations of soils.

Now if we consider soils as broken and decomposed rock, the first question that comes to our mind is, how and when were the rocks which originally covered the face of the earth converted into soil. Certainly ages and ages before man appeared on the earth. In fact before animal life of any kind could exist there must have been vegetation ; and vegetation of the higher forms could not exist on bare rocks. Probably the commencement of the disintegration was coincident with the appearance of plant life in the lowest form.

— In the Beginning. —

Geologists tell us that the earth was once a molten mass, also that the water which now composes the oceans, was probably in the form of a dense vapor which surrounded the red hot earth. Naturally, the earth began to cool, and it is cooled, it contracted. The result of this was that the surface subsided in some places and wrinkled in others, thus producing the sea basins, valleys and hills. When the surface had cooled sufficiently (and this cooling was hastened by the vapor in the air) the vapor condensed and fell as rain or snow, and thus began to wear or weather the rock. Frost and heat assisted the water in disintegrating and breaking up the surface. Some time after the surface had cooled sufficiently vegetation began its existence. First in almost microscopic forms, the mosses and lichens which are able to extract nourishment from almost any rock. These by their death and decay formed a very thin film of vegetable matter on the rock and a stronger growth took place which in turn died, decayed, and gave way to a still stronger and higher form of vegetation, and so on till grass, shrubs, and even trees were able to exist. This decayed vegetable matter in the soil is called humus. And this humus helps to disintegrate the rock by holding moisture and by supplying acids which increase the solvent powers of the water on the rock. When a soil contains much of this humus, it is called a vegetable mold. Rich garden soils are good representatives of this class. A soil that contains vegetable matter that has only partly decomposed under water is called peaty soil. Such soils are found in swamps and bogs and are generally sour and need to be aerated and limed before using.

While organic matter or humus is by no means indispensable to plant life, and though it is a debatable question whether plants derive any nourishment from it directly, it is of great importance in making the soil more friable and easily worked, and in supplying carbonic acid which feeds the plant, and acts on the soil dissolving and making available other foods such as soda, potash and magnesium which are held in an insoluble state in the soil. Humus also gives the dark color to the soil which enables it to absorb the best rays of the sun more readily and thus warm up more quickly in the spring.

— Clay. —

True clay is composed of silicate of alumina but the term clay in agriculture is employed rather loosely, being given to soils that contain a large percentage of impalpable rock dust with very little of the true clay present.

We hear rather misleading terms light and heavy applied to soils. These terms have no reference to the weight of the soil but are used in reference to the mechanical condition. A light soil is one that contains considerable sand, falls apart and works easily. A heavy soil is one that is stiff and tenacious, with more clay than sand. It is a fact that a heavy soil actually weighs less than a light one.

A tenacious or adhesive clay soil can be greatly improved by the addition of sand, lime or vegetable matter, which tend to separate the particles of clay. It is this adhesiveness of clay which causes heavy soils to crack when drying. Clay expands very much more than light soils when wet and shrinks upon drying and owing to the adhesiveness of the particles of which it is composed, the shrinking causes the cracks to appear. These cracks are naturally injurious to the roots of the plants, breaking and pulling them apart. Sand does not change its bulk by wetting or drying. Likewise a sandy soil can be improved mechanically by the addition of clay, lime or vegetable matter. Lime has the peculiar power of lightening heavy soils and also of making light soils hold together better. Bringing the two extremes to a happy mean as it were.

— Chemical Composition. —

The general chemical composition of soils is extremely similar, owing to the general mixing of the soil ingredients that has been going on since soil first began to form. Through the action of water dissolving and carrying material from place to place, through the action of streams, floods and glaciers, of burrowing animals, worms, etc., of the wind and even plants. Silica or quartz, because it is so hard and insoluble, is the chief ingredient both by volume and weight of all soils. Aluminium probably comes next in abundance, being a fundamental constituent of true clay, feldspar and mica. Some Some of the other elements in the soil are oxygen, which occurs free and in combination with nearly all the other elements. Carbon occurs as part of the humus, also united with calcium and magnesium in the form of carbonates; also as carbonic acid gas which plays such an important part in the solution of plant food. Sulphur occurs as sulphates. Hydrogen is united with oxygen in the water. Chlorine occurs in limited quantities generally in the form of common salt (sodium chloride). It seems to be in some way essential to plant life. Phosphorus is never found in nature in a free state but always combined with some other substance. It is very generally distributed through the soil but in small quantities and is very essential to plant life. Nitrogen is found in the soil in a combined form in the humus and the vegetable and animal matter, which upon decaying give up the nitrigen in the form of ammonia, which is turned into nitric acid by bacteria. The nitric acid unites with potash, soda or other soil ingredients and is taken up by the plant as a nitrate. Nitrates are extremely soluble and easily washed out of the soil. Calcium and magnesium in the form of carbonates compose the limestone beds of the earth. Both calcium carbonate or lime, and magnesia are necessary plant foods, and both are generally present in the soil in sufficient quantities to supply the plant with the required amount. Potassium is another element found in soils which is very necessary. It is widely distributed as a constituent of some feld-spars and micas. Sodium, which is the base of common salt, is also widely distributed, it very much resembles potassium as a chemical element, but can in no sense take its place in plant life. Iron is always present in the soil in sufficient quantities for the plant.

— Chemical Analysis. —

It would be supposed, that to find what foods were necessary for soils, all that would be necessary would be a chemical analysis of the particular soil. Then if any element was found to be lacking in sufficient quantity, the addition of this or these elements would give the desired results. But chemical analysis of the soil as they have been made, unfortunately can and do throw but a very dim and uncertain light upon either the condition of the amount of plant food a soil may contain.

It is true that the results of these analysis show a marked difference in soils, but from the data at hand, these variations may reasonably be supposed to be due more to the relative size of the soil grains than to any chemical differences in the composition of the soil. Taking an average of different analysis of soils the following has been stated by one writer. Potash enough to last 1,521 years, soda 4,050 years, magnesia 3,300 years, lime 4,367 years; phosphoric acid only 542 years, sulphuric acid 292 years, and soluble silica 17,650 years.

These amounts of plant food are what chemical analyses have told us were in the top foot of soil, and we know that plants send their roots foraging two, three and four feet down. And the subsoil is sometimes richer in certain ingredients than the surface or top soil.

Seeing these figures anyone would think it superfluous to add any more of these elements to his ground. Of what earthly use would it be to add a paltry 25 or 50 pounds more? Why, it would be lost. A chemist with the most accurate and careful analyses could never find it. It would be money thrown away.

But we know from practical experience that ninety-nine times out of a hundred crops are increased more than enough to pay for the manure or fertilizer added. We know that in spite of these figures, which there is no reason at all to doubt, soils do need fertilizing, they do play out, that farms do run down and become unproductive. And only by feeding can the soil be kept up to its fertility. So we cannot be governed by a chemical analyses as to the different elements our soils need. The only way is by trials, experiments, and careful observation.

The most important thing in considering a soil is the mechanical condition. Is it too stiff or too light for your purpose? Has it enough humus or organic matter incorporated in it) The proportions of clay, loam and sand can be readily ascertained in a laboratory with a simple apparatus, the percentage of humus can also b) ascertained by analysis. But a practical man can judge a soil very closely by feeling it and observing how it works.

Soils, generally, have the power of fixing the plant food added to them. By fixing, we mean holding the food in such a state that it cannot be washed out by the rain. This is true of phosphoric acid and potash, but nitrogen is very easily lost by leaching in the form of nitrates and under certain conditions escaped into the air. Clays hold the plant food more firmly than sandy soils and the same is true of moisture. Humus also helps to hold the moisture by absorbing it in the same way a sponge does, while clay holds it by surrounding it as though it were in a cup.

Oxygen or fresh air is very necessary to the soil to promote the growth of the innumerable bacteria that are always present in a fertile soil and to assist the chemical reactions that are continually going on. When the water in soil evaporates or is used by the plant, air rushes in to take its place. When more water is added, air and any injurious gases which may have been formed is driven out, and when this water is gone more fresh air is taken in. Also fresh air is taken into the soil at night. When the evening comes on, the soil cools and shrinks and air is drawn in to fill the vacant spaces. The opposite occurs when the soil grains expand with the heat in the morning. So you might say that the soil takes a breath once every twenty-four hours.

The Farm

Breeding Cows for Quantity Plus Quality of Milk.

By Professor J. Prince Sheldon, in Live Stock Journal.

One of the most prominent and characteristic anomalies to be met with within the broad and spacious limits which enclose the domain of dairy-farming in this country, as it appears to me, is this, viz., the common carelessness with which the milk-yield of cows is regarded. The apparently supine and happy-go-lucky listlessness on this subject, which formerly prevailed to a large extent, and does in some measure still prevail, amongst dairy farmers — cheese makers, chiefly—as to the quantity of milk each cow produces, and still more as to the quality of it, would be incredible to outsiders who were not practically acquainted with the subject. This trait of character—not altogether what one would like to see, in respect to things generally, in a community anywhere—is in some of its aspects really admirable; in this, for instance, it serves as an indication, by way of inference, of the staying-power possessed by those who, day after day and year after year, drink in the health-inspiring odour of Mother Earth, and of the leaves and grasses which adorn whilst they cover with a verdant mantle and carpet. It is the varied charms of country life, the close association with Nature, the inhalation of purest air, and with it of many mingled plant odours which are liberated in the great and glorious laboratory in which birth and growth and re-arrangement are consummated, that continually serves to reconcile these tenacious people to working for intangible profits and leading lives of detachment and isolation.

— Taking it Coolly. —

Herein is found, in fact, an explanation of the general run of contented acceptance of the 'unavoidable, so to speak, as to matters whose real importance would rouse a townsman into feverish but commendable energy. Most farmers take things more coolly—philosophically, idly, if you like and will—than is the case with townsmen. A good thing for them, in some respects, that they can do this and do it. Dependent on the caprices of a fickle climate, and wholly powerless to regulate the weather, they feel themselves and their avocations to be subordinated to the resistless current of the cosmical tendencies, and hence it follows that they seldom "cry over spilled milk"—a misfortune, in one sense or another, that they are more than tolerably familiar with. Hence, too, the careless unconcern with which, apparently, not a few dairy-farmers regarded the relative merits of different cows at the milking-pail in days gone by, when each man's milk was made into cheese at home, and the cheese-tub hid a multitude of shortcomings. This particular type of philosophic mind is, however, much less commonly met with now than formerly amongst farmers. But although a cow inferior as a milker is noticed now a good deal sooner than was formerly the case, steps to get rid of her—to feed her off for beef—are not taken as soon, perhaps, as they might be with advantage. There is still too much—shall I call it?—broad-minded toleration extended to such a cow, too much inclination to be content with average performances throughout the herd, too common a tendency to excuse individual dilinquencies by the stoical reflection that "there's always a something"!

— Quantity and Quality. —

The one is obvious, plain to the naked eye; the other is a point whose accurate elucidation involves a process of scientific examination of an analytical nature. A certain widely-known man, whose farming is presumably to some extent a hobby, though withal a practical hobby, had a great fancy for pedigree cattle, and bought a dozen or so. He likes to see his ruby quadrupeds grazing amongst the hedgrows and the isolated trees. They are as fat as mud, but as milkers are dismal failures. About a quart each per "meal" is said to be the quantity of milk these aristocrats of bovine society will condescend to give, though feeding on good land, amidst abundant grass. A quart per "meal," instead of six or eight, or even ten or twelve, seems to be a reductio ad absurdum in dairy-farming. As a lacteal performance, it is a travesty on the bovine race, and all self-respecting cows, jealous of their breed's reputation for milkiness, should bellow out their detestation of such frauds.

And yet, for all that, it is man's fault rather than cows' that such failures at the milking-pail are possible; their milkiness has been deliberately and purposely bred away, out of them. This has been done for generations — not only of cattle but of men—and the resulting milklessness may be charged with having done its share, and that no small one, in bringing about the disastrous collapse in pedigree Shorthorn values, which chiefly occurred in the penultimate decade of the nineteenth century.

Well, it is clear enough, or ought to be, that a cow's ordinary but most honourable destiny is to yield a maximum quantity of milk whose quality is decidedly above the average. The breeding of a calf is a subsidiary incident in her career, though not in itself unimportant. Dairy farmers who are alive to their own interests will not be content with cows that give less than eight quarters of milk each "meal" for months in the flush of the season—milk that may be depended on to pass any milk standard recognized by the law, and to analyze up to 12 per cent. of solids, of which about 3½ per cent. represents the butter fat. This ought to be—but isn't—what every cow should aim at, and some cows accomplish; just, indeed, what they would accomplish if only they were as carefully bred as they ought to be for quality as well as quantity of milk.

— The Milking Capacity. —

As the question is now understood, the giving of rich milk and a fair lot of it, or of doing badly in one or both, is, for the most part, a matter of each cow's own individual capacity. It is an endowment of Nature that is susceptible of development by art, or by Nature, under favourable conditions. It is, in point of fact, a physiological capacity which, fortunately, is susceptible—by suitable breeding through each succeeding generation of cows, by kindly treatment and shelter when needed, by judicious feeding, and regular and cleanly milking, and so on—of being raised into a prominent and permanent hereditary function in the life-economy of the cow. A somewhat fugitive—a short-lived—an undeveloped property, like that of secreting milk, may be trained and expanded until, in each succeeding generation, it becomes stronger and yet stronger as a tendency in the direction of hereditary. These properties—and there are many of them in the sentient organic world; pigeon fanciers can tell us this as well, or better, than anybody else—have need to be developed systematically, on intelligent and intelligible lines; patiently followed the system must be, not daunted the artist, not relinquished the method, though a lapse or two backward may now and again occur. It is to him who patiently plods year after year, never entertaining the idea of 'turning back, seldom tired but always hoping, that the plenary reward is sure to come in the end.

— Some Great Breeders of — Cattle. —

In all this, as I may surely hope, some encouragement—happily some incentive, too—may be found, even by him who runs as he reads. For it is so probable, so reasonable, so logical on the face of it, so completely well backed up by experience, by well-sustained experiments, so clear to him who studies the laws to which the stupendous process of animal reproduction is susceptible and obedient. In the days of the early breeders the principles of breeding, the elastic laws of heredity, the susceptibility of certain animal functions to development by art as well as by Nature, were little more than surmised, and certainly not understood.

To Bakewell, of Dishley, belongs the credit of being the first to demonstrate—with Longhorn cattle—the influence which man could employ in modifying and improving to an unsuspected degree the animal form in domestication. To toe brothers Colling we turn in admiration, too, for they were the first of his disciples to put his principles into practice in their herds of Shorthorn cattle. The success of these famous men was striking and rapid. Very few years sufficed to demonstrate the equal and even superior capability of Shorthorns over Longhorns to make rapid response to the principles inculcated by him in Leicestershire. Superior as were the Collings' cattle to the general run of their breed, in the Teeswater country or out of it, they soon became more excellent still in form and substance, though not perhaps in milkiness too. Bakewell, indeed—wisely, no doubt, for the breed shines but dimly in the constellation of milkers—did not aim at milk in his Longhorns, but confined himself to securing early maturity, beauty of form, and aptitude to lay on the flesh in the parts which are most appreciated on the table.

— Beef and Beauty—With Milk or Without it. —

Be it understood as a cardinal fact that while the Shorthorns of Colling were excellent milkers already, the Longhorns of Bakewell were not and never had been, as a breed, conspicuous performers on the pail. Bakewell—greatly to the world's loss and regret—left behind no record of his methods or of the motives which induced him to formulate them. We may, however, venture to suggest the probability that he, having thought out the subject in his characteristic and practical way—having, perhaps, made a few collateral experiments, whose results were not encouraging—came to the conclusion that success was more probable in one single line than in two as a pair; in beef as the one, rather than in beef and milk as the pair.

It would not escape so acute and practical a mind that beef and milk were not necessarily co-ordinate in cows, but might conceivably be in conflict if pushed too far together, and he had no information at hand to say how far they might, with success, be run together in harmony. His, indeed, were the first experiments in that line. Had he tried to run them so together, he could not have attained so high a dual success with Longhorns as he might have done with Shorthorns. This, indeed, it is more than merely safe to assume. It is almost an absolute certainty, in the absence of demonstration to the contrary, inasmuch as Shorthorns are more in the way than Longhorns of being good milkers; inasmuch, too, as they are more ductile and plastic in the hands of man, who would mould and model them to his liking; or, in the lap of Nature, where the most genial and generous conditions occur. But these things are only an allegory to him who knows little or nothing about them, and does not wish to know.

— And the Inferences. —

In the first place, it may be said that dairy farmers and all other breeders of dairy cattle hold the power of making, within limits, what they like of their herds, so far as milkiness is concerned. The limit to be expected is the potential capacity of the breed, whatever breed it may be — Shorthorn, Longhorn, Red Poll, or any other. Instances will occur to anyone familiar with country life, and with cattle in which some young farmer has started with an inferior lot of cows—low-priced, to suit his limited capital—and gradually improved them into a herd commanding the notice and approval of practical men. These instances show, in the best of all possible ways, what can be done. But there are other instances, far more numerous, in which no progress has been made with improvement, though there was ample room and opportunity for it, and urgent need as well.

— Knowledge. —

We may allow that some men have no eye for bulls that would improve their herds; these might enlist our sympathy, but for the fact that they will not condescend to consult other men, who have proved that they know something worth knowing about that sort of thing. Too proud to be taught, or, rather, too proud to tacitly, and virtually confess by asking for advice that certain other men are in a position to give it, these laggards in the path of progress pay the inevitable penalty which attaches to lack of knowledge in business affairs, and to that "pride which goeth before a fall." The man who succeeds in anything of this sort—in cattle-breeding as much as in anything else—is he who is ever in quest of information, and is not too proud to ask for it, if he does not find it on his own account. It has long seemed to me that farmers might derive no end of benefit, in various ways, if they would meet together now and then for mutual improvement in the concerns they are interested in.

But while there are many who are well up in breeding for beef and beauty, which are so obvious to the eye, there are comparatively few who seem to know much about breeding for quantity, and fewer still about breeding for quality of milk. It is next to impossible to absolutely make sure, long beforehand, by the so-called "escutcheon," or by any other external indication, whether a heifer will or will not be a good milker, giving plenty of milk of more than average quality. The signs may turn out to indicate correctly as to milk, but again, they may not. They are a guide, but not an infallible guide. Generally, indeed, a milky cow has a refined and feminine countenance, a long and narrow, finely-cut sort of face, which is an antithesis of that of a bull. Some cows, indeed, have broad and massive faces, masculine rather than feminine in cast; and cows owning this kind of face are but seldom good at the pail, and are correspondingly inferior at the churn when butter is made.

— Difficulty in Diagnosing Milk. —

But it is impossible to give such instructions on paper as will teach anyone about milk characteristics so effectively as viva voce illustrations, with a herd of dairy cows as object lessons. Do what we will, however, the best of judges is not always correct in his diagnosis of an untried heifer's capacity for filling up the pail. Not long ago I bought an in-calf, four-year-old cow, whose milk indications were not by any means strikingly promising. She was a polled black cow, probably crossbred, but showing nothing but Galloway characteristics. Her milk was quite uncommonly rich, and, for so small a cow, she gave a large quantity of it. Yet again, subsequently, I bought another polled cow, of the same age or thereabouts, whose milk is, I believe, richer than that of any cow I have ever before possessed. She, too, is a small cow, and, but for the absence of horns, might readily be mistaken for an undersized Shorthorn crossbred, which probably she is. Neither of these cows struck me, at the time I bought them, as possessing any "features specially distinguishing for milk. They seemed likely, and that was all. Being crossbreds will sufficiently account for the unexpected in regard to milk. There can, I think, be little or no doubt that, as regards milkiness, crossbreds are much more difficult to diagnose beforehand than are the pure breeds from which they spring. As to milkiness in cows, nearly half a century's experience amongst them has merely gone to confirm my original idea, which then was purely a theory or even a conjecture, that appearances are not always correct indications, and that "the only proof of the pudding is in the eating," so to speak.

— Is Milkiness Worth the Trouble ?

Those who are engaged in the milk trade are more alive than most other folk as to the value of breeding for quantity of milk, and those who make butter for quality of milk. The two properties do not always necessarily, or even probably, correlate or synchronize in any cow or breed of cows, unless the animals have, like the Jerseys, fixed characteristics of severa, centuries' standing. And even a pure-bred Jersey, I am assured —I haven't had much to do with them myself—will sometimes bring discredit on her race by milking poorly, both as to quantity and quality. But for all that, it is true that careful breeding for milk will establish a stream of tendency, amongst cows, that may, with rare exceptions, be relied on, and the establishment grows firmer as times goes on.

It is worth while, therefore, to all intents and purposes, to breed cows for copious milking, though the milk standard established in this country does little or nothing to encourage breeding for quality as well as quantity of milk. I find an opinion prevailing that it is hardly worth while to breed for anything but quantity, since low-quality milks—not lowest—may creep through the meshes of the standard. This is an opinion to be regretted because the time is coming—is already within predictable distance of time—when milk will be sold on a basis of quality to wholesale as well as to retail customers. Then will arise a demand such as we have not yet known for cows whose milk will be confidently held to contain a reliable four per cent. of butter-fat. Then, too, will cattle—herds of dairy cows—yielding low-quality milk be looked at askance in the trade, as, indeed, they are already to some appreciable extent; especially are they so regarded at the creameries, and only a little less so at the cheeseries. High-quality milk finds preference already in the trade.

It is an open secret, indeed, that dealers readily show a cash preference for "dairies" of superior average quality of milk, which is wanted for customers who can discriminate and appreciate, and to whom price is a consideration quite subordinate to quality. Let us hope that such discrimination will become general, and that all farmers will receive prices corresponding with the quality of the milk they put on the market. No inducement can surpass this: the inducement which increased payment for recognized merit can supply! We have recently had what was called a milk famine in London, that was mostly owing to shortage in supply during the tropical weather. The shortage was, however, owing to increased demand as well as to the lessened yield of milk that was caused by the want of rain throughout the southern half of the country.

It seems to me that improved quality of milk all round will certainly bring about an increased consumption, and that this will go some way toward establishing a chronic shortage of supply. But this will not take place until farmers generally aim to breed for quality as well as quantity of milk —two conditions which are not incompatible—and until the public awake up into the knowledge—elementary though it really be—that quality is the only true basis of value in milk.

Your mistake in life is that you do not look forward far enough.—Dickens.

How Horses are Spoiled.

Were it possible to arrive at a correct estimate of the percentage of horses that are ruined every year by mismanagement, the total would surprise a good many people who have not troubled to consider the matter. Beyond all doubt, a large number of such animals are spoiled by being broken hurriedly —that is to say, that although they may have been entrusted to capable hands, their breakers have not possessed sufficient time to attend to their duties thoroughly, and consequently have, through no fault of their own, been compelled to hasten their work. A still larger number of young horses owe their subsequent bad manners and consequent reduction in value to having been under the tutelage of men who either have possessed little knowledge of how to make a colt, or else have been handicapped by an inability to act by their charges as they ought to. Finally, there comes a third catagory, and this is by no means a small one—namely, that which includes horses which practically have never been broken at all, as they have been put to work alongside a steady old horse almost as soon as they have been brought up from grass, and have been compelled to pick up their ideas of harness as best they could.

Regarding these three classes of young horses from 'a closer point of view, it can only be obserbed of the first and third that the remedy can be found by the owners if they desire to discover one. There is no necessity for an employer to entrust a valuable colt's future to one who has not the time to do justice to his charge, as assietance can always be obtained to relieve the latter from a portion of his other duties ; and, when it is remembered that the value of a well-bred colt may be diminished to a very large amount by imperfect breaking, it is extremely bad economy to grudge a small outlay for extra help in the stable. The horses in the third class are, of course, to be sympathized with to a certain extent, for, although their value at the outset was probably nothing very great, some of them, had they been properly broken, might have aspired to better things than they succeeded in achieving, and, if so, their lives might have been more comfortable, for a time at all events. As regards the horses in the second division the case is entirely different, for the owners of the majority of them may be credited with a desire to have every justice done to their colts. Unfortunately, however, they may not be aware of the lack of knowledge or the infirmities of the breaker until the pupl has been ruined, and gaining experience in such a way is decidedly expensive. Of course, a man who does not understand the work is hopeless ; but there are plenty of breakers who are perfectly capable but who spoil their charges in various ways. If the colt is timid, the methods employed by some of these will break his heart, and should he be inclined to show temper, an impatient or rough breaker is likely to make bad a great deal worse.

— Other Failings. —

Then, too, there is a tendency on the part of some people to overbit their charges, and whilst this is as bad as it well can be in the case of an old horse, it is absolutely fatal to a young one's progress. A sharp bit breaks the heart of many a colt, and almost as many are ruined by overwork. Such inflictions as the above engender a hatred of the sight of harness or saddle even before the youngsters have an idea of what is expected of them, and, therefore, as a preliminary word of advice it may be laid down that the earlier lessons should be as light as possible. No doubt there would be fewer failures if breakers were, as a rule, to make some attempt to discriminate as regards the difference of tempers that exists amongst horses ; and not only this, but if they were to treat the animals as though the latter possessed some degree of intelligence. For instance, if, when a young horse is being schooled to jump, it were a general practice to wait until he got well on to his hind legs before letting him go, there would be fewer failures than there are if he is sent at the obstacle and made to rise at it before he is properly on his balance. As soon as the colt gets to understand what is required of him he will usually try his best to do it ; but if he is taught a bad style it will stick to him to the end, and his prospects for life will be spoiled.

It is to be feared, however, that there are a good many people who, either by reason of their bad or careless driving, succeed in spoiling a horse which came to them as free from vice or tricks as could be desired. A horse which by nature is not a shier can easily be transformed into something very like one by being unmercifully thrashed if he becomes startled at some unfamiliar sight. The next time he encounters anything of the kind he remembers his thrashing and associates the sight with suffering ; then he shies again, and the punishment is repeated, with disastrous effects. The man who is careless about his harness, and who allows his horse to drive himself, will spoil any animal, and is as likely to end up by letting the horse down as not. But this observation must not be taken as suggesting that a driver should always be fidgeting and worrying his horse. His aim should be to get the animal to go right and to keep him at it ; it is often the slovenly coachman who produces the ill-mannered horse. In frequent cases it is the driver's fault when a horse stumbles, but even when it is not so it is quite unnecessary to use the whip in nine cases out of ten. If the horse once begins to connect a stumble with a thrashing, he gets flurried when he puts a foot wrong, and is very likely to come down in consequence ; but if he gets careless it is necessary to wake him up by a light stroke just to remind him that he must keep awake. Of course the jagging at a horse's mouth is as certain a way to ruin the animal as anything can be; and it is very far removed from a good practice to shout at and rate a horse for no particular fault. A naturally timid animal is liable to lose its head on such occasions, whilst a bad-tempered one resents it, for horses are not fools, and are far more amenable to kindness combined with firmness than they are to ill-usage or violence of any kind. This being the case, it is unfortunate that their memories should be so good, for the recollection of chastisement has often transformed an ordinarily-tempered horse into a perfect savage, and a good reliable worker into a useless brute. Of course, horses can be spoiled in many other ways, but it is believed that causes mentioned above are responsible for most of the losses incurred by owners through the deterioration of their animals.—Live Stock Journal.

The Merino in America.

Sheep farmers in Australia have never concerned themselves very much over the doings of their rival of Amerira both have a common origin, and each has in turn adopted a variety of ideas for improving upon the original stock. So far as is known all the fine-wool sheep in the world are descendants from the merinos of Spain, where they have been bred from time immemorial. There is no occasion to concern oneself regarding the introduction of the merino into Germany, France, or England, when the object n view is to trace the origin of the merino in America. In 1801 a Mr. de Lessert imported the first Spanish merino sheep into the State of New York. The shipment consisted of four, and of these three died before reaching land. In the same year, a few months later, a pair were imported from France, a modified form of Spanish merino, and universally known as the Rambouillet sheep. In the following year an American doing duty as Minister to France sent over four pure-blood Spanish merinos to his farm on the Hudson River. In the same year the American Minister to Spain brought home 200 Spanish merinos with him. In 1809 and 1811 the Minister to Portugal sent home large flocks to his home in Vermont.

By the year 1812 as many as 20,000 Spanish merinos had been brought to America and distributed through the New England and middle States. These sheep were procured under very favourable circumstances, as the Spanish Government had confiscated the estates of four Spanish noblemen for political offences, and the American buyers could select the best by paying the price demanded.

By this means America became possessed of some of the very best blood of the Spanish flocks. Under genial conditions of soil and climate, and through the great care that is naturally bestowed upon a new acquisition, the American merino was gradually improved in both frame and fleece. Full-grown rams weighed from 120 to 180 lbs., and ewes about 40 lb. less. The wool maintained its wonted fineness, but the density was increased, heavy folds of the skin being established about the neck. The growth of wool was encouraged all over the carcass from nose to toes. The form was improved, the legs shortened, and the back broadened at least one-third. As wool and mutton producers the breed has been immensely improved. The American claims for his merinos that they are the best in the world. This is not the only product regarding which he crows in the same keynote. So long as he confines comparison to the French merinos, or Rambouillets, which produce a long, straight combing wool, on a long, leggy carcass, the chances are that Brother Jonathan is correct. When, however, he starts out to beat the world, he has got a different class of article to reckon with in Australia, and a comparison of portraits of the two types does not place Australia second.

American merinos have in the past suffered much in the ups and downs in the prices of sheep and wool. Droughts and other peaceful imbroglio have oftimes played battledore and shuttlecock with Australian merinos. Never, however, has the industry been molested by a local war. In 1812, however, in America, when the British fleets were blockading the ports, there was a tremendous rise in the price of wool and sheep. Wool was sold for 10/- per lb., and sheep at a correspondingly high price. Speculation in merino sheep ran wild, some rams and ewes selling for £200 apiece. When the war ended in 1815 the bubble burst. The American markets were immediately flooded with cheap wool and woollen cloths, the price of sheep fell to 4/- per head, and wool was correspondingly low. The sheep-raising business which had been unreasonably stimulated by the war and by speculation sustained a fearful setback. The reaction was greater than the situation called for, and many farmers gave up raising sheep at a time when they should have remained in the business. It is stated that the great manufacturers of woollen cloths in England sent agents through the sheep-raising regions of America and bought all the sheep they could find, slaughtered them, sold the meat for what they could get, and took home only the pelts.

In America to-day, just as in Australia, there are some distinct types, or sub-breeds, of merinos which are rivals with each other for popular favour. This spirit of rivalry is ever for the benefit of the breed, as it promotes improvement and prevents deterioration. There is a type known as the Dickson merino, sprung from 200 head imported in 1802 by the Minister to Spain. These have been bred with absolute purity, and are now in the hands of more than a hundred successful breeders. These latter have formed an association and a studbook, in the records of which there are now more than six thousand pedigrees, tracing back to the original stock. This breed produces a beautiful standard Delaine wool from 4 to 5in. long, with a soft, glossy fibre, clean, and well crimped. The breed is hornless, and the mutton is good. It has fair size of frame, the rams weighing 200 lb. in ordinary condition and 50lbs. more when fat. The ewes weigh about 150 lbs. The fleece in the grease weigus far rams from 20 to 30 lbs., and for ewes 15 to 20 lbs. A good sort of article as viewed through Australian spectacles.—Elder's Review.

The Value of Herd-Testing.

The establishment of a herd-testing association has been recently urged upon the dairy farmers of Queensland. So far, the attempts made by the Agricultural and Stock Departments to introduce herd-testing on the dairy farms, though the results have shown the advantages of it, have not been very successful. Easy-going methods, in many instances, are preferred to more exact and scientific ones, and while good seasons have continued and the general results have been satisfactory, there has been little inclination to trouble to make systematic investigations of the value of the cows or to grade the herds up to their most profitable productiveness. But the difference that might be made in the annual returns from the farm by it, and in the increase of the amount and value of cream sent to the factory are unmistakable. In Denmark, where herd-testing had its origin, the results have been very striking. The first herd-testing association was formed there in 1895, and the good effect produced was so pronounced that in 1909 there were 530 associations existing in that country, and the average number of pounds of butter per cow had greatly advanced. In 1894, according to the Government statistics, the average was 112lbs. per cow; now it is 224lbs. In other countries where associations have been established, though the result might not have been quite so great, in every instance there has been a very marked improvement in the value of the herds and in the output of the butter. An association formed by the dairymen in a district in Queensland for the purpose would do much more than the visit of a Government expert to test an occasional herd. The interest in the testing processes would be keener and more likely to be sustained. Co-operation, too, would create healthy rivalry, increase the knowledge of the best breeds for milk production, and tend to improve the whole of the stock. The cost of forming and maintaining an association need not be great. The chief officer to be employed would be an expert tester, duly qualified and with an accurate knowledge of the scientific appliances necessary and of the calculations to be deduced from them, of breeds and of foods, and the also some knowledge of the value general care of the stock. Much would depend upon the selection of the tester, and also upon the co-operation of the dairymen in making and keeping records and summarising them at the end of certain periods. But all this would present little difficulty, and the interest awakened and the service rendered in the tabulated results would soon overcome any disinclination towards the system adopted and turn the work into a pleasure. An association in a district would lead to mutual co-operation in obtaining the best milkers, the best foods for the stock, and the best breeds. There is no question that nothing but scientific and systematic testing can discover the value of the individual cow in any herd. It is easy for the dairyman to be deceived. Cows that have been supposed to be of the best milk-producing calibre have been found when tested to be not paying for their keep. Perhaps they gave in their first milking days a large supply of milk and won a good reputation, but for a long time afterwards yielded little, and when the long meagre yield has been balanced with the first supplies a different opinion has had to be formed. Others have yielded little at commencement, but taking the year through have been good milkers. Rough estimates are unsatisfactory and misleading. The dairyman can only get the full advantage from his herd by knowing the value of each of his cows, and culling out those for the butcher that are scarcely paying for their keep. Butter-fat must be measured with the cows rations before its value can be known. An association among the dairy farmers in Queensland for herd-testing would be of untold service in many directions, and once formed would soon prove it value. —" Dalgety's Review."

The Silio.

The Missouri State Board of Agriculture reports:—It does not matter what naterial the silo is made of; it must be airtight on sides and at bottom. Any crack or knothole or poor joint at the door will admit air, and the silage will rot just in proportion to the amount of air that enters. The receptacle must be strong enough to withstand the lateral pressure of the silage when it settles. This lateral pressure at 10ft. from the top is 110lbs. per square foot, at 20ft. 220lbs., and at 30ft. 330lbs., and at 40ft. 440lbs. It is very difficult to make deep rectangular silos whose walls will not spring enough to allow air to circulate up and down the sides and cause losses. The depth should be made as great as practical, because— first, in this way the largest amount of food per cubic foot of spaee may be stored; and, second, the silage keeps better because packed so solid; and, third, there is less relative loss at the surface. The top of the silage always spoils to a depth of 2 to 8in. No silo 20 by 40 will hold twice as much as one 25 by 25, and one 36 ft. deep will hold five times as much as one 12ft. deep. Summer silos should be deeper in proportion than those intended for winter use, because the silage spoils faster in summer and must be fed down at the rate of about 3in. a day to have always fresh silage. The foundation must stand on level, firm earth, and should extend about 2ft. above the surface of the ground. If the foundation is started deep the hole should be dug large enough to give ample room outside the wall to thoroughly tamp the earth up close to the foundation. It is a good plan to dig down 4 or 5 feet in order to secure good, firm earth on which to start the foundation, and also in order to get the greatest capacity in the silo without going too high into the air. Deeper than 5ft. would not be either convenient or safe. Care must be taken in wet places not to dig down much, or else the soil must be drained. In many places even a good wall of stone, laid in cement and well plastered inside with cement, will not keep the soil water out. On sandy soil a floor will be needed to keep out soil air, but on clay land there need be no floor unless rats and mice trouble; then a cement floor may be laid.

Care of Dairy Cattle.

Well-bred dairy cows are, as a rule, of a more or less nervous temperament, and therefore they are very susceptible to any rough treatment, and are easily upset when frightened. The nervous system and the milk-secreting functions in a cow being closely connected with one another the milk yield is most liable to be adversely affected when the cow is frightened or excited. In the interests of milk production, therefore, if for no other reason, dairy cows should always be treated with great gentleness, and they must never be frightened or hustled in any way.

Complete comfort and contentment of the cow are essential if she is to give a maximum yield of milk (says an English exchange), and care should, therefore, be taken to promote these are much as possible. Anything which tends to disturb dairy cows or to ruffle their placidity has an adverse effect upon milk-secretion, and must for this reason be avoided. Thus it is of importance that regularity and punctuality in milking and feeding should be observed, as the cows are upset and rendered restless if they are not milked at the accustomed time, or are kept waiting for their food beyond the usual hour. After feeding, and when the cows are lying down chewing their cud, they should not be disturbed in any way.

In driving the dairy herd to or from the pasturage the cows should be taken along at a very leisurely pace, and they ought not to be hustled. There is room for much improvement in regard to this matter on many dairy farms, and a little supervision may with advantage be bestowed occasionally on the taking out or fetching of the herd. It is most objectionable for cows to be chased about in any way.

During the summer it is most desirable that the cows should have plenty of shade on the pastures, this being essential to their comfort. Want of shade is a source of great discomfort to grazing cattle, and exposure to a hot summer sun is not good for them. On pastures on which there are no well-grown hedges or trees to afford the necessary shade some rough shelter against the sun ought to be provided.

Care of the Hand Ssparator.

Without the hand-power cream separator, dairying in many parts of the country would be impossible. The principle upon which they do their work is practically the same in each case, but there is a difference in their efficiency and durability. If the dairy farmer has a preference for a certain make of machine, and is satisfied that it is durable, and will do good work, that is the separator for him to buy; but the man who has no preference, who simply wants a good machine, should not accept one that has not been thoroughly tested. If the separator is put in and operated, capacity tested, and the skim milk tested for butter fat by the agent or salesman, be sure the machine is not turned fasten than the number of revolutions indicated on the handle, or stated in the book of instructions. There are machines that will not do close skimming at regulation speed, but will do very efficient work at a greatly-increased speed, and this means greater wearing of running parts, and more work for the operator.

Some very practical instructions for the care and handling of the hand separator are given in circular 131 issued by the University of Illinois agricultural experiment station, from which we quote the following:—"Set the machine perfectly level on a solid floor; be sure that no dirt or grit has found its way into the gearing; clean all parts thoroughly before using; all parts that come in contact with the milk should be thoroughly scalded; oil the separator each time it seems advisable thograde of separator oil; once a month remove all gearing guards, and examine to see if everything is working properly. If at this time it seems advisable. Thoroughly clean all bearings and gearing parts. Kerosene applied, wiped off, and replaced by oil, will materially lengthen the life of the separator. If by accident some milk should get into any portion of the separator works, clean it out, as it will soon clog the gearings, and give an offensive odour to the room. Look occasionally to see if the machine is standing level. Do not think that the separator is a difficult piece of machinery to handle, and that it is hard to take care of. Follow the directions given in the book of instructions pertaining to your make of machine. Clean the separator each time after using, as once a day is not sufficient, and this is best done immediately after it has been used. Take it apart, rinse well with cold water, and then wash all parts of the bowl and tinware in warm water, using brushes that belong to the separator. Never use a dish cloth, or soap of any kind; but rather small quantities of sal-soda or washing powder free from grease. After all parts are thoroughly washed, rinse in boiling water, and place in the sun. Even the brushes used in washing should be scalded and placed in the sun. During the night, leave all parts in the supply can without putting together. It is best to skim the milk immediately after milking, or while it is still warm. Most separators do their best work at a temperature of from 80 degrees to 95 degrees Fahr."

— Further Instructions. —

Some other points to which careful consideration should be given are also provided in the publication mentioned,:—See that the machine is operated at full speed and at full capacity. If turned by hand, see that the speed is uniform and evenly applied. Do not simply push when the handle goes down, and pull when it starts up, as this is hard on the separator. Prior to turning on the milk supply, and just after separating is completed, it is well to run a quart of water through the bowl. The common practice is to stop turning, and then pour in the warm water, but the speed should be increased while flushing the bowl. Allow the bowl to come to a standstill of its own accord, unless there is a brake attached. The relative amount of cream to be obtained from the amount of milk skimmed will depend on the breed of cows, the season of the year, and whether the cows are fresh or advanced in the period of lactation. The per cent. of fat in cream varies as the season advances, because the milk does not test the same throughout the year. Other conditions being the same, the richest milk is produced on dry feed and towards the end of the lactation period. It is best to skim cream that will test from 30 to 40, or, in other words, in skimming 10 gallons of milk, one or one and one-third gallons of cream should be obtained. It is not the amount of cream that is important, but the amount of butter fat. If the cream is sold to a creamery where sampling for testing is done by weighing instead of measuring, the correct test will be obtained whether the cream is thick or thin. Cream testing betwenty 30 and 40 means more skim milk left at home. Higher testing cream keeps better, and naturally there is less transport. If a certain amount of cream is churned at home, and an equal amount sent to the creamery, the number of pounds of butter obtained will be a trifle more than the butter fat figured from the test of the cream at the creamery, simply because the test determines the amount of butter fat and, as a rule, under daity conditions six to six and one-fourth pounds of butter fat will make seven pounds of butter. When a separator is set to skim a 40 per cent. cream, it does not mean that every can of cream will test 40 per cent., for the percentage of fat in the cream varies with the speed of the machine, temperature of the milk, amount of milk going into the bowl, amount of water used in flushing the bowl, and variation in the test of the milk.

The Short-Ribbed Horse.

If a horse is short-ribbed, he is light in his middle, and is nearly always a poor feeder, says a bulletin issued by the Canadian Government. He has not the stomach to contain succulent food to serve him from one meal to another.

A light-centred horse seldom weighs well; and weight in a draught horse, if it comes from bone, sinew, and muscle, goes a long way to determine his commercial value.

When a horse is well coupled together on top, and has a short back, he must have the length below from the point of the shoulder to the back of the thigh. When so built, he will stand the strain of drawing heavy loads much better than if he has a long, loose back.

The front feet and hocks are the parts of either a draught or a driving horse that come directly in contact with the hard work, and unless they are sound and good a horse's usefulness will be very much impaired, and his commercial value very much lessened.

Before using the stallion, get the groom to lead him away from you. Stand squarely behind him, and see that he picks up his feet, and places them on the ground properly, travelling in both trot and walk clear and clean, not striking the ground first with the toe and then bringing down the heel.

The feet should be large and waxy in appearance. The sole of the hoof should be concave, and the frog spongy, plump, and elastic, because it acts as a buffer to take the concussion from acting too severely on the foot, pastern, and fetlock. See that both sire and dam have sound feet, free from fatness, brittleness, and not contracted. There should be no "gumminess" about the hocks of the draught horse, as it indicates coarseness. They should be wide, especially from a side view.

A stallion whose feet are contracted and brittle, and whose hocks are puffy and fleshy-looking, should be avoided, as such hocks are generally associated with a coarseness throughout the whole conformation, and a general lack of quality.

Some Aids to Agriculture.

Ohne Phosphor kein Gedanke (Without phosphorus no thought) is a German saying which may sound very materialistic, but which nevertheless contains an element of truth. Phosphorus in one form or another enters very largely into the composition of the human frame. Bones, brain, and nerves, with the healthful condition of them all depend upon the constant and sufficient supply of this element of life. Our bones are largely made up of phosphate of lime, and if we reflect for a moment upon the prodigious quantity of bony matter which is formed every year in a dense and ever-growing population, and realize that this matter is in one form or another derived from the soil, it becomes evident that to avoid the inevitable exhaustion of the land the amount abstracted from it must be replaced. Phosphoric acid constitutes nearly one half of the substance of the ash of wheat, and more than one-third of that of oats, or of barley. Phosphorus does not occur in nature in a pure state. It is found combined with other substances, chiefly with lime, potash, and soda. Its combinations with these substances are termed phosphates. As phosphate of lime it is used in the manufacture of chemical manures. It is a substance largely diffused in the strata which form the successive layers of the earth's crust. When this mineral has been mined or quarried it is ground to a fine powder and made soluble by the action of sulphuric acid. In this formed it is called superphosphate, and incidentally it may be mentioned and welcomed as one of the greatest blessings ever introduced to South Australian agriculture. Thus from the fulness treasured up within itself is the earth replenished. Its stones are made into bread, and the waste of remote ages ministers to the life of to-day.

— Limestone. —

Limestone abounds in the strata of the earth's crust; some of the beds are comparatively pure limestone, others are more marly in their occurrence. The latter contain a larger proportion of earthy matter. When treated with fire the lime is quicker in its operation on the soil than if utilized in a crude pulverised condition. The beneficial effects of the incorporation of lime with the soil are very various. It acts mechanically, imparting strength and solidity to light soils, and lightens those that are of a heavy nature. It promotes the richness of the soil by assisting to dissolve its mineral constituents, and thus it places new food within the reach of the plant. Taken up into the plant, it is supposed that it acts as a tonic or gentle stimulant, assisting its digestion and increasing its power to take up and assimilate to itself the food lying within its reach. There used to be an old saying that barrenness was caused by an excess of acid in the soil. One action of lime is either to nullify the deleterious action of such acids, or by entering into combination with them, to produce compounds which, instead of being hurtful, will be healthful to the plant; hence the sweetening effect of a lime-dressing upon sour or coarse herbage. Not only does lime give itself to the growth of the plant, but it also facilitates the extraction of other nutritious properties from the soil. It follows, therefore, that unless these are replaced by other fertilizers, the constant application of lime will accelerate the utter exhaustion of the soil. Hence the old saying, "Lime enriches the father, but it impoverishes the son." Here again, as in the instance of phosphates, we see an element which in distant ages was evolved from the great laboratory within the earth's crust.

— Salt. —

The use of salt as a fertilizer has never been taken into serious account in the agricultural economies of this country. Years ago the use of it become very general in Europe. It appears, however, to have been used indiscriminately, without due regard to the nature of the soil or to those conditions of climate and atmosphere on which its successful use depended. In all coastal districts, and for some distance inland, the soil is supplied with a sufficiency by the evaporation of salt with the water from the sea, to be subsequently thrown down upon the land in the form of rain. Several hundred pounds of salt per acre are thus annually deposited around our coastal districts. Like lime, the beneficial effects of salt upon the soil and plant declare themselves in various ways. Salt contributes directly to the food and life of plants, and causes certain chemical changes in the soil that make the latter more productive.

— Ammonia. —

Another ingredient, however, that requires a greater amount of intelligent thought and clever manipulation in its extraction than the above is ammonia. This takes its name from the district of Ammonia, in Libya, where it is said that the Arabs first obtained the pungent salt known as sal ammoniac from the dung of camels. This salt is also prepared from a variety of substances, such as bones, leather, hoofs, and horns. In a gaseous state it is also largely produced by the decomposition of animal dung and of vegetable matter generally. The fact that decomposing vegetable matter gives off so large a quantity of this gas shows how largely it must first of all have entered into the composition of plants, and through them into animals' horns, hoofs, and excreta. Some portion of ammonia in the form of gas is constantly escaping into the atmosphere, but is returned to the soil again in dew and rain. It is by the admixture of lime with ammonia that the sharp pungent smell of ordinary smelling salts is produced. The usual way in which it is applied to the soil is in conjunction with other substances as artificial manure. It is most valuable to those plants that contain gluten, and hence in conjunction with phosphates forms a valuable fertilizer for wheat and potatoes. Its vapour gives a denser green to leaves, and it exercises a delicate but powerful effect upon the respiratory power of those portions of the plants.

— Bones. —

Bones are made up of about fifty parts of phosphate of lime, about forty-three of organic matter, into which ammonia enters, four parts of carbonate of lime, and the remaining three parts are composed of magnesia, soda, and potash. They contain the ingredients of several fertilizing substances. The wonder is that their application to the soil should be of so recent a date, but since Europeans have realized tha value of this material for agricultural purposes they have imported bones from all parts of the world and have not hesitated to enter into contracts with the modern Egyptians of such a nature as to cause them to rifle many an ancient burial ground and send the bones of the Pharaohs, their contemporaries, and their cats to make bread for modern Englishmen. Bones are applied to land in a raw state. When first employed they were put upon it in a size as large as 2in.; gradually, however, the size has been reduced. When they are boiled first or when ground to dust their action is much quicker and more powerful, but more temporary in its duration. It used to be said that a good dressing of ½in. bones would be observable in its effect upon the soil for ten years, and even longer, from the time of its application. The good effects of a bone-dressing are particularly manifest in the improvement of pasture, vineyard, and orchard lands, often doubling their value.

Summer Fodder.

With little hay, and less grass than usual, dairymen should make sure of having as much summer growing fodder sown as possible. Maize, sorghum, amber cane, Japanese millet, pumpkins, melons, and the like, are all good summer crops; but a good variety of of maize will usually give the biggest bulk yield per acre; and it is also a fodder much relished by stock when properly grown. At least ¼ acre per cow should be sown; and the sooner it is in the better, for it will then be available all the earlier to keep up the milk supply.

When the ground is ploughed it should not be allowed to become dry and caked on the surface; but should be kept loose with the harrows. If the land has not been well manured previously it is as well to put in a little supherphosphate with the seed. The seed should be sown in rows 3ft. apart; and not deeper than 3 to 4 ins. Putting the seeds from 6 to 8 ins. apart in the rows, from 30 to 35 lbs. will sow an acre. When hand sowing after the plough, every fourth furrow will be close enough to put in the seed. In very loose or dry soil, rolling the land after sowing is an advantage, as it sets the soil closer to the seed; but harrowing after sowing is the better method in damp or loamy soils.

As soon as the crop shows through the ground the horse-hoe should be run down between the rows to loosen the surface soil again, to check the weeds, and to prevent the soil moisture from drying out. This can be repeated with advantage about every ten days until the crop is 18 to 24 ins. high; but only a very light working must be given so as not to stir the soil deeply, or break the roots of the maize. A piece of brush under the scarifier will keep it from running too deep in light land; and two or three workings are generally sufficient for a crop. A cultivation should always be given after each rain. The scarifying does all that is required to keep the maize growing, even through very dry weather. It is the drill sowing and careful cultivation that will make the maize crop a success.

While there is a great variety of material fed to pigs, it should be remembered that it is the properly matured animal that gains the place of honour, though unfortunately it often happens that the man who produces the right material too often fails to reap the reward and benefit to which he is entitled.

Summer Forage Crops.

—Room for Maize and Ensilage.—

The weakness of South Australian agriculture, said Mr. Colebatch during the course of a lecture on "The growth and utilization of summer fodder crops," was that it was not sufficiently "mixed." In the cultivation of wheat South Australia was equal to or ahead of all the other States, but green fodder crops had been sadly neglected. Of course South Australia could not hope to equal those States in the growth of summer fodder, for there was a very large area of this State that would never produce any green forage. But, on the other hand, there was a very large area on which it could be grown successfully. At present in some of the best dairying districts it was necessary to shut down butter factories in the winter time because there was not sufficient forage to feed the cows all through the year. It had been said South Australian farmers took no interest in anything but wheat, but there was now an awakening interest in the cultivation of fodder crops. Farmers, however, did not realise the care that was necessary in the cultivation of these crops. Green fodder crops were voracious crops, and they needed to be planted on land that was in good heart. Indeed, he believed they required greater care and attention than wheat. Both for dairy farming and for the raising of fat lambs, fodder crops were of the first importance, and whilst the lamb industry had grown immensely they still had a long way to go before they reached the limits of the productive capacity of South Australia in that direction. In choosing their fodder crops they must consider the crops most likely to suit the climatic conditions of the country, and the crops that would return the best feeding quality—not the greatest tonnage per acre. For instance, they might get much better value out of a maize crop than out of a much more prolific crop of sorghum. The digestible albuminoids were the factors that determined the feeding quality of the crop, and they varied as follows:—Sorghum, .60; Japanese millet, 1.05; maize, 1.10; barley, 1.90; rye, 2.10; oats, 2.60; and mixed grasses, 2.50. Where rape could be grown successfully it was absolutely the best crop for the fattening of the stock. It was essential, however, that it should be sown in land that was in good heart. The feeding of rape must be carried out with judgment. Rape, spring-sown, was very forcing as a food, and sheep that were put on to it while hungry very frequently suffered from internal complaints. As protection against that it was a common practice to feed the sheep on grass and rape at the same time. Rape had to be given a start with manures, and if it was not coming on well they might stimulate it with a light top dressing of nitrate of soda and sulphate of ammonia. Kail for sheep grazing was almost as good as rape. It was not so effective in itself, but it would last throughout the season and was much safer to feed. It was also a true fallow crop and would improve the land. Sorghums, maizes, and millets, were another class of crops altogether. Sorghum was likely to have a much larger range of cultivation than maize, but he would say unhesitatingly that where both could be grown maize was preferable. It was richer in food value and there was not the same danger in feeding it green as there was with sorghum. Many farmers were afraid of feeding sorghum to their stock, but really it was only necessary to use discretion. Sorghum that had been in any way stunted in its growth was unsafe for grazing, but after it had once been cut and stacked it was not dangerous. It liked land that was of a sandy nature, and had plenty of substance in it. It could be grown satisfactorily under a rainfall of 18 in., or even 15in. Maize was not likely to go very far north without irrigation, but in the south it should be grown more than it was—15 or 20 tons to the acre should be nothing to take off in the Mount Gambier district. They should be able to get 30 tons to the acre without very much trouble if they treated the crop properly. In that district they could grown on a small area enough maize to supply them with fodder all the year round, and there was no reason whatever why any factory should have to close down. If they went in for conserving fodder in the form of ensilage—and they certainly should—then maize was by far the best crop to grow. Millets were more particular than either maize or sorghum as regards the quality of the soil, and Japanese millet was the only variety that had given him satisfaction at Kybybolite.

Sheep and Blowflies.

The blowfly is one of the most frisky of the winged insects. Its disturbing influence on the comfort of mankind and our domestic animals demands a general crusade. The blowfly takes care to operate on the sheep in places where the animals cannot displace it. There it propagates its species, and the only remedy the stockowner can conceive is clipping away the wool from the crutch of the animal and applying some chemicals obnoxious to the fly. While "crutching" the sheep in the manner described entails much trouble and expense to the flockmaster, it is not permanently effective. In fact, the embryo of the flies is cut off with the wool and permitted to seek cover in the soil, when, in due course, it again resuscitates into active life countless number of the species. As it seems humanly impossible to destroy all flies of any kind once they are enabled to take flight, it is therefore obviously essential to endeavour to control the sources. The New South Wales Entomologist (Dr. Froggatt) recently said that during the last few years many mixtures, dips, and powders have been in use in all parts of the State—with more or less success as lasting cures — to keep the flies from blowing the wool or reinfesting the wool previously blown. The active properties of most of these were crude oils, turpentine, tar, carbolic acid in various forms, and arsenic. Many of these, rubbed in after the damaged wool had been shorn off, will drive the flies away for a time, but none has been found that will last for any length of time. The reason why these methods are not permanently effective in warding off the persistent blowfly is because the wool is always growing; and in a few weeks, or a month or two, there is a layer of new untreated wool below the poison—if there is any remaining—which will be, should the wool become damp or soiled, a safe feeding place for fresh maggots. Consequently it is very difficult to find any dressing that can be lasting on close-woolled sheep or some months before shearing, especially when the sheep are full-fleeced. The damage of the sheep is caused by the maggots of two common yellow blowflies found in both the house and bush all the year round.

It is not a little remarkable that farmers and graziers, when dressing their sheep, never consider the subsequent development of blowflies which the operation may cause. They throw on the ground the damaged wool when crutching, and scrape the maggots out of the wounds. The maggots, if nearly full-grown, burrow into the soil, and rapidly change into pupae. The previously so't, white maggot is then encased in a stiff parchment-like shell, where it can remain safe and sound until suitable conditions arise. It then bursts out of its protective covering and emerges a new-born blowfly. In summer the transformation from maggot to pupa, and pupa to blowfly, is only a matter of days; whilst in winter it often takes months. Every other blowfly maggot that escapes from the blown wool is capable of reproducing a female blowfly that can deposit at the least 100 eggs—sometimes double that number—several times in the course of her few weeks of life. Thus every well-developed maggot that is allowed to live and get under cover when "crutching" is being proceeded with means another fly, and that fly may mean hundreds more, ad infinitum. Although the poisonous dressing fluid may fall upon or be sprinkled over the maggots, as is often the case, if they can get away from it into the soil they soon work it all off their skins, and will suffer no damage to stop them developing later. The maggots and infested wool from every blown sheep should be carefully collected and destroyed. Mr. Froggatt considers this is quite practical. Each man should have a sheet, upon which the sheep should be placed while being crutched or dressed. Everything clipped from, or what drops from, the sheep could be caught on the sheet, transferred to a bag, and the contents shaken into a fire or tub of boiling water. This method would certainly go a long way towards minimising the pest. The maggots from one crutching would cause more trouble and expense, subsequently, than would pay many times over for the precaution in destroying them in the first instance as described. Under the present thoughtless method of crutching every sheepman is rein-

(Continued on page 230).

The Horse's Foot—Soil and Climate.

With regard to the right and proper growth of the horse's foot, there would almost appear to be a certain amount of contradiction in the laws of Nature. The Arabs of the desert must have had their earliest experiences on dry, if not hot, sands, where there can be but little moisture from year's end to year's end. There is nothing to show, however, that the Arabs do not treat their horses in a manner calculated to counteract the disadvantages of heat and soil. They generally live near wells that give a never-failing supply of water, and the chiefs know their way from one set of wells to another. Their colts, supposed to wander about the settlements that are free of all pasture, may have their feet washed and attended to for all anyone knows, and the supposition that a very dry soil is the best for the healthy condition of horses' feet may be based on no better grounds than those believed in by a well-known trainer who shortened his supply of water to his horses because they descended from an Arab source. And so must we come down from those accustomed to work on scanty supplies of the liquid elements. At any rate, when allowing that Arabs have generally hard, serviceable feet, they are no better than horses bred elsewhere. It is possible that Australian horses might take the palm with respect to qualities as durable feet, but they may only be from management on the part of Englishmen to suit them for the soil and climate.

Such considerations can be extended to every part of the United Kingdom, as there are different conditions, no doubt, in almost every country of England, Ireland, Scotland and Wales. There is much to show the shallow soil on the tops of hills or on plateaus that are dried up much by sun-rays is the worst of conditions for the horse's foot. It does not grow there. The late Doctor Freeman, of Bath, was fond of chalk soil for the well-being of his young thoroughbreds, but he did not like it for their feet, and would have changed his stud farm if he could have done so without interfering with his great professional duties. Those who purchased the Lansdown yearlings will vote that the doctor's fears were well conceived, as they nearly always failed through having small, contracted feet. There are many other studs in England of thoroughbreds, Shires, Hackneys, etc., that have been found out as possessing the same disadvantages, and when one hears of this or that breeder changing his abode and taking his stud with him, it is nearly always because the primary value of his stock is threatened by the growth of small, upright, donkey feet, instead of the wide, healthy foot, possessing plenty of good, hard horn, it being an unquestionable truism that where there is no foot there can be no horse.

— The Horse in Nature. —

Now, what can be adduced from a consideration of the condition of the horse in nature? The moor-pony lives on what might be called the most unhealthy soil imaginable, bogs that had never been drained, and in some cases totally outside the possibility of improvement. The ponies have their own particular methods of crossing these bogs. They never go on what looks dry and safe ground, but always on a wet, sloppy path of their own, and hence they never get into a bog, which other less-accustomed travellers invariably do. But the ponies have uplands as well to go upon, and they vary their whereabouts according to the weather. They have valleys to explore and feed in, burns or small brooks to cross, different soils, from turf to sand, to wander upon, and a bracing climate to harden the bone, horn, and tissues. The result of it all is that they are the best-footed horses in the kingdom. No one has ever heard of a Welsh of Dartmoor pony going wrong in his feet, excepting through the culpable stupidity of an owner. They are always very hard and wide for the size of the animal, and as a proof of durability there are hundreds of native-bred ponies that have lived up to thirty years in hard work and have never been lame in their lives. The Irish horses give a somewhat similar experience. They have often been bred where land has had very little draining, with fences in a very loose condition to make one field accessible to the next; and so the animal may be in uplands in one part of a day and on a marsh or meadow in the other, with generally a brook running through to cross over, and, being left out at night as well as day, there are the dews and frosts to moisten and perhaps invigorate the hoof. At any rate, Irish hunters invariably impress English blacksmiths. Concerning their wonderfully hard feet, one can remember a steeplechase horse that had won on twenty-three occasions and been in training seven seasons that quite astonished his shoers by his extraordinarily hard, tough hoofs that really wanted some handiwork to pare. He came from Ireland, and was not trained until late as a two-year-old. Another two-year-old that stood training very well until he was six was English-bred, and for the first twelve months of his life was an occupant of fashionable paddocks, kept in, excepting in fine weather, got up for sale, and plates put upon his half-grown fore feet, with the result that they were like cockle-shells, little round feet, upright, and looking to the eye glossy and soft. In other hands the little plates were quickly taken off and the young animal allowed full freedom in a paddock in which there was a pond with a very muddy bottom. Here he would stand for hours on a hot day, swishing the flies off himself with his tail, and evidently enjoying the cold mud as comfortable to his poor young feet. In six months they grew wide, flat, and strong, quite the reverse to the little cockle-shells, and two years later that horse won the Ceasarewitch. Would he have done so but for the muddy-bottomed pond?

— The Lesson. —

That there should be some water in all paddocks or fields for young animals to cross over or to stand in is reasonable enough, but such a view is seldom taken, as the greatest stud farms are as often enough without such accommodation. The disadvantages of certain soils might be obviated by such a natural course, as certainly a clay subsoil that is rendered into almost the condition of bricks by the sun's rays cannot be right, and a chalk soil of no depth, and so lacking in moisture, must be equally objectionable. Old land is said to be very good, such as has never been ploughed within the memory of man, and of these Yorkshire can boast in her wide stretches of wold, but perhaps the fine, breezy climate has something to do with it as well, and make the many-acred county the land for horses. Something, though, must be said for Lincolnshire and Cambridgeshire with their fens that, up to fifty or sixty years ago, were in very much the condition of Dartmoor in the matter of drainage. The science of agriculture has done much since, but in years long ago, when these fens were marshes, horses by thousands were bred there, and the very animals of all others that did the road work of the times that wanted exceptionally good feet, the hacks that had to travel sixty miles a day, the horses for the fast coaches, and the hunters that used to last ten or twelve seasons, without the assistance of comrades or second horses. It might not be the wisest policy to change the site of stud farms on soil and climate considerations only, as it appears from the suggestions of Nature, and much that has been seen in the past, that the ever-important growth of horses' feet is due to an almost daily different existence. A constant dwelling-place on very dry soil is no doubt prejudicial and answerable, perhaps, for the fact that a good third of the racing-stock is useless through a deficiency of foot-structure, and diseases of the feet in the heavier breeds may be due to the same. It may not do, either, for the foot to be resting always on wet, damp grounds, as that might produce a tendency to softness in hoof-texture, but the changes such as horses give themselves in shifting their ground according to weather seems the right course, and perhaps it is our variable soil and climate that has made the British horse what he is. The right policy should be, then, to follow that of Nature as applicable to the country, and that would be to have uplands and lowlands on the same stud estates, with water such as the ponies have on their moorland retreats, and to carefully follow out the rules of Nature in constantly changing the locations of young stock in accordance with the weather.—Livestock Journal.

Barbed Wire.

Most of us know barbed wire, some of us have sworn at it, some of us have sat on it and sworn some more. The inventor, however, is still blessing it. It is said to have been the luckiest invention in history. It came about by accident. The inventor of barbed wire, having a neighbour whose pigs trespassed on his garden, he put up one day a wire fence of his own make. This fence had barbs and points on it; it was queer and ugly—but it kept out the pigs. It was a real barbed wire fence—the first in the world—and there was millions of money in it; but the young owner and his friends laughed at its freak appearance. One day two strangers saw this fence, perceived how well it kept out the pigs, realized how cheap it was—realized, in a word, its value—and ordered several tons of it. Furthermore, they contracted to sell for a term of years all the barbed wire he could produce. He borrowed 1,000 dollars, and set up a little factory. A few years later on he had paid back that loan, and was worth a small matter of 15,000,000 dollars besides.

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festing his sheep yards and paddocks every time he dresses a sheep. It seems probable that were all dead animals in which flies deposit maggots destroyed by fire, or by other means, the main source of infestation would be wiped out. This would, of course, be a task demanding tremendous vigilance on the part of run-owners. Carcasses of wild animals and reptiles would possibly have to be dealt with in this manner.—Exchange.

Water Supply for Bees.

The necessity of providing a supply of clean water for bees is commented upon by a writer in Gleanings in Bee Culture, and it is pointed out that much valuab,e time is frequently lost by the bees in having to fly long distances in search of water, of which they require a considerable quantity. Under these conditions it is obvious that the best returns cannot be obtained from bee-keeping. Bees, too, are drowned in large numbers in drinking from pools, or from water contained in ordinary vessels, but this continuous loss may be obviated by placing chips of wood in the water, on which the bees can alight.

In many places bees can obtain water for themselves without making any long journey, by visiting drinking places of horses and cattle and also pumps, etr. But in such places the insects are frequently a great annoyance. Generally, too, many bees are drowned under such conditions. To avoid annoyance and loss, it is well worth while to have a place where the bees may find water at all times.

Such a place should be provided before the bees have formed the habit of visiting a pump or horse-trough, for that habit having been once formed, the bees will not, under ordinary circumstances, pay the slightest attention to any other drinking place. They may, however, by suitable means, be enticed away to a new place, if it be only a few feet, or even a few yards distant. For this purpose, the pump or horse trough should be covered up so that the bees cannot drink from it, and a vessel of water set near by. Next day, and each day thereafter, the vessel should be moved a little nearer the hive. After getting a short distance, it can be moved 5 or 10 feet each day. Keep the old drinking place covered up for a few days, and afterward keep water constantly at the new place, and there should be no more trouble.

Whatever vessel is used should hold a good supply of water; and then if care is taken to refill it before it has been completely emptied, there is not much danger that it will often be entirely dry.

The best thing I have ever tried is a tub, or half-barrel, with cork chips or cork dust thrown on the water. Put in all the chips possible, provided that the bees will have no difficulty in reaching the water. The bees are just as safe walking over them as on the ground.

Cultivating.

The difference between profit and loss often turns upon the manner and method of cultivation. He who cultivates for the mere purpose of destroying weeds has missed one of the important factors which should be made the basis for the use of the cultivator. Regard the cultivator if we will as first and foremost a weed-destroyer, yet its moisture preservation is a far more important consideration than the killing of weeds. We have all heard farmers passing through the discouragements of a dry season remark that they were at least able to save cultivating, for weeds killed so readily, and grew so slowly, that one or two cultivations did the work of the season. In such statements there is less wisdom than philosophy. The fact of the matter is that the dry season is generally the time when a large amount of cultivating should be done. The cultivators should be set at work early in the year to prepare a dust mulch and retain the spring's moisture in the soil as far as possible. The process should be repeated often so as to make the mulch continuous. The cultivator should be set to work after each rain. Even though a shower may be so slight as to penetrate the soil only an inch or two, the cultivating should be done just as religiously as though there had been a genuine soaker. A slight rain, ineffective in itself, is sufficient, however, to pack the surface soil, establish capillary connection with the deeper soil layers, and cause a rapid wasting away of what little moisture may be present in the soil through evaporation. Where thorough, consistent cultivation for the purpose of conserving soil moisture is carried on, the weed proposition will generally take care of itself, for the cultivation will be frequent enough to guarantee an early death to all weeds. On stiff soil, or soils that have a tendency to puddle, the farmer must sacrifice a little on moisture for the sake of preserving good tilth after heavy rain. Were he to attempt to save all the moisture possible by starting the cultivator before the soil had become sufficiently dry to work readily, he would simply have a puddling surface which would bake, and not only make later tillage more difficult, but actually help it in conducting moisture from the soil to the atmosphere. The same is true as regards preparation of the seed-bed. Working the soil before it is sufficiently dry starts the whole season wrong. It means a vast deal of extra labour during the cultivating season, and more or less unsatisfactory results in spite of the extra labour. In general, it is a safe rule to cultivate for the purpose of retaining and conserving soil moistures, using judgment as to when the soil is in proper condition to work. If this is done, weeds will not make any trouble.—Farm and Home.

Staleness.

Pasture has long been recognised as one of the best things possible for "run down" or "stale" horses. When grass will not bring them up there is not much hope. A writer in the London Live Stock Journal says :—"The only remedy for staleness is to turn the horse to grass for a longer or a shorter period, as circumstances may require. In cases where the legs of a horse show signs of wear as the result of work on hard roads, much can be done to restore the limbs and to brace them up again by turning the horse off for a few months or for the whole summer on a soft and spongy pasture. The legs and feet of stabled horses are always greatly benefited by turning out, and an occasional run at grass will do much to preserve the limbs and keep them sound. If the legs are much worn, or if there has been an actual sprain, it is advisable, if not absolutely necessary, to blister before turning the horses away. In any case a horse that is given a run at grass on account of leg trouble needs a long rest if any permanent good is to result therefrom. The legs may fine down pretty quickly after the horse has been turned away, but this must not be taken as evidence that they are fully restored, nor should it tempt the owner to take up the animal and bring it into work again prematurely. In cases of leg trouble a rest of, at any rate, ten weeks is necessary if any permanent good is to be effected, and more often than not a considerably longer run at grass than this will be beneficial."

Retention of Moisture in the Soil.

When it is considered that for the production of one pound of dry substance our cultivated crops required three or four hundred pounds of water it is easy to comprehend what an important function the moisture in the soil exercises, and how necessary it is to keep the water deposited by the winter rains from drying off before the crops can utilize it, because the rainfall during the growing period is irregular, and would frequently be insufficient to furnish the requisite amount of water to the plants, which, without this dissolving element, are unable to absorb the plant-food in the soil.

To retain the winter moisture it is desirable, as far as possible, to prevent the spring winds from effecting too great a drying action.

Deep cultivation in the autumn contributes to the improvement of the moisture soil condition, as the water reservoir may be said to be thereby enlarged and more moisture stored up. Anything that enriches the humus in the soil also increases its power of retaining moisture. The humus not only attracts moisture to itself, but loosens the soil, and, as is well known, a loose soil has more retentive power than a close one.

Poultry Notes

Frauds About?

The influence of the male bird on the laying of the pullets got by him is a well recognised fact in more advanced poultry breeding. This recognition is far from general, still in successful work it may be taken as the rule. It is not often that one reads of so marked an adverse instance as that recorded by Mr. A. E. Terry, in connection with one of the Tasmanian competitions, as follows:—

"In the second competition a pen headed the list with 1,318 eggs —a very creditable performance. During that year the exhibitor referred to very much admired a certain strain of birds, which certainly caught the eye so far as appearances went. The male bird was purchased and mated to some of his best-laying hens. I understand that the pen entered in the third competition was the progeny of this mating. The six birds only produced 900 eggs during the 12 months; 418 less than won the previous year. Subsequently I became aware that the cockerel came from a strain of birds which in the competition only averaged 100 eggs per bird."

In such cases as the above we are on plain ground. The bird makes no pretence to be other than he is. As far as we know his history he is a plain and unconcealed rotter, but he isn't a fraud.

— The Fraud. —

A fraud is something which pretends he, she, or it is something he is not, and it is just this which makes him dangerous. Do such things exist in our poultry pens? It seems more than possible. Put a Blue Andalusian male with a Blue Andalusian hen and you get blue, white and splashed chicks. Why? There are frauds about, though it must be admitted that the apparently genuine article is the real fraud in this case. Put a certain type of Rose comb to another Rose comb and you get rose and single combs. Why? There are frauds about. The Rose is rose in appearance not in breeding. Mate a certain type of white Leghorn together and you get Browns, Whites, and splashes. Why? There are frauds about. The parent whites were bred from brown and white but did not show it. They were not what they seemed. Mate a rose comb with a pea comb and you get which? Each, you say; wrong, you get neither, but walnut. Mate these two walnuts together and you get what? All walnuts, you say; wrong again. Things are evidently not what they seem for you get single, rose, pea, and walnut. Why? Rose is dominant to no rose, Pea is dominant to no pea, Walnut is the form taken by the comb containing both of the dominant characters, and single appears when the dominant of neither is present. Mark that sentence please. It has, we believe, a message to all thoughtful poultry keepers.

— A Problem. —

You mate a 250 laying hen with a 250 descended cock and you get what? and why? As to the what, competitors in seven States answer with one accord, anything from 100 eggs to 250 eggs, and they wish they didn't. They do it in public, there is no appeal from the published figures. Truely there are some frauds about, birds which are not what they seem. As to the why. Competitors have no answer beyond bad luck. Science has no time for bad luck, it is a word unknown in its vocabulary and in the few examples of many which we have quoted above, is giving us a hint. What is the weak spot of our poultry breeding work, it is the hidden fraud, the bird which is not what she or he seems. It isn't their fault, it isn't that they won't use a quality which Nature or their parents have given them, it is simply that they do not possess a quality which Nature or their parents had not the power to transmit to them and man has not known enough to read the signs, but he is learning.

— A Possible Solution. —

Is there not something very suggestive in the walnut comb; bear in mind, this is not fancy but amply demonstrated, scientifically proved fact, recorded with a hundred others in a hundred books which are the text books of modern biology and to a less extended extent of breeding. Moreover, they not only always act in this way but do it in certain known and definite ratio. Is there not something which can help us from uncertainty to a measurable degree of certainty. It seems worth more than a passing thought. If the production of a certain form of comb depends on certain inborn gametic qualities, if the production of a certain colour of feather depends on certain quite different inborn qualities and so on through the list of proved facts, is it not more than conceivably possible that the production of a certain form or capacity of egg-laying is due to equally definite inborn qualities and that they can be equally sorted out and once sorted out be fixed for generations. You see the external difference of the comb, but are the differences likely to be less real because they are unseen. Let us get rid of the idea that a chick is the outcome merely of the union of its parents and that it is composed of a casual mixture of the varying elements and proportions of both. If this were so we might expect the comb instead of being definite in numbers and in type, would vary in all conceivable shapes and patterns. Modern biology says the chick is not, in other than a very limited sense, the child of its parents. It is the gametic constitution which came to the parents from dead and gone ancestors and will go on to future generations, an endless chain splitting up and reconstructing, always the same yet ever changing, which counts. However, that's rather away from the point.

The unit characters which control the comb are clear and distinct, for instance, they are quite separate from colour and there is no merging. Nature has a certain number of patterns of comb. She makes varying combinations but always the same, and what she does once she does always and in the same proportion. A comb is single or it's not, it is case of giving the lot or none at all. If the unit characters which govern comb do this why not the unit characters which govern egg production. Is there any reason why they should not act in precisely the same manner. Is there not, on the contrary, very good reason for thinking on the evidence of our yards and competitions that there has been something of this sort going on. Look back at the explanation of the impure walnut and read the same formula in other words as applied to egg production. Average egg production is dominant to no egg production. High egg production is dominant to no egg production. Maximum egg production (250 a year) is the form taken by the hen containing both the dominants and low egg production appears when the dominant of neither is present. Does it sound any less far-fetched when applied to comb production which we know to be a fact than to egg production as postulated by the "Pearl" theory we referred to last month.

(To be Continued).

Dual-Purpose.

All over the world the rivalry between the special as against the general-purpose breeds goes on Beef and milk, wool and mutton, straw or grain, quantity and quality, etc. In poultry it is just the same, eggs or meat or both. It is of course admitted that you get the maximum result with a specialized breed for a given purpose, but it is held by many that you get the greatest money return from breeds which, though not the highest in any one quality, are good in two. There is, however, no absolute best, it is a question of men and markets.

The real question that the recently-organized General Purpose Poultry Club is up against is the latter. The men are all right, they know the merits of their breeds, what they have to do is to drive them home to the public. In the last resort the deciding factor is the consumer. You can write, talk, and illustrate, but unless you have the goods, and they are the sort the public wants, you don't get very far. The meeting the other night was splendidly attended. It showed the interest which is being taken in the subject, but it somehow, or to some extent, missed the mark or fell short of it. We know that it is more easy to criticise than to construct , and in writing the above we do so in no unfriendly spirit. The job before those interested in any case is difficult, but it will be made lighter if all do what they can to help. To push down the public throat even a good thing which a portion of the said public does not know it wants, and the remainder knows it does not, is a pretty big contract. Yet this is practically what has to be done. A step in the right direction will be to frankly recognise just what the public do want and cater for it. In all business propositions it is not what you think the buyer ought to want but what he really does want or he thinks he wants, which counts, and the quicker you tumble to this and suit your wares to his wishes the better.

For all practical purposes a fowl consists of four qualities, eggs, meat, maternity, and appearance. They have, however, very different values. One man in a hundred wants appearance as the leading line, most people will chance the question of broodiness; comparatively few trouble about meat but practically every person wants eggs and wants them often. How do the club propose to meet the position. They have nothing to expect from the man who wants only appearance, nothing from the few people who grow prime table poultry for home use, and nothing from the man who banks on a straight flush in eggs. Whom have they left? Well, a very big and important crowd, but one who has very decided notions as to what he wants. He is found in all the suburbs, in the country towns, and on 75 per cent. of the farms of the country, and he, too, wants eggs all the time, meat where and when you show him a profit, broodiness in August and September, and behind him and upon whom he is dependant is the consumer. How does the proposal meet the position.

Poultry Costs.

On the labour question, the report of the last competition states "that on a commercial plant birds would be in large flocks and attendence labour would cost very much less." This is fortunate, for otherwise poultry keeping would be equivalent to insolvency. It adds that this fact is mentioned "to prevent misunderstanding." One is, of course, lost in admiration of the excellence of the intention, but regrets that it does not lead to something more definite. Of course it is admitted that there is a difference, but this difference may be a great deal over-estimated and there two sides to the question. The costs are admittedly greater, but what about the results. The actual preparation of the food takes the same time per bird whether fed in six flocks or thirty, the time of collecting eggs is much the same per egg, whether you lift six or thirty per nest, it is only the distribution which counts. In any case, one has to do a lot of walking where eight hundred birds are concerned, for it is not usual, at all events not at Government Colleges, to dump mesh about in barrow loads or wheat in sacks full. This, however, is not the important point.

Are we not rather given to overlooking the difference that this subdivision makes or may make to the results? Would thirty birds penned together lay five times as many eggs as six together? General opinion says no, and general opinion is often right. It certainly would be interesting and possibly very instructive to know at what point the limit of maximum individual production per pen inmate is reached and at what point it pays to increase the number of pens rather than number of inmates. What does our department say? As far as we know, it follows the historic example of the sailors' parrot—we refer, of course, to the respectable sailors' parrot—not the other one. Anyway, the report has nothing to say on this score. It finds room, however, to mention that "at a recent conference of poultry instructors and investigators from twenty-eight countries, it was stated, that the work of our South Australian poultry station and competitions was well known." We have a glimmering idea that it was Major Norton who made that remark. In any case, it leaves a good deal to be desired in the way of detail. For instance, the work of the Adelaide burglars is "well known" but does not necessarily meet with the unqualified approval of those most interested, and we noticed in an Adelaide paper the other day, an exhilarating communication from a north country correspondent, that a local resident was "well known" but it went on to say that he was leaving in custody of the police, and rather plainly hinted that his departure was not regarded as an irreparable loss. To be "well known" may of course be highly desirable.

There is one point we rather envy those assorted investigators and instructors, and that is their apparent knowledge of the work of the South Australian poultry stations. This hardly seems fair, for if one asked, say, the first dozen native poultrymen one met, replies would be in about, the following proportions—Two would be enthusiaistic admirers, a trifle vague perhaps, but quite genuine. Two would not know they had existed. Two would probably say, "Oh, just messing round and spending money." Two would be anxious to see a report. Two might be hoping to sell a little stock, and would beg to be excused, and two might express their opinion in language unfitted for publication.

— They would not be Missed. —

Referring again to the six as against 30 or 300 per cent. Is it not rather feeble that with the materials lying at hand in the competitions to settle this question and others of more importance once and for all, without disturbing the competitive side in the least, nothing has been done. The doings of the lower 50 per cent. of the pens after the first four or six months, is of no conceivable interest or importance to anyone not even to competitors. Yet reasonably used, by being split up into a number of contrasting pens of varying numbers, they could have been made of very great service to poultry keepers generally. What's more simple than to take say, the last six pens. From each pen take one bird and make a pen of six, then two birds from each of the original six pens and make into a pen of 12, the remaining three from each pen to form a pen of 18. Make, say, ten of these sets of pens, that is, 10 of six each, 10 of 12 each, and 10 of eighteen each. That would take the 360 worst scorers out of the competition proper. They would all be poor layers, but each set would be approximately of perfectly equal power. One couldn't get better material for the work and it wants doing. There are, of course, other matters which might, to a very great extent, have been settled by this time. Twenty-five pounds prize money split up amongst the owners of these comparative teams, and the advantage of not having their heroic efforts to dodge the bottom place published every week, would, we imagine, be welcomed by competitors.

During the last five years about 2,000 birds have each spent six or eight months at Roseworthy at a cost of some hundreds of pounds without the slightest benefit to themselves, their owners, or the public. Has the idea ever occurred to the Department that these birds might have been profitably used? Apparently not, or if so they have very successfully smothered its prompting. Hawkesbury, as usual, are taking the lead in this matter, though on somewhat different lines.

An Interesting Comparason.

Whether it is wise to keep hens over their second year is a question which has been a good deal discussed, the correct answer, no doubt, depends on circumstances. The Hawkesbury College competitions have given us a lot of information on the subject, and it is interesting to compare those figures with some reported by the Maryland Expt. Station. A flock of 60 pullets selected from a larger flock of 140 White Leghorns, was used for the experiment. During the pullet year the 60 birds used for the experiment produced 10.280 eggs, or an average of 171.3 eggs per head. In the second year they produced 149.05 per bird, and in the third year 115 eggs per bird. Thus, while the decrease in the number of eggs per bird for the second year as compared with the first year was 22, the decrease in the third year as compared with the first year was 56.2 eggs per bird. The report concludes that the difference in second year birds is not sufficiently marked to justify the discarding of second year hens, especially as such stock is well suited for breeding purposes. The Hawkesbury averages are:—1st year, 167; 2nd year, 133; 3rd year, 115. This is for the full series of competitions, eleven of 1 year, six of two years, and three of three years, and for all breeds.

If we take the White Leghorns alone for the competition ending last April, we have 189 for the 1st year White Leghorns, 141 for 2nd year White Leghorns, and 123 for third year birds, which makes a total of 151 eggs a year for three years from the Australian Leghorn as against 145 eggs a year for three years by the American. Brought down to figures our lovely climate does not appear to amount to much. In this connection it is interesting to remember that old time writers put the figures for good layers at 180, 140 and 100, down to 10 for the seventh year. They had no public figures to put up, of course, but they appear to have been surprisingly near the mark. Biddy herself, too, seems to have known quite a lot about laying long before the first expert was hatched or laying competition started.

Dead in Shell.

Occasionally a number of chickens seem unable to make their way out of the shell; these chickens are apparently fully formed. but for some reason have not sufficient strength to pierce the shell, and consequently die, so far as one can tell, from exhaustion. It is one of the most difficult problems of artificial incubation, and most people suffer from time to time in this direction. While it may not always be possible to prevent dead-in-shell, as it is commonly termed and while, however careful one may be, a few fully-formed chickens may fail to hatch, yet there are a good many contributory causes which, if neglected, may very considerably swell the number of chickens dying during the last day or two of incubation.

In nearly all cases when dead-in-shell occurs the machine is at once blamed, and while it is sometimes undoubtedly due to an inferior make of incubator being employed, it is much more frequently the management that is at fault. In fact, very seldom indeed is the machine to blame, unless, of course, an unreliable one is used; it is a mistake to economise too greatly in the incubator itself, and it pays far better in the long run to secure a thoroughly reliable and trustworthy machine. Sometimes dead-in-shell is due neither to a poor incubator nor to faulty management, but to the eggs themselves. It appears reasonable to suppose that lack of stamina or vigour or if too many hens are mated with one male bird, many in their turn produce weak and delicate chickens, possessing insufficient strength to pierce the shell. Though strange to say there is very little evidence to support this.

The treatment of the eggs between the time they are laid and placed into the incubator is of some importance. It is said that shaking has a very injurious effect upon the germs, and afterwards upon the chickens, but we do not think this accounts for one per cent. Stale eggs generally result in a great deal of dead-in-shell, and as far as possible no egg should be more than a week old when placed within the egg drawer. During the time they are waiting to be set they should be kept at as even a temperature as possible, preferably about 50 to 55 degrees. They should be carefully handled, as rough treatment generally results in dead germs.

— Pure Air Necessary. —

An insufficient supply of pure fresh air during the three weeks of incubation is often held responsible for dead-in-shell, but we are told that average incubator air is "purer" than that under a hen.

Great variations in temperature within the incubator must be avoided; if it does not actually kill them it makes the chickens, when hatched, extremely delicate and difficult to rear. Slight variations are immaterial to the hatching results, and cannot often be avoided.

— Lack of Moisture. —

Lack of moisture is a very common cause of this complaint, and during a spell of extremely dry weather a much larger percentage of chickens fail to make a successful exit. In a tank machine there is generally a water tray beneath the egg drawer, and this should never be allowed to run dry, as if it does the inner and outer membranes are almost certain to become thick, making it much harder work for the chicken to pierce the shell. The incubator is so arranged that all the fresh air that enters has to pass through this water tray, or rather through the canvas which covers it, and in this manner moisture is taken to the eggs. If, therefore, it becomes dry, an insufficient supply of moisture is being received by the eggs, which thickens the membranes and causes dead-in-shell. Whether there is water or not, it is said to be an excellent plan to dip the eggs for about thirty seconds into warm water, heated to 103 degrees.

A Poultry Meeting.

To the Editor.

Dear Sir.—The meeting on table poultry improvement seemed to me to be chiefly remarkable for what was missing. The president explained the objects in detail, which was hardly necessary at this stage. The Expert showed cinematograph views of the life of a chick, very interesting but hardly to the point under discussion. One speaker reminded me of the lawyer's dodge, when "no case abuse the other side," and the principal ornament presumably arranged for and who we were led to believe, had the whole bag of tricks in his pocket and the figures at his fingers' ends did not turn up. Unless the club has more to offer, they will not get much support from practical breeders. We want to get all the information we can, but principally we want to get together on the selling side. Am I not right?—Yours, etc., "F."

(Probably you are, but did you get on to it at the meeting. If not, you missed a chance to do your little bit and that will be the way to help on the cause. We imagine you over-estimated the importance of the absentee, interesting as anything he might have had to say would have been. If, however, the club has the elements of a go in it, it won't hang fire for that reason. Presumably the Expert could have given any figures asked for of costs, weights, and to some extent, of sale receipts from the Roseworthy Poultry Station results. Experimental results are not perhaps considered as entirely conclusive and satisfactory as those put up in the way of getting a living. In both cases, however, figures and facts can only be a guide to the individual breeder. Each one is limited by his own ability and his conditions. When you start to bank on another man's figures, however painstaking and accurate, you may be making trouble for yourself. On the main point that poultry flesh under ordinary circumstances, returns more than it costs, there is no dispute. One point you overlook, this is not a straight-out table poultry proposition, if it were it would be much more simple. The question before the house is to put up a bird which lays practically as well as a high class Leghorn, weighs 2 or 3 lbs. more, tastes 20 to 30 per cent. better, rears 1 or 2 broods and makes as much money in the year. That's what the public wants. It's a stiff order. Can you help it forward?)

Artificial Incubation.

— To Cool or Not to Cool. —

It has been the invariable custom, based on what has been considered natural conditions, for breeders to give daily attention to eggs under the process of artificial incubation, for the purpose of airing and cooling them. As is known, eggs when being incubated by a hen are left in the nest as a matter of course when her ladyship goes forth to forage for food. During her absence the eggs are aired and cooled, for in some cases a hen will remain away from her nest any time from a quarter to half an hour.

Whether it is essential that eggs should be cooled and aired is a matter that has taken up the attention of poultry experts in America. By them certain tests have been made to assure themselves whether those processes are necessary.

The tests were made at the West Virginia University Agricultural Station, U.S.A., and were carefully carried out. White Leghorn eggs were used, and these were selected so as to make the eggs in the two incubators as similar as possible. Special note was made in each case of the maximum and minimum outside temperatures during incubation.

The chickens from this test were marked and kept in the same brooder for three weeks, and were, of course, subjected to the same conditions as to food and temperature. At the termination of the time there had died 16 chickens hatched from the non-cooled eggs, and 18 chickens from those cooled. On weighing, it was found at three weeks that the chickens from the cooled eggs weighed 14.7 lbs. per hundred, while those from the non-cooled eggs weighed 16.8 lbs. per hundred.

There were, of course, variations in further tests, but the whole of the tests are fairly summarised by those having the management as follow :—

"In the first trial, with the ventilators open and with an average maximum and minimum outside temperature of 80 degrees and 54.7 degrees respectivel¼, a better hatch was obtained, and the chicks were stronger when the eggs were not cooled."

"In the first trial, with the ventilators, and with a low temperature, the eggs not cooled degrees respectively, a better hatch was obtained, and the chicks were stronger than was the case with other treatment.

"In tests 3, 4, and 5, conducted simultaneously, with closed ventilators, and a high outside temperature the eggs not cooled hatched better than the cooled eggs in the two Cyphers (incubators), and not so well in the Prairie state (incubator). The chicks, however, from the cooled eggs were materially stronger in all three hatches, as fewer of them died. This would seem to indicate that in warm weather, when the circulation of air in the incubator tends to become sluggish, and especially with an insufficient opening of the ventilators, it may be advisable to air the eggs for a reasonable length of time, for the purpose of giving the embryos a more adequate supply of oxygen."

"It is difficult to conceive of any valid reason for cooling eggs during incubation and thus slowing down the vital processes, and these experiments seem to indicate that the beneficial effects which unquestionably sometimes result from the cooling process and airing, are due to the airing, and that the cooling of the eggs during the process below the proper incubating temperature, when considered by itself, is deterimental."

Home Notes.

American Sweets.

By Kathleen James.

These sweets can be made in the dining room ; they require no fire, are easy to make once one knows the proper method, and if the directions given are carried out the result will surprise and delight the maker.

The following ingredients will be required to experiment on : Two pounds of icing sugar (costing 10d.) the whites of two eggs, half a pound of shelled walnuts, a quarter of a pound of sweet almonds, a small bottle of rose water, a bottle of cochineal, green colouring, a bottle of essence of coffee, and some vanilla and lemon flavouring. If chocolate creams are wanted a quarter or half a pound of cake chocolate must be bought in addition ; but to make these latter either a fire or a spirit lamp will be needed. The flavourings and colourings used are those to be found in most store cupboards, and only a few drops of each kind are used.

The first thing to do is to break up the icing sugar and pass it through a fine wire sieve. Take one-third of the walnuts, selecting the broken bits and the smaller piece ; chop them as finely as possible.

Blanch the almonds and chop half in the same way as the walnuts.

Having made these preparations, beat up the white of two eggs very slightly. Put the icing sugar in a medium sized basin, and stir in the whites of eggs with a wooden spoon, working the mixture thoroughly, so that every particle of sugar may be moistened, but as slightly as may be ; it should be grainy, not wet enough to form a paste. Now take a fourth of the prepared sugar and put it in a large pudding basin ; cover the remainder till wanted, as it will dry up if exposed to the air.

Pour out half a tablespoonful of rose water ; to this add three or four drops of cochineal ; mix them well together, and pour very gradually into the sugar in the pudding basin. Stir well all the time with a wooden spoon. The mixture should then be of a pale pink colour and exactly of the consistency of well worked putty.

Now divide this mixture again into four parts. Take one part, covering the other three, and work into it with the hands as much of the chopped walnut as it will absorb. If too dry, a few drops of rose water may be added : if too moist, add a little more dry icing sugar. Experience will soon tell one when it is of the right consistency ; it should not crumble, yet should not stick to the hands.

When the sugar has absorbed sufficient walnut, work it into a square an inch thick ; make it even at the edges by pressing it with a knife. Now cut it into lengths and then across to form sweets an inch square. Flatten each of these in turn by patting them gently with a knife, so that they will form nice even squares; then leave them aside on a dish or tin which has been very slightly rubbed over with fresh butter. They are finished.

Now take a second portion of the pink sugar, roll it on the pastry board, divide into small portions, and form these into balls with the hands the size of marbles. Take half a walnut between the finger and thumb of the left hand, place the ball over it, cover with a second half of walnut, and press gently to make the centre bulge slightly at each side. The balls should be of uniform size. Put them beside the squares already made.

With a third portion of the pink sugar mix as much chopped almonds as it will take up. Form into squares or balls as preferred.

Form the remainder of the pink sugar into balls the size of marbles. Lay each ball in turn in the hollow of the hand, and press into the centre a blanched almond.

While making these sweets have a basin and a towel at one side to rinse one's hands now and again.

A second portion of the sugar mixed with white of egg may now be measured out. Dilute a little green colouring with a dessertspoonful or so of lemon juice ; mix well, and stir thoroughly into the sugar so that all may be exactly the same shade. When coloured, divide into four, and proceed in exactly the same manner as for the pink, mixing one portion with chopped walnuts, another with chopped almonds, forming a third into balls, and setting these between half walnuts, and laying an almond in the centre of the balls formed from the fourth portion.

More of the prepared sugar, viz., the sugar mixed with white of egg, may be coloured and flavoured with essence of coffee and then made into sweets like the first and second batches. Coffee is generally a favourite flavouring for sweets, so if liked a larger proportion may be made with it than with the other kinds. The remainder of the sugar may be either left white and flavoured with vanilla, or flavoured and coloured with chocolate and vanilla.

Once a trial has been made with these sweets numberless varieties can be made. Green coloured ones may be coloured with pistachios, others may be flavoured with different liqueurs (and these are delicious), and coloured according to the colour of the flavouring. Ginger, too, is excellent; a little syrup from a ginger jar will moisten and flavour sufficiently, and dried ginger may be used to decorate with.

For chocolate cream a fire or heat of some kind is required. When making the above sweets set aside four or five of each variety, formed into balls the size of marbles, to be afterwards coated with chocolate. For this scrape half a pound of cake chocolate into an enamelled saucepan, add a gill or more of water, and set over the fire to boil. When boiling it should be liquid enough to pour, just as for chocolate icing, so add water or chocolate to bring it to the required consistency. Pour it into a pudding dish, and set this over boiling water. Now throw into the chocolate one by one the prepared sweets, turn them over that they may be coated all over, and then lift them out with a strong hat-pin, holding each one for a moment or two over the chocolate to drain. Place on a sheet of buttered paper and leave them till morning, when they may be glazed with confectioner's glaze or with white of egg. Raise the chocolates gently off the paper. All these sweets should be packed in tin boxes and kept air tight, when they will remain fresh for an indefinite period, but if exposed to the air they harden.

Home Hints.

— The Cold that Kills. —

Doctors say that cold ankles kill more women than nerves and disease put together. This may be an exaggeration, but it is not too much to say that when the ankles are well protected and kept warm their owner is not likely to suffer with colds. When a woman goes in and buys a pair of low shoes in the cold season for outdoor wear, she is one of two things, vain or silly.

— Going to Bed Hungry. —

It is a mistake to suppose that it is never good to eat before sleeping. Many an hour of sleeplessness may be avoided by nibbling a biscuit at bedtime. All animals, except man, eat before sleeping, and there is no reason why man should form an exception to the rule. Fasting between the long interval between tea and breakfast, and especially the complete emptiness of the stomach during sleep, add greatly to the amount of emaciation, sleeplessness, and general weakness so often met with. It is well known that in the body there is a perpetual disintegration of tissue—sleeping or waking. It is, therefore, natural to believe that the supply of nourishment should be somewhat continuous, especially in those in whom the vitality is lowered. As bodily exercise is suspended during sleep, with wear and tear correspondingly diminished, while digestion, assimilation, and nutritive activity continue as usual, the food furnished during this period adds more than is destroyed, and increased weight and improved general vigour is the result. If the weakly, the emaciated, and the sleepless were to take nightly a light meal of simple, nutritious food before going to bed for a prolonged period, they would be raised to a better standard of of health.

— Nice Hands. —

Hands may be kept nice even if much housework has to be undertaken by the young wife. Gloves should be worn whenever possible, but it is a mistake to use a thick, clumsy kind under the impression that the extra thickness gives extra protection. It is only the skin which needs protection, and this it receives as well from thin kid as from thick. The gloves should be a size larger than is usually worn to allow plenty of freedom. Another thing is, never to put off washing your hands when they are soiled, for by doing this they become so "grimed" that even pumice stone will not cleanse them.

— Causes of Hysteria. —

Most people do not sufficiently understand that hysteria is a symptom and not a disease. Among the many predisposing causes which might be named are chronic dyspepsia, neuralgia, anaemia, depressing surroundings, and great mental anxiety and worry. Sometimes hysteria is due to ennui, and it is a well accepted fact that it is an affection which chiefly attacks the upper middle classes. Poor people have no time to indulge in the luxury of a display of the emotions. When the cause can be ascertained, the general treatment must be directed towards its removal. Daily exercise in the open air, the morning sponge bath, and a good quinine and iron tonic are valuable aids towards cure. A change of air and scene will also sometimes work marvels, and in all cases the patient's mind should be kept interested and amused.

— An Emergency Box. —

Every mother should have a box, kept in a safe and easily accessible place, containing some of the things likely to be needed in common emergencies, such as pieces of soft old linen and cotton, rolls of bandage from half an inch to an inch and a half wide (these may be made from old worn linen sheet), adhesive plaster for cuts, a wide-mouthed bottle filled with bicarbonate of soda—common baking soda—for burns, a bottle of witch-hazel for bruises, a roll of absorbent cotton for use in covering the chest when there is a cold there, pieces of flannel to wrap round rheumatic joints, and last but not least, a hot water bag. To these she may add, if she likes to do so, such remedies as the state of her children's health makes it likely they may require at a moment's notice, ot wit, her favourite croup mixture, toothache tincture, camphorated oil for the wee bairn who gets "husky" at nights, and so on.

— Recipe for Cold Cream. —

The life of the skin is the oil which nature stores up under it and sends to the surface as required. As we grow older the supply gets less; thus the skin shrivels and the muscles relax, and if we wish to retain our freshness a little assistance should be given by feeding the skin with the proper oils. The following is good: Get one pound of fat mutton, and melt it down slowly in an enamelled saucepan. When thoroughly melted down pour it through a hair sieve, then stir into it as much glycerine as there is fat, add a few drops of perfume, and keep stirring gently until it begins to harden, when it should be put into little jars or wide-necked bottles. Rub the face every night with this, pressing it particularly into any wrinkle appearing, and rub it off in the morning.

— To Renovate Black Satin. —

Take equal proportions of spirits of wine and warm water, sponge the satin on the right side with this, working down the material and not across it. Another plan is to scour the satin with this mixture: Four ounces of honey, the same quantity of soft soap mixed with an egg and a wineglassful of gin, using a stiff brush. When the satin appears clean, rinse in cold water; press between clean clothes to dry, or hang up to drain. Iron whilst still damp, and thoroughly dry before folding.

Uses for Lemons.

No family should be without lemons. Their uses are almost too many for enumeration.

The juice of a lemon in hot water, on awakening in the morning, is an excellent liver corrective, and for stout women is better than any anti-fat medicine ever invented.

Glycerine and lemon juice, half and half, on a bit of absorbent cotton, is the best thing in the world wherewith to moisten the lips and tongue of a fever-parched patient.

A dash of lemon juice in plain water is an excellent tooth wash. It not only removes tartar, but sweetens the breath.

A teaspoonful of the juice in a small cup of black coffee will almost certainly relieve a bilious headache.

The finest of manicure acids is made by putting a teaspoonful of lemon juice in a cupful of warm water. This removes most stains from the fingers and nails, and loosens the cuticle more satisfactorily than can be done by the use of a sharp instrument.

Lemon juice and salt will remove rust stains from linen without injury to the fabric. Wet the stains with the mixture and put the article in the sun. Two or three applications may be necessary if the stains are of long standing, but the remedy never fails.

Lemon juice (outward application) will allay the irritation caused by the bites of gnats or flies.

Lemon peel (and also orange) should be all saved. They are a capital substitute for kindling wood. A handful will revive a dying fire.

The September issue of the "Everylady's Journal," which is just to hand, is practically a special Fashion and Fancy-Work number.

In addition to some fine illustrated article and stories it gives 120 Fashion Designs for the New Season, an Illustrated Home-Dressmaking Lesson, three articles on Australian Crochet-Work and Embroidery, and also encloses Four Free Spring Patterns.

In the same issue of "Everylady's Journal" is announced "A Revolution in Dress Patterns and Transfer Designs"—a new plan to give home-dressmakers and fancy-workers perfectly cut patterns and high-quality Australian Transfer Designs at less than half the usual price.

Sixpence spent on a copy of "Everylady's Journal" for September will secure a fine magazine and all details, with many illustrations, of this cash-saving plan.

It is also announced by the editor that all the 120 dress pattern designs and the 72 new Australian transfer designs covered by this new scheme are given in a 32-page catalogue, which will be sent absolutely free to any of our readers. Simply write on a sheet of paper: "Send Pattern Catalogue" over your name and address, and post, with penny stamp, to Pattern Department, "Everylady's Journal," 376 Swanston Street, Melbourne. At the same time mention this paper, and the catalogue will come by return post.

To Starch and Gloss Linen.

See that the collars, shirts, etc., are thoroughly dry before you attempt to starch them, or they will never take the starch properly, and will be quite limp. Put the articles into the starch, squeezing them well with the hands to get the starch through them; then wring them as dry as you can, and place on a clean towel, pull them out, wrap them up in a towel, and leave for an hour or two.

Take out one collar at a time, spread it out on the wrong side uppermost. Then iron it till slightly dry, after which turn it and repeat the process on the right side; then go back to the wrong side, and iron thus alternately, first slowly, then more and more quickly, till the collar feels quite dry, and is glossy and shining. In many cases polishing irons are used to finish the gloss. Brush the surface. There is more knack than dipped in cold, clean water, being careful not to wet it so much as to blister it; now hold the collar firmly in the left hand and swing the iron quickly backwards and forwards from the wrist, bringing the weight to bear on the rounded surface. There ismore knack than strength required for this process, which only practice will give. At first the polishing iron will make the collar look streaky, but this disappears as the iron or glossing is continued. The iron should be well heated.

For cold water starch allow 2oz. of cold water starch to every three-quarters of a pint of cold water; mix the starch well into the water with the fingers till quite smooth; then cover up the basin and let it stand till next day at least; it is better if left for several days, as the longer it soaks the less likely it is to cake on the linen, and even if it should smell sour it does not matter. When you wish to use it stir it well up from the bottom of the basin; then mix into it first a teaspoonful of turpentine, and then half a teaspoonful of powdered borax previously dissolved in a very little boiling water. This mixture will give the linen a nice gloss, and make the irons run more smoothly. Remember the borax must be thoroughly dissolved, or it will show later on in shiny patches.

Play Grounds.

One of the best ways of keeping children off the street is to provide an attractive place for them to play in. Many of our back yards are "back yards," in fact. This name is wrong. They should be called lawns instead of yards. Having the name, we are inclined to make them live up to it, and make them a lawn instead of a yard. It is true, also, that most people spend nine-tenths of their efforts on the front and one-tenth on the back. This system reminds one of the small boy's method of polishing the toes of his boots and allowing the heels to go by default. There is no reason why the back yard should not be more than a place to house garbage and clothes lines. Should it not rather be a place to enjoy the comforts of out-door privacy and retreat, where children may romp at will or where afternoon tea can be served in seclusion and comfort? True, it may cost a trifle to have wood, etc., carried in by hand, and the expense of cutting the grass and water, but this is more than offset, by the satisfaction of a clean and healthy romping place for the children.

Your Daughter's Lover.

There are two ways in which this favoured individual is often treated. He is welcomed with open arms—so effusively, in fact, that sometimes perhaps the suspicion is engendered in his mind that the prize he has won is not such a very great prize after all, if its possessors are so glad to pass it on to another; or, again, he is received as an enemy — a thief that has stolen upon them unawares—not entering in at the door, but slily, and as a robber. Speaking from a cynical point of view, the latter method might be commended, because a little opposition is not bad for any man, especially in cases like it, for it puts him on his mettle, and makes him realise what a treasure he has got if the parents guard it so jealouly. But commonsense counsels a mean between these two extremes. Meet the young man fairly, let him feel you are loath to lose a daughter, but that if he is her choice you give her freely to him, providing always, of course, that nothing vital can be brought against him by friend or foe. And in sifting gossip you may hear about him don't be too eager to find something in it. He is only human after all, though, perchance, your child thinks him a very god among men. Don't try to disillusion her, awakening will come all too soon in this work-a-day world, and remember your child has a much better chance of happiness with her "every-day-man," if one may coin the term, than with one too far removed from everyday life to feel its needs, its temptations, and its sympathies.

Garden Notes for November

Buffalo and couch grass lawns will make growth right away if planted this month. Weeding and watering are the two most important items in getting a satisfactory sward.

The best place to select roses for future planting is in the gardens and this is a good time for doing so. The shows will tell you the most beautiful blooms but it is only where they are growing that they can show you their growth and habit, quality of foliage, and lasting quality of bloom.

The present is as good a time as any for sowing Phlox Drummondi. It is certainly not one of the novelties, it is so easily grown and so generous in its flower giving that, however crowded the garden is, most people should find room for a clump or border and none are likely to regret it.

The Columbines, or Aquilegias as they are now called, are becoming very popular and they deserve it. They have many good qualities, a fine range of dainty colours, charming foliage, they of course like good treatment, but will put up with some which is not so good, slugs do not worry them, which is certainly an advantage in many gardens, and the flowers last well, either on the plants or when cut. A packet of seed sown now in a sheltered bed or box will give the grower a nice lot of flowering plants next spring.

Two summer flowering friends which are best sown where they are to grow are the Salipglossis and Portulacca. Dig the bed for the former deeply, make the surface smooth, sow the seed finely, scatter some sandy s-il lightly over, firm over the bed and cover with a thin coating of old decayed manure. The Portulacca make a fine border, their wants a few and they simply revel in the open sunlight. Don't delay a sowing of either of these. Petunias are another of the sun-lovers. It is not too late to sow seed, but a pot of seedlings from the nurserymen will save time and some trouble. One can easily increase the stock from cuttings of the growing plants. ...

Nicely grown seedlings of Penstemon and Snapdragon cost only a few pence per dozen and the two are a host in themselves in any garden. Seed of either sown now in beds or boxes which can be protected from the worst of the summer weather will give fine plants for next year.

If you want something really hardy, something that you can almost leave for a hot week and come back to find it smiling, the double or single gaillardias are what you are looking for. If you have not a patch of seedlings coming on, your nurseryman will be happy to oblige you. Two other speciallv helpful plants, Zinnia and Aster, he will also have an abundance of at prices which, as the drapers say, are within the reach of all. If you have so far neglected a sowing of Cosmos or Minature sunflower for a background in the garden or yard, it is not too late to do so, or once more the nurseryman is at your service.

Most people, at some time or another, have tried the Sturt Pea, and many have failed. Well, just try again, for it is surely worth while; this month is a good time to make the attempt. One recipe for growing the Sturt Pea is to put the seed in some unlikely place and forget about it. Try soaking the seed, planting it an inch or so deep in almost pure sand where it will get plenty of sun heat and when the seedlings show, well, just beware of slugs, for they have nipped many a promising Sturt Pea in the bud and also in later stages.

The show chrysanthemum has passed away as a common garden plant, though fortunately it is grown and admired by many old-time friends, and doubtless it will again have its day. It still has its old place for decorative effect in the garden at a time when it is very welcome. Offsets of named varieties can be purchased from the nurserymen or cuttings for this purpose may still be put in. The late autumn months seem a long way off now but the wealth of colour and bloom which the chrysanthemum can give us will be very welcome then.

From now on for the next six weeks will be a very busy time in dahlia planting. To grow the plants so that each shall show off its individual beauty takes up a great deal of room, more than the average gardener cares to sp. re, but we get gorgeous masses of bloom with much closer planting than is considered orthodox. If the beds have not been already prepared, it should be put hand at once. As near as you can get to a light rich soil with enough water to keep the plants growing without rushing ought to give you good results in the flowering time. Don't leave your order for plants too late, there is such a thing as nurserymen running out of popular varieties, though they make liberal provision for likely requirements. Don't forget a packet of seed, they will bloom inside six months; you will certainly get variety and you may strike something particularly good.

Nasturtium seeds, properly pickled, make an excellent substitute for pickled capers. Many people are very fond of caper sauce with mutton, and if they are not told they will be unable to distinguish between the real thing and the substitute. The seeds must be picked when about full size, but still perfectly green and tender.

Ferns.

There are several methods of propagating Ferns—by spores, the counterpart of seeds, being the most general. Davallias, Polypodiums and others with creeping rhizomes are propagated by division. Asplenium bulbiferum is increased rapidly by means of the young plants on the fronds. Pteris and Maidenhair Ferns are propagated by division of the rootstocks. Most of the Ferns mentioned below can be grown in soil consisting of two parts fibrous loam and one part leaf-mould, adding plenty of coarse sand.

— Hare's Foot Fern. —

This Fern, Davallia canariensis, is found wild in the warmer parts of Europe. The rhizomes as they hang over the side of a pot are very suggestive of the name Hare's-foot Fern. There is a smaller-growing plant from Japan to which the name of the Squirrel's-foot Fern is sometimes applied. This is the plant which the Japanese twist and grow into all manner of queer shapes.

— Maidenhair Ferns. —

These include some of the most popular Ferns, the fronds of Adiantum cuneatum, the best-known sort, being especially valuable for cutting and arranging with cut flowers. They are readily propagated by division of the roots, preferably in spring. They may also be easily grown from spores, but it is not often necessary to sow any, sufficient young plants being found in the crevices of the bricks, under the stages, or on the surface of the pots of other plants growing in the house.

— The Holly Fern. —

This is a very distinct Fern. The dark, shining green fronds being somewhat leathery in texture, the plants stand the varying conditions of a room better than most Ferns. Aspidium or Cyrtomium falcatum is the Latin name of this Fern. It is a native of South Africa and some parts of Asia, being especially abundant in Japan. Young plants are readily raised from spores, but it is seldom necessary to do this, sporlings coming up under the stage or elsewhere in the shade house.

— Polypodiums. —

These Ferns are very widely distributed throughout the world. The Golden Polypody (Polypodium aureum) is one of the best. The plant obtains the name from the creeping rhizomes, which are covered with golden yellow scales. The arching fronds are bluish green in color, 2 feet or more in height. During winter the plants may lose one or two of the older fronds, but plenty of young ones will be produced in spring to replace them. Propagation in a small way can be most readily carried out by division of the rhizomes. Spores germinate freely when large quantities are required. In addition to being grown as pot plants, they are high ornamental when cultivated in baskets and suspended from the roof of the shadehouse.

— Spleenworts. —

There are quite a number of Aspleniums or Spleenworts, of which A. Bulbiferum and its varieties are the best known. The young plants develop from the bulbils produced on the fronds. These, if severed from the parent plant and pegged on pans of sandy soil, soon make sturdy little plants.

— Ladder Ferns. —

During the last few years the Nephrolepsis or Ladder Ferns have developed a large number of interesting crested and tasselled varieties. Most of them are very suitable for hanging baskets suspended from the roof of the shadehouse or in the bay window. Another suitable position for them is the top of a bamboo stand, where the long, slender fronds will hang down and show to advantage. Large plants of Nephrolepis can be grown in comparatively small pots, provided they receive plenty of moisture. They are readily propagated by division of the crowns, by buds produced on the wiry stolons or runners, which develop into young plants, and by spores. Nephrolepis should be potted in a lumpy fibrous soil in preference to a fine compost.

Clematis.

The Clematis has not met with any great degree of popularity, considering the variety, both of character and colour, which it affords. For climbing up stumps of old trees, training to a tellis, planting to droop over rock-work, for festooning or covering arbours they have a distinct value. There is many a house front which would be improved by a plant or two being trained up and left to hang loosely over. S. Jackmanii, laden with its purple bloom; C. montana adding its contribution of white starry blossom. C. flammula, the Virgin's Bower, also a billowy mass of fragrant flower. Then there are the Scarlet Flowered Clematis, C. Fortunei, a beautifully-scented double, and many others are well worth, if not a leading place in the garden, at least some neglected corner which they may make beautiful in their own graceful generous way.

They are usually grafted but can be grown by layering. For this purpose a leader should be pinned to the ground at intervals. To aid in rooting scrape the bark a little below the joints which are to be pinned down, and if these are kept moist they will be found to emit roots. In the spring, before growth commences, the layers should be cut apart and planted. Success in flowering depends a great deal on the treatment to which they are subjected. They should be planted in a good depth of rich loamy soil, with decayed manure added. If given good soakings of liquid manure from time to time the plants will be found to greatly benefit. If the plants are required for some part of the garden where the soil is heavy, take out 2½ft. square, and the same in depth, and with some of the soil mix some light rich material, such as road scrapings, leaf mould, or refuse.

Cactus Plants for Greenhouse and Window.

An enthusiastic cactus grower writes in "The Garden," of plants under glass, with us, of course, many varieties do well in the open garden. He writes :—

One of the most important considerations with a gardener is to grow plants which can be left during the daytime without harm. With most plants there is the shading to put on if the sun is bright, and ten hours during the day is too long to leave many without water. The Cactus enthusiast can go off to business in the morning feeling satisfied that, whether it rains or the sun shines, his plants will not harm. Their requirements are simple, and they thrive with a minimum of attention.

— Treatment of the Plants. —

When we consider that in their native habitats Cacti grow in the crevices of rocks and in dry barren soil, we shall have some idea of the treatment they require. During the growing season they are subject to torrents of rain, while during the remainder of the year the sun blazes on them and the ground becomes parched. Nature has provided them with thick fleshy stems, so that they are able to go without water for weeks. During winter they require little or no water. It often happens that all the trouble taken by an amateur with his plants in the greenhouse is ruined while he is away. There is no likelihood of this with Cacti; if left for a fortnight or even more without water they will not harm. When grown in greenhouses containing a mixed collection of plants they should be given the highest position.

— Potting. —

The plants like plenty of drainage and porous soil. Use clean pots, and as a rule the smaller the pot, within reason, the better the plants thrive. Many can remain in the same pot for years. Fibrous loam three parts and half a part each of broken brick rubble and old mortar form a suitable soil. In the spring the plants should be syringed every morning and receive plenty of water; this treatment may be continued until the end of summer, when water must be gradually withheld. Propagation is carried out by means of cuttings and seeds. In the case of the latter it necessarily takes several years to obtain fair-sized plants. The seeds should be sown in spring in pots or pans containing plenty of drainage and light sandy soil. Some of the kinds can be increased by division, notably Mamillarias. Grafting is also practised, some of the weaker sorts being grafted on the stronger.

— The Hedgehog Cactus (Echinocactus). —

Many of these are remarkable for their stout, often hooked, spines. The flowers attain to a considerable size and vary in colour. The Golden Cactus (E. Grusonii) has an enormous globular stem, golden yellow spines and is very distinct. The Bishop's Hood (E. Myriostigma) at first looks more like a piece of chiselled granite than a living plant; it has small clusters of minute hairs dotted all over the stem, giving the plant the appearance of being marked with white spots. The Fish-hook Cactus (E. Wislizeni), is a large-stemmed kind with prominently hooked spines.

— Cereus. —

These differ very much in size, mode of growth and flowering characters. Three distinct types of growth are noticeable. First of all there are those with thick fleshy stems, columnar or globular in growth; the next in importance are the climbing sorts; and, thirdly, those with hanging or trailing stems. To the first-named group belong the giant C. giganteus, attaining a height of 50 feet or more in its native haunts of California and Mexico. Plants of this can be grown in a small greenhouse. C. peruvianus is a tall, rapid grower, flowers white, tinged with red on the underside. C. variabilis is a tall night-flowering species, with cream white flowers. The Old Man Cactus (C. senilis) is one of the most attractive of the Cactus family; the long silky white hairs, 6 inches or more are peculiar. C. grandiflorus (Queen of the Night) is one of the most beautiful climbing sorts; the flowers are delightfully fragrant, opening at night, pure white inside, reddish brown outside. C. flagelliformis (the Rat-tail Cactus) is most interesting; it has rich rosy red flowers. Even without flowers it is exceedingly interesting; the stems hang down when the plants are suspended from the roof like so many thick tails. It is sometimes met with growing and flowering freely in windows.

— Thimble Cactus (Mamillaria). —

These are popular with cultivators of Cacti, most of them being small in growth, and a collection takes up little space. The clusters of small stems growing in a pot have a fascination of their own. Sometimes little more than an inch in height, often covered with silky spines, it seems almost impossible to believe they are living plants. A number have very beautiful flowers, while some produce small red berry-like fruits when the flowers wither. M. elongata produces offsets freely from the base; stems about the thickness of one's finger, flowers yellow.

— Phyllocactus. —

These are distinguished from the plants usually referred to when speaking of Cactus by their flattened branches, which are leaf-like in general appearance. These grow out of the ends of others, and also from the stem near the base. They are, perhaps, the most widely grown of the Cactus family, and they certainly excel them all in point of variety and brilliant colouring of the flowers. They should be given the warmest position in the greenhouse or window. Mix a little leaf-mould with the potting soil, and give a little weak liquid manuring during the growing season. Established plants should not be potted annually; they flower better if left in the same pot for three or four years. A top-dressing of fresh soil and cow manure annually is sufficient. Cuttings inserted in spring root readily.

— Euphorbias. —

These do not actually belong to the Cactus family, but many of them are very similar in appearance. It is easy to find out whether a plant is a Euphorbia or not, by pricking it with a pin. If a milk-like juice exudes, the plant is a Euphorbia; if watery in appearance, it belongs to one or other of the Cactus family. The flowers are not conspicuous, the curious stems and spines being the most notable features.

Sedum Sieboldii.

The Stonecrops present a great variety of height, habit and colour, but Sedum Sieboldii has slender, arching stems furnished with three leaves at each joint. Thse leaves are nearly round, beautifully scalloped on the margin, and of a pleasing sea-green hue. The flowers are produced in flattened clusters at the apex of the stem and of a pleasing pink colour. The plant may be grown in a shady position, but it will produce the best colour if given a sunny aspect. The stems and leaves will also be firmer and more durable. Whether grown in sun or shade, however, the plant never becomes coarse or rampant, so that it is admirably adapted for growing in windows. If hung up by a piece of wire in a small basket or cocoanut shell, it will fill a place in the window or verandah without interfering with other plants, and be seen to better advantage than if crowded up.

Streptocarpus.

Both as regards size of flower, and brightness of colour, this beautiful plant is remarkable for the wealth of bloom, and the continuous succession in which the same is produced.

If a packet of seed be procured a fine stock of plants can easily be raised, which, apart from the trouble necessary in the earlier stage of their growth, will need but comparatively little attention to successfully cultivate. The pans in which the seeds are sown should be well drained, and nearly filled with a compost of equal parts loam and leaf mould, and half a part of silver sand, the top layer Sow the seeds thinly, and cover them with a light dusting of silver sand, and after placing a piece of glass on each of the pans stand them in a shady position in the greenhouse, supplying water when necessary and wiping the moisture every day.

On germination taking place, remove the pieces of glass, and when the seedlings are large enough to handle, prick them out in other pans prepared as before. After a short time in these, pot up singly in thumb pots, and later on into 3in. pots, using a compost of equal parts loam, peat, and leaf mould, with a good proportion of silver sand.

During the winter great care should be taken not to overwater the plants, but with the return of spring liberal supplies of root moisture are required, but syringing the foliage should not be practised.

Move into the flowering size pots (5 in.) using the compost as in the previous pottings, with a sprinkling of a reliable chemical fertiliser added.

During the flowering period occasional applications of weak liquid manure is beneficial, and all faded blooms should be removed, except those required for providing seed.

If the plants be given a dry position after flowering the grower can save his own seed, but as the Streptocarpus is not self fertilising it is necessary to perform this operation by hand. This should be done on a fine dry day by carefully transferring the pollen on to the stigma (when the same is ripe) with a camel hair brush.

A greater yield of seed will result if the flowers on different plants are crossed, but if it is desired to perpetuate any particular variety the flowers on the same should of course be used only.—"The Gardening World."

Schizostylis coccinea, sometimes called Winter Gladiolus, is bulbous and semi-herbaceous, i.e., it loses its old leaves annually, but before these decay the young leaves are a good size, so that it is nearly evergreen. Established clumps send up many spikes of deep scarlet flowers. The flowers are durable in a cut state and extremely pretty.

The Day Lillies.

The beautiful day lilies, or Hemerocallis, succeed under the commonest treatment in any ordinarily good garden soil, if deeply worked, moderately enriched, and with a good supply of moisture in spring and early summer. There are variegated varieties, and these make splendid pot specimens useful for house or greenhouse decoration. They produce their large lily-like flowers in great profusion, they bloom for a long period, the flowers are valuable for cutting, and the plants never need any stakes or supports of any kind.

H. flava is one of the commonest kinds; its clear yellow flowers are freely produced, and they last for a long time in good condition, they are also sweet-scented. H. fulva is a bronzy-orange colour, shading to crimson. There is also a double variety of this, which is often termed the "tawny-flowered day lily." H. flava argentea has silver variegated foliage. A very early variety is H. Middendorffiana; it is a smaller growing plant than the others, and its pale yellow flowers are only a moderate size.

H. aurantiaca major has large, deep golden yellow flowers, and is one of the finest; its blooms are fully six inches in diameter.

Magnolias.

Every garden should contain someth ng that at some time shall give it an individuality and character. Large sized flowers have a striking and distinctive effect; they do, give the originality and individuality that should belong to every garden. Take for instance the Magnolia which is one of the most beautiful of trees. M. grandiflora is one of the best known. It is a evergreen and the flowers are large white and highly perfumed. M. conspicua is of smaller growth and is sometimes used as a wall plant. The stellata is suitable for the smallest gardens for it is one of the dwarf growing. It is deciduous and one of the earliest to bloom. The flowers consist of numerous long, narrow petals, giving the flowers a starry appearance, and in this respect it differs from most other Magnolias which have fewer and broader petals mostly arranged in the form of a cup. In this case the of same being pressed down level. petals spread widely open, and the flowers come in advance of the leaves. The plants may bloom freely from the time they are 12 in. high, and 3½ ft. is usually the limit of the height of plants we see in gardens. It is a Japanese species.

Many of the Magnolias, especially those which attain the size of trees, are difficult to transplant owing to the fleshy character of the roots. M. Stellata is one of the easiest, however, to transplant, being more of the nature of a dwarf shrub than a tree, and producing more fibrous roots. On account of the fleshy character of the roots, the best time to transplant Magnolias, is just before growth commences.

The usual methods of propgagating Magnolias are by seeds and by layers in the case of established plants. The young shoots may have a tongue cut in them similar to that of Carnation and be pegged down on the soil. A little fresh soil consisting of loam, leaf mould, and sand would encourage the production of roots.

Hydrangea Paniculata Grandiflora.

When well grown this is one of the best of shrubs as it keeps in flower for a considerable time and is very showy. The type, H. paniculata, is a Japanese shrub that grows 6 feet or so high and several feet through. The leaves are ovate, 4 inches to 6 inches long and serrated. The flowers are white or cream-coloured and borne in large terminal panicles, most of the blooms being small and fertile, the others large, showy and sterile. The variety grandiflora is very much like the type in habit, but the inflorescences are composed mainly of sterile flowers, and are much larger than those of the type. When they first open they are white or cream-coloured, but with age they become suffused with red. When young, healthy plants are grown in very rich soil, it is possible to obtain exceptionally fine heads of flowers often as much as 18 inches long and 1 foot through at the base. To obtain inflorescences of these dimensions it is necessary to restrict the plants to a few growths, cutting hard back each year. Grown to a full-sized bush the flower heads are more abundant, but are much smaller.

Making New Lawns.

Double digging and manuring is as good as trenching, and is less costly. In many instances single digging is sufficient, the manure at the same time being well blended with the soil. If the soil is in good condition, the manuring is confined to the surface, and is given in the shape of top-dressings. If the land is uneven, or if banks or terraces have to be made, the good soil should in all cases be saved for the surface, which should be made firm by treading, rolling, or ramming. The same pressure should be given to the whole surface, so that the settlement may be equalised. All made-up surfaces should be rammed. Steep banks are an abomination, and it is better to cover these with wichuraiana Roses or other creeping plants or shrubs than to plant grass, which generally becomes unsightly. Where a perfectly level lawn is required, the spirit level must be used and a series of stumps driven in at equal distance apart, showing the level of the lawn when completed. A good toolman can expeditiously work this out in a perfectly true manner. If possible, the preparatory work of levelling, etc., should be done in time for the seeds of weeds to germinate, so that the grass may be set on a perfectly clean surface. All roots of perennial weeds may be taken out during the digging and preparing of the surface.

Wall Gardening.

The kind of wall that is best suted for wall plants is that known as the "dry wall," by which is meant a wall made of rough stones without mortar, and built against a backing of good soil. Such a wall is usually constructed at some place in the garden where a sudden change of level occurs, and may with great advantage take the place of some rough, sloping bank. I have myself constructed such a wall, and the method of procedure was as follows :—The line for the wall is marked out half a foot or so from the bank, and a trench taken out to the depth of half a foot. In this trench the first course of stones is placed along the whole length; these should be fairly large, oblong, with a broad, flat base and fairly flat upper surface for the reception ol second course. The stones in the course touch each other, but no mortar is used in the joints. In laying a course it is well to use a hammer for roughly shaping the stones as they come to hand, and, in place of the bricklayer's pile of mortar, to have a pile of soil at hand with which, as far as possible, the joints are filled. When the first course is laid there will be a considerable gap between it and the 'bank behind; this space is filled with good soil, leaf mould, and manure, the latter not coming quite as far forward as the stones. In laying the second course, care should be taken that ehe stones are set somewhat further back than those in the first course; in no case should they overhang. In laying the course it is important that a fair number of stones should be placed with their long sides at right angles to the line of the wall, with the object of "tying" the wall and so adding to its strength. The space behind this course is again filled up, and the third course laid with similar precautions as to overhanging the course below. In some places considerable ledges may be left, when it is thought that their presence would conduce to the happiness of some particular plant. In this connection some stress should be laid on the importance of putting in the plants as one builds the wall, as in this way one is enabled to build and dispose the soil according to the needs of the plant, and also to ensure that sufficient soil is placed about its roots to guide them to the richer soil behind. Each successive course is laid further back than the one below it, and so the wall slopes upwards to the required height. When it is required to construct a wall facing in two directions, the bottom course is laid as described on each side, and the intervening space filled up with good material, the second course laid, and the intervening spaces filled, not forgetting in the courses plenty of "tie" stones; each successive course generally approximates to its fellow on the other side of the wall, and so the top of the wall is considerably narrower than the base.

In rough stone walls the plants are best inserted as the wall is being built. A joint between two stones is filled with soil and the plant laid along the joint with its root towards—or, if long enough, —in the soil in the middle of the wall. Some fine soil is sprinkled on the roots, and so a train is made leading to the middle of the wall. A flatish stone is then placed on top, and thus the delicate roots shielded from the sun soon track back to find the cool root-run in the middle of the wall, and so the plants are enabled to face sun and frost with impunity.

The planting of a brick wall is a more difficult and more unsatisfactory matter. In the construction of such a wall the middle is left hollow and filled with rich soil; holes are left in the brick-work where plants are required. The roots of the plants are in the soil in the middle of the wall, rather below the level of the hole.

Seeds may be sown either when the wall is being made or after it is made. In the first case, a few seeds are laid along one of the vertical fissures between the stones, taking care that there is soil in the joint. Some fine soil is dusted over the seed, and a stone placed upon the top. The seed must not be sown too far back. When the wall is already made, seed may be dropped into an earthy chink, preferably near a ledge, and lightly covered over with the soil. It is, I think, preferable to use seedlings than to sow seed, as with careful planting one can ensure that the roots are in good soil, and the plants soon obtain a firm hold.

Using Artificial Manures,

Artificial manures are most valuable to the gardener if carefully used. They are especially valuable at this time of the year when most plants are growing strongly and are showing blossom buds, and are therefore in just the condition when some extra food is required. These artificial manures, as a rule, act quickly, and may be applied to growing crops with advantage now, especially during showery weather. It is necessary to be very careful not to give the plants an overdose, otherwise more harm than good will result. A little at a time, just a mere pinch, such as can be taken up between the thumb and first finger, should be sprinkled among the plants. Such applications may be given once a week with advantage, and they will impart an added vigour to the plants and increased size and substance to the flowers. An overdose will have the effect of making the plants lose their leaves, and, perhaps the flower buds fall. Artificial manures must be applied to Sweet Peas very cautiously; the slightest overdose may cause the flower-buds to fall. In applying concentrated manures to plants growing in pots the safest method is to mix a little in the water one is about to give them rather than to sprinkle it on the soil. In an ordinary two gallon watering can full of water a pinch of manure that is taken up between the thumb and two fingers is, as a general rule, sufficient. Artificial manures should not be given to plants when the soil about their roots is dry. If the soil is dry it should first be watered with clear water, giving the artificial manure afterwards, while the soil is still moist.—F.J.

Alocasias.

Alocasias are plants of great beauty and easily grown into large specimens, providing the proper greenhouse treatment be given, which consists of supplying them with moist heat, and an abundant supply of water at the roots during the growing season. This naturally causes the material in which they are potted to decompose quickly, and necessitates its being renewed yearly. Where this is not done it is liable to get sour. The soil should consist of peat and well-decomposed manure in equal parts, with the addition of a little loam and silver sand. Spring being the best time to shift them, most of the old soil should be taken away. Alocasias are surface rooters, and do best when the pots have a greater depth of drainage in them than is used for most things.

In Wonderland: The Unseen Artists.

We are influenced by the company we keep. Association with the pure and beautiful will have its impress upon us. When we think of it, there has been large provision for our spiritual as well as material wants.

Beauty is for immortals. Animals cannot appreciate it. Along in the fifties I used to drive over the vast flower-sprinkled prairies. The fragrance was so profuse you seemed wading in it. In the far-off horizons the emerald of the earth blended with the sapphire of the heavens. I sat entranced, drinking in the scene. But my horse never could take any interest in it. Along with the world of matter there is a world of soul. And the soul has tastes as well as the palate. Sometimes I sit down among my flowers and think of them as the most skilled artists on earth, with a refinement of taste, a delicacy of touch no human brain or hand can imitate. In a group there will be an iris, a peony, a columbine and an oriental poppy. How 'courteous each one is to the rights of the other. Under the earth are unseen influences which baffle all human ken. These tiny roots down in their prison are doing what no human artist can do with wide open eyes in the full light of day. Each busy worker knows just what he is about. The peony never steals the tints that belong to the columbine. Flowers of the same variety never rob each other. How can those unseen artists pick out and send one color for the outer petals and another for the inner ones? Two varieties of the same family grow side by side. Each may have a dozen shadings and tintings. Never is there a mistake made. No red is sent up when the color should be blue. Each flower must have just what belongs to it—such exactness baffles all human effort.

See that superb iris, the finest of the whole Germanica family? The standards are immense petals of velvet and ivory, with that marvelous glistening reflex like that of the richest silk. How could those artists down in the dark manufacture that elusive sheen which flashes in the sunlight? Then these charming petals must be veined and traced with the most delicate tintings, while they are edged with deeper purple. Never is a mistake made in the blending of those harmonious colors.

The giant macrantha is the largest of all, with petals three inches across. Never a blunder made in the moulding and fashioning of those great blossoms—veining and tinting them with a beauty surpassing the rainbow. And there is Fairy, tall and princely, with the delicate fragrance of the peach blossom. Who manufactured that dainty little vial of odors and then uncorked it to pour the aroma out upon the air? Mark that tracery, interwoven with the pure whiteness of the flower.

There is no blind chance in all this. In this garden of delight I am at work with God. All these things are the expression of His love. "How precious are thy thoughts unto me, oh God." All these forms of beauty—these miracles of the highest art, are the translations of his thoughts to me. So much for the present. But just over in the unknown are new forms of loveliness which are yet to greet me—new creations. I take a dull piece of earth and plant it to bulbs, roots and seeds, and He and I created this section of Paradise let down to earth for our delectation. It is all a promise and a prophesy of the "glory to be revealed."

I am over fourscore, living on the margin of the two worlds, and instead of growing old I seem on the borders of eternal youth. So I am proclaiming the evangel of beauty far and wide. It is the Gospel of Hope. There is an uplift and inspiration in it. It will make people less sordid and greedy. It will lead the young into paths of pleasantness and peace.—G. S. Harrison, in "Horticulture."

Potting Soil or Compost.

What is meant by "good potting soil." Now these words, or the common ones, "good compost," flow glibly from tongue and pen; but they convey little or nothing to the mind of the novice in pot plant culture. First, it is needful to impress the fact, that for pot plant culture ordinary garden soil will not do. Plants growing in rich soil out in the garden are in very diverse conditions from similar plants growing in the very restricted space that flower-pots afford to their roots. For these soil must not only have an ample supply of plant food in it, but it must have in it also some fibre or other ingredient which shall keep the compost fairly open and porous, allowing air and water to pass through it freely, thus keeping it equally moist and sweet, but also enabling roots to run in it freely. Ordinary garden soil lacks fibre, and after being frequently watered in pots lacks porosity. It runs close together and becomes hard and impervious; it also lacks natural plant food. Now, for ordinary plants grown in pots the compost or soil should consist of turfy loam, old hot-bed manure, now solid and fully decayed, equally well decayed leaf soil and sharp white sand. But the turfy loam is the primary constituent, and should be in the proportion of two-thirds at least of the whole. This material may be difficult to obtain, but the skimmings of grassed land will do. The older it is and the yellower the sand under it the better. If when this soil be compressed in the hand it holds together it is a stiff loam, and can be corrected in using by adding rather more sand. If it is a free loam it breaks freely and will need less sand. To make good soil the surface should be cut off to a depth of from 4 to 6 inches, be removed to where needed, then be made a stack or heap of in one corner of the garden. If a good sprinkling of soot be placed over each layer it will do good. Such soil is practically virgin loam, and is full of plant food and fibre. It should remain untouched for fully six months at least before any is used for potting. Then cut down the sides, collect the soil, and run it through a coarse sieve, having a mesh nearly an inch in width. Too great fineness in potting soil should be avoided. In running the loam through the sieve care should be taken to see that neither grubs, wireworms nor other insects are in it. To the two-thirds proportion of loam thus provided for a potting process, add through the same sieve, and well rubbed by the hand if not passing readily, old hot-bed manure and good decayed leaf-soil to make the other third. Well mix it, then place it into a neat heap or in a box ready for use on the potting bench. It is best, as a rule, to add the sharp white or silver sand when about to be used, giving, if the loam be stiff, a quarter part.

Notes on Rose Manuring.

The following hints on manures are from one of the yearly publications of the English Natural Rose Society :—

1. Maiden Loam.—There is no material to equal this for rose growing and particularly valuable is the top spit from pasture land.

2. Leaf Soil.—This seems to possess the same excellent quality as maiden loam in that it encourages the formation of fibrous roots. I prefer to use it with the leaves not too much decayed. If it has become sour a little lime should be added.

3. Horse Manure.—This should be from stables where the horses are bedded on straw or moss litter. As they are generally prepared, straw litter has the greatest manurial value for Roses. Experiments have shown that peat moss litter may, when properly prepared attain, at least for some crops, a higher value than straw litter. Whichever is used it should be turned over from time to time till completely fermented. In the case of moss (1) see that the litter is finely broken up before used as bedding, (2) take care that the litter is not allowed to get dry before it is applied as manure.

4. Cow Manure.—This is less heating than horse manure, and is particularly useful as a summer mulch.

5. Liquid Manure.—Horse or cow manure soaked in a tub or tank and the sediment allowed to settle is excellent for watering in summer. It should be diluted to a light straw colour and applied after rain or a thorough watering.

6. Artificial Manures.—Lime in one form is the most useful, particularly in soils where Roses have been growing for some time, and in those of a heavy texture. Basic slag contains a great deal of lime and also phosphates, and has one great advantage for an amateur in that it acts very slowly. An overdose, therefore, is less harmful than in the case of the acid phosphates—e.g., supherphosphate of lime. The golden rules for the use of artificial manures are as follows : (a) Never use them in greater strength than recommended ; (b) do not use the same preparation too often on the same ground ; (c) regard them rather as supplements to than substitutes for animal manures.

7. Burnt Earth.—Burnt earth has considerable manurial value for Roses, particularly on heavy soils.

It is rare that the soil of flower gardens is sufficiently rich; it may have been made so in the beginning, but is not infrequently neglected afterwards, although it is advisable to apply a portion, according to requirements, of manure annually.

Pot-Pourri of Roses.

The simplest recipe we know for Pot-pourri of Roses alone is to be found in "Home and Garden" as follows :—Put alternate layers of Rose leaves and bay salt in any quantity you please in an earthen pot. Press down with a plate, and pour off the liquor that will be produced every day for six weeks, taking care to press as dry as possible. Let the mass be broken up, and add the following ingredients, well pounded and mixed together : Nutmeg, ¼oz. ; Cloves, Mace, Cinnamon, gum benzoin, Orris root (sliced), 1oz. each. Mix well with a wooden spoon. The Rose leaves should be gathered on a dry, sunny afternoon, and the bay salt roughly crushed before using. Orris root may be replaced with advantage by good Violet powder.

Evolution of Flowers.

Lecturing recently at the University of London, Professor Bottomly, of King's College, pointed out that a flower is a machine for manufacturing seeds, and that it was estimated that flowers first began to bloom about 500,000 years ago, before which they were mere plants. When insects were evolved flowers were also evolved to attract insects as a means of distributing pollen. As in Darwin's theory of the evolution of flowers there was, up to a few years ago, a missing link which marked the evolutionary stage between the fernworld and the true flower world—namely, the Maidenhair tree, discovered in Japan.

Origin of the Sweet Pea.

The sweet pea has been traced back to 1650. The origin of the sweet pea is divided principally between Sicily and Ceylon, the original purple variety being native to the former Island and Sardinia. Sicily was also the native habitat of the white variety. Testimony also points to Ceylon as the home of the original pink and white variety, known as the Painted Lady; the original red also came Ceylon.

Father Franciscus Cupani, an Italian monk and botanist, is credited with being the first cultivator of this flower at Panormus in Sicily, in 1694, and the seed of the purple variety was sent by him to England and elsewhere.

The seed of sweet pea became an article of commerce as early as 1730. In 1793, a London seed catalogue listed four varieties, Black, Purple, White and Painted Lady. About 1876, Henry Eckford, of Shropshire, England, took up the sweet pea. He began with six or seven common sorts and put out over 100 varieties. The great boom in England began with the Spencer type. Strange as it may appear the beautiful colours we now enjoy in the Sweet Pea are a "degradation." The original purple contains them all but they are masked.

The star of the Sweet Pea is still in the ascendant—indeed, it soars higher and higher every year. It is very important that gardeners are at last coming properly to appreciate its unlimited utility in the garden and in the home, not to speak of it as one of the most beautiful exhibition flowers that one can grow and show. Whatever the cause, the result is a matter for gratification, and the greater the vogue that is attained by Sweet Peas, the better it will certainly be for our gardens.

Sweet Peas differ from all other flowers in several material points, but in none more than in the effect of evolution. With the development of most flowers on the lines laid down by the florists we have seen the loss of some feature that had previously been regarded as essential. For example, many of our modern Roses, superb in form, glorious in colour, magnificent in size, wonderful in substance, lack perfume. It has been bred out of them, and while the man who fights in the exhibition arena does not deplore this one iota, the cultivator who grows Roses for his garden and his home considers it a matter for keen regret. Something in the same direction applies to the modern Carnation, but no such charge can be maintained against the Sweet Pea. The blooms have increased in size, substance, and abundance, and they remain Sweet Peas still —fragrant, floriferous, elegant. —

Saintpaulia Ionantha.

This pretty compact little plant, often called the African violet, is a charming subject for the warm greenhouse. Its bright blue flowers show up admirably when staged with the pink Gloire de Lorraine Begonia, or one of the white varieties as Turnford Hall. It shows to still better advantage when grown in small baskets suspended from the roof, alternately with the above Begonias grown as hanging plants. Propagation can be effected in three ways, namely, from seed, from leaves, and by division. If from seed, which is the longest process, treat in the same way as tuberous Begonias. If from leaves, select good stout leaves, cut the midrib in three or four places, get a seed pan, well drain it, fill with one part leaf mould and one part coarse silver sand well mixed, and peg down leaves on this, giving a good watering with a fine rose. Then plunge in brisk bottom heat and cover with a bell glass; wipe the glass every day, taking care not to allow any moisture to rest on the leaves or the result will be damping off, and in the course of a few weeks little plants will appear. Prick these off into small thumb pots, and when the pots are full of roots shift the plants into their flowering pots or baskets. The surest method of propagation is by division of the roots. Select old plants with a good many crowns, knock them out of their pots, cut each crown with a piece of root attached, and put up into 6in. pots, which is a suitable size to flower them in. If grown in baskets they must be well lined with sphagnum moss. Pot moderately firm, but not too hard. The compost best suited for this plant is two parts good fibrous loam, broken with the hand to about the size of walnuts, two parts flaky leaf mould, half a part chopped sphagnum moss, with a good dash of coarse silver sand. This should be well mixed. They enjoy a warm, moist atmosphere at all times, plenty of shade in summer, and full exposure to light in winter. Water in a medium way during growing season, keeping rather dry during winter.— "The Gardening World."

Attar of Roses.

There does not appear to be much probability of any great development in the scent industry on an export basis in view of Mr. French's recent report, but Australia imports considerable quantities of scent, and there would appear to be no reason why this cannot be home grown. The following article should be of assistance to those who, in a small way, may have opportunity or inclination to take a share :—

By Joseph Knight, in Journal of Agriculture, Victoria.

Possibly there is no plant grown which is more popular than the rose, nor any perfume produced which finds more favour than the Oil of Rose, or, as it is generally known, "Attar of Roses."

Its cultivation is simple. If grown under healthy conditions, the plant adapts itself to almost any soil or climate, and there is but little trouble with insect and fungoid pests.

The work of gathering the flowers lasts but a few weeks—generally from four to five—after which the plant may be left to itself. All that is necessary is to prune in the autumn, and cultivate the soil sufficiently to keep weeds in check. It takes about 4 tons of bloom to make 1lb. of oil, and the present wholesale price of oil in Melbourne is £3 per oz., or £48 per lb. It is well, therefore, to look whether regular labour can be obtained to gather the blooms every second day, as this is necessary to ensure success. The work is light, and where the united efforts of a family may be utilised, rose cultivation has much to recommend it. This brief paper is written as a guide to those who wish to give rose-growing for essential oil production a trial.

— Varieties Suitable. —

In dealing with this question, only those which have been tested in this State, and found to be satisfactory, will be considered.

The late Mr. F. Mellon, who had experience of essential oil production in the South of France, was employed many years ago by the Department to establish a Scent Farm, and provide plants. He introduced the variety known as the "Provence Rose," which is much cultivated in the large rose-producing district of Grasse, in the South of France.

Mr. Mellon, in giving his evidence before the Royal Commission on Vegetable Products, in answer to the question of the suitability of Victorian soil and climate, stated that it was much better than that of the South of France. He stated that in the town of Grasse, which is said to be the centre of the world's floriculture, there were 52 distilleries, some of them employing 500 people at a time. With this experience before him, Mr. Mellon was careful to introduce the best rose for his purpose when stocking the first scent farm established in this State. He discarded all others but the one referred to, this he named "Rose de Grasse," which is identical with "Rosa centifolia," or "Provence Rose."

On Mr. Mellon's departure, the writer took charge of this Farm, and can say that this variety supplies all requirements, as it is hardy and easily cultivated, and, with proper attention in pruning, gives a large amount of blooms.

Another variety of rose will be dealt with separately later on.

— Soil. —

Many rose growers assert that special soils with clay, or a "clay bottom," are necessary. Possibly this may be the case with some varieties, but with the "Provence Rose" it is not necessary. A warm, dry situation, whether sand, loam, or clay, answers the purpose quite well. The only situation which I have found unsuitable is one with a wet bottom.

— Climate. —

Most parts of Victoria are suitable for rose cultivation. Those that do not experience excessive rain, but sufficient to allow the plant to mature its blooms, give the best results in "oil." Rain on the blooms has a deterimental effect.

At the Dunolly Flower Farm, North-western District, the crop could be harvested without danger of rain; while at Leongatha, Southern District, the reverse was the case, considerable rain falling during the four or five weeks the plants were in bloom; but under these conditions the plants were more vigorous, and gave a much greater yield of blooms.

As to the yield of oil, I had no opportunity of judging, as the farm was closed down before a proper experiment with distillation was made. It is recognised that the more sunshine the greater is the amount of oil, providing there is sufficient moisture for the proper development of the plant.

Plants were distributed to almost every part of Victoria, and so far as growth is concerned, I know of no place where there has been a failure. The "Provence Rose" can be recommended by any part of this State.

— Plants. —

Plants may be obtained from shoots, or what is known as "suckers." The latter may be obtained from any plantation which has been established for three or four years, when the plant is being thinned out. When growing from cuttings, pieces 6 or 7 inches long are planted out in a well-prepared nursery bed in autumn, and left until well rooted; they may be put out in late spring, or carried over until the following autumn. When well rooted suckers can be obtained, they will be better, as they can be planted out in their permanent place at once. The plants should be well cut back when being planted out, and it is advisable to prune back straggling or wounded roots. The stem and side shoots should be trimmed first of all, both above or below the surface, with the exception of two or three on the top. These should not be more than 1 foot to 15 inches above the surface, as it is desirable to have a good strong stem to build the plant on, so that it can fill the space allotted to it. In selecting plants, it is well to take only from those that are of healthy growth.

— Cultivation. —

The soil for rose culture should be cultivated to some depth. If ploughed, it should be subsoiled, as in most cases it is better to keep the surface soil on the top, and loosen the subsoil to a depth of at least 10 or 12 inches. The soil should be well pulverized before planting, and, where convenient, it would be better to lie fallow for a few months before putting plants out. Where drainage is necessary, it should be attended to as early as possible, as a "wet bed" is most objectionable. All that is necessary in the after treatment is surface cultivation by light ploughing—3 or 4 inches deep—and extermination of weeds.

The plants of the "Provence Rose" should be set out in rows about 4 to 5 feet apart, and the space in the rows should be about 3 or 4 feet. Where it is intended to employ horse labour, the wider distance between the rows should be selected, or even more, say 6 feet. The bush develops considerably under favorable conditions; if planted too close, it would be most difficult both to gather the flowers and cultivate the land.

Care should be taken not to plant too deep, for if it is planted too deep the crop becomes stunted and unhealthy. This is a mistake commonly made by those having no experience of rose culture. The roots should be near the surface, well spread out, and running down at an angle of about 45 degrees, and the fine surface soil pressed down on them tightly. This should give the plant a good start, and go a long way to the successful establishment of a plantation of this kind.

— Pruning. —

Rose pruning generally is a much debated point, and methods differ; but with oil extraction as the object, the form of bloom or quality as a rose is of no consequence. What is required is "quantity." The bush should be cut back so as to produce an abundance of young growth on which the blooms can develop. Care must be taken to cut out the thinner growth, and admit light and air through the plant, and at the same time strengthen the leading shoots so as to keep it in proper form. The season in which this should be carried out is important, as late pruning does not give time for strong shoots to develop before the flowering season is due. The usual time for rose pruning about the city is July and August, but June, or early in July, is to be preferred when pruning for the purposes of oil distillation. The work should be done thoroughly, so as to give free scope to work the land.

— Gathering of Blooms. —

The blooms must be gathered every second day, and the best time for this operation is early in the morning before the sun gets at its height; the earlier the better. The blooms should be taken off before they are fully expanded, but not before they are opened sufficiently to show the petals. There is less risk of bruising or loosening them by shaking if it is done at this time. Care in this respect is necessary if the best results are to be obtained.

The blooms should be cut as near to the flower as possible, as any matter beyond the petals reduces the quality of the oil, and is useless. When gathered, blooms should be taken direct to the still-room and not exposed to the sun's rays, or rain, or moisture of any kind.

— Distilling. —

Rose distillation is similar to that of other essential oil-producing plants, but somewhat more delicate, and extreme care must be taken not to force the "boiling." This is, perhaps, difficult where direct heat is applied, but with superheated steam it is easily regulated, and where it can be done, this method is the best way of raising the temperature.

In Bulgaria, small stills are scattered all over the flower-growing districts, but it is said that nothing like as good results are obtained as in the South of France, where the work of distillation is carried out in large and well-equipped establishments, which sometimes handle 150 tons of roses a day. Nevertheless, with proper care in applying the heat, and attention to little details, good results can be obtained with the ordinary still and direct heat.

In distillation, two methods are adopted. The oil is contained on the surface of the petals. Either the petals are stripped from the calyx and distilled separately, or the whole flowers are employed. The former method gives a superior product, but it is doubtful whether the extra labour is repaid.

In rose distillation, delay must be avoided as much as possible; the roses should be treated within 24 hours from the time of gathering, and care should be taken not to submit the roses to more rough treatment than is absolutely necessary. The place of treatment should be free from offensive or other odours. A good supply of cold water is necessary to supply the cooler, and where a running stream is not available is must be supplied from a well or tank by pumping; this water may be used over and over again.

Many small growers along the Mediterranean coast make rose water without the second distillation or extracting the oil in any way. As there is no licence-fee for holding a still in the Commonwealth, but a permit only, with a guarantee against any imposition or infraction of the Excise laws, it may be worth while for some of our young ladies to try this as a pastime, as there is a ready sale for Rose Water if properly prepared. It is used largely for many purposes.

— Enfleurage and Maceration. —

Roses grown in France and elsewhere are also utilized for perfume extraction by the processes known as "Enfleurage and Maceration." In the latter case pure olive oil is generally used. The oil is placed in a large vat, and the rose petals are submerged in it; they are stirred up occasionally, and after about 24 hours drawn out, and the oil pressed from the spent petals, and the same process is repeated with fresh petals until the oil is sufficiently impregnated with the scent of the flower, when it is stored, and the essence extracted by some highly rectified spirit solvent.

The "Enfleurage System" is very popular in France, and a very considerable amount of "Pomade" is made and used in this form.

— "Red Rose." —

Rosa Gallica.

The rose is cultivated in England and elsewhere for its flowers, which are gathered in the bud. The lower portion of the calyx is cut off, and it is dried in this form. Mr. Slater states that it finds a ready sale at 3/6 per lb. The wholesale chemist and druggist purchases freely, and there should be a good opening by way of export.

It is recommended in the British Pharmacopoeia, but, like many other articles, to have its proper standing, plants must be cultivated in Great Britain. This rose has but little perfume in its fresh state but develops a beautiful fragrant odour when dried.

The drying is extremely simple and inexpensive. The bud when gathered and trimmed should be spread out so that the air can pass through the leaves. The most suitable method is to make a few trays, about 3 feet long by 2 feet wide, with strong hessian for a bottom. The buds are spread evenly over this, and a temporary stand is made after the style of a "three sided clothes horse"; then these trays can be laid across the two side bars, and the whole built up to whatever height is desired, and if just sufficient room is left between each tray for the air to pass through, the drying can be completed without further trouble. This may be carried on in the open air or within doors; if out of doors, there should be some sort of cover to protect from rain or dews. The quicker the drying is done the better will be the result; the blooms should not be exposed to the direct rays of the sun.

Vegetable Garden

Vegetable Calendar.

Hurry in late sowings of marrows, melons, trombones, pumpkins and all kinds of summer vegetables. N.Z. spinach, although not one of the most delicate of vegetables, is one of the most prolific. It certainly pays well for any space or attention given it. Silver Beet is always a handy stand-by. It can be sown now. A bed of nice, free, sandy soil, not too far from the water tap, can hardly be put to better use than growing a crop of sweet potatoes. Pots of rooted cuttings are obtainable and they are no trouble at all. Small sowings of celery may be made but most amateurs will prefer to buy the seedlings later on. Salads are all the sweeter for being home grown. Lettuce, of course, we get in such abundance and of such excellent quality from the hills, that few attempt growing them in summer. It can be done with a well and deeply dug soil, a liberal mulch and a mist spray nozzle close at hand for the hot and scorching winds. Onions, mustard, cress and radish are less exacting, they should, however, be grown quickly otherwise they lose the freshness and sweetness which the home garden salads should possess.

Tomatoes.

To fertilize tomato flowers hold the bunch of flowers with the left hand, place the nail of the thumb immediately underneath the flower so as to make the pollen fall upon the thumb nail; then gently press the end of each flower in turn into the pollen on the nail. When the pollen is used up, more may be obtained in the way described. If every flower is thus treated, a good crop of fruit will be assured.

Runner Beans.

This is a very excellent vegetable, especially for cooler situations. With plenty of water they do well on the plains. As the plants are voracious feeders and appreciate a cool, moist root-run, no pains should be spared in providing them with these essentials. The stout roots also penetrate the soil to a considerable depth, so that it well repays to break it up at least two spits deep. With the lower spit plenty of partially-decayed manure should be mixed. If the soil contains a preponderance of sand, cow or pig manure is best; but if clay is the principal element, that from horses is preferable, though in many cases the beginner has to use the best that is obtainable. With the top spit it is a good plan to mix some superphosphate, a small handful to each yard run of row. In addition, if the soil is very stiff clay, some sand, some burnt earth, old potting soil, road scrapings, or, indeed, anything of a porous nature that will tend to render it more friable may be added, taking care to mix it well with the soil.

When the seedlings appear, steps must be taken to guard them against slugs, which are particularly fond of them. Apart from trapping the pests, which is the most satisfactory method of all, some fine coal ashes, soot, or soot and lime may be sprinkled rather thickly round the plants. As soon as the plants begin to run, stout stakes, twine, or coarse netting must be placed for them to climb. Six feet is a reasonable height for the supports, though the plants will climb nearly twice that height if supports are available. The system of topping Runner Beans is not one that we would advocate for garden cultivation; wherever a pod rests on the soil its flavour is impaired. Besides, a well-supported row of Runner Beans makes an excellent screen in the garden, a point that ought not to be lost sight of in selecting the site. During hot weather, and particularly when the plants commence to flower, copious supplies of water must be afforded, and once a week should be supplemented with weak liquid manure. In addition, an overhead syringing with clean water will prove highly beneficial and keep that most dreaded of all pests, red spider, at bay. When the plants reach the tops of their supports, the growing point of each may be nipped out, an operation that may have to be repeated several times.

Propagating Seakale and Root Cuttings.

There are two methods of propagating this subject, one by seed and the other by root cuttings. Raising Seakale from seed is an easy, cheap and satisfactory method of propagation, although much slower than that of cuttings. Make drills 1 foot apart in well-prepared ground and the seed sown about 1½ inches deep and 6 inches apart. This is a better practice than sowing thickly and subsequently thinning out the resulting seedlings to 6 inches apart. Later on remove each alternate seedling, thus leaving the plants 1 foot apart ultimately. Two years at least are required for the plants to be sufficient advanced to lift for forcing. Sow in winter.

Seakale crowns, however, may be obtained for forcing within a year. Any old plants obtainable will answer our purpose admirably. The thong-like roots, or "thongs," as they are termed, may be cut or broken off from the main root quite easily. The strongest plants are always raised from root cuttings, and these are obtained from the severed portions. The severed thongs vary in thickness. Some are as thick as a man's forefinger, others are nearer in substance to that of the small finger of a lady. These are cut up into lengths of about 4 inches. For exceptionally fine forcing roots 6 inches is thought the better size but either size will give satisfactory results.

The upper or wide end of each length should be cut straight across, and the lower or narrow end in slanting fashion. As there is often very little difference between the upper and lower end of the lengths, it is a good rule to cut the lower end slantwise, which quickly determines the fact. Tie these in bundles, placed in a sheltered place and they will soon callus over, when they may be planted out.

Thrifty French Nursery Practice.

The French cultivator has a good knowledge of the soil treatment, and, compared with his French neighbor, the Englishman has, it is said, much to learn. The working of the soil goes hand in hand with its improvement. Throughout the year the workers by the piece are to be found in the gardens. In spring the ground is broken up. They do not wait till "goats fodder" can be made. As to manure, it is not so much of the dear stable manure that is used but rather waste from the kitchen of which every big town wants to rid itself, and which the gardener and farmer throws into a heap to decay. The dust and rubbish of the summer months, which contains but a small quantity of coal ashes, and therefore the more humus, are the most made use of. This is mixed with stable manure and cow dung to improve it. About Paris this rubbish is put at once on the land, crockery, metals, etc., picking out these latter, afterwards. This compost is not only a manure, but it helps to lighten heavy loams soils.

Compost.

By carefully keeping the paths, beds, and fences which surround the garden clear of weeds and grass, a considerable addition of good compost and manure will be obtained. All kinds of vegetable and animal refuse may be used to swell the pile, but do not add any cuttings of hard-wooded plants, as they take too long to rot. These should be burned, and the ashes thus obtained thrown upon the heap.

Weeds that have seeded should be burned, and the ashes only added to the heap, and this because no other treatment will get rid of the seeds. Such is their vitality that nothing else will kill them, however well they may apparently cause the decay of the weeds with their seeds, will not in reality have killed the seeds. We have known seeded weeds lie for a very long time in a compost heap, with every appearance of the whole being reduced to a condition of thorough decomposition, and yet on the application to the land, a very short time sufficed to give as fine a crop of weeds as if the seeds had been put in quite fresh. The bedroom slops put on with the ashes from the house are very useful. Care must be taken not to add more than can be absorbed by the material without an excess to be offensive. Lime should be added in the form of gypsum, which will allow of the slops in moderation to be added without offence or fear of disease.

In the preparation and management of manure lies much of the success in the cultivation of the garden. It is a strange fact that the greater number of amateur gardeners usually take one of the two extreme courses—they either fail to manure at all, or else they add large quantities of fresh, hot stable manure, and it is hard to decide which course does the more harm.

The whole heap should be turned over two or three times, and then in less than twelve months a splendid manure is ready for the garden, over which it should be scattered in the usual way, and dug in.

In making up cucumber and melon beds many people sink a three or four inch pipe close to where the plants are to stand. If the pipes are porous the bottom end is plugged with clay, or if solid the pipe is filled with sand gravel, or manure. Where water is scarce it is a good plan, though it is not an unmixed blessing.

A suburban amateur gardener, who rather prides himself on his peas, has had a particularly fine crop. The other morning, having picked a supply for the day, he was returning to the house, when he noticed a neighbour who is rather deaf, looking over the garden fence. "Peas," he shouted as he held up the basket on the fence. "Peas," from my own garden." "Thank you," replied his neighbour, picking up the basket and making a short track for his own door, leaving the disconsolate pealess one to wonder whether the neighbour is really as deaf as he is supposed to be.

About Fertilizers and Their Use.

Chemical conceptions of any sort, especially concerning solids, are always complicated with questions of solubility. The slow but certain action of the elements making our rocks yield up their stores of food for vegetable growth is largely a question of solubility. The only "Open Sesame" at the plant root is solubility. Animal and vegetable life both are dependent upon solubility.

Every day conditions are such that we immediately associate solubility with that combination of elements called water. Water and solubility.

The illimitable solvent action of water needs no proof. Sea water even contains gold, although gold is one of the most obdurate metals, being dissolved by only the strongest acids. Yet gold is not soluble in water in the common acceptation of the word. Such substances as sugar, nitrate of soda or sulphate of potash are, although not to the same degree because sugar will disolve in twice its weight of water, pure nitrate in nearly its own weight while the sulphate takes ten times to become dissolved.

The simple solvent action of water, while remarkable, should not be confused with that obtained when it is combined with other agents. Many "mixed fertilisers," blood or bone, are insoluble and require something besides water to dissolve them.

In this connection the great influence of the fineness of fertilizing materials should be noted for its great practical importance. The ease or otherwise with which it yields up its value depends largely upon the amount of surface exposed or in other words upon the working surface. Fine grinding makes surface grow in astounding fashion and therefore even if the solubility is slight the work done in a given time is vastly increased and the maximum effect is reached with the finest powder.

Everybody is cognizant of this truth and its application to bone. Being of slight solubility in water its immediate value depends to a great extent upon its fineness. Almost any action upon it from any agent will be aided by large surfaces. To have bone last a long time we use "inch" bone. To have it less lasting we use "meal." To get its value as near to "now" as possible, use very fine. But no grinding mill ever made by man can begin to equal the smallness of the particle of a fertilizer already dissolved in water yet fine grinding does advance a little along the road of solubility.

The great importance to the plant of this question of solubility lies in the accepted fact that no solid can be taken in by the root. Whatever necessary mineral is wanted by the plant must first be dissolved; to be admitted to the internal works it must be a liquid.

Scab in Potatoes.

The injury is confined to the surface of the tuber, the skin being broken up into fragments over the diseased patches. Although the market value is much depreciated when scab is present in quantity, the quality of the potato is not in the least impaired for eating.

If scabbed potatoes are used for "seed" without having been sterilised, the resulting crop will almost certainly be diseased, and in addition the fungus will pass into the soil, where it is capable of living for several years. Scabbed potatoes may be used for "seed" without the slightest danger of spreading the disease if they are immersed for two hours in a solution consisting of one pint of commercial formalin (equal formaldehyde, 40 per cent.) mixed with thirty-six gallons of water. The potatoes should be spread out to dry, when they may be cut and planted in the usual manner. Great care must be taken after potatoes have been treated as above that they are not placed in sacks or hampers that have contained scabbed potatoes.

Land that has produced scabbed potatoes is certain to be infected with fungus, and should not be planted with potatoes for several years afterwards; beet, swedes, carrots, and cabbages are also attacked by the fungus. Cereals may be sown with safety on infected land.

In the case of gardens and small allotments, where potatoes are of necessity grown every year, the trenches in which the potatoes are planted should be sprinkled with powdered sulphur.

Lime favours the development of the fungus in the soil; the same is true of stable manure, night soil, etc. Acid manures only should be applied to land that is infected.

Peelings from infested potatoes, unless they have been boiled, should not be given to pigs. Burning is the safest, and in the end, the most economical, method of dealing with them. — From the Journal of the Board of Agriculture and Fisheries.

Readers! Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Potatoes for Exhibition.

In soil fairly rich, deeply worked, and inclined to be rather light, there should be no difficulty in growing first rate tubers. Strong, or rank, manure should be avoided. When manure is put on the ground it should be in the autumn, and dug in deeply, leaving the surface as rough as possible for the winter's frosts to do their work. Some think that anything in the shape of a potato will do for seed purposes. This is a grave mistake, for here lies the foundation of success in a large measure. It is a question of beginning well that leads to ending well. No trouble should be thought too much in preparing the sets. Select good sized tubers and of the very best shape, from four to six ounces in weight, and set them up in boxes in a light airy place secure from frost. They will then sprout and throw up short strong shoots and by planting time be in fine condition. Plant whole sets, rubbing off carefully all weakly side shoots, and leaving the two strongest. The dwarf growing kinds may be two feet between the rows and 18 ins. from set to set. Stronger growers should be three feet from row to row, and the same in the row. They will well repay for the extra room given them. Plant carefully about six inches deep with a trowel, loosening the soil well all round, and taking every care not to injure the shoots. Fill in round the set with nicely prepared sifted soil in which a small quantity of soot and wood ashes and leaf mould form a part. When growth commences they should be looked over frequently, keeping the ground flat hoed until fit for earthing up. A light dressing of soot and superphosphate alternately will help them on through the growing period.—Exchange.

Plant Foods.

If basic slag, bone meal, bones, etc., are used either in composting, digging in or surface application, it is of importance to know what quantity to use, what time they are to remain in the soil and what effect, immediate or future, is desired by their presence. Basic slag is soluble to the extent of 35 per cent. where there is free carbonic dioxide present in the soil water and an application at the rate of from 6 to 800lbs. per acre show the effects of the application for from three to four years. If a quicker or greater result is needed an application in solution and suspension should be given either with clear water or liquid manure, constantly stirring while using. Superphosphate gives a quicker result than basic slag particularly where phosphates are present in the soil already.

Bone meal used in the same proportion, i.e., 600 to 800 lbs. per acre, if steamed or finely ground is traceable for about two years, yet it is true that the important effect is exhausted in the first few months.

I very much prefer using wood ashes for the potash, but do not object to using kainit, as it acts as an animal and vegetable organism destroyer and an accumulator of water; in fact, for this reason I really prefer to use in addition at the rate of from one to two hundred.weight per acre applying it as a surface dressing after wood ashes have been either dug or hoed in.

Basic slag is by some preferred to bone meal or to superphosphate for the phosphoric acid because the bone meal always favours fungus growth and maggots, and the superphosphate readily becomes reconverted to the tricalcic phosphate state.

For nitrogen there is nothing that equals well decayed farm-yard manure, that which has been well made, its potash, phosphoric acid and nitrogen conserved, the former two by providing a cesspool to receive the drainage which should be pumped over the manure heap again and again, and the latter by using small quantities of sulphate of iron either in solution or dry state. These applications of sulphate of iron will clean the manure heap of spurious organisms and form with ammonia present in the manure, ammonium sulphate. Finally, it is of the utmost importance to get a soil that has present either naturally or artificially all the essential plant foods, and further, that the soil should be free or rendered free from harmful organism.—Exchange.

Blanching Celery.

A big American celery grower writes :—Blanching in hot weather is not easily accomplished. Soil at this season affords most favorable conditions for rust. Instead of this method, 12-inch boards are used. Only good lumber is purchased, cleats are nailed on to prevent splitting, and the boards are as well cared for as hotbed sash, far better than many a gardener cares for them. Each board does service six to seven times in a season. When the plants are 12 inches high, the boards are set beside them and fastened in place with clamps made from a piece of heavy wire about 10 inches long, and bent to a little less than a right angle two inches from each end. Pairs of rows are selected at intervals over the field for the first blanching. In this way wagon ways are opened and labour is saved in moving the boards from row to row. The process requires from 10 days to two weeks, according to weather conditions. When ready for market, the celery is dug with spades, and stripped of outside leaves in the field. It is hauled to a shed, trimmed, washed with a hose, bunched and scrubbed. The root is cut to a four-sided wedge and three or four stalks are tied at top and bottom into a flat bunch.

Mustard and Cress.

Mustard and Cress in a salad crop that is largely grown, but not always to the best advantage. A few shallow boxes, some finely-sifted but sweet soil, some crocks and a good supply of seed are all that is required. One good-sized over each hole in the bottom of the box will provide ample drainage. Fresh soil, finely sifted and containing a large percentage of sand, is best. Fill the boxes so that when the soil is pressed moderately firm the surface will be slightly below the edges of the boxes. Scatter the seed on the surface fairly thick and even, press it in slightly with the bottom of a clean pot or pan, give a watering with a fine.rosed can and stand in a semi-dark place until germination is effected or cover with paper. Never cover the seeds with soil and do not use the same soil for more than one crop. Mustard and Cress are usually wanted together, therefore the former should be sown three days later than the Cress, as it grows faster and consequently becomes ready for cutting more quickly. After germination stand the boxes in full light and avoid watering latter to permeate the soil from overhead. If water is required, just dip the boxes and allow the water to rise from below upwards.

Birds and Seedlings.

The sparrow is exceedingly fond of tearing up plants as soon as a speck of green appears above ground. Those who have watched this bird carefully know that some are torn up out of sheer mischief, for, as soon as they are out it drops them ruthlessly to continue its work of destruction. Cotton has been found the best preventive. Black is to be preferred, for, being nearer the colour of soil, the bird cannot see it so well. Stretched along the side of rows of seedlings a few inches from the ground the sparrow strikes against it, and goes off faster than he came. Another way to keep the birds off the fruit buds and seed quarters is to get some broken mirrors and suspend them a few feet from the ground in such a manner that they cast a reflection over the ground, so that any little breeze keeps them moving. This causes the reflected light to dodge in and about in an unexpected way to the alarm of the birds. The mirrors should be placed six or eight yards apart. Any pieces over three inches square are suitable. The birds get used to it in time, still it does help.

Fruit Garden

The Art of Budding.

Budding is the operation by which a bud, with a portion of bark, is taken from a tree or plant and inserted beneath the bark of another tree or stock, as in the case of young trees, or beneath the bark of the same tree. This is at times necessary, as some parts of the tree may fail to produce branches. The main principle of budding is the same as in grafting. The union is effected by means of the organisable matter, the cambium, which is found between the alburnum and the inner bark; and the success of the operation depends upon the abundance of that matter being such as to permit of the bark being easily lifted from the wood. When both the stock and the tree from which the bud is taken are in that condition, which is usually during the earlier part of summer, and often continues till the middle or end of the March following, especially if there is a moist summer, the union is most readily effected. There are times when the flow of sap is checked, and the bark will not lift readily (this will be noticed during a dry spell). At such times budding should not be attempted. Still, moist, warm weather is the most suitable; very dry, hot weather with a fiery sun is likely to kill the buds, and during such weather budding should not be attempted. Irrigation, with the water at a fairly even temperature, will assist the union very materially in a dry season. Rainy weather is injurious, for when water gets into the wound it decomposes the sap, and organisation cannot proceed so as to form a union.

There are several modes of performing the operation, but shield or T budding is the method generally adopted, it having proved to be the most successful. When operating, the shoot containing the buds to be used should be taken off, and the heels placed in a little clean water, the fresher the better, till the stocks are ready for working. A cut the shape of a T is made in the stock large enough to admit the bud. A bud is then taken out of the shoot, by inserting the knife about half an inch above the bud. The cut should be made so that the bud is in the centre of the shield, the shield being from a quarter to half an inch wide at the centre, sloping off to a point at the lowest end. The petiole or leaf stalk should be cut through at half its length, and the bud inserted by holding the petiole between the thumb and finger, and inserting the lowest point of the bud at the top of the T, pushing gently the while till the whole of the bud and shield is under the bark of the stock. The "petiole" is then "righted" till it is in the centre of the T, and the binding is then applied, using a soft twine or raffia, and not tied too tightly, for it is essential that a free circulation of sap should continue. In taking the wood out of the shield, or, as some call it, the "core," is not removed. Should this come away, leaving a hole at the base of the bud, it will not succeed, and a new one must be chosen. The base of the bud is of a greenish colour, and of a pulpy nature, and is the commencement of what is known as the medullary sheath, the upper part of which is the eye or growing point of the bud. If the wood comes out clean, with the exception of the substances just mentioned, the bud is ready for insertion. The operation, to be done successfully, should be done quickly, for the organising tissue is very delicate, and soon becomes vitiated or spoilt if exposed to the action of the air for any length of time. This will be seen if the operator will take the trouble to notice the effect of exposing the wound to the air. The cambium will become quite brown, and in a short time a thin layer of bark will be formed under it, yet it can never unite with living tissue placed in contact with it. In the course of two or three weeks it will be seen whether the buds have taken. If the petiole on being touched drops off readily, it is a sign that the bud has taken, or become united with the stock: on the contrary, if the petiole withers or shrivels, it is an indication that the bud is dead or dying. As soon as it is known that the buds have become united with the stock, the ties should be loosened or cut, and the buds seen to occasionally, and in about six weeks from the time of budding they may be removed altogether. When the bud shows signs of pushing, the stock, if necessary, may be headed back to within half an inch of the top of the shield. The bud will then begin to grow rapidly, and in the course of the growing season a nice tree will be formed. On the other hand, if the bud is left dormant till the winter pruning, the heading back may be left till that time. If the budding is done in or before December, the bud is better to be pushed right away, and no time is lost; but if the budding is not done till late in the summer, it will be better to leave the bud dormant till the spring, when a vigorous shoot may be looked for.

Raspberries.

Raspberries are much appreciated fruits, wholesome, delicious, and easily cultivated where the situation and soil are suitable. Both the red and yellow kinds are pretty dessert fruit, while for tarts, compotes, preserves, syrups, and vinegar they are far superior to the strawberry. Few old writers have said much about the berry, which owes its name either to its very thorny stem or to the fact that the fruit looks rough, hence raspberry, which gardeners and others often shorten to "rasps." The common raspberry (R. idaeus) grows wild in a good many English woods and shady banks, and upon hills and high cliffs. The fruit in the indigenous plants is generally bright red, sometimes yellow. It also grows wild in most parts of northern Europe, Africa, and Asia; some say most of our cultivated species are descended from the Himalayan raspberry, which has fruit of a reddish-orange colour. The stems of the wild raspberry, like those of the garden species, are erect, no trailing. The flowers are greenish-yellow, and the fruit consists of a very few comparatively large scarlet drupes of pleasant flavour.

In America endless kinds of brambles are cultivated, and some of them are crosses between the blackberry and raspberry. The wineberry is really a Japanese plant; the very abundant berries resemble those of the mulberry in shape, but are of a bright red hue, and the foliage is handsome. The Loganberry, with its large, maroon-red fruit, is a hybrid between the blackberry and raspberry. There is another species with almost black fruit; there is also the "Glenfield" black raspberry. The so-called "strawberry raspberry" is a hybrid, for which very much cannot be said. The fruit is rather like that of the Arbutus, but is very tasteless.

Caprification of Smyrna Figs.

In the following article will find an interesting and very clear explanation of the caprification of the fig. What applies to South Africa applies with equal force to our own country where the dried fig industry is fairly on the way to becoming successfully and permanently established, largely through the efforts of Mr. T. B. Robson, of Hectorville. For those who have a tree or two of the Calimyrna fig in the home garden it will be of interest to know that Messrs. E. & W. Hackett supply the all-important insect (Blastophagus) in season. The Capri tree is of course necessary to maintain a permanent supply but the ordinary suburban gardener will find it much less trouble to procure his supply as he requires them. As mentioned in the article referred to it appears to be well established that second crops in other countries are matured by the insect, which would otherwise not do so. It is also believed that it improves the quality of certain varieties in which its presence is not essential for the actual purpose of maturing the crop.

Lecture delivered before Pearl Farmers' Association, 5th December, 1911, by I. Tribolet, Horticulturist and Viticulturist, Elsenburg Government Agricultural School, Cape Province.

The fig is one of the best known, most widely distributed, and most wholesome of fruits, and has been as long cultivated by man as any of the fruits now used by him.

During the last twenty-five years or so a great many facts of interest have been brought to light especially bearing on the matter of pollination and on the different types of figs.

The fig, botanically, is known as a spurious fruit (Syconus), and is fleshy, partly hollow receptacle, with its flowers and seeds, or real fruit on the inside, and belongs to the tribe Artocarpeoe, genus Ficus carica, and is divided into two great classes—

(1) Those which ripen and become edible without developing perfect seeds, or, in other words, they become pomologically ripe, but not botanically ripe.

(2) Those which are unable to ripen or become fit for eating except the formation of perfect seeds takes placed. This class becomes both pomologically and botanically ripe, that is, it can be eaten and also be propagated from the ripe seeds it contains.

To the first great class belong all the figs that have been grown in this country till quite recently. To the second belong all the figs of the Smyrna type; some of these have been introduced here during the last few years.

The initial difference between these two general classes is that the first which can become ripe and fit for eating without pollination possesses what are known as mule flowers. This class cannot be propagated from seed, but only from cuttings.

The second class possesses male, female, and gall flowers, becomes botanically ripe, and can be propagated from seeds as well as from cuttings. This class includes the Smyrna type, which contains only female flowers, and which to be of any value must be fertilized. It also includes the Capri, or what is called the male fig.

Now, the Capri section (which is also Ficus carica) possesses male, female, and gall flowers—these gall flowers, as will be explained later on, play a very important part in the economy of the fig.

Thus the two great classes of figs have four distinct types of flowers, each of which has a different purpose to serve.

The flowers, as already stated, are (1) male, (2) female, (3) mule, (4) gall, and vary considerably in shape and size.

The male flowers are found occupying about a third of the inside area of the fig, and grow round the ostiolum or eye of the fig, point towards the centre of the fruit, and are not to be seen from the outside except in the case of abortions or freaks, when they sometimes burst through and grow there.

They, as in the case of other flowers, carry the pollen, and are found in the first and third crops of the Capri figs.

The female flowers occupy, in the Smyrna figs, nearly the whole of the interior, and their office is to receive the pollen, become fertilized and produce seeds. If this fertilization does not take place, the fig fails to come to maturity, and drops off the tree when about half grown.

The mule flowers are formed throughout the whole of the interior of the ordinary edible fig, are incapable of being fertilized, and are probably degenerate female or gall flowers that have become modified by cultivation. The figs bearing mule flowers ripen without pollination. The gall flower is characterised by an imperfect stigma and a shorter style than that of the female flower. It is found in all the crops of the Capri fig tree, and is incapable of being fertilized. It is specially adapted as a receptacle for the eggs of the little wasp (Blastophaga grossorum). It is in these galls that the wasp is hatched out and lives till it reaches maturity and is able to undertake the important work of pollination.

— Caprification —

is the means used for bringing about the fertilization of the Smyrna fig by the transference of the pollen from the male flowers of the Capri fig to the female flowers of the Smyrna fig or figs of that type.

Unlike the flowers of most other plants the fig flowers are enclosed in a partly hollow, fleshy receptacle, and cannot be visited by passing insects, such as bees, wasps, flies, etc., by which the pollen from one flower may be carried to another.

For bringing this about in the fig there is a special insect that is not, as is the case in other flowers, a visitor, but is a permanent resident in the fruit, and so interdependent is this little insect and the fig tribe that it has been said, and truly so, that if this insect were by any chance to die out every fig tree in existence (if the intervention of man in the matter of propagating by cuttings be left out) in a few years would perish off the face of the earth. The converse also holds good: if the fig trees died the insect would be wiped out.

In the case of Ficus carica, this little insect is known as Blastophaga grossorum, and none of the other Blastophagas, of which there are a great many species known, inhabiting a number of different varieties of Ficus, could do the work.

The female wasp to look at is very much like a small black ant, about one-eighth of an inch in length, with wings mostly held at right angles in a vertical direction to the body, which gives her rather a haughty appearance as she struts round after emerging from the Capri fig.

The male is somewhat smaller, and looks much like an ordinary quarter-grown flea with a telescopic ovipositor. His sight is very bad, having only partly developed compound eyes and no ocelli. He never leaves the interior of the fig, but emerges from the gall, in which he has grown up somewhat sooner than the female, and busies himself by going round fertilizing her before she leaves the gall in which she has been bred, so that when she emerges from the fig she immediately sets about looking for another fig in which to lay her eggs.

In making her way out of the eye of the fruit she has to push through quite a tangle of male flowers, and, covered with pollen, she bursts into the outer world and enters any convenient fig, whether it be Capri or Smyrna. If it happens to be the former, she lays her eggs in the gall flowers and soon after dies.

If the latter, she finds no gall flowers, and rushes round in rather excited state, spreading the pollen grains with which she is covered on the receptive part of the female flowers of the Smyrna fig, which thus becomes fertilized. In her futile quest for a suitable place in which to lay her eggs, she will probably drop one here and there, but soon gives it up and usually dies in the fig.

— Capri Fig Trees. —

For the maintenance of the generations of the little wasps there must be a tree or trees on which there is always fruit, or rather that carry overlapping crops always at a suitable stage for the reception of the insect. These crops must also contain suitable receptacles for the insects' eggs. Such a tree is the Capri ficus or Capri fig tree, which bears and brings to maturity three crops in one year. In each of these crops are found gall flowers, which seem to have been specially evolved to suit the breeding peculiarities of the insect.

The three crops borne by the Capri fig tree are:—

1. Profichi crop, which contains gall and male flowers.

2. Mammoni crop, which contains gall and female flowers.

3. Mammei crop, which contains gall and male flowers.

The insects from the profichi crop go into the mammoni crop and lay. Those hatching out from this laying come from the mammoni crop, enter the mammei crop, and lay.

The insects from this laying come from the mammei crop enter the profichi crop, and lay, and so on, ad infinitum, as long as there are figs at a suitable stage for the insects to operate on.

To insure proper overlapping of the crops, it is hardly safe to depend on one variety of Capri tree, so that in practice at least three varieties ripening at slightly different periods are planted.

This also tends to lengthen the period of emergence. Even then from various causes, such as frosts, droughts, etc., sometimes the insects are lost through not having figs to go into. When this happens they must be obtained from somewhere else and re-established in the Capri trees when the next crop is at the right stage.

The time at which the risk is greatest is between the profichi and mammoni crops. Millions of insects emerge early from the profichi crop before there is a sign of the coming mammoni crop on the trees. All these perish, and it is only the insects coming from the very latest profichi that have an opportunity of getting into a few of the most advanced of the mammoni crop.

As the wasp likes cool places and shade, the Capri fig trees are usually planted close together, 12 ft. by 12 ft., 10 ft. by 15 ft., or in hedge rows about 10 to 12 ft. apart. The branches in a few years should shade the whole of the ground. They need practically no pruning, and most, if not all, the suckers are allowed to grow up round the tree. The figs on these are later in coming to maturity than those on the main stem.

It is advisable to plant so that you can irrigate at least a few of the trees: this assures a plentiful supply of buds, and somewhat retards ripening, and so lengthens the period of emergence.

— Method of Caprifying. —

This is done by stringing a number, say five to ten Capri figs (profichi crop) on a bit of twine raffia, rush, or some such material, just about the time the insect begins to emerge. This period can be gauged within a day or two by cutting open a few of the figs and observing if there are a number of males busy moving about the galls. If this is so the fertilized females will very soon eat their way through the little galls and thence out through the eye of the fig; the fruit at this stage also becomes soft to the touch.

The strings of figs that have been prepared are then placed here and there among the branches of the Smyrna trees either by throwing them up in the tree or placing them where required with a long light pole such as a bamboo. In some cases for the first caprification four or five figs are placed in little wire baskets tied-in different parts of the tree. For small or young trees a couple or three strings with, say, five figs on each would be sufficient for all the figs that would be likely to be fit. Very large trees will take up to fifty figs to do the first caprifying. As the Smyrna figs are not all fit to receive the insect at one time it is advisable to give the trees a fresh lot of Capris in about a week or ten days' time to 'pollinate the figs that were too small at the first caprifying.

When the figs come on slowly and unevenly it is sometimes necessary to caprify a third or a fourth time so that the whole of the crop may be fertilised.

The caprifying should be done from the time the Smyrnas are about the size of a hazel-nut up till they are nearly the size of a walnut, say, from a little under half an inch to one inch in diameter. The flowers inside must not have become brown, must be of a greenish colour, and be upstanding. A safe proportion of Capri trees to Smyrna trees is one Capri tree to fifty Smyrnas. Each fig may be looked upon as giving from 300 to 600 insects.

— Introduction to California. —

After eight years of persistent and continuous effort the seventh and last introduction from Algiers, sent over to Mr. Geo. C. Roeding by Mr. W. T. Swingle, of the department of agriculture, in 1899, proved successful. The insects entered a number of the young Capri figs on the trees and thus became permanently established in California.

The Smyrna figs held their crops, and the best drying fig in the world was given a place amongst the progressive fruit growers of the West to enter into competition with the decadent East, that for over twenty centuries had supplied practically all the dried figs of commerce.

— Renaming the Fig. —

The Smyrna of Asia Minor, soon after being firmly established in America, was given the name "Calimyrna," being a word compounded from the two words California and Smyrna, taking the first part of the first name and cond name. This end was arrived at by giving a prize for the most euphonious and appropriate name for the fig, and "Calimyrna" was selected from among the thousands submitted.

As there are a number of varieties of Smyrna figs, this name is given to the most famous drying fig known to distinguish it from other varieties of Smyrna figs.

— Introduction to South Africa. —

On hearing of the success in California, the Cape Department of Agriculture was not long in getting an importation of trees direct from Mr. Geo. C. Roeding, which consisted of a parcel of 140 Capri and Smyrna trees of different varieties (Calimyrna, Kassaba, Bardajie), mostly Calimyrna and Capris No. 1, No. 2, No. 3, which three varieties between them keep figs on all the year round. This was in 1902.3.

Two lots went to Constantia District, one to Elsenburg, and one to Grahamstown.

In July, 1907, Mr. Lounsbury, then Chief Government Entomologist of the Cape, but now Chief Entomologist of the Union, was in America, and as both our Capri and Calimyrna had reached the fruiting stage he arranged to have some of the Blastophagas sent on at the right season. In November, 1907, Mr. Mally, Assistant Government Entomologist (Cape), on his return from California, got four twigs of Capri from Mr. Roeding with fruit containing wasps. They were wrapped in damp moss and kept chilled till landing on 4th January, 1908.

One twig with figs on was put in a tin of moist sand at once and exposed to the sun and outside conditions. The others were kept in cold store till 20th Februasy. After forty-five days of exposure the first twig yielded a few females. This was at once brought to Elsenburg by Mr. Lounsbury himself, who gave instructions as to what attention, etc., was to be given to the cutting and insects when they emerged. Whether any insects got into the Capris from this twig is not certain.

The second lot was brought out on 25th March. The insects were carefully watched and helped where possible, and figs into which they were seen to enter marked.

The experiment proved quite successful, and the calimyrnas have been pollinated by them each year since their introduction.

The following is within a few days—either earlier or later—the time at which the Blastophagas enter each crop of figs on the Capris at Elsenburg :—

1st crop Profichi—enter 2nd week in September, emerge 2nd week in January—4 months.

2nd crop Mammoni—enter 2nd week in January, emerge 2nd week in March—2 months.

3rd crop Mammei—enter 2nd week in March, emerge 2nd week in September—6 months. Total 12 months.

— Advantages of Calimyrna Figs and Caprification. —

Apart from having the best drying fig in the country that ever the world has known, with its necessary appurtenances — Capris and Blastophagas—it can safely be assumed that by the caprification of some of the old established figs of the country that bring to perfection only one of their crops, such as figs of the San Pedro type that only mature Brebas or first crop, a considerable gain will be obtained through having the insect and the pollen from the Capri (male fig) to pollinate the second crop of these varieties, which is now lost to us.

It has already been definitely established that the Castle Kennedy, which only matures its first crop under ordinary circumstances, will with caprification mature its second crop, and so with many other varieties.

If the Capris of the district do not always fit in for pollinating these first or second crops that are now lost, they may be obtained from either late or early districts for the purpose of pollinating the crops as occasion may dictate. This will materially increase the returns of our already existing fig industry.

The superiority of the Calimyrna over other drying figs shows itself in the properties of superiority of taste and nuttiness of flavour that it has on account of maturing seeds and becoming botanically ripe, on account of its falling off the tree when it has reached a state of maturity, and on account of the lesser amount of manipulation required to make a perfect dried fig.

Sulphuring, and even the dipping and processing as in other figs, is not absolutely necessary. The colour, smoothness, velvetyness of skin, etc., is all that can be desired.

The fig is one of those trees that thrives over as big an area, in as many kinds of soils, and under as variable climatic conditions, as any other of our fruit trees, and there are many places in the Union where it should grow to perfection, especially if from one to three waterings could be given per year. Where the soil and conditions are suitable, I don't think one could put their land to better use than to laying down a Calimyrna fig orchard, say, from five to ten acres to start with.

Fruit as Diet.

— Arthur v. Benjafield. —

Dr. H. Benjafield, at the fruit conference the other day, took occasion to refer in terms which, to put it mildly, were the reverse of flattering to Dr. Arthur's evidence before the Fruit Commission, in which he suggested a dietary scale, which, if it was meant to appeal to the average man, woman, or especially children, was a lamentable failure. Dr. Arthur, it will be remembered, and supposing his meaning to have been correctly reported, certainly appeared to go unnecessarily out of his way to depreciate the food value of fruit and vegetables.

Dr. Arthur is a man of eminent scientific reputation and there is no doubt that his protein and fats, his carbohydrates and ash, his digestive co-efficients, and his calories of energy in quantity and ratio were amply sufficient and scientifically correct in theory, and probably in experimental result. Brought down to the level of general practice they might fail and do it badly. Man wants but little here below, we have been told, but at least he wants that little palatable and appetising. It it probable that even with its inadequate supply of fruits, nuts and vegetables it would sustain healthy and vigorous life though it would deprive it of some of its ameliorating influences. It may of course be grossly material to speak of the pleasures of eating but it is nevertheless true. It should also be remembered that a nut, fruit and vegetable only diet would equally sustain healthy and vigorous life, though possibly under present conditions at slightly increased cost. There is nothing to be gained by going to extremes and any system of diet if it is moderate, regular, and in variety is good. In such a scheme fruit undoubtedly has its mission.

— Theory and Practice. —

The American people have, through their colleges and experimental stations, gone very thoroughly into the question of human nutrition and the consensus of opinion certainly gives to fruit an important position in dietetics. This importance may possibly be better shown by observation than by chemical analysis or experimental data. The case is somewhat analagous to that of plant feeding. The chemist may say with perfectly truth that a given soil does not want manure because it already has phosphoric acid, potash and nitrogen enough to last anything from 50 to 500 years or more, yet the fruitgrower comes along with a few pounds of bonedust and increases his crop. It is not necessary to refer to the question of availability, etc., we know much more about plant food than human food, and it is probable that the complexities of the working of the ever present "microbe" are greater. The point is that the chemist may equally say that bonedust and fruit juices are not necessary, but that the fruitgrower is one case and mankind in the other prove that they are. A want inborn (witness the child's appetite for fruit) and marked has some more deeply rooted source than the pleasures of taste.

Man is an adaptable animal and from the dawn of creation he has broadly speaking, lived on what he could get rather than on what he might like. The Esquimo, for instance, cannot get pineapples and peaches but he does very well on blubber. The Fijian cannot get sirloins of beef or saddles of mutton, so he fills up with bananas. Climate is the deciding factor, and the Australian climate simply howls for large supplies of fruit. To some extent this is modified by the fact that, broadly speaking, we are of northern origin, the race comes from a cooler climate and the call for fruit is tempered by ancestral instincts which do not require so much fruit, but the further we, as a race, go, from the starting point and the longer we are influenced by climatic environment, the more the natural call will be heard and the less potent will the meat-eating inherited instinct be felt. Stated geographically, the aboriginal peoples on the equator eat all fruit, those at the poles no fruit, and those between, a half and half diet.

— The Real Question. —

Two resolutions were passed in connection with the subject—"That the Government be requested to demonstrate the value of fruit as a food," and also that "This conference collect and publish a bulletin containing every known recipe and use of fruits." Both are quite admirable as far as they go but they really don't do more than touch the fringe of the matter. Incidentally the second point if acted on in the letter rather than the spirit, raises appalling visions. Perhaps it is intended to provide a special building to house the book which, in one sense of the word, will certainly be a magnum opus, and provide special trains at excursion fares to enable visitors to come and see it for it would be obviously impossible to send it to them. However, we can safely pass that point.

— Interesting Evidence. —

The evidence of Dr. Benjafield of the extreme difficulty any resident at Glenorchy finds in dying at that favoured spot, four only having accomplished it in the last three years out of 1,000 chances and the expedients which residents in a neighbouring district resort to in attaining the same end, also Mr. Fisher's contribution towards the theory of the coincidence of fruitgrowing and nongenarianism were interesting if not wholly convincing. Carrying the same principal a bit further one would expect inhabitants of some of the South Sea islands to live for ever and the bushman of the outback districts of the Commonwealth to succumb at a distressingly early age. Similarly the peasants of South Europe, where the grape, the fig, the date, the olive and the onion make up a large portion of the diet should be stronger and longer lived than their northern competitors, but according to statistics the reverse is the case and the Swede and Norwegian fish, flesh and cereal eaters, outgrow, out-work, and out-live the southerners.

—Preference not the only Factor.—

Most people like champagne, motor cars and fish, but they do not habitually indulge in them for the simple reason that they cannot afford them. They make the best of plain water with something to take the taste off, ride in tram cars and moderate their desire for fish. It is precisely the same with fruit. Put a dish of 1d. a lb. grapes, apples, tomatoes, apricots, cherries, or strawberries before each of one hundred people and 90 per cent. of them will, like Oliver Twist, ask for more. Put the same fruit before them at 1/- a lb. they will tell you that they like it but will leave the buying to the millionaires of the community. They will admit its palatability and hygienic value but as to the former they will do without at the price and for the latter wait till it comes along and buy a bottle of corn cure or painkiller or see a doctor as being cheaper in the long run. The average Australian does not really want to be told of the value of fruit he knows it already. He does not particularly want to know how to eat it, any small boy will be happy to give a practical lesson, but what he does want to know is how to pay for it as a regular and extended item of daily use. Dr. Benjafield hits the nail right on the head when he spoke of the middleman's charges. They are simply an outrageous tax on the grower and on the public. It is not that the middlemen are unfair or make great profits, but the system is wrong. Except with apricots, grapes, cherries, and tomatoes at certain limited periods of the year, there is probably no popular fruit in which the retail buyer can purchase an equivalent in tissue building and energy producing material as in meat and cereals at the same cost. At high prices fruit must depend on its palatability to secure sale, at medium prices it can stand on its palatability plus its food value, and at low prices it can stand solidly on its food value alone. Put in another way, any average fruit or vegetable at 6d. a lb. is a very pleasant, very healthful, but very expensive source of nutriment as compared with meat; at 4d. they are probably equal to bread in food value with some advantages thrown in it, and at 2d. a lb. they are a reasonably cheap source, and at 1d. they are very cheap.

— The Remedy. —

If Dr. Benjafield is correct in his estimate of the proportions the fruitgrower and the fruit seller receive of the consumers' money, the further the grower can get in the direction of lessening the cost of distribution the further he gets to popularizing the practice of fruit eating. The position is that though the grower does not get more than he earns and sometimes perhaps not enough, the consumer has to pay too much. The grower has it in his own hands, he must grow more cheap fruit, he must be his own middleman on co-operative lines and he must create and foster demand by looking to it that the supply and distribution end is fixed up on the most economical lines and before all that the supply is constant as far as season and climate permit. We look to such methods as more likely to lead to the fruitgrowers and fruit-eaters millenium, when fruit at every table three times a day for 365 days in the year shall be the rule, than to get Government assistance or the most entertaining of cookery books, excellent as both these incidents of modern life undoubtedly are.

Small doses of aconite alternated with belladonna are recommended as a preventive of milk fever. Commence immediately after calving, ten drops of the latter tincture every four hours till four doses of each drug had been given.

Canning.

In America the canning of fruit for home and market use is very largely adopted. The dried product not having found as much favour as with us. A writer in a recent issue of "Wisconsin Horticulture," describes the theory and processes of the operation as follows:—

The principle underlying the preserving of canned goods is simple. It was early in 1800 that a Frenchman named Appert discovered that by thoroughly cooking a fruit or vegetable that had first been placed in a hermetically sealed vessel, it could be preserved for a long period of time. The idea was to exclude the oxygen, which he regarded as the cause of decay. His practice was correct though based upon an erroneous theory.

To the French scientist, Pasteur, is due the credit of discovering the cause of fermentation and decay, namely, the presence of bacteria and other micro-organisms.

The steps required to bring about the preservation of canned goods differ with each crop. In general fruits and vegetables with a high percentage of nitrogen, such as peas, are the most unstable and require the greatest care in canning. On the other hand acid fruits, such as tomatoes and rhubarb, are easy to handle, the presence of an acid assisting in preserving the vegetable.

There are no hidden secrets in canning, the problem is simply that of sterilization for the destruction of the bacteria by heating and the use of hermetically sealed vessels to maintain this condition. Generally speaking the contents at the centre of the can must be brought to a temperature of 185 degrees F. for a given period of time. The time required to do this varies according to the crop and size of the can. Corn, for example, is a poor conductor of heat, and it will often require a full hour to reach a temperature at the centre of the can that can be secured in fifteen minutes with tomatoes.

There are a number of farm canners offered on the market. The fundamental feature of all of them is the sterilizing chamber. Water boils in the open air at 212 degrees F. At a given altitude, no matter how long it is heated, it never goes above this temperature. However, if it is confined in a closed vessel, it soon reaches a much higher temperature. In other words, in order to secure the high temperature necessary for sterilization the chamber must be a closed retort.

Again if we add sugar or any other substance that increases the dentisty of the water, the temperature of an open vessel can be brought to 250 or more degrees. Every housewife knows that preserving is one of the simplest and most successful methods of canning fruit. Here she is able to secure a higher temperature by the means of a denser liquid.

The first step in the canning process proper is known as blanching. This consists in plunging the fruit or vegetable into boiling water for from one to three minutes, the object being to remove certain complex chemicals known as enzimes. These enzimes do not cause the fruit to decay, but they gradually digest or break down the fibrous tissue, leaving a musy mass; hence this sort of parboiling process to remove them.

The next step is the cooking or sterilizing—and the length of time and temperature required for this varies with each crop.

Following the cooking comes the cooling process. Unless immediately cooled many products will continue to cook for hours or even weeks after taking out of the chamber, somewhat on the principle of a fireless cooker. In one instance, for example, a large quantity of corn was stored in a room, and it was discovered some three months later that many of the cans toward the centre of the stack were still warm and it is needless to add that that bunch of corn was cooked to a finish. To avoid over-cooking, the tins are immediately cooled either by plunging or spraying with cold water.

The closing of the small steam hole in the centre of the top is called tipping, or dotting, and the soldering on the cover is known as capping. One becomes proficient with these operations only by practice. The working of capping has been greatly facilitated by the use of a solder rimmed cap. In this case a thin layer of solder is placed around the edge of the cap by the can manufacturer, hence it is only to heat this with a soldering iron in order to seal the can.

Glass jars, while in some respects ideal, are too costly and cumbersome for this work. Tin is much cheaper and more convenient. However, one should have a care about what is put into them. The acid of certain vegetables, such as rhubarb and tomatoes, will dissolve tin. When vegetables under these conditions are consumed, the tin is deposited in the human liver, so if you do not want a tin liver, give attention to this feature of any canned article. Acid vegetables should be placed in enamelled tins. These cans are coated on the inside with a hard enamel substance that is not affected by the acid of the fruit even at a high temperature. The enamel adds somewhat to the cost of the tin. Generally speaking only the best grades of canned goods are put up in enamelled tins —in the standard and second grade the consumer takes his chances.

The outfit we are using costs about 150 dollars and with some crops, like tomatoes, is capable of handling upwards of 1,000 cans per day. The results for the first season have been very satisfactory. I strongly believe that any truck grower who handles above an acre of a given crop can profitably invest in an outfit of this kind and build up a good trade of his own, selling only in case lots. It means putting before the consumer the finished product instead of the raw material and at a considerable increase in profit. To cite a not unusual example of its possibilities, I have a letter from a friend in Missouri who writes me that his asparagus crop has averaged at the rate of 552.00 dollars per acre for the last six years and for the year 1911, 780.00 per acre.

If a horse is short-ribbed, he is light in his middle, and is nearly always a poor feeder.

Topping the Vine.

The advisability of "topping" vines—like all operations that go under the name of summer pruning—depends on various factors.

The operation consists of cutting the shoots off flush with the top of the stake, but it is a mistake to do it indiscriminately. If all the shoots of a vine are bundled together and cut off with one stroke of a hook at the top of the stake, the tendency must be to disturb the balance of the root and leaf systems, and the very fact that immediately they are cut off a number of side shoots make their appearance is proof that a mistake has been made which the plant is endeavouring to rectify.

The side-shoots certainly provide thicker foliage round the grapes, and therefore more shelter, but they also bring a second crop of grapes, which often is fairly large and, therefore, detrimental to the main crop. I do not believe that topping causes the strength of the vine to go into the grapes; the strength of the vine, on the contrary, finds an outlet in the side-shoots, for nothing goes into the fruit that has not first been elaborated by the leaves.

The vine-growing districts of Australia are all fairly hot, and it is singular that in the districts of Southern Europe, where the climatic conditions are somewhat similar, vines are not topped; and in France the method is confined almost entirely to very cold districts.

Where topping is done in the north of Italy it is always done before blossoming, and the shoots are not all removed at once, but at different times with intervals of eight to ten days, making generally three operations.

Some growers in Australia "top" principally because the shoots interfere at a certain stage with work in the vineyard. In such cases, why not limit the topping to the shoots that have grown too long? At any rate, five joints should be left over the grapes if the shoot carries one bunch, and three joints if the shoot carries more than one.

I should say that in the case of old vines, or of vines not too vigorous, or in districts where long spells of dry weather occur during summer, "topping" may be done, provided it is not done drastically; in the case of very vigorous vines growing in a soil not lacking moisture during summer "topping" will hardly do any good, and may cause harm in the long run.—M. Blunno. — Agricultural Gazette, N.S.W.

Thinning Fruit.

It is unfortunate that the thinning of fruit goes absolutely against the grain of the average amateur. He has planted fruit trees to bear fruits, and he cannot, or will not, see the advantage of removing them before they are big enough to be of the slightest value. By laying a thoroughly good foundation at the start, the grower immensely benefits in the long run, for if a tree is not subjected to the exhaustive process of cropping in its earliest days, it will bear regularly season after season when it is established, whereas, if it is overburdened at the start, it will be stunted or thrown into that peculiar state which spells a crop in alternate years only.

Moving Orange Trees.

Though it is not good to move trees when they are growing freely. Nevertheless, if it be necessary they can be moved safely during any cool change, and preferably just as the change is coming on. Prepare the ground well where the tree is to go in a day or two beforehand; dig the hole, taking out one good spit, and digging the next deeply, mixing in some wood ashes and a few pounds of crushed bones or bonedust—half a gallon will not be too much for each tree. Then water and leave; also water the tree to be removed. When the work is to be done the ground will be in good working condition. Take up as much root as possible, cut off the big roots cleanly, keep all moist, and put into the new position, allowing for the after-sinking of the soil, so that the tree will finally stand with the swellings at the base of the stem; where the big roots begin are just above the general surface. Spread the roots well, cover with fine, moist, mellow soil; keep the roots in their proper place; firm the soil round them gently, and water well. Thin out the top, corresponding with the loss of the roots, more particularly taking off the tender growths. When a tree is removed its first effort is to restore and develop its root system before it makes growth above ground. To this end of leaves are necessary for the elaboration of sap, but the tender growths are of little use for this purpose and require nourishing to grow. They are, therefore, a source of weakness, and except under exceptional circumstances are better nipped off. Cover the tree if possible with hessian, and it will hardly droop at all, and will soon start growing again.

Young Trees.

The first two summers are usually the most trying period for a young tree, and it is during this time that strict attention must be given to them. After the second summer is over they will require very little attention, except the ordinary cultivation. The young tree having been carefully planted and staked during the winter months will begin to make its growth as the warm weather approaches. When watering the tree use a hoe or fork, and give the soil a good stirring, this will allow the water to soak well down into the ground, and the young roots of the tree will follow it down. Do not allow a hard crust to form round the tree,—which is usually caused by the sun baking the damp soil,—by giving the surface soil a little stirring with a hoe, this will be prevented. The use of grass or litter as a mulch is to be recommended for when it is provided for the trees, the number of waterings each summer may be reduced. Remember that one thorough watering is more beneficial than two or ten sparing ones.

The Farm

Securing the Best Cows.

The dairy cow has been described as a machine, the object of which is to convert the forage raised on the farm into money by means of milk, butter, and cheese. But while the owner of a piece of machinery knows exactly of what that particular machinery is capable, few farmers can say the same of their animals. They may form estimates more or less accurate, but they seldom reduce it to a test. Men have been known to refuse the means of enlightening themselves as to which of their cows yield profit and which scarcely pay for their feed, preferring to linger in the groove in which their forbears travelled, but they adopt an attitude which is at the same time unreasonable and unprofitable. To attain the greatest success, we must be abreast of the times, and when a man has placed within his power means of ascertaining the exact value of each of his cows it is surely to his own advantage to put those means into practice.

— The Best Cow. —

The best dairy cows are those that will return in milk the greatest value for the food consumed. It is easy for the farmer to ascertain how much butter-fat a cow produces in a year for a given amount of feed by weighing her milk at every milking, or at frequent intervals, and testing it with the Babcock test. It can be done with little labour providing proper arrangements are made. The names or numbers of the cows, together with the days of the month, should be placed on a ruled sheet, and with a pencil and a spring-balance handy in the milking shed, the amount of milk given by each cow at every milking can be recorded in a few seconds. It would be best to total the figures at the end of each month, and at the year's end the farmer would have a complete record of the exact amount of milk each cow has produced. Compared with the knowledge it gives, the trouble is infinitesimal.

— Testing. —

Testing, of course, is another matter. It should be done about the middle of each month. A day's milk, both morning and evening, should be tested, and if this is taken for the average each month, it will approximate at the end of the year very closely to the actual amount of butter-fat produced by a cow. Every farmer can tell pretty nearly the value of the food his cows consume, and when this is compared with the value of the butter-fat furnished to the creamery by each cow, it is easy to discover which cows return a profit and which are not worth keeping.

The value of this system is so obvious that it ought not to require any argument to convince the farmer of its necessity, but it does. One man who was urged to adopt the Babcock test replied, "I'm afraid I should find too many poor cows in my herd." It would be difficult to conceive a more ridiculous answer, and it would seem that argument is futile with such a man, but other men with similar ideas have been converted to saner views. Many have confessed that, prior to using the test they were grievously mistaken in their estimates of the capacity of individual cows.

— Selection. —

The selection of a good dairy cow requires much discrimination, and even an expert cannot always select one with unerring certainty. and even an expert cannot always his own discernment, of course, but he should always aim to secure a cow from a dairy breed. Occasionally an animal of excellent quality might be found among some of the beef breeds, but it is safer to hunt among the dairy breeds. The cow's head is the first thing to examine, and every indication of a strong brain and strong nervous force, because milk-production is the result of nervous force, which starts from the brain and runs along the spinal cord. The mouth should be large, and the jaws strong and muscular. There should be a great depth of body, a broad chest, large girth round the heart, and plenty of lung capacity. A broad, strong loin, with hips wide apart, and backbone rising high between them, are recommendations in so far as the organs of maternity are concerned. The thighs should be thin, and incurved on the back side, with plenty of room between, and the flank arched up high just in front to give room for a fine udder. The udder should extend well forward and well back, and have four good-sized teats set well apart. Large, full milk veins to carry the blood from the udder to the heart through large "milk wells," or openings through the walls of the chest, are signs of a large flow of milk.

Some farmers base their judgment entirely on the size of the udder, and providing it is large they are satisfied. In many cases, however, they have been deceived. A cow may have a good udder, but it must also have a good dairy form—that is to say, her "machinery" must be capable of filling her udder for a sufficient time to make her profitable. The buyer should carefully examine the udder, to see that it has no paralysed quarters, and gives milk easily and freely from each teat. "Leaking" and "sucking" cows

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

should be avoided. It is not easy to observe these faults. To detect leaking, particular attention is required, but a ringed nose or slit tongue frequently betrays the animal which suffers from the habit of sucking other cows, or, what is still worse, sucking itself.

To obtain the greatest profit out of his business the dairy farmer must be frequently selecting cows, and he will soon be convinced that, just as there is the best beef form, there is the best dairy form.

Feed Oats Freely to Farm Stock.

By Thomas Shaw in American Agriculturist.

The oat-crop has never been given that prominence in our agriculture which its importance demands. It is usually looked upon as a crop that can take care of itself under hard conditions, and is, therefore, generally sown on land low in fertility and less clean than ground assigned to crops of wheat, barley, and maize.

— The Best Frame-Food Grown. —

The fact cannot be questioned that the oat-crop is the safest food, and yet the oat-crop grown is so far short of the demands made upon it that it is usually looked upon as the dearest concentrate that is extensively fed. The relative price of oats as a food is away beyond what it ought to be, a result that comes from the fact that the area sown is not as large as it ought to be, and the attention given to increase the yields is less than it ought to be.

— Oats as Food for Horses. —

No grain-crop will compare with oats as a food for horses. In some localities more corn is fed to horses than oats, especially to horses hard at work, but they are so fed because of the cheapness of corn rather than because of any superiority which it possesses. Confine a horse to a ration all corn in its grain portion, and another to all oats, and the latter will keep in better shape and for a longer period than the former. When the runner or the trotter is to develop staying-form, he must have oats. When the pregnant mare is to be fed grain, oats will serve far better than corn in developing the foetus. When young foals are to be rushed forward, it is an oat-ration that is wanted.

— Oats as Food for Cattle. —

As a food for calves, oats are without a rival. The calf only a few weeks old may be allowed to eat whole oats ad lib until it is twelve weeks old, and along with even skim milk only it will grow nicely and never be off feed if the milk is fed properly.

Oats are the most important grain-factor in growing cattle for shows. Pound for pound, more oats are fed to them than of any other kind of grain. The bulk and concentration in them are so perfectly adjusted that better than any other grain do they help to keep the digestion in tone under forced feeding.

Oats are a splendid food for fattening cattle. The only reason why they are not used more for the purpose is that they are too dear to be fed in very large quantities, and yet, notwithstanding their relative dearness, many feeders think it pays to feed them in considerable quantities along with corn. In leading animals up to full feed they are a necessity.

— As a Food for Milch Cows. —

they are superb. Here also were it not for their dearness they would be used to a much greater extent in feeding milch cows than at present. They are a good food for the pregnant cow. Pound for pound, they are as good as bran for milk production, and some persons, indeed, consider them better. Even in the form of hay, when cut at the proper stage, they are a satisfactory food.

— As a Food for Sheep. —

As a food for sheep they are superlatively good, whether fed to the pregnant ewe or the ewe in milk. They are the mainstay in growing lambs for any use. Sheep can be fattened in good form on oats alone, but some corn aids in cheapening the ration. They are the best grain-food that can be given to stock-rams, and oat-hay cut somewhat earlier than is suitable for cows makes good food for sheep.

— As a Food for Swine. —

For young swine oats are a good food, providing the hulls are sifted out. Otherwise, the hulls are too coarse to suit their digestion. They make a splendid food for brood sows when pregnant, given and made into sop alone, or along with bran. For sows in milk the same mixture is fine, and is further improved by adding ground corn. The two former are fine for milk-production. The latter a ds in maintaining flesh. For swine during the growing period ground oats are also good, alone, or with other grain; but corn is better than oats for swine that are being fattened.

— As Food for Poultry. —

Oats make a good grain-food for poultry, also, but they should not be confined to a grain-ration of oats only. Wheat is rather better than oats for egg-production, and corn is better for fattening, and yet for both uses oats along with the respective grains would be an improvement. The live stock of the country and their needs call loudly for an increase in the oats crop.—American Agriculturist.

Crib Biting.

A writer in Rural New Yorker gives this as a remedy for preventing horses gnawing their mangers and halter-ties:—"I have found that by painting the woodwork with coal-tar the worst wood-gnawing horses would never bite it afterward. The tar should be put on while hot. An old broom or whisk-brush may serve as a paint brush. I have also found a way to cure a horse of biting his halter-strap or rope, by boiling the rope in water, in which a bar of cheap washing soap has been dissolved. This remedy, tried on several horses which I have owned, never failed. One horse, when I first got him, would bite a heavy rope in two almost as soon as tied. A small soaped rope cured him completely. This was nearly ten years ago, and it has not been necessary to tie him with a chain since."

Milking Indications in the Male.

There are no physical characteristics in the bull that may be taken as infallible indications of his ability to produce females of milking merit. In the cow there are some things that seem to indicate merit, or lack of merit, as a milk-producer. A large, well-balanced udder, firmly attached and connecting with the blood system by well-developed milk veins, indicates, providing there is a well-sprung barrel and ample digestive system going with it, that the cow will be of some value as a milker. Sometimes these signs are true indicators of milking merit, sometimes they are misleading. But with the bull there is little outward indication, even passably reliable, to show what his value is likely to be as a sure of milk-producers. Constitution he should have, but constitutional vigour and high milking performance do not always go together. Records of his female ancestry is the surest way to a possible accurate determination of his possibilities as a sire of milk-producers. But this, except in a small number of cases, is not obtainable.

One of the first authorities on dairy cattle breeding known to us selects his bulls on basis of the development of their rudimentary milking organs. He pays attention to the records of their ancestry, of course, of the cows on each side as far back as can be traced, but he takes the placing and development of the rudimentary teats as a fairly constant guide to the animal's ability to sire milkers. If these teats are small and clustered closely together, the bull would not be used in the herd, unless he came from a line of milking stock that was fairly uniform in individual merit. If the teats are well placed, large, and with some show of udder to back them up, the bull is taken as an almost sure getter of a desirable kind of milking stock. And invariably, it is said, his offspring size up to the standard of production indicated by this characteristic of their sire. The sign is not infallible—no signs of milking ability we ever heard of were—but there is a great deal of sound reason in the sign of the rudimentary udder to back up the indication. The matter, anyway, is worth considering when one is purchasing a dairy sire, especially if the purchase is being made with nothing to guide the buyer but the appearance of the bull before him and the word of the man doing the selling.—The New Zealand Farmer Stock and Station Journal.

Those who have the care of horses should accustom them to eat a variety of food which is not always included in the usual billl of fare; such, for nstance, as a bran mash in which a drop of linseed oil has been put, sweetened gruel made with oatmeal or flour, and of course, linseed tea or gruel. It is rare that a horse refuses to eat good linseed cake, and there are times of sickness and ill-health when a little may be given with good results. A horse which will eat and drink such food is much easier to nurse than one which does not care for change of diet that is calculated to do him good, and therefore has to be continually drenched, a process which no horse likes.

Essentials in Dairying.

The first thing, of course, is to have the right sort of cows to produce the milk; the second is to have the right sort of appliances for dealing with the milk when obtained. Most farmers already have their stock of dairy cows, but for those who are about to start in the business, " says "Mark Lane Express," and the younger generation generally, it may not be out of place to here describe the sort of cow to look for when one goes to market. In general appearance a cow should be gay, her eye should be full and bright, eye-socket prominent, head a fair length and free from coarseness, the face should be dished, the nostrils large, and the muzzle preferably white, though this point is of little importance, as cattle with black noses, indicating Welsh or Channel Island crosses, are often excellent milkers. The horns should not be too strong; neck having the appearance of length; withers and shoulders fine; brisket well let down; back rather hollow; ribs well sprung; with as little slackness as possible behind the shoulders; the haunches wide, as also the pelvic bones. The sk n should be soft and slack, and the animal should be as fleshy as possible, but not loaded with fat about the region of the root of the tail, which latter should be thin and long.

— Colour. —

Colour does not matter, but perhaps a roan is the likeliest of any. The udder should not be pendulous, but should extend well under the belly and back between the hind legs. The teats should be as far apart as possible, and should all point in the same direction — rather forward, in the direction of the front feet. The most important indication of a good milker, and an infallible one, is the size of the "milk veins." These are the large blood-vessels leading from the udder along the belly, and if these are not large and well developed the cow is not a milker, no matter how large the udder may be; and, on the other hand, no cow with well-developed veins was ever a bad milker. The calf should be with the cow, as when dealing with a reliable vendor its age may be taken as an indication of the length of time she has been calved; but as a cow will often, in the absence of her own offspring, suckle any that may be given to her, unscrupulous traders do not hesitate to sell as fresh calved a stale milked cow, having with her a young calf. Hence it is as well to know with whom one is dealing. Sometimes cows can be purchased to good advantage before they have calved, but in this case their dairy qualifications have to be taken very much on trust, and frequently when they calve their too-confiding purchaser discovers that his new acquisition is minus the use of one or more of her quarters.

Having got our cows, we will proceed to deal with the question of milk. In case of a person starting a dairy, only enough cows should be purchased to produce about the quantity of butter or milk desired, others being added to the stock as the first purchases get stale and fall off in their milk.

— Milking. —

The operation of milking should be conducted in as cleanly a manner as possible, and though washing the hands before milking is always strongly insisted upon, and is, of course, very proper, as a matter of fact the hands should not be allowed to touch the milk at all. The teats of the cow should be seen to be clean before the pail is placed underneath, and milking with a "dry hand" should be insisted upon. In the case of a cow very "hard" at starting, and inclined to be tender, a draw of milk may be taken into the palm of the hand and teats rubbed with this until a start can be made, the pail not being placed underneath until all possibility of any drip from the fingers falling into it has been removed by the absorption of the surplus milk.

— Cleanliness. —

Foddering of the cows with hay should be postponed until after milking, to avoid the dust created by this operation finding its way into the pail. The milk while still warm, after having been sieved, should be passed through a separator, which takes out the cream, and at the same time removes all suspended impurities from it, thus having a most important bearing on the quality of the butter to be subsequently made. As regards a cream separator, choose one that is simple and easy to clean, and have one of ample capacity, as if too small the process of separating becomes extremely tedious and wastes a great deal of time. A most important point is to have the machine mounted on a rigid bed, and if possible on the ground rather than on a wooden floor, as if there is any vibration or movement the work of separating becomes very much heavier and the wear and tear on the machine proportionately increased. Always use the best lubricating oil for a separator, as the gearing is very high, and any friction of the working parts materially increases the labour of working and wear of the machine.—Exchange.

Preparing for Bush Fires.

On the average farm the burning of grass strips between ploughed furrows as preventive fire guards around the boundaries is so indispensable a requirement that in no case should its carrying out be neglected. The mixed system of farming is steadily extending, and if it was universal the general danger would be greatly minimised; but that time is not yet, and hence the necessity for a general adoption of precautionary measures. The greatest danger of bush fires springs as a rule from the large farms worked on the single crop system. In the hottest, driest part of the year these areas, as the natural result of this mode of working, are like tinder. The wheat paddocks carry a bedraggled mass of stripped straw, the headlands wave knee deep in ripe dry grass and weeds. The weeds and grass on the rest of the area, having become rank and dry, are as inflammable as benzine, and a fire once started swiftly spreads, unless a check has been provided in the shape of burnt grass strips between ploughed furrows. A mixed farm is not to the same extent exposed to this risk. In the first place, at the season when thousands of areas of stripped wheat straw are being put to the match, and when risk of fire is greatest, there is a smaller proportion of dry material on a good mixed farm. The wheat stubbles are buried in the fallow ploughing. Instead of it being necessary to save the natural grass to sustain the stock in summer, the worker on the mixed farming principle can, on the approach of the hot season, feed down the growths that would otherwise become dry and inflammable, because in his rotation of crops he has sufficient succulent green stuff coming along for the stock. By working his sheep on the stubbles he is able to clear the long grass and weeds from the headlands, and also have everything eaten close down around the house and farm buildings. In every case, however, the safest kind of fire break, and the cheapest, is made by ploughing around the area two parallel strips about a chain wide and setting fire to the grass between. Some plough one side strip and do not clear the grass, which certainly saves grass, but to be on the safe side it is better to sacrifice the strip of grass and have a cleanly burnt out strip of at least a chain wide.

— In case of Fire. —

Assuming, however, that even these precautions are taken with regard to providing fire breaks as a basis from which to fight fire with fire when crops and grass are threatened, it has to be remembered that the produce of the harvest is by means out of danger although in the stack yard. In many cases the risk of stack burning is as great as when the crop was in the field. In this connection there remains a method of establishing a fire break base from which to oppose a rapidly approaching conflagration that can be adopted even as late, as after an alarm has been given. It was contained in a letter sent to the Leader by a practical correspondent, who vouched for the fact that the adoption of this means has already on one occasion saved him from absolute ruin. In cases where protective breaks have not been previously ploughed, he writes, and in the event of a fire breaking out suddenly and threatening a crop or stack yard, it is imperative that the danger be immediately counteracted by starting another fire out from the point to be protected, in order to run and meet the one approaching. In such a case there is danger in the tendency of the protecting fire strip to run back upon the property sought to be saved. The means of avoiding this is to attach about 8 feet of fencing wire to a barn door or large sheet of galvanised iron, and pull it by the wire attachment as a drag round the stack yard or crop, while a second hand follows applying fire along its edge. Say it is a stack yard that is to be protected, then the grass is lighted along the edge of the drag furthest from the point to be protected, by one man told off to light the grass following the drag as it is steadily drawn along, while another follows in the wake to beat out any sparks that may threaten to light the grass in towards the stacks, leaving, of course, the other side to burn outwards to meet the approaching danger. This expedient has proved effective, not only in our correspondent's own case, but also in others that he is informed of, so that by its means much loss has been prevented, even in the face of a raging fire bearing down in full blast upon the crops and homesteads. For beating out the fire, instead of using branches or wet sacks, the best kinds of fire-beaters are made by fixing a piece of bullock hide about a foot square in the slit end of a wooden handle, and using it on the fire as a gardener pats the earth on one of his seed beds with a spade, and it is well to have a supply of this class of beaters prepared beforehand and kept in readiness.—Leader.

The Advantages of Dishorning Cattle.

The advantages of dishorning, or, more properly, of preventing the growth of horns, are so appreciable that it is surprising that the practice is not more extensively adopted, says "The London Field." From a comparatively early age till the time they reach the shambles, horned cattle are a source of annoyance and risk to the interests of their owners. Even on the pastures animals are frequently injured from being attacked by some infuriated or mischievous companion; but it is when they are confined in the sheds, or in the course of a journey by road or rail, that the horn nuisance is most visibly revealed. When animals are tied up in stalls the presence or absence of horns may be of insignificant account, but under all other circumstances horns are undesirable in the highest degree. The preference which graziers show for hornless cattle is the strongest and most convincing evidence of this fact that the breeder could obtain, and it is an extraordinary fact that he manifests so little regard for the wishes of his customers, and, indirectly, for his own pocket. Hornless cattle, it has been noticed, are, as a rule, more docile and contented than horned stock, which seem to harbour the impression that, having been provided with weapons of warfare, it is their duty as well as their privilege to make use of them against their fellow-creatures.

— Grazing with other Stock. —

This remark does not apply to the same extent to breeding stock, but holds good, as most graziers will affirm, in the case of two or three-year-old bullocks, which are notariously pugnacious at every available opportunity. There is no doubt that the preference for hornless stock has aided materially in popularising the black or blue grade cattle of the north with graziers in all parts of the country. The Aberdeen-Angus and Galloway breeds and their crosses possess strong claims to high favour irrespective of their advantages in this respect, but many instances could be cited in which they would probably not have been purchased in preference to other types had it not been for their inability to injure horses or other stock with which they are pastured. Owners of thoroughbred studs invariably select hornless cattle in preference to horned to occupy the pastures in which their colts and fillies graze; and thus breeders of Shorthorn and other horned types lose a good class of customer through their failure to dishorn their store calves in the simple manner indicated. In almost every batch of cattle there are one or two representatives, usually the smaller, selected as the objects upon which the rough and evil inclinations of their companions may be expended, and these as a rule require a longer time to grow and mature sufficiently for the fat market. The reason for this is that, apart from being the objects of abuse and ill-treatment, they are prevented by tyrannical masters from obtaining their proper share of the food rations, and are indeed literally starved. Their removal to another yard or shed would, of course, effect a remedy as far as they are concerned, but in all probability the bullies of the lot would select some others upon which to vent their evil inclinations. The dishorning process is more commonly adopted than was the case ten years ago, but it is still far from being as general as it ought to be, and it is unfortunate that it should be so difficult to convince breeders of the extent to which the value of their neglect to apply the simple remedy which is ever ready at hand.

Healthy Stables.

Air is the first necessary of life; we may, without suffering more than temporary inconvenience, abstain from food for a time, but we cannot, even for many seconds, exist without breathing atmosphere around us. This is one of the self-evident truths which appears to be sometimes overlooked in connection with horses and the stabling erected for them. It is unfortunate that it should be so, because, of all domestic animals, the horse by reason of his great lung capacity, is the one that requires the most copious supply of air, and is the one that suffers in the greatest degree from lack of fresh air. An ill-ventilated stable is an unhealthy stable; the horses kept in a building in which the air is vitiated and foul with the exhalations arising from the excreta, and from the animals themselves, are infinitely more liable to contract disease than horses which enjoy plenty of air and sunlight.

The virtues of fresh air have long been well understood in hot countries, where it is even more necessary to man and horse than in temperate climates. The Arabs, who are particularly good horse-masters, keep their animals as much as possible in the open air; and both native and European owners in India prefer, during the dry seasons, to picket their horses with head and heel ropes in the open under the shade of some spreading tree.

Curry Comb.

One of the most misused articles about a stable is a curry comb, particularly the old fashioned kind with sharp teeth. The curry comb, when used on a horse at all, should be employed with judgment, otherwise it does more harm than good. As a method for ruffling the temper of a horse there is hardly anything more effective than a curry comb roughly used. It is bad enough at this time of year, when the coats are short, and there is only dust to deal with; but in winter, when the mud, after a hard day's work, has caked on various parts of the animal's frame, and the curry comb is used to scrape it off, and incidentally to tear a considerable quantity of hair out by the roots, the tool becomes an instrument of torture. "In grooming horses," writes the Farmers' Advocate, "main reliance should be placed upon the brush, and is sometimes serviceable for direct application, though it ought to be rubbed in the direction the hair lies. Some men will ruffle the whole coat with the comb, in order to loosen the direct, and remove traces of scurf among the hair. The hard teeth of the comb injure the skin, and thus produce more scurf than they remove. The secret of keeping a horse's coat in good condition is to use the comb but seldom, and the brush moderately, taking pains not to rub the hair the wrong way. A little regular brushing is better for the coat than a great deal of reckless currying, and very much better for the horse's disposition."—Australasian.

Who is the best adviser on farm practice? A successful farmer in your own district. That is—he can if he wants to.

Red Polls for Dairying.

By Dr. S. S. Cameron, Director of Agriculture, Victoria.

As milkers, the Red Poll herd established by the Department of Agriculture four years ago is maintaining the early promise of becoming a factor in the improvement of the dairy herds of the State. It will be recalled that in 1911-12, with an average milking period of thirty-seven and a half weeks was 5,750 lbs., and in 1911-12, with an average milking period of forty weeks, 6,353 lbs. For the year just closed, 1912-13, the records are still very good, although the average (5,128 lbs.) is somewhat lower, on account of the inclusion in the herd of a number of heifers milking for the first time, and also because of the untoward conditions under which the herd was milked for the greater part of the year, the summer drought at Boisale and the dry, scant pastures at Rutherglen being markedly detrimental to record raising. A feature of the held, however, which is even more satisfactory than the comparatively high milk yield under the adverse conditions, is that the butter fat tests have been as uniformly high this season as during previous seasons.

— High Testing. —

In 1911-12, the average test ranged from 4.31 to 5.95, the three highest cows going 5.1 to 8.2 (Vuelta), 4.4 to 8.4 (Cuba), and 4.5 to 7.0 (Muria). Three other cows regularly tested over 6 per cent. towards the close of their milking period, viz.: Connecticut, 4.6 to 6.4; Beulah, 4.9 to 6.4; and Bullion, 4.8 to 6.2. This season (1912-13) the high-testing capacity of the herd has again been demonstrated, and two heifers, India and Birdseye, have run the best of the older cows very close for the record of the herd. India's test has ranged from 4.1 to 6.2, and Birdseye's from 3.9 to 8.0, the latter on three successive evening milkings giving the extraordinary tests of 9.4, 9.5, 9.7. All the tests referred to above, are composite tests of the morning's and evening's milk taken under Government standard conditions. Some of the heifers, too, appear likely to carry on the fame of their dams as regards milk yield, Goldleaf, a daughter of Bullion (7,733 lbs. record), having yielded 6,437 lbs. during the Standard Test period of nine months, with a butter fat test ranging from 4.1 to 5.3. She calved at two years and two months old, and is due to calve again at three years and one month. Her yield of butter fat, viz., 308.5 lbs., is so far the best of all the heifers that have completed the nine months' milking under Standard Test conditions. ...

— Sale of Bull Calves. —

Satisfaction appears to have been given by system that has been adopted for fixing the price of the bull calves, viz., the value of the annual butter fat yield of the dam at 1/- per lb. Thus Bullion yielded 357 lbs. of butter fat, and her calf was sold at £17 17/-; Havana yielded 230 lbs. of butter fat, and her calf was sold for £11 11/. Bull calves ex cows on their first milking, and in respect of which there is therefore no record available other than that of the grand dam, are sold for a uniform price of five guineas; and this last season the purchasers under these conditions of the Goldleaf and Birdseye calves can be considered fortunate. 'Three guineas additional if the calves are kept till over twelve months old; but this has occurred in only one case, each season's drop having been disposed of as calves. Details of the different bull calves available are advertised in the Journal as the drop proceeds, and those which are bespoken are reared for delivery at six months. If a calf does not rear well, a second choice is allowed, but so far no purchaser has had occasion to take advantage of this.

— Hornlessness. —

Reports from breeders who purchased the earlier calves show that upwards of 90 per cent. of the calves got by the Red Poll bulls, ex crossbred cows, or cows of other breeds, are hornless, and 75 per cent. are whole red in colour.

The characteristic feature of the breed, viz., hornlessness, is destined, in the opinion of the writer, to play an important part in the economics of dairying in Australia. With the gradual increase in the expensiveness of hired labour, the cost of stall feeding dairy cows is becoming almost prohibitive, and yet hand feeding or artificial feeding in some form must be carried on if the butter yield is to be maintained or increased. For this country must adopt the practice of growing and conserving fodder in the spring for feeding in the autumn and winter if it is to continue to compete successfully in the butter export trade. The period of lactation of cows must be lengthened to increase profits to a degree commensurate with high land values and costly labour; winter dairying must be be carried on to avoid the present baneful break in our supplies to the London market; and neither of these things can be done if dependence is placed on pasture alone and without hand feeding.

— Its Advantages in Hand Feeding. —

With horned cattle, for hand feeding to be successful, they must be stalled and fed separately. If dehorned, or hornless, they may be fed with half or less labour from troughs or racks in open sheds or yards, or paddocks. When deprived of their horns, cattle cease the disastrous butting and ripping of one another which is so common a sight in cow yards, and the damage done by the bully of the herd, if such exists, is negligible. On one of the large dairy farms along the Murray in South Australia a dehorned herd of 100 milking cows is kept continuously on a paddock of 30 acres, being fed with green lucerne and lucerne hay deposited from a waggon over the fence into long lengths of troughs, out of which the fodder is eaten by the cows comfortably ranged up side by side.

Lest some dairymen, who sight the advantage of conserving labour in hand feeding in the way suggested above, may be led into trouble, it is necessary to mention that dehorning has been decided by the Courts of this State to be illegal. Consequently, if hornless cattle are wanted, it is necessary to breed them hornless, and it was with a view of giving a lead in this matter that the Department undertook the experiment of establishing a herd of polled milkers. The breed has been developed as a milking herd in England for many years, Lord Rothschild's herd at Tring Park being notable as deep milkers. But in Australia they have hitherto been mainly known as a beef herd, reputed for their quick conditioning, and it was with some misgiving that the experiment was undertaken. So far the indications are that the milking function is inherent in the breed, and the records published during the last two years, as well as those set out in the tables following, appear to show that the cross may be introduced into ordinary dairy stock without any risk of a diminished milk yield. At any rate, results so far afford ample justification for the departure made by the Department and for its continuance.

— Yields and Returns for Best and Worst Cows and Average for Herd. —

Cow.	Days in Milk	Milk. Weeks in	Milk in lbs.	Tests.	Butter Fat. lbs.	Commercial Butter. lbs.	Values. £	s.	d.
			Season 1910-11.						
Vuelta	270	38½	556	7.0—7.8	405.14	461¾	17	10	10
Pennsylvania	270	37½	461	4.8—4.4	189.75	216¼	8	4	3¼
Average for 12	261	37½	575.0	4.4	255.77	291½	11	1	9
			Season 1911-11.						
Vuelta	289	28¼	775	5.2—8.2	485.1	553	26	5	9
Havana	262	37½	535	3.8—4.5	215.3	245½	11	15	4
Average for 13	283	40½	635.5	4.7	384.6	346¼	16	4	7
			Season 1912-13.						
Muria	256	36½	578	4.5—7.3	314.96	359	15	15	0
La Suelta	241	34½	266	4.3—8.2	134.21	153	6	14	3
Average for 23	262	37¼	521.8	4.5	236.49	269	11	16	0

Food.

Very many owners (says an English exchange) object to maize or Indian corn, as they contend that it fattens horses without strengthening them in proportion to the amount consumed when compared with oats or peas or beans. That there is foundation for this belief is correct enough, and, as the price of maize is now much higher than it was formerly, there is less attraction about it; but it provides a welcome change for the horses, and if supplied judiciously can do no harm; in fact, if it assists in putting flesh upon a lean horse, its adoption as a food is to be welcomed. Wheat is a form of grain that cannot be recommended as a food for horses, and serious consequences have attended its consumption in considerable quantities; whilst barley often upsets the bowls and causes the skin to break out, in addition to which it is not easily digested. In all cases of a change of food, however, it is most essential that it should be gradually effected, as otherwise abdominal troubles may follow. Bran, if given dry, is a useful addition to the mixture of grain and crop, as the horses usually like it, and is innocuous. Of course, if given wet, or in the form of a mash, bran tends to loosen the bowls, and, therefore, it cannot be regarded in the light of a regular food, unless it is given in a dry condition.

Don't be "consistent," but be simply true.—Holmes.

Weeds.

Some people, in their eagerness to get cheap seed, would buy sweepings and refuse from seed cleaning machines if they could, nor would we greatly blame th vendor, says an exchange. All seedmen keep good seed for those who will pay a fair price, but buyers demand cheapness—save the mark—and if they get it, likewise sufficient nastiness to occupy them a very long time in securing its elimination, it is certainly not more than they deserve.

All this would not matter so much if it were possible for the sower to keep the results of his errors on his own ground. Can he do so? No. He rapidly infests his neighbours' properties. The seeds of his folly are born on the wind, by stock, and by water, far and wide, infesting many miles of country, working who shall say what injury to his fellows.

The risk of stock poisoning by sorghum owing to the presence of prussic acid, depends to a large extent on the growth of the plant. It is a somewhat curious fact that prussic acid is present in larger quantities in plants which have from any cause become stunted whereas in a quickly grown crop on rich land very little will be present, and second growths are said to be more dangerous than the first cutting. Nitrogenous manures appear to induce the formation of the toxic element in the plant.

Ostrich Farming in South Africa.

— Origin of Ostrich Farming. —

Ostrich farming was begun by the catching of wilds birds some time between the years 1857-60. As far as I can gather the two men who are entitled to be called the fathers of the ostrich industry are Messrs. Van de Westhuyzen and Gert Olivier. They caught many wild birds which were then running on the flats, domesticated them, and bred from them. The feathers of these wild birds and their progeny were in great demand, and from £20 to £30 was paid for the full plumage of a single bird. I well remember on the market here an uncle of mine getting £20 apiece for the plumes of twenty-two birds. Nowadays, for far finer feathers, £6 is a fair average price. Some twenty-five years ago (1886-88) there was a bad slump in the price of feathers, which then realized only from £2 to £3 per plucking. At that time there seemed to be no demand for feathers.

The credit of first introducing lucerne to Oudtthoorn is due to a former magistrate, Mr. Scholtz. He sowed a small patch in drills in his garden. A little later my uncle, Richard Gavin, arrived from Ireland. He noticed this leguminous plant and thought it very like the clover of his old home. Accordingly he sat down and wrote to Phillip Bros., seed merchants, at Capetown, and asked them to procure some seed for him. This he sowed broadcast on a piece of land which is now a part of High Street and there it grew luxuriantly. Then another of my uncles, James Gavin, bought a similar bit of ground which is now a portion of Queen Street. Here he likewise planted lucerne.

One of the first farms on which lucerne was planted on a large scale was Welbedacht ("well thought of"), which was owned by the Gavin Bros. I believe I am correct in saying that they were the first farmers in South Africa to realize that lucerne fodder could be used not only to feed ostriches, but also for all kinds of live stock as well. Before their experiments it was practically unknown in this country. Since then every year more and more land has been laid down to lucerne, until you now see the large area under this crop in this district alone. You will not be surprised to learn that we consider it a truly wonderful plant. We can keep six birds to the morgen (a morgen is approximately 2 acres) on irrigated lucerne land, and we can safely reckon on an average price of £8 to £9 for the plumage of good birds. The annual value of the output of feathers from Oudtshoorn is now close on a million sterling.

— What Capital is Required for Ostrich Farming? —

Around Oudtshoorn a great deal is required when compared to other branches of farming in other parts of South Africa. This is mainly due to the very high price which must now be paid for land under water and lucerne in this district. Some of my neighbours are now buying more land for their ostriches at £300 per morgen. You may be interested to know that the whole of the arable land of the Oudtshoorn District, i.e., land under the plough and the furrow, is rated by our Divisional Council at an average price of £150 per morgen. In the face of these facts I would say that the prospective ostrich farmer should have £5,000 to start with in this district. Nevertheless, the majority of our well-to-do farmers began their careers with little or no capital.

Let us suppose that a thrifty colonist buys ten morgen of lucerne land under water with certain grazing rights, and pays at the rate of £200 per morgen, £2,000. He must then buy three pairs of birds at, say, £150 per pair, or £450. Next, he proceeds to erect outhouses, incubating rooms, and rough sheds for the chicks—the cheaper the better, because ostriches should not be pampered. Then he must purchase a wagon and mules, a span of oxen, ploughs, cultivators, and other farm implements. The cost of all this equipment may be placed at £1,000. Wages and the cost of fencing must also be taken into account. A simple homestead may have to be erected: so that by the end of the first year he will have expended a fairly large sum of money.

With us the birds are mated in March and April. We allow the chicks to run with their parents until they are from two to three weeks old. Then we wean them and let them run on lucerne, giving them in addition crushed barley, bone meal, and limestone to aid their digestion. Many farmers run their birds on growing lucerne, but the best and most economical plan is to cut it and feed it in separate paddocks. There is less waste by this method and the plants are not injured by too close cropping. Young birds running on tender lucerne are liable to suffer from liver troubles. Old birds are seldom so affected.

The first feathers are pulled when the birds are from eight to nine months old. Some farmers clip their chicks when they are four months in order to form an even crop of feathers later on. The weight of a chicks feathers is usually from five to six ounces, and is valued at 45/- per lb. After six months we clip the wing feathers and the largest blacks, and pull the others. The first crop after the chick stage is worth from £6 to £10. Next, in from two to three months we pull the quills of these same birds, and six months later we have another plucking, and so on. That is to say, we have on an average three plumages in two years and two months. Ostriches often live twenty years and more. But after their fifth plumage they seem to deteriorate and the feathers become narrower, shorter, and lighter. A mature bird gives eight ounces of wings and about s xteen ounces of tails and blacks or drabs. I have known some birds to give twelve ounces of wing feathers. The record price for a pair of ostriches in this country is £1,000. The largest ostrich farmers in Africa are the Potgieter Bros. They own over 5,000 birds. Most of our feathers are sold locally, as we find that we get higher prices from the Oudtshoorn buyers than anywhere else in South Africa. These buyers ship direct to London, Paris, and New York.

— Why is Oudtshoorn Specially Adapted to Ostrich Farming? —

There are three main reasons. Firstly, the climate. The ostrich thrives best in a dry climate. Aridity is essential to the production of the finest feathers. The ostrich can stand a great deal of heat, but he does not like dampness nor extremes of heat and cold. Secondly, the Karoo soil of the Oudtshoorn valley is specially suited to the bird, probably due to the fact that it contains a good deal of salt and lime. Lastly, Oudtshoorn is well watered by two perennial rivers which make possible the growth of lucerne, or, in other words, a rich and abundant food supply. The pedigree ostrich, like the thoroughbred horse, needs to be well fed and well cared for if he is to give the best results. Neither ostriches nor horses can be expected to thrive if they are left on poor veld grass.

The Oudtshoorn valley is roughly 70 miles long by 35 miles broad. We utilize the waters of the Grobbelaars and Oliphants River for irrigating our lucerne lands. A large portion of our valley is composed of rich loamy soil. We find that lucerne does best in a sandy loam which has a substratum of lime. Our average annual rainfall is 10 inches. This is a very important point. Take, for example, the ostrich country around Grahamstown, where the rainfall is 30 inches per annum. There the farmers cannot produce three crops of feathers in two years—as we can—because there is too much moisture. Suppose rain falls when your feathers are ripe to clip it d scolours them and spoils their lustre. Coming nearer home, the same thing is true of the ostriches in the Districts of Mosse, Bay and George, where the precipitation is so much heavier than with us. Birds removed from the sea-coast to the Oudtshoorn valley pick up at once, and their feathers begin to show that extraordinary lustre for which our district is so justly renowned.—N. H. O. Gavin in the Agricultural Journal of U. S. Africa.

Standard Test Cows.

First report on Victorian Government Herd Testing for period ending 30th June, 1913, by W. A. N. Robertson, B.V.Sc., Chief Veterinary Officer.

In submitting this, the First Report of the Herd Testing Scheme, as carried out by this Department, it is opportune to briefly trace the steps which led to its successful launching.

In nearly all countries in which the dairying industry has been highly developed, associations of one form or another are in existence for the testing of the individual cow. Some of these associations confine themselves to tests covering a short period only. It is, however, becoming more and more evident that, in order to obtain reliable data, the recording of weight of milk must be done daily, and the test must cover a full milking period, and continue from one season to another; for it is well known that great variations may occur in the returns at different stages of lactation and during different calving periods. All progressive dairy farmers are familiar with the conformation which for generations has been regarded as an indication of milking qualities; and most are also familiar with the fact that reliance cannot regularly be placed on type and form as indicative of milking capacity, and oftentimes buyers may be landed with a duffer; but just as the external form is handed down from one generation to another, so also is the capacity for milk production, which, on external appearance, cannot be truly predicted. It is, therefore, only by means of testing over a period, and under careful observation, that the capacity for transmitting milking qualities can be determined.

The scheme for the Government certification of standard cows, which was inaugurated last year, is confined to the testing of pedigreed herds of the various dairy breeds under the strictest conditions practicable. The object designed to be attained is that purchasers of bulls of any dairy breed may be assured concerning the milk and butter yielding capacity of the dams. Oftentimes in the past great disappointment has been experienced by purchasers of bulls from pedigreed herds by reason of their failure to improve the milking capacity of the progeny of cows upon which they have been used. Greater reliance has been placed upon show yard points and so-called milking type than upon actual milking records, and, indeed, the practice of recording milk yields of pedigreed herds has not been at all common in this State, so that the owners were not in a position to give any records to purchasers. It is anticipated that when the scheme comes into full operation dairymen will pay much greater attention to the milking record of the dams in the pedigree than their show yard honours.

For the period which this report covers, terminating on 30th June, 1913, fifteen herds have been entered. The breeder who was first to recognise in a practical manner the benefits to be derived from the test, and to whom must go the honour of being the first to enter his herd, is Mr. F. J. Stanmire, of Pomborneit, who entered, on 14th May, 1912, his Ayrshire herd. He was shortly followed by Messrs. P. E. Keam and C. G. Lyon.

There were many other breeders who, though realizing the benefits to accrue from holding official records for their cattle, were, for various reasons, unable to immediately participate by entering their herds. As the test covers a period of nine months, only those cows which were entered prior to October last can be considered, consequently only a small number have had an opportunity of qualifying for the certificate.

The first samples were taken on 3rd July, 1912, from the herd of Mr. C. Gordon Lyon; and the herds of Messrs. Stansmore, Keam and Read were tested soon after, in the order mentioned. Up to the present the butter fat yield (completed or incomplete) of 180 cows is in the possession of the Department, though this number comprises only eight herds of the fifteen entered. The approximate number of cows which will be tested in the fifteen herds is 400. Representatives of most breeds have been entered, viz., Jersey, Ayrshire, Red Poll, Shorthorn, and Dexter Kerry, and the figures, already on record indicate that no one breed has quite a monopoly as first-class butter producers. Up to date sixty-two cows have completed their term, and of these all but seventeen qualified for the certificate. The details of the individual herds are given, from which some interesting comparisons are shown.

Standard cows under these regulations are those which, during the official lactation period, yield—(a) in the case of cows commencing their first lactation period and being then under 3 years of age, 150lbs. of butter fat; (b) in the case of cows commencing their first lactation period and being then over 3 years of age, 200 lbs. of butter fat; (c) in the case of cows of any age commencing any lactation period other than the first, 200 lbs. of butter fat.

The Effect of Watery Foods on Milk.

In summarizing a number of experiments on the effect of watery foods on the milk flow in dairy cattle and the sometimes conflicting results the Board of Agriculture report that:—

On examining and comparing the conclusions drawn from the various experiments there are several points which appear to emerge. The general view of those who have studied the subject seems to be that excess of drinking water does not appear to have any effect whatever upon either the quantity or quality of milk. It seems, therefore, unreasonable to expect water administered in any other form to have any effect on the yield and composition of milk. The experiments cited show that there are certain watery foods (such as roots) which appear to have no very pronounced effect on the milk, while others, such as pumpkins, reduce the secretion materially. Still others (brewers' grains) have, by general consent, a marked stimulating effect. It would appear, then, that the water content of the food as such has but little influence on either the quantity or quality of the milk. It is one or more of the other ingredients of the food—not necessarily nutrients in the ordinary sense—which are responsible for the variation in the output and fat content of the milk. It is pointed out that brewers' grains might have a physiological effect resulting in increased flow. This is an important conception worthy of further attention.

In the experiment on the use of molasses as a condiment it was concluded that molasses contained materials which, apart from their nutritive value, had a considerable effect on milk secretion. Further, it is concluded that the specific effect of a food varies with such circumstances as the composition of other ingredients with which it is employed, and, it is (1) That many feeding stuffs have a specific effect on the yield and quality of milk; and (2) that this effect is to be attributed to stimulating substances in the food—substances which have physiological rather than nutritive effects, and which are present in foods in small quantities only.

As has already been pointed out, it is difficult to eliminate factors other than the one the effect of which it is desired to investigate. The water in the food may be associated with substances which produce physiological effects resulting in an increased yield of milk, but care must be taken not to attribute such an increase to the influence of the water in the food. This mistake appears to be largely responsible for the very conflicting views which obtain.

Effect of Change of Pasture and Feed on Milk Production.

The dairy herd on the Ruakura (N.Z.) Farm received, in addition to pasture grass, a liberal supply of forage in the form of chou moellier, millet, peas, and maize, from the new year until March 27th. It was then found that the milk yield had commenced to decrease very rapidly. The cows which were nearing the end of their lactation period were taken from the pasture field and confined tares. Both yield of milk and in a field of green barley and butter-fat content were considerably increased:—Milk yield for week previous to removal to tares and barley, per cow, 118lbs. Percentage of butter fat, 4.5. Milk yield for second week, on tares and barley, 157lbs. Percentage of butter fat, 5.0. It is stated that the weather was cooler during the period when the cows were on the barley and tares than it had been previously, and this was also a factor which influenced the yield of milk and fat to some extent.

The Practical Use of Timber.

Although the following notes refer more particularly to western (N.S.W.) timbers, the principles enunciated apply nevertheless equally to the use of timbers from other districts. Before entering upon the subject we will give an elementary description of the structure of timber.

All trees that provide us with timber are outward growing trees—that is to say, they increase in girth by developing successive layers round the trunk next to the bark. Each year generally adds one of the layers or rings, and consequently they are called "annual rings." In addition to the annual rings, trees have medullary rays, which are thin and generally broken lines, radiating from the centre, or pith, to the bark, and vice versa. These rays are not very apparent in some trees, but in dry cypress pine they are easily seen. Cabinet makers call these rays the "silver grain."

The trunks and branches of trees consist of two kinds of wood—the hard, dead heartwood, or duramen, and the soft sapwood, or alburnum. The latter is much lighter in colour than the former.

The bark consists of an outer and inner layer.

It is through the sapwood that the root-sap is carried up to the leaves. Here chemical changes take place with the carbon that has been abstracted from the carbon dioxide of the air, which has found its way into the leaves by means of the breathing pores or stomata. After the various changes have taken place the "food sap" returns by means of the inner bark and passes through the medullary rays to nourish the tree.

Heartwood is much stronger and more durable than sapwood, and the outer portion of the heartwood is stronger than that near the centre, or pith, more particularly if the wood is "pipey," because then it has been subjected to decay and is very brittle.

Old wood is stronger, though lighter, than young wood. The strength of timber is influenced by the quality of soil on which it grows. Evenness of grain in the annual rings denotes strong wood. Localities subject to droughts produce faulty timber.

By strength of wood we mean the resistance it offers to force acting at right angles to its grain. This is called "transverse strength."

It must be patent to all that where the strongest parts of timber are preserved the structure built would have a much longer life than where the weaker tissues are made to stand the strain.

For stockyards, stables, huts, and the like, cypress pine (Callitris sp.) timber is generally used in this district, because it is practically the only timber of any size, and is much easier split and worked than the eucalypts and acacia.

Cypress pine is very fissile, but will stand very little transverse strain; and therefore, when using it, knowing of its weakness, workers should aim at conserving the strength in every possible way. Anyone familiar with pine used in stockyards knows that the rails most frequently break at or near the middle and at the tenon, which fits the mortise of the post. When pine saplings are used as rails the posts should be close together to lessen the strain when stock bump against the rails. Little or nothing but the bark should be removed from young pine in making a tenon, because the young wood is much weaker than that from mature trees, and by removing the harder heartwood of an already weak timber the strength and durability is very materially lessened. — Agricultural Gazette of N.S.W.

Separating Temperatures.

In a recent issue of Hoard's Dairyman, Mr. J. H. Monrad, of Denmark, gives some interesting notes upon the effect ol temperature on the work of the cream separator. In Denmark cream and skim milk must, under the law, be heated to at least 176 degrees Fahr. for pasteurizing, and thus the milk can be separated at a high temperature if this is desirable. As a fact, the normal separating temperature in Denmark may be placed at about 131 degrees. Experiments at the Royal agricultural laboratory in 1910 showed, however, that this temperature was little superior to 95 degrees, which is about the temperature of freshly-drawn milk, the difference amounting to only .006 per cent. in favour of the warmer milk. The difference, however, became much more pronounced when the temperature was allowed to drop below 95 degrees, and German experiments are quoted showing that at 86 degrees there was 2 per cent., and at 50 degrees there was 6 per cent. left. Altogether, the data quoted show that freshly-drawn milk is warm enough for practical purposes, but that when the milk has been cooled by standing, the work of the separator is decidedly less efficient.

Balanced v. Unbalanced Rations for Dairy Cows.

With a view to demonstrate the loss which may be sustained by dairymen who supply their cows with unbalanced rations, the following experiment was made by the Illinois Experiment Station. Two lots of 9 cows producing practically equal quantities of milk and butter fat were treated for 131 days in every way alike, except in the rations fed. The treatment for several months previous to the commencement of the experimental period had been the same for all the cows.

The ration fed to Lot 1 was a well-balanced one for cows giving 40lb. of milk daily, and had a nutritive ratio of 1:6, while that fed to Lot 2 was deficient in protein, and had a nutritive ratio of 1.11.

The following conclusions were reached :—

The quality of the ration affects the physical condition of the animal, and the physical condition vitally affects consumption, and production. The cows on the unbalanced ration lost greatly in flesh during the test, and their subsequent production was reduced. Lot 1, which received the balanced ration, produced approximately one-third more than Lot 2, receiving the unbalanced ration. Thirteen cows on a ration with a nutritive ratio of 1 : 6 produced as much as eighteen cows on a ration with a nutritive ratio of 1 : 11. Because of the lack of protein in the ration fed to Lot 2 the other nutrients were not used to the best advantage. This shows in a striking manner that an excess of carbohydrates cannot be made to take the place of a deficiency of protein.

Take Care of the Farm Egg.

With the view of determining the causes of the enormous loss in eggs, and, if possible, working out methods for its elimination, extensive experiments were carried out by U.S.A. Dept. of Agriculture. The production of spots, blood rings, and rots is favoured by the conditions obtaining during the hot summer months. The greatest deterioration in fertile eggs occurred in the experiments which included a certain amount of natural incubation. Both fertile and infertile eggs taken from straw-stack nests gave the greatest number of spots ; this was the only case in which a large number of infertile eggs deteriorated to such an extent as to be unfit for food. Infertile eggs, regardless of where they may be kept, are more resistant to deterioration than fertile ones. The haphazard methods of poultry management on farms are responsible for two-thirds of the 'total loss in fertile and infertile eggs. The production of the infertile egg seems to be the greatest asset in the attempt to produce high quality market eggs during hot weather. Eggs of high quality would be produced and much loss prevented if egg producers would observe the following rules :—(a) Give the hens clean nests ; (b) gather eggs at least once daily ; (c) keep eggs in a cool dry place ; (d) market eggs at least twice a week ; (e) kill or sell all mature male birds as soon as the hatching season closes.

Farm Notes.

Seaweed is considered to have some value by farmers of the Atlantic States of U.S.A. It is gathered by farmers and fishermen, dried and baled as we bale hay in Australia. In this state it is eaten by sheep, cattle, and deer, and when boiled and mixed with a small quantity of any cereal meal, is said to be of some value as a pig and poultry food.

* * * *

As an instance of the variation in yielding capacity of an ordinary herd of shorthorn cows, the following, recorded by the Edinburgh and East of Scotland Agricultural College, may be quoted:—The highest yielded by a single cow was 1,505 gallons in 47 weeks, the lowest being 478 gallons in 39 weeks. In the following year, the figures were 1,224 gallons in 52 weeks and 438 gallons in 26 weeks.

* * * *

It seems only reasonable to urge on every stock owner the advisability and even the duty of acquiring at least some fundamental knowledge of the more common diseases to which his stock are always liable, and a very limited amount would enable him at once to see whether or no professional aid was necessary. It should also prove a safeguard against the dangers of ignorant blundering, of which the following is a striking example :—A valuable draught mare was suffering from simple colid, and the owner gave a dose of spirit of turpentine in linseed oil, which was administered through the nostril, with the result that she died instantly from suffocation.

Poultry Notes

Single and Dual-Purpose Breeds.

— A Comparison. —

One is a little amused at the tendency which exists to dismiss with very small consideration the claims the General Purpose Club make for the breeds they favor. As a matter of fact, they could put up a very good case for the Orpington, Wyandotte, etc., not only as a general purpose bird but as a straight-out layer The Australian Leghorn record is 1589, the Black Orpington is 1,534. In proportion to number of entries for the Record Stakes the latter is the better performance. It may be objected that you don't judge a breed by the exception, but the average, which may to some extent be correct. How do the various breeds stand on this basis?

— The Place of the Leghorn. —

We do not suggest that there is any breed likely to displace the White Leghorn from the commercial man's point of view. It has too long a lead and too many good qualities ever to fear serious rivalry under present conditions, or any which are likely to obtain for many years to come, but it is of some interest to trace back to the "how and why" they established their lead of the breeds, and what it really amounts to on averages from the ordinary poultry man's point of view. There was a time when all breeds were practically equal—we will go further and say that they still are equal in inherent capacity, and they all had, or have, we believe, equal possibilities. Certainly the difference between the two classes, Dual and Single Purpose breeds, as layers only was so small as to be negligable.

— Old-Times. —

In the early days of competitions the Wyandottes probably had the pull. Warren's Silvers were talked of all over Australia, and W. A. Smith put in a word for the breed at Magill. They were probably one of the exceptions to what we had just written about all breeds having equal possibilities, for they were, we believe, doomed from the start by their color. It is hard enough to breed a Silver-laced Wyandotte. It is hard enough to breed a layer. When you have to look at both points at the same time and in the same bird you are apt to get cross-eyed or quit the game—most people did the latter. Had Warren's Silvers happened to have been White Wyandottes it is not impossible, not even improbable, that it and not the White Leghorn would have been the national fowl of Australia—but they weren't.

— Some Figures. —

In looking up figures to back our contention that all breeds were equal or had equal possibilities, the first volume we took down happens to contain the final figures of the Hawkesbury, Rockdale, and Gatton competitions for 1906, with Dookie and Roseworthy nearly completed. Taking the completed returns, we find that taking the first ten pens in each, the breeds include—9 White Leghorns, 8 Black Orpingtons, 3 Silver Wyandottes, 2 Minorcas, 2 Golden Wyandottes, and 1 pen of Imperials. That is, 16 light breeds to 14 representatives of the general purpose class. Dookie gave three to each in the first six pens, and Roseworthy five to each class in the first ten. Totals, 24 single purpose to 22 dual purpose—a pretty even go. If you took the same number of pens to-day in the same or equivalent competitions, the record would read 46 pens—46 White Leghorns—the rest looking on.

— A Great Win. —

It's a great win surely. What has done it? The birds themselves, their innate capacity and color, or the men behind them, their ability and perseverance. Probably it was both, with a little luck to help. Personally we are inclined to think the men behind had the major part, and that good luck had a considerable share in the beginning. Things certainly came their way for the Whites, and the records even then give a hint of how things were to go. Wyckoff, with an advertised egg average of 190 eggs from a 600 head flock, and Van Dresser with a 203 average from a 900-head flock, had already sent over birds to a number of breeders. The Black Orpington men had no Wyckoff or Van Dresser behind them, for English breeders were advertising shape of comb and quality of sheen. The Silver Wyandotte men had no one to give them a hand, for American breeders were discussing lacing and shape. No Australian breeder happened to want White or Barred Rocks, in which America could probably have produced a Wyckoff or a Van Dresser.

— The Break in South Australia. —

In South Australia "Sunnyhurst" Leghorns had put up a big break on the next pen, also Leghorns, in the previous test and were selling like hot cakes. The Subiaco 1494 pen, which, if we remember rightly, led the way into the fifteen hundreds, and filled the West with Leghorns was in the making. "Ontario" was well on the way to the first of his two Roseworthy wins, and his New Zealand success, which went a long way to do the same office for the Dominion, and Mr. Padman, at Dookie and Roseworthy, had started his series of triumphs all over Australia, which stand quite alone in poultry history, and are certainly the principal factor in the standing of the Leghorn to-day.

— Luck! —

It is idle to speculate what would have happened if Mr. Williams had not bought a setting from Mr. Stewart, and subsequently used the Wyckoff blood. If Mr. Brooks had not owned a famous rooster, which, we believe we are correct in saying, was never known to throw a poor pullet in his long and very useful career—probably no other single bird did as much for the breed—or if Mr. Padman had happened to prefer his Silver Wyandottes as a starting point. The Leghorn may, of course, have come out top-dog. We believe it would but it is safe to say that it would have taken longer about it, and would not have become quite so top-doggish. We do not forget that others have had a big hand in the position to-day. The names of Kinnear, Bertelsmeier, Cosh, and Morrish occur to one in South Australia, not forgetting, of course, General Hart and his contingent.

— A Reflection. —

How little a few or even a great many individuals can do to leaven the mass, and the quite absurd desire of the hen as a tribe to stand by a constant average, and incidentally the evenness of the candidates for honors as they stood in 1906, and the natural laying habit of the unselected hen is shown in the page before us. The Hawkesbury breed averages stand at 120 White Leghorns 167 eggs each, 120 Silver Wyandottes 165 eggs each, 114 Black Orpingtons 158 eggs each. Taking last year's results (7 years later), "Agricultural Gazette" of New South Wales, the figures are:—168 White Leghorns 189 eggs each, 42 Black Orpingtons 175 eggs each, 24 Silver Wyandottes 152 eggs each. The Leghorn has gained 22 eggs in seven years, the Black Orpington has gained 17 eggs in the same time, and the average Silver Wyandotte has lost 13 on seven years' laying. If Tennyson had happened to write about hens he would probably have amended his famous couplet, and written "Strains may come and strains may go, but the hen stops still for ever." Truly, it seems about as difficult to raise a breed average as to break up a Buff Orpington, which has made up her mind to become a mother.

— More Reflections. —

By the way, there are two ways or more of breaking a broody—one is to keep lifting her off but leaving the nest there; that is evidently a fool's game. It is just possible that the present system of selection is equally a fool's game. We keep lifting out of our strains the hen that fails, but are we equally careful not to leave the male bird who passes on the weakness to some or all of his daughters. It would certainly be safer in one case to toss the hen out of the yard, and in the other to heave the male bird over the fence and keep him there until you have proved that he can transmit to all his daughters his mother's capacity. At present "selection" and "lifting" appear to pan out very much the same—you keep on doing it, but you don't get much forwarder in the mass. Keep on long enough and something may happen. Nothing much happened after ten years at Maine. Nothing much has happened apparently at Hawkesbury after seven years, for certainly a average rise of two eggs a year in the three most popular breeds are somewhat small potatoes.

— A Fair Comparison. —

There is another way of comparing the value of the breeds to the average suburban or farm poultry keeper. Most of such people keep their birds two and sometimes three years. Under their conditions all eggs laid are worth current value, they seldom have enough to worry about cold storage and pickling by which the commercial plant man equalises his summer and winter returns, the actual daily value of his eggs rather than the total number is the fairer guide for him. On this basis the Hawkesbury returns before us are of interest. In one two-year test the actual value of eggs laid was per head 34/5 for White Leghorn, 32/6 for Black Orpingtons, 30/3 for Silver Wyandottes. In another 32/11 for White Leghorns, 34/2 for Silver Wyandottes, 26/4 for Black Orpingtons. Average, 33/8 for White Leghorns, 32/2 for Silver Wyandottes, 29/5 for Black Orpingtons. For a three-years' test the figures are 45/6 for White Leghorns, 44/4 for Silver Wyandottes, and 36/2 for Black Orpingtons. For ordinary home or market purposes at, say 6d. a lb. live weight, and 1/ dressed, the average Wyandotte cockerel is worth 1/ an Orpington, 1/6 more than a Leghorn. We think that is a reasonable comparison. If we allow each hen one brood a year, and two cockerels reared to the brood, and add the excess meat value, we have on the two years' basis:—Gross returns, 36/2 for Silver Wyandottes, 35/5 for Black Orpingtons, and 33/8 for White Leghorns. On the three-year test the Silver Wyandotte leads by 5/ on the same basis, and the Black Orpington and White Leghorn are level.

To make sure of the matter we have just looked up Mr. A. A. Dunnicliff, jun.'s splendidly compiled analysis of the ten years' egg-laying tests, and find that in the five two-year tests the White Leghorn occupied third place, the Silver Wyandotte fifth place, and the Black Orpington seventh place of the fifteen breeds treated of. The figures are: — 502 White Leghorn, value of eggs per head 34/4; 150 Silver Wyandotte, 31/6; 264 Black Orpingtons, 29/10; if we add the meat excess on the same basis we get for the two years' gross return per head:—

1. Black Orpington	£1 15 10
2. Silver Wyandotte	£1 15 6
3. White Leghorn	£1 14 4

— A Good Case. —

Yes, on those figures, and they are more or less applicable to all tests and all breeds, the general purposes people have a good case. A specially well-grown Orpington or Wyandotte cockerel would probably put up bigger breaks on their rivals. For instance, Mr. J. H. Hobbs mentions in the volume before us, growing Buff Orpingtons to 5½ lbs. in 13 weeks, and 7 lb. in four months. We remember Mr. F. J. Wimble giving us much the same results with Blacks. In Silver Wyandottes Mr. W. A. E. Smith used to put up some big weights, and Mr. Gabb, also in Wyandottes and other breeds, easily made a 50 per cent. increase on average growth. We have not the figures by us, but putting it at 1½ a month, at four months or thereabout is within the mark. These figures are not usual, but they are to be got. As between the Leghorn and his rivals, an impartial judge would probably sum up that for average conditions of poultry keeping, the odds were in favor of the rivals, but he would be careful to add that if you throw a stone in any part of Australia you would be much more likely to hit a good Leghorn than a good one of any of its rivals—there are more of them, and we can safely leave it at that.

Look the chicks over once in a while for lice. If you find any, just take clear lard and rub some well into the feathers on their throats and on top of their heads, and don't forget to put some under their wings.

The Pearl Theory Again.

In discussing the theory of the inheritance of laying through the male we have referred to various outward characteristics of comb color and structural formation, which are more or less exactly governed by definite rules, and suggested that there is no reason why other characteristics such as size of eggs, color of eggs, the habit of broodiness, and more important than all, number of eggs should not be equally the result of definite inborn constitutional changes,, which could be equally predicted and controlled. Because we do not know a thing is really not sufficient reason to suppose that it is unknowable.

Apart altogether from any theory the male bird is sometimes credited with a controlling influence in the size of egg, more correctly he transmits the quality which he inherited from his mother. If in a general way, we can admit the male influence in size, why not in number? In color of egg the male bird has a known and easily proved influence. Again, it is reasonable to ask if his share in color of egg is known why can not the reasonableness of his suggested influence in number be admitted, and if that be admitted, as it practically is, is the further admission that this influence is predominate, and can be controlled a very big step forward.

— Broodiness. —

Broodiness would on first sight appear to an essentially feminine quality, transmitted from female to female, but we know that it is not so, and that the male is equally potent. Broodiness in Leghorns, for instance, has been put down to too much bran or too little bran, to too much meat or not enough, fed to the birds themselves, though we doubt whether there is any experimental evidence to support this or any similar idea. Is it not more reasonable to suppose that broodiness is the result of the inborn constitutional make-up of the bird. In this case it may be a constantly recurring factor in the ancestral make-up of the breed or it may have been one recently introduced by one of the acknowledged crosses of the breed. Bran or no bran, meat or no meat, may possibly exaggerate the tendency, but that it will ever be the originating cause seems more than doubtful; anyway, the notion would make a biologist smile.

Broodiness, color, and size of egg are easily and quickly recognised characters. They are or should be easily controlled. It is reported, for instance, we believe, that broodiness in later years was on the increase at Roseworth competitions, yet one would think that continuous selection would ere this have been completely controlled, for obviously any breeder finding he had the taint in his strain or flock would take care never to hatch an egg from a hen guilty of it.

If the principle on which the "Pearl" theory is founded is sound such breeders, though they may have reduced the trouble, will not be free of it, unless they have had a lot of blind luck in choosing their male birds. And this seems, on competition figures, to be about the position. Any breeder in the same circumstances who has not only not hatched any eggs from a broody-tainted hen, or used a male bred from such a hen bought from a tainted source should have a non-broody flock. The strain will be constitutionally "pure" as regards broodiness. According to the Mendal law, a strain may be "pure" to broodiness, or white eggs, or large eggs, it may be "impure," or it may be simply soaked in broodiness, tinted eggs, and small eggs, either one or all together. The latter would really be "pure" for the quality or qualities which was not wanted.

Birds of a "pure" non-broody strain on both sides, will throw only non-broody birds, the "impure" broody strain will throw the three sorts, and the recessive or "soaked-in-broodiness" strain will throw all broodies, though possibly they may not show it unless they eat too much or too little bran. It would be possible to build up on Mendelian lines a strain of which every bird would show broodiness, and lay tinted and small eggs, and yet be pure White Leghorns. On the other hand, on the same law it should be possible to build up a flock, every bird of which will be non-broody, and lay white eggs of large size, and do it in three generations from the same original pen. Quite similar breeding has been done times out of number with peas and beans, and animals, &c. Returning to the "pure" non-broody strain, it is not that broodiness is mislaid or dormant, it is simply that the capacity to brood has passed out of their constitution, and no amount of effort or bran will bring it back. Their is just as much chance of a white man and woman producing a black family. Blackness in the one and broodiness in the other is simply non-existent.

— Where We Stand. —

The practical opportunity given to breeders does not rest on theory. Dr. Pearl has put up the results of four years' work. He has shown that he or any other breeder working on certain lines can breed birds of good, bad, or indifferent laying capacity, and do it with certainty, and he puts up the figures to show it. Not figures from 6 or 10 birds, but from 10 hundred. There appear to us to be just three possibilities which would warrant scepticism. The gentleman may be mad, his figures may be a dream, or he is wrong in his assumption that pullets of equal age will show in the first few months of laying which class they belong to. Failing either of these somewhat unlikely possibilities, the figures must stand, they may be ignored, but they cannot be questioned on any other ground. The fact that color, comb, leg-feathering, extra toes, crests, skin coloring, and many other characters in bird, animal, and plant life have been shown to follow similar rules, as those suggested by Dr. Pearl, and the known influence of the male in such closely allied character as size and color of egg, the further fact that so essentially a feminine trait as broodiness is equally influenced is, of course, no proof that number of eggs is also governed by the same laws, but it is at least pretty good presumptive evidence.

Wanted: An Explanation.

Some months ago we were discussing the inconsistent scores made by many competitors in successive laying competitions, with a breeder who, in his day, was well in the first flight. We asked him why he dropped out of it. Apart from the stereotyped "No time" and "Not worth while" excuses he owned up that the real reason was that he could not keep it up, and having had a place in the lead the ruck was not good enough for him. "As you know, I had good stock," he said, "and by all the rules of the game they should have improved, for I bred from higher scoring birds, they hatched better, eat better, grew better, feathered better, and worked better, but they didn't lay better—not by long odds. I don't know why, unless it was that the strain on the vital energy was too great, and that the general stamina was reduced." In this particular case, every point was considered, and everything that knowledge and observation could suggest was put into the birds, but still they went back. Few breeders have been so thorough in their methods, but generally speaking, the case is typical of others, as far as can be judged by the performances of birds at our laying competitions. It may be, of course, that the decreasing stamina idea is correct, there is, at all events, a good deal to be said in support, but it is a little surprising that such birds, or at all events, these particular birds, were about the healthiest, busiest, and most active set of invalids we have ever seen. One would expect that they would show other signs of impaired vitality. If we hadn't seen them we should have been more sanguine as to the correctness of the theory. That was four or five years ago, but we hear that they are still able to sit up and take a little nourishment.

An Achievement.

"Tropical Agriculture," quoting from the journal of the "British Board of Agriculture," refers to the report of the poultry expert, South Australia, and says that it deals with the general progress of the industry. It also refers to the result of an experiment with Leghorns and Black Orpingtons. We are particularly happy to have seen this notable record, as it happens to be the first we have come across in regard to the recently defunct poultry stations, and we hasten to do justice to the occasion or try to.

Who can say now that the work of the South Australian Government Poultry Experiment Stations is not well known! In view of this discovery (though possibly dimly guessed at before) of so unusual a contribution to the world's accumulating knowledge of the hen and her peculiarities, it would not be surprising to know that the experts, experimentalists, instructors, and investigators of 28 countries, together with their reporters, typists, secretaries, and general backers, at their recent very interesting conference, received the news with enthusiasm before adjourning for drinks, which might have been very appropriately chalked up to the Agent-General.

In the natural agitation arising from reading of such a record of experimental work one is perhaps apt to lose sight of some of the details. For instance, did the Kybybolite and Murray Bridge stations share in the achievement and participate in the triumph, perhaps they didn't. If so it would almost be enough to account for their closing down. To have waited so long for an opportunity of distinguishing themselves, and then be barred at the last moment would indeed have been hard. To speak lightly of such an experiment after it is accomplished is, of course, easy, but one is perhaps apt to forget the brain wave which originated the conception and further remember the naturally anxious consideration as to whether the staff was qualified to deal with so intricate a project, or whether it would be safer to ask the Government for an extra sum for supplementary assistance. As far as we can judge, it was successfully carried through with the customary staff, and means already within the control of the department, there do not appear to have been any contingencies to grapple with.

Again, there would arise the important question, whether the stock available was sufficient to meet all demands, or whether it would be necessary to import any from New Zealand, for it is quite probable that there were never more than a poor 2,000 birds to select from. True, that left a margin, but was it sufficient? An anxious moment, to be sure. Need, then, for a stout heart and mind well fitted to grapple with emergencies. But the minister was at the helm. Happy State; fortunate industry. There are other points worthy of the same enthusiasm, but why elaborate? Virtue brings its own reward, and in any case "All's well that ends well."

What was the experiment? Great Scott, we nearly dropped the cutting. Here it is in its sweet simplicity and its noble design:—

"The weight of eggs produced by three White Leghorns and three Black Orpingtons during a year are recorded, and the results tend to show that the limits of variation in the weight of different eggs laid by the same hen are considerable, in nearly every instance after a rest of a day or two, the succeeding egg showed an increase of weight."

Talk of the value of time and the usefulness of labor! What a splendid example to the young of what they may live to accomplish, say the junior division of that very admirable institution, "The Mail's" Boys' Poultry Club; what an inspiration to them to labor and to wait (rather a long time) in the cause of poultry culture. Perhaps we may be permitted to humbly tender our congratulations to the Minister of Agriculture, the Director, and even to the least of the members of the departmental staff. When they are quite old men they may possibly be glad to remember with pride that each in their degree contributed to making the world richer in its store of poultry knowledge. We trust that it will not lead to unworthy jealousy or unprincipled emulation of what has been so gracefully and so unostentatiously done. We feel quite sure that wiser councils will prevail, and that we shall never read that some far future Director of Agriculture "planted three Carmen and three Pinkeye potatoes. He noticed that there was considerable variation in the size of tubers, that it gradually tended to increase, and that after rain this increase was specially noticeable," or that the then Principal of Roseworthy College "sowed three students in deep sand." He noticed differences in conduct, but generally speaking temperatures tended to increase and facial expression to become contorted. When water was forcibly applied these symptoms become complicated and manifestly irate." Truly South Australians are a patient people, but they might in far distant days smile at so unusual a notion of practical agricultural experimental work, they might even go to their last extremity and "ask an interesting question in Parliament." In these days they will probably say as we do, "Well and bravely done, thou good and faithful servant," for it is surely better to do something, even if its practically helpful outcome is not apparent to the untrained eye, than not to do it. We hope there will be many more experiments; we also hope we shall not be considered offensive in suggesting that they be on somewhat different lines.

Have you ever seen a picture of a poultry louse? My stars, what awful looking things they are! No wonder the chicks keel over and die when they have to endure such terrible enemies as these. Let's fight for our birds against these fearful things! Keep right at it till the last one is gone. Then the birds will grow and that means something for you and me.

Vitality.

As far as a hen is concerned, eggs are merely nature's call for reproduction and perpetuation of her kind, and there is a more or less well-founded belief that nature where she feels a lessening of the vital forces, whether in a tree or animal, makes a special effort to reproduce her kind, so that one, perhaps, might reasonably expect an extra flush of eggs in a hen which felt some premonition of this slackening of her vigor, just as a dying tree may put out very abundant blossom. In this case, the tree is usually obviously a very sick tree. With regard to the devitalized hen she would appear to be a subject to keep out of the breeding pen, but it is doubtful whether the health of the parent has any great effect on the offspring, seems a radical sort of suggestion.

— A Lot to Learn. —

We have a lot to learn yet of the relation of the hen to the eggs she lays, or rather the embyro it contains. On the face of it, one would suppose that it is very close and intimate, but the further one gets in the records of experimental work the more one finds that the embyro is a good deal more than a reproduction of the mother plus the father. It is a very generally, in fact universally accepted belief that health, vigor, and stamina is the foundation of a profitable flock. Nothing seems more reasonable, but that sound health in its fullest sense is essential in parents and offspring. We have been told always to breed from birds which are and always have been healthy, to cull chicks that had crooked toes, because they couldn't scratch; that were pasted up, because the bowels were weak; that had worms, because their little tummies were out of order; that had catarrah, because they would have bellows to mend; that didn't rush their tucker, because their digestive organs were faulty; and finally, to cull those that couldn't scratch their way through a galvanized bucket, because their vitality was low. All very good advice and as sound now as the day it was first written, which, as far as general principles are concerned, was something like two thousand years ago, but up to a year or two ago we don't know that it ever occurred to anyone to put the life history of sound as against unsound chicks, and their differences into figures.

Cornell University, however, have thought it would be of interest to know what would become of the thousands of chicks which are now allowed to die of neglect, or killed to put them out of their misery. Birds which would be considered unfit to live on a decent commercial plant, or be allowed the priveleges of parenthood. They therefore selected contrasting lots of chicks. Three lots were so ill and weak, "that only special diet and attention was necessary to enable them to live at all," the other three lots were strong and healthy normal chickens.

— A Shock. —

We have not the report at hand at the moment, but generally speaking the results must have been a shock to the "sound" high vitality lots. The erstwhile invalids and the healthy lots were put into the laying houses at the same time and all treated alike. In the breeding season the "weak" lots were mated, some with "weak" cockerels, and some with "strong" cockerels, and of the "strong" pnllets some were mated with "strong" and some with "weak" cockerels. It certainly was a grand opportunity for the "strong" to show what they were made of, and simply walk over their weaker sisters, but they did'nt, possibly of course it was modesty which prevented them, anyway, it was a pity considering a great department had taken the trouble to clear the course for them. In number of eggs, weight of eggs, cost of eggs, the results were very even, generally the "strong" were ahead slightly, but not always, and at the end of two years, from the time they were put in the laying houses, the financial advantage in favour of the "strong" crowd was about a shilling a head. It is only fair to state that special attendance and medicines for the interesting invalids was not charged against them.

— More Shock. —

More surprising is the fertility, hatchability, vitality, and first year laying of the chickens produced by the various combinations was much of a muchness, whether two "weaks" or one "weak" and one "strong," or two "strongs" were noted the results were quite variable. This experiment is not of course quoted, and it was certainly not conducted to advocate the claims of the "weak," for if weakness does not tell to any extent in one, two, or three years years, it is surely safe to say that the difference between constantly selected "strong," and unselected birds and more especially selected weak birds would tend always to increase in favour of the "strong." The experiment does show perhaps that the yearly massacre of the chicken innocents is a little overdone, and appears to show that "vitality" is an unexpectedly potent and constant factor in the make up of the hen, at the same time vitality is a dangerous weapon to play with, so in the words of the ancient Roman agricultural writer who lived and naturally also died something B.C., and which has been repeated somewhat frequently since, "let those which be kept for breeding be strong, and the best which thou hast."

The Coucou de Malines.

There is a sort of impression that poultry keeping and English speech are synonymous, but there are others. the following from an English exchange refers to one of the most well known breeds:—

Anyone visiting the restaurants of Brussels for the first time can hardly fail to notice the extreme delicacy of flavor and whiteness of flesh, as well as the enormous size of the poulet, without which hardly any dinner is served. The inquirer is told it is a poulet de Bruxelles, and as the chicken is certainly in Brussels, and was fairly certain to have been purchased in one or other of the markets there, the answer is taken as an incontestable fact, conveying nothing special to the imagination. But, perhaps, in the course of his travles through Belgium, the same inquirer may come across a village which seems to contain nothing but black and white chickens of every size. "Plymouth Rocks," he says, with a knowledgeable air, "crossed with Buff Orpingtons. Some of them, evidently!" he adds, as he sees a yellow tinge on another lot. Yet the shape of the birds is more that of a Brahma, and neither Plymouth Rocks nor Orpingtons have feathers on their legs, and surely there cannot be so many mongrels all alike!

With pity for such profound ignorance the peasants would explain that these are "Coucous de Malines," bred and reared exclusively to supply the market with poulets de Bruxelles, and then the traveller remembers his dinner in that city.

The writer visited a small village—by all accounts only one of many—where literally thousands of this breed were being reared. Upstairs, downstairs, inside and out, every peasant had Coucous of every age, wherever there was an available corner. The Coucou argentee (silvered) is much favored by the peasants, but these, and the Coucou doree (gilded) have certainly a mongrel appearance. The white Coucou, either single or rose-combed, is a magnificent bird, but the plumage of the Coucou proper greatly resembles that of the Plymouth Rock, though that of the cock should be more evenly barred, and the shades very distinct. The end of the feather is generally light, while with the hen it is the reverse. She should be altogether darker and of a blue grey, uniformly shaded. The eye is red or pale orange, the beak white, or slightly lined with grey, especially in the case of dark pullets The legs are white, more or less feathered on the outside.

The Coucous mature very quickly and cockerels should feather at three to four months and weigh 7 lbs. and upwards. They are very easy to rear, as they are hardy, and the most contented and happy of little chicks, though they are rather a cause of anxiety to their mothers, never losing an opportunity of getting out of the run, to roam off and scratch on their own account. As mothers the hens are excellent, and for young Partridges unequalled. It might be thought such large birds might be clumsy, but they take the greatest care never to put their foot on a chick. A brood of thirteen young Partridges was hatched off by a Coucou, one hen's egg being added to what she considered the most puny eggs she had ever been asked to sit on. These were put in a coop with her, close to a shrubbery, and every morning she took her little family out all among the long grass, seeming to know exactly the food they required, and every evening she brought them back to sleep in the coop, and she never lost one. They had a few ants' eggs, but beyond that nothing but what they found for themselves.

The Coucous are most excellent winter layers, and lay a large, pinky brown egg. For breeding for show purposes care should be taken to select only the most perfectly marked birds, as they certainly have a tendency to "sport"—though, of course, for table purposes this does not matter in the least.

Lice.

About the first thought the poultryman has when the hot weather comes around, is to look for lice. Now lice are ever present where cleanliness is neglected, but the hot days is the time they form into a grand army and make their most serious attack.

All sorts of remedies are offered: Whitewash to which is added an ounce of carbolic acid to every pailful, hot salt water, kerosene (the last two can be used in a spray pump), and soap water left over from the week's washing.

The main point in fighting off lice is to keep the houses clean. All droppings should be removed at least once a week, twice a week would be better, and every morning would be best of all. Use some tobacco waste with nesting material, for both laying and sitting hens. Use plenty of kerosene over the roosts and in the corners of the nest boxes. This should be done at least once a month, and twice a year the exterior of the house should be whitewashed, using carbolic acid in mixture, as noted.

Poultry Notes.

Hens feel the warm weather as much as other folks. Give them a shady place to sit down once in a while and rest. They will do all the better for it.

For table purposes Orpingtons grow very satisfactorily and flesh well; and being of a docile nature (a point that they doubtless owe to the Cochin and Dorking blood in their composition) the birds lend themselves well to the cramming process of fattening. The whiteness of the skin and legs of the buffs, whites, and jubilees renders these varieties first-class marketable fowls, for they can be most satisfactorily "dressed." All varieties, the whites included, are of exceedingly hardy constitution. They are great foragers, and are equal to most sitting and heavy breeds for small places; and for the poultry-keeper who has a large range and desires a good all-round breed they possess all that is needed.

Many persons suppose that the yolk is more nourishing than the white, but the reverse is the case. About 80 per cent. of the solids of the white are flesh-forming, and only about 30 per cent. of the solids of the yolk. An important advantage in giving infertile egg to chickens is to prevent waste. Meat and other animal matter stand next in importance in this respect, having a greater proportion of flesh-forming elements—true food. Meat and eggs will make up the deficiency of flesh-forming matter in the proportion of grain and meal that may be in a diet.

A cross between Plymouth Rock and Brahma or Plymouth Rock and Langshan will be found useful; but perhaps the best of all is Indian Game and Langshan; birds of this cross produce eggs with a very deep brown shell.

Avoid posts stuck in the ground for perches to rest on, for two reasons—they are in the way when cleaning up the droppings, and they afford a transit for the red mite from the floor to the perches. This pest, as a rule, breeds in the floor among the manure and then ascends to the perches. Suspended perches are probably the best, but one can affix battens to the ends, or side walls of the houses and let the perches rest on them, but do not nail the battens tight up to the walls, but leave about a quarter of an inch space, so as not to afford a harbor for the mite.

Fowls do not get body lice if sufficient dusting facilities are available. Consequently, there is no necessity to resort to dipping them, which is a laborious undertaking when some hundreds of birds have to be handled, particularly as it must be done in daylight and on a bright, sunny day. Occasionally one will find an old cock bird affected with vermin, in which case a good dusting with insectibane immediately settles the pest. Care should always be taken to provide good dust baths. If the runs are located in light sandy soil the matter is very simply arranged, that is by covering in a dry corner in wet weather and always having a damp spot in summer time. This is easily done by throwing a few buckets of water in a shady spot, under a tree for preference. If the runs are located on hard soil, a corner could be well broken up, made as fine as possible, and supplemented with wood ashes.

A good supply of coops is essential for the chicken raiser. They should be twenty-four inches square at the bottom, and be built of stout wood, tongued, and quite water-proof. It pays in the end to have them really serviceable. They will last many years if the owner takes the trouble to paint and store them in a dry place each season when not in use. Cheap coops let in the water in bad weather, and the test of a coop is that it gives adequate protection to the inmates when they most need it; and this is exactly what makeshift coops fail to do.

The symptoms of roup are:—Eye inflamed and closed and filled with offensive matter. Nostrils closed in the same way. Face swollen. Offensive smell. To treat the sick birds, take a quart dipperful of warm water and color it purple with permanganate of potash; add a half teaspoonful of creolin to the mixture. Souse the head of every roupy bird in this mixture, so that it reaches all the passages in the nostrils and eyes. Keep the little finger of the left hand between the bird's bills and keep its mouth open. Place the sick away from the others in well ventilated coops. Give nourishing food, seasoned with ginger.

The hen in preening itself, gives a few hard digs or squeezes with the point of the beak upon the spot where the oil gland is, on the back near the tail; then the head and face are twisted about vigorously upon the place where the oil has been squeezed out by the beak; next the head and face, well annointed with the grease, are applied to the part of the plumage which is to be preened, and there the head and face are again rubbed about vigorously, just as they were over the oil-gland. The way the fowl is able to lay its head upon its back and twist it about there, shows the freedom of movement of the head of the bird, owing to the skull being jointed to the spine at only one place.

Ever noticed a fowl drink with the beak pointing towards the water; as soon as the beak dips into the water tthe head is thrust forward until the beak is as nearly horizontal to the surface as the fowl can hold it. It appears as though the tongue is relied upon to feed when the tip of the beak has reached the surface. The fowl never dashes its beak down into the water. The hesitating way the fowl approaches the surface of the water with the tip of its beak seems to accord with the suggestion that the position of the eyes renders the fowl incapable of distinct binocular vision. As soon as the fowl has its beak as nearly horizontal as it can get it, with the greater part of it immersed, it works the lower mandible, and probably the tongue too, in such a way that some water is made to trickle into the bottom of the enlarged part of the mouth behind the tongue. Then the fowl raises its head upright to let the water run down the gullet mechanically.

Don't forget to provide shade. A wheat bag on a frame is better than nothing, two wheat bags opened out and fixed up wigwam fashion are better. Anyway, let there be a current of air under whatever contrivance you fix up.

Natural shade is best. Any vacant pens or unused ground should be sown with maize, sorghum, millet, etc. If there are no vacant pens sow some of the strong climbing beans around the sides and train them over the top. We saw some climbing cucumbers used for the purpose once and they were a great success. If you prefer beauty to utility try a few seed of Mina Lobata.

The cackle of the hen may not be musical, according to accepted canons, but the notes her efforts produce always pass current with the grocer.

Home Notes.

Canning Vegetables.

The preliminary care for canning vegetables must begin in the picking and handling in the garden, and the necessary directions will be given with the recipes—but the preparations in the kitchen are the same for all and can be given here.

This kind of canning is merely sterilizing food stored in sealed jars, and once the contents has been thoroughly sterilized there is no likelihood of spoiling for several years if the sealing is intact, except under one condition and that condition is so important, so underrated, so generally ignored that I can hardly place too great a stress upon it—and that is clean jars, chemically clean jars. How many times do women canning use a jar stained by previous contents? Never use a jar or cover that is stained. If hot soap suds does not remove the stain, soak the jar for 24 hours in strong solution of washing soda, if that fails use comercial hydrochloric acid one part water, two parts (can be used over and over again) or try sapolio, bon ami or dutch cleanser—and if all these fail use the jar for pickles or throw it away.

Never use a rubber ring a second time. Buy the best you can get. They should be soft, flexible, not too thick, and should not stretch in the boiling.

Never touch or handle the cover or rubber on a sealed jar. The steamed juices in cooling form a delicate cement between the cover and rubber, and this, if broken by turning or handling is liable to start a leak and admit air. Always lift a jar by the jar itself, never by the cover. Keep your jars in a cool, dry, dark place after canning.

Provide the following utensils: (1) A boiler or kettle with flat bottom and with a close cover. The kettle should be deep enough to take pint or quart jars and yet leave an inch of space above them. An ordinary tin wash boiler such as is used for clothes is the best when a number of jars are to be done—but when I have only one or two I use a soup ketle.

(2) Provide a piece of expanded metal lath, or galvanized wire netting having ½ or 1 inch mesh cut to fit the bottom of the boiler. Or have a wooden rack made to fit the boiler. Either should lie flat. The object is to lift the jars from the bottom of the boiler to prevent them from pumping when the water boils hard.

(3) Plenty of new good rubbers.

(4) One or two extra jars for emergencies.

(5) Boil one or two gallons of water for ten or fifteen minutes after it comes to a boil. Cover it while cooling and keep it covered until used as shown later. The objects in boiling the water are threefold: (1) To sterilize; (2) To expel the air absorbed in it; (3) To throw down the lime if the water is hard.

With clean jars, rubbers, covers, and the above utensils one is ready to try the first vegetable.

— Peas. —

It is labor lost to can old peas. Peas for canning are better picked when best for the table, but better too small than too large.

As peas ripen the development of starch makes them difficult to keep when canned. Canning also emphasizes any tendency they may have to a mealy flavor. Peas should be picked in the early morning when they are cool. If the pods are dirty or the pickers of questionable cleanliness, *wash the pods before shelling.*

Fill a pint jar half full of the sterilized water (if the water is put in first air is not imprisoned in the space between the peas, to cause trouble in boiling). With clean hands shell the peas directly into the jar until it is full. Add half teaspoon of salt. Lay on carefully washed rubber ring, then the cover loosely fastened. When all jars are ready place them in the boiler on the wire or wooden rack. Now pour in cold water until it comes to two-thirds the height of jars, cover and put the boiler on the stove and boil two and a half hours from the time the water boils. Quarts should boil three hours. As soon as the period is up turn the fire out and without delay as quickly as possible lift the jars out one at a time and tighten the cover before lifting another to tighten. One bushel of peas makes 10-12 pint jars.

Never, never, never, lift a cover off the jar, as that would admit infection of moulds and ferments. Let me repeat again, do not delay in tightening or sealing covers as soon as the water ceases to boil; if you do you can in a few minutes hear fresh unsterilized air carrying all sorts of germs of moulds and ferments sucking into your jar to ruin your work. I consider this and the question of clean jars and covers and good rings the crucial points of the whole process. Everything depends on them.

— Asparagus. —

Wash and trim the asparagus. Cover it with boiling water, boil fifteen minutes, drain, cool, and arrange it neatly, heads up, in wide mouthed jars; adjust the rubbers, fill the jars to overflowing with water that has been boiled and cooled; add a half-teaspoonful of salt and lay on the tops loosely. Cook the jars in the boiler one and one-half hours as directed for peas and finish in the same way.

— Beans. —

Beans should be picked before the dew falls in the evening, or after it is dry in the morning, and kept in a cool place covered with a cloth or wet paper to keep them crisp. String and cut the beans as for the table, throwing them into cold water as they are cut, drain them and throw them into boiling water to cook until they can be pierced by a silver fork without breaking and they must cook no longer. If they are cooked too long at this stage they become soft and mushy in the cans. Remove from fire, drain immediately, and pour cold water through them in a colander until they are cool and firm. If one has not a faucet or pump, three or four changes of water will be sufficient. Use plenty of water. This cooling is called blanching by some writers.

Half fill the jars with the sterilized water, then put in the beans which have been thoroughly drained and pack them in as firmly as one can without crushing, add one-half teaspoon of salt. Finish as directed for peas, cooking one and a half hours.

Young and tender beans require little more than scalding in the preliminary or first cooking, but old beans require sometimes fifteen or twenty minutes according to toughness and quantity. It is advisable on this account not to cook more than four or six quarts at a time for the preliminary cooking. Shelled Lima beans are done in the same way.

— Beets. —

Young beets may be canned either whole or sliced, and with or without vinegar. Select young fresh beets; wash, put them into boiling water and boil carefully for thirty minutes; then remove the skins, and pack the beets into quart jars. Add half a pint of vinegar to a quart of water that has been boiled and cooled; fill the jars with this mixture. Finish as directed for peas, cooking forty-five minutes.

Some Simple Home Remedies.

Salt and water, used as a gargle for sore throat, is equal to chlorate of potash, and is entirely safe. It may be used as often as desired, and if a little is swallowed each time it will have a beneficial effect on the throat by cleansing it and allaying irritation. In doses of one to four teaspoonfuls in half a pint to a pint of tepid water it acts promptly as an emetic, and in cases of poisoning is always on hand. It is an excellent remedy for bites and stings of insects. It is a good astringent in haemorrhages, particularly for bleeding after the extracting of teeth.

Mustard is another valuable remedy. No family should be without it. Two or three teaspoonfuls of ground mustard stirred into half a pint of water acts very promptly as an emetic, and is milder and easier to take than salt and water. Equal parts of ground mustard and flour or meal made into a paste with warm water, and spread on a thin piece of muslin, with another piece of muslin laid over it, forms the indispensable "mustard plaster." It is almost a specific for colic when applied for a few minutes over the "pit of the stomach." For all internal pains and congestions there is no remedy of such general utility. It acts as a counter-irritant by drawing the blood to the surface; hence in severe cases of croup a small mustard plaster should be applied to the back of the child's neck. The same treatment will relieve almost any case of headache. A mustard plaster should be moved about over the spot to be acted upon, for if left in the place it is liable to blister. A mustard plaster acts as well when at a distance from the affected part. An excellent substitute for mustard plasters is that known as mustard leaves. They come a dozen in a box, and are about four or five inches. They are perfectly dry, and will keep for a long time. For use, it is only necessary to dip one in a dish of water for a minute and then apply it.

Common baking soda is the best of all remedies in cases of scalds and burns. It may be used on the surface of the burned place either dry or wet. When applied promptly, the sense of relief is magical. It seems to withdraw the heat, and with it the pain, and the healing process soon commences.

People whose occupation keeps them on their feet a great deal are often troubled with chafed, sore, and blistered feet, especially in ex-extremely hot weather, no matter how comfortably their shoes may fit. A powder is used in the German army for sifting into the shoes and stockings of the foot soldiers, called "Frusstreu-pulver," and consists of three-parts salicylic acid, 10 parts starch, and 87 parts pulverised soapstone. It keeps the feet dry, prevents chafing, and rapidly heals sore spots. Finely-pulverised soapstone alone is very good.

Another plan is to soap the feet well with good yellow soap before putting on the socks.

A public school teacher says that she once required a pupil to compose a sentence with the word "dogma" as the subject. The pupil, a lad of ten, after some deliberation, submitted his effort. It read as follows:—"The dogma has five pups."

Ounces of Prevention.

Never begin a journey until breakfast has been eaten.

Never take warm drinks and then immediately go out in the cold.

Keep the back, especially between the shoulder blades, well covered; also the chest well protected.

In sleeping in a cold room establish the habit of breathing through the nose, and never with the mouth open.

Never go to bed with cold or damp feet.

Never omit regular bathing, for unless the skin is in an active condition the cold will close the pores and favour congestion of other diseases.

After exercise of any kind never ride in an open carriage or near the window of a train for a moment; it is dangerous to health, and even to life.

When hoarse, speak as little as possible until the hoarseness is recovered from, else the voice may be permanently lost or difficulties of the throat be produced.

When going from a warm atmosphere into a cooler one keep the mouth closed, so that the air may be warmed by its passage through the nose ere it reaches the lungs.

Crystallised Fruits.

The means of preserving fresh fruits in a crystallized form is attained by extracting the juices from the fruits and replacing them with sugar syrup, which upon hardening, preserves the fruit from decay, and at the same time retains their natural shape and, to some extent, flavour. The process is as follows:—Fresh fruit, nearly ripe, whole, or cut into quarters, in the case of citrus and such large sorts, should be boiled until they are soft enough to be handled without breaking. In the case of citrus fruit, the rind should be lightly pared off and the pith removed, at least a couple of hours before boiling. The softer kinds, such as peach, plum, apricot, etc., would merely be steeped in boiling water for a very short time, care being taken that they are not immersed sufficiently long to be cooked. The exact time can only be determined by actual experience. After this the water from the fruit should be allowed to drain off thoroughly, and when sufficiently dry, they should be placed in hot sugar syrup, and kept there for a few days, so that the sugar may enter the fruit cells and displace what juice remains after the boiling or scalding process. The fruit should then be lightly washed in clean cold water and packed in dry white sugar while wet, and allowed to remain there and dry off in a draught, until it is hard enough to be packed away for storing. A common home recipe for preparing sugar syrup is: One pound white sugar to 1 pint of water, adding the white of an egg to every 4lbs. of sugar; boil this mixture over a fast fire for twenty minutes, and strain through a cloth while hot, when it is ready for use.

Children.

A child's bed should slope a little from the head to the foot, so that the head may be a little higher than the feet, but never bend the neck to get the head on to a pillow. This makes the child round-shouldered, cramps the veins and arteries, and interferes with the free circulation of the blood. Even when a child is several years old the pillow should be thin and made of hair, and not on any account of feathers.

Scalds and burns are more fatal in children than in adults. The blisters arising from them should never be cut.

Every part of a child's body should be warmly clad except the head; to keep the head too warm increases the tendency to brain disease.

Next, after warmth, children need freedom—freedom for movement in all limbs. They want to exercise their muscles even more than their brains, and they never will be quiet or staid unless they are ill. Do not startle a child; many nervous diseases can be traced to a sudden noise or alarming object frightening and startling the infant.

Don't allow a child to sleep with an elder person; its rest will be less disturbed and more beneficial alone.

An excellent dish for the nursery is made in the following manner: Place in boiling water for five minutes half a turnip, half a carrot, and a large onion. Cut up half a pound of neck of mutton, brown it slightly in a frying pan, and add half a pint of warm water and the vegetables. Simmer for an hour, and serve in a vegetable dish with all the gravy.

To Tell Anyone's Age.

Ask the person, writes an exchange, whose age you are to tell to take the number of the month in which he was born and multiply it by two.

January is counted as number one, February as number two, and so on through the year. To this product he must add five and multiply by fifty.

To this last number he must add his present age, and from the sum subtract the number of days there are in a year, or 365.

All the work up to this point must be done by the person without letting anyone see his figures; but now you ask him to tell you what number he has found, and to that number you add 115.

The result obtained by this last operation contains the information wanted.

Point off two figures on the right, and the number will be the age sought, while the number on the left will give the month in which the person was born. This trick never fails.

Always keep carbonate of soda in the house; it is useful for so many purposes. For burns and scalds it is an excellent remedy. The surface of the burns should be covered with it, either dry or just damped. It relieves the pain caused by the bites or stings of insects. A small saltspoonful in half a tumbler of water will relieve heartburn and indigestion, and if taken with tepid water the last thing at night will frequently induce sleep in restless persons.

Varnish on the hands should be removed with methylated spirit, and paint or tar by rubbing in butter or lard. When the stains are loosened, wipe the hands as clean as may be with soft paper or rag, and then give them a good washing with soap and warm water.

Tried Recipes.

— Veal Shape. —

Pass two pounds of veal through a mincing machine with half a pound of fat ham. Grate half a pound of bread-crumbs and add them to the meat; add two well-beaten eggs, salt, and pepper. Mix well and press into a butter mould. Put a few tiny bits of butter on top, cover with buttered paper, and bake for two hours. Turn out when cold.

—Conserve of Apples and Pears.—

Take a pound of hard green apples and a pound of hard stewing pears, peel both, cut the apples into quarters and the pears into halves, coring both, but retaining the pippins. Put them in a deep earthenware pan with two pounds of sifted sugar, two ounces of candied peel, the grated rind of a lemon, an orange sliced and freed from pips, and the juice of both an orange and a lemon, half a stick of cinnamon, a few knobs of ginger, and a glass of rum or water. Cover the pan and place it in a moderate oven, where it should be allowed to remain till the fruit is perfectly cooked and the syrup is a rich red colour. It will take six or eight hours. The fruit should not be broken. Serve cold with whipped cream.

— Rabbit Pie. —

Prepare pastry as for beef steak pie (about a pound of flaky crust), lining the edges of the dish. Cut the rabbit into neat joints, season them with pepper and salt, and put them in a pie-dish with a quarter of a pound of salt pork cut into thick pieces. Pour in half a pint of water. Cover with pastry. Make a hole in the top and decorate with pastry leaves. Bake for about an hour and three quarters.

— Russian Salad. —

Scrape and cut a carrot into thin strips, cut a turnip into somewhat thicker slices; boil them in separate saucepans in salted water till soft; strain, and put into basins of cold water till wanted; then put each vegetable in a clean dry cloth and swing them round and round to dry them. Put them in a salad bowl with cold sliced potatoes, peas, and any other vegetables at hand; sprinkle with pepper, salt, finely chopped onion, and parsley. Pour in two tablespoonfuls of oil and one of vinegar, toss lightly, and mask with mayonnaise sauce.

— Apricot Cream. —

Rub a pound of apricots through a hair sieve. Dissolve an ounce of gelatine in a little milk, whip some cream till stiff. Mix all together, sweeten to taste, colour a pale pink with cochineal, and pour into a mould. Turn out when set.

— Rice Shape. —

Boil a pint of milk and an ounce of sugar; when boiling stir in a tablespoonful of ground rice and any flavouring preferred. Boil for a quarter of an hour. Turn into a shape. Eat cold with jam or cream.

— Chicken Patties. —

Mince some cold chicken and a little cooked ham, moisten with gravy, and add a few drops of lemon juice, also salt and pepper to taste. Roll out some puff pastry and stamp it into rounds. Lay half the rounds on greased patty-tins. Brush round the edges with beaten white of egg, and put some of the minced chicken on each round; cover with the remaining circles of pastry. Brush over with white of egg, press the edges slightly together and bake in a quick over for about twenty minutes. Eat hot or cold.

— Puree of Vegetable Marrow. —

Peel and cut up two medium-sized marrows, put them in an enamelled saucepan with an ounce of butter, an onion, a little celery seed, a bay leaf, pepper corns, tied in a muslin bag, salt, and enough stock to barely cover the vegetables. Boil them till quite soft, then rub through a sieve; return them to the saucepan and add enough milk to make the soup the consistence of cream. A little cornflour may be added to thicken if liked. Serve with fried croutons.

— Broad Beans with Sauce. —

Boil the beans, remove the skins. Put them in a saucepan with a tablespoonful of chopped ham and cover with brown sauce. Add a squeeze of lemon before serving.

— Duchess Pudding. —

Mix a pint of milk with an oz. of cornflour; boil up; add two ounce of sugar and two tablespoonfuls of crumbled sponge-cake. Beat all well together, and when cool add four well-beaten eggs and half a glass of sherry. Decorate a mould with raisins and citron peel, and steam the pudding in it for an hour and a half. Turn out and serve with custard sauce.

— Custard Sauce. —

Beat up an egg; add half a pint of milk and three lumps of sugar; stir over the fire till the sauce thickens, flavour with vanilla, and pour round the pudding.

— Meringues with Cream. —

Beat the whites of six eggs to a stiff froth with six ounces of castor sugar. Put spoonfuls of the mixture on waxed or buttered paper. Allow a little space between each Bake in a slow oven or in a good moderate oven with the door left open. When cold, scoop out some of the centre of each meringue, fill with whipped cream, and join two together, enclosing the cream between.

— Green Gooseberry Jelly. —

Three quarters of a pint of water to each pint of berries. Simmer until the berries are broken, put them into a jelly bag, and drain overnight. Measure the juice and boil it quickly for fifteen minutes. Stir in an equal measure of sugar, and boil steadily half an hour. It should be then ready to pour into jelly glasses, but it is best to try it first. Skim well while boiling.

— Celery Soup. —

Wash one head of celery and cut into pieces: simmer in two quarts of stock for half an hour or until the celery is tender. Make a thickening with four ounces of flous, pour into the soup, and boil for ten minutes; then rub through a sieve, return it to the saucepan, add half a pint of cream or good milk, bring to the boil again, and serve with fried croutons.

— Rice Soup. —

Melt four ounces of fresh butter in a saucepan; add half a pound of rice, a pound of veal (cut in pieces), half a pint of tomato sauce or four tomatoes sliced, a chopped onion, a tablespoonful of chopped parsley, some pepper, salt, and cayenne. Fry in the butter for ten minutes; add a pint of stock or water, and let the rice simmer until all the stock has been absorbed; then add enough stock to reduce it to the proper consistency. Skim off the fat and serve very hot.

HORTICULTURAL DEPARTMENT

Open Border Notes for December.

All summer seedlings should go in without much delay. Half the battle in giving them a good start is to have the ground well watered a day or two beforehand, so that it is moist and kindly to the touch when dug and raked over. Also water the seedlings well before taking out of the seed box or pot, plant them firmly but not too deeply, and water and mulch at once. If bought seedlings are wilted before you have a chance of putting them in, it is a good plan to plant the whole packet, without undoing the wrapping, in moist earth, water them well, and cover them with a pot or box for a few hours.

Sabvias, Asters, Petunias, Dianthus, Gaillardias, Zinnias, Phlox, Marigolds, Celosias, Amaranthus, Cosmos, and Calliopsis are a dozen which will give you no trouble.

Cannas are one of the hungry ones. They will not make the lusty, vigorous growth which makes such an addition to their beauty unless they have plenty of water and a good mulch of manure which has some body in it. Some weak liquid manure once a week will also help them along. Mention of the canna reminds one that seed should be sown now. It is very hard, hence their name Indian Shot, and will be none the worse for a thorough soaking. Pour very hot water over them and let them steep in this for twelve hours.

Other seed which can be sown to advantage this month are Cineraria (do not, by the way, forget the Stellata type, of which we saw such a beautiful show last month), Cyclamen, and Primulas, either for indoor or outdoor flowering. Gloxinia, Calceolaria, and Begonia where you have facilities for growing them. The always popular Pansies and Stock at the end of the month, though you may get there almost, if not quite, as soon with much later sowing. Balsam grow and flower very quickly, and if you have room for a packet or two, in not too sunny a place, why just dib them in nine or ten inches apart. Hoe, mulch and water and you won't be disappointed. Small patches of summer flowering annuals just to make up for failures in earlier sown lots may be made, but in a general way we should have finished with the late flowering plants of this season and be looking forward to the early flowering ones of next. Snapdragons, Penstemons, and Columbines are three you should sow if you have not already done so. Don't hurry the seedlings when they appear, just keep them gently moving.

Don't forget that the nurserymen are able to sell you some very nice dahlia plants in pots, which will be flowering in three or four months' time. That is, they will flower if you do your share. In planting out see that they have been well watered beforehand and that the soil is nice and mellow. Knock them gently but firmly out of the pots, and please do not pull them out by the stalk. Plant them firmly, but you can do this without your number nine boot. Boots and the brittle roots of the dahlia do not agree. Early planted tubers and last year's clumps of the coarser kinds will be making very strong growth. Unless you want them to flower at the hottest and most trying time, try cutting them down and let them begin again. Some plants might object to this treatment, but the dahlia appears to thrive on it. You do not want to rush this plant along at this time of the year, as long as they are healthy and making moderate growth you can be a little easy with the water tap.

Cut back carnations which are showing a lot of old stems. Keep them well mulched and watered and you will be delighted with the fresh lease of flowering life which will result. Verbenas will respond to the same treatment. Geraniums which may be looking shabby will also be all the better for it.

Don't forget that you do as much good by spreading a dray load of manure, or a barrow load for that matter, on the surface of the garden as by digging it in. Some, at least, of the "goodness' goes down with the watering, and what is left of the mulch in autumn will do as much good in opening and lightening the ground then as now. Plant food in super, bone dust, and potash is more cheaply bought than in manure, and in any case what you save in water by the use of a good two, three or four inch mulch will go a long way towards paying for any artificial substitute.

Mulching naturally reminds one of the roses. Those which were cut back after the first flowering are making preparations for a second and perhaps unnatural crop in a few weeks' time. They will be helped by a regular weekly allowance of some gentle stimulant in the way of manure water. Do not forget the chrysanthemum bed when trundling the mulching barrow. Where ordinary decorative blooms are wanted it will be time to cut the plants down. They, like the dahlia, will not mind at all. Water as they need it, but do not flood the bed. Delphiniums and Pentstemons will both be candidates for any you have to spare. Keep the former clear of old flowered spikes and all new growth securely staked as soon as it becomes necessary.

If you have not divided up your violet, polyanthus and primroses it may still be done or can be left till March for the violets and later still for the others. You certainly get finer and earlier violets by summer division, but you occupy a good deal of sometimes precious room. Take up the clumps. Carefully select the old, exhausted parts of the crown and throw them away. The newer growth you divide so that each piece to be planted has its share of root. Plant very firmly in a well dug and manured bed or border. Mulch to keep the root run cool and moist, and give plenty of water to keep it so. When the plants are established and making nice growth, you can ease off with the water, for you do not want to do more than keep them just green and growing. Violets are not at all afraid of a reasonable amount of sun, but any of the polyanthus primrose tribe will want a more shady situation during the summer months. Perhaps the best plan is to set them in under an orange or similar tree, and divide when they make new growth next season. They are worth taking care of, but an ordinary summer month in an exposed open situation will simply bake these plants out of existence.

Couch and buffalo grass are still plantable. Many old lawns are still looking for that spring dressing of nice sandy soil; it is not too late. Also a little sulphate of ammonia in weak solution will be appreciated. Don't be afraid of planting out pot grown stuff. Much of this will turn out better in December than June. Bouvardias, Bougainvillea, etc., much prefer it.

Readers ! Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Garden Notes.

—Nasturtiums.—

Why is it that Nasturtiums are so seldom given prominence in the garden? Is it that they are too easy or too common? We have just been looking at a bed, or rather heap, which certainly proves the truth of the former "fault." What was a few months, or rather weeks, ago an untidy heap, mostly bricks and rubble, has been converted with the aid of a couple of barrowloads of soil, a tree stump or two, and a couple of packets of mixed seed, price 3d. each, into a veritable glory patch. No sowing in specially-prepared beds, no hardening off in pots, no bother about slugs, no mulching, no heavy watering, no anything. And the result. Well, just beautiful. Pale yellow with flaming orange, bronze and amber, with wine dark reds merging into black. What a colour scheme. There is hardly a flower which gives so much beauty at so little cost. They do not end their beauty in the garden, for with their cool green leaves they add a charm to the most daintily arranged table, and though one hardly likes to mention such mundane affairs, the leaves make an excellent addition to a sandwich, and their seed, as a substitute for the coarse commercial caper, to the most tender cuts of a nicely-boiled leg of mutton. Don't forget the Nasturtium for autumn and winter sowing.

—Graceful Growth—

There is perhaps a special grace about plants which from a thick tuft throw up long slender stems crowned with delicate blossoms. These add the beauty of extreme gracefulness, and of course they must be planted so that they are seen from that tuft of foliage below to the dainty flowers above; because they may reach two and a half or three feet they are often marred by having dense plants of shorter growth in front of them. It is, perhaps, in a nice perception of these details of garden craft that lies the secret of achieving a beautiful garden, as compared with one that is ordinary and commonplace. There may be the same varieties of plants in each, but the effect of one will be of beauty so subtle but so real that we shall hardly know wherein it lies, while the other may make no impression upon us. The novice has learned a valuable lesson when he realises that true and artistic gardening does not mean merely the skill to grow plants, however well he may grow them. A poor little strip of a town garden, tended and cared for by one who was veritably a garden artist, may be far more picturesque and artistic and interesting than a much larger garden in a beautiful country district. Only a study of nature, a study of the subtle and often surprising harmonies, contrasts, distinctive character, boldness, or dainty gracefulness can achieve a really beautiful garden.

—Rosa Wichuraiana and its History.—

The word "wichuraiana" is derived from the discoverer's name, Herr Wichur, who was a German botanist (says "The Garden"). He accompanied the Prussian expedition to China in 1859-61, and during that expedition the species was discovered. This botanist was suffocated in the year 1866. In the "Index Kewensis" R. wichuraiana is mentioned there as R. Luciae. It was not until about the year 1895 that an American, Mr. Manda, took the species in hand and hybridised it with other roses, which produced such sorts as Manda's Triumph, Pink Roamer, and, later on, Gardenia and Jersey Beauty. Evergreen Gem came to us from the United States. The well-known Dorothy Perkins originated also in America, its parents being the species and the Hybrid Perpetual Rose Mme. G. Luizet. The species is a very low, trailing plant, with bright glossy foliage and large clusters of pure white single blooms, blooming in August. It is very readily hybridised, and is capable of vast improvement in the hands of the skilful hybridist.

— Lilies in Pots. —

Liliums in pots may be given liquid manure when in full growth, and the pots are filled with roots. It would be a mistake to give them any manure while they are just pushing through the soil or for some time afterwards. A little manure may sometimes be used in the soil when potting, but more especially when top-dressing, and in that case liquid manure would be unnecessary until some time after the top-dressing. One may, however, give liquid manure when the stems are about 18 in. high or 1 ft., provided the leaves are fully expanded, but it ought to be weak rather than strong. After the buds commence to expand liquid manure may be made stronger. After the flowers commence to expand liquid manure is of no further service as far as the flowers are concerned, and the soil should, indeed, be sufficiently enriched to enable Liliums to complete their growth without any further liquid manure after that time. One should remember that Lilies are not very gross feeders, and if their constitution is in any way weakened by over-feeding the bulbs may decay after flowering.

— Fixing a Strain. —

The verb, "to fix," is often used in gardening phraseology. When a cross is made between two varieties the resulting seedlings generally give several different colors. Some of these are sure to be of a poor character, but the best one only is selected, and the rest thrown away. Seeds from the best one are sown, and the seedlings may again show some variation from the desired color, but all these are weeded out — or "rogued," as the term is—and seed saved again from the desired color. The same process may be gone through again and the seedlings again rogued, but if these are of only one colour, and that true to type from which the seed was saved, then the grower considers that the variety has been fixed. Seeds saved from new varieties are very liable to sport—that is, to give rise to other colours inferior to that which is desired. The inferior ones are pulled out as soon as they come into bloom and seeds only saved of those which have come true to the type. The process is, of course, repeated for a number of years until the desired variety ceases to sport. It is then said to be fixed.

—Cheap Fumigation.—

A convenient and effectual method of fumigating plants attacked by green fly, etc., for those possessing only a few plants for window decoration is performed by procuring a tobacco pipe filled with strong black tobacco says an exchange. Next take the plant to be fumigated and wrap it closely round with newspaper, and then light the pipe and smoke till the tobacco is well kindled; place a lid on the pipe and lay a handkerchief over it, pulling the loose ends tightly round the bowl of the pipe. Next push the stem of the pipe through the newspaper on a level with the rim of the pot and blow through the lid till you are sure the space within is completely filled with smoke. The paper should be left on for about an hour.

—The Use of Liquid Manure. —

Most gardeners know the value of this for plants that are rapidly advancing to their maturity, though the novice in his ignorance of the properties of sulphate of ammonia, nitrate of soda, soot, animal manures, salt, &c., is often inclinded to ignore them, but roses, carnations, delphiniums, in fact the choicest things of the garden that have to produce an abundance of blossom over a long period are greatly helped by occasional doses. It should always be given after rain or a thorough watering with clear water; it should never be too strong for the plant to which it is administered, and it should not be given too frequently. When one realises how grandly some plants flourish near the sea, it is not difficult to fancy that the vigour is to some degree due to the salt. Carnations are said to respond to the treatment, and enjoy a pinch of salt in the water, and especially during a time of drought. There is this to be said of salt, however, the ground is inclined to harden unduly, and therefore must be frequently stirred with the hoe. Soot especially in a cold, heavy soil is beneficial to most growing plants, and may be used as a change sometimes, rather than, as is often the case, relying solely on liquid animal manure. This last, of course, is especially useful for strong-growing specimens, and unless it has been plentifully supplied by being dug into the soil the roses will greatly benefit by occasional doses. Nitrate of soda and sulphate of ammonia are powerful stimulants, and their action is quickly perceptible, but they should be used only occasionally and in turn with others.

—The Lawn Mower.—

Before commencing work the running parts should be oiled, and when cutting is finished, dirt and grass should be brushed off. An oily rag rubbed over the knives and plate will keep it from getting rusty. Setting the knives to the plate must be done carefully, as the smallest movement of a screw will cause it to go heavy with unnecessary wear, and the least lifting from plate will not cut the grass. Place a piece of notepaper between plate and knives, when if it cuts this evenly from end to end without rattling it will make good work.

—Choisyea Ternata.—

The Choisyen ternata is one of the best of our smaller shrubs. A nice stock of plants for forming a low hedge may be worked up by taking cuttings of young growth, three or four inches long. Set around the side of a pot, which should be placed in a moderately shady position. Pot off singly later.

—A Useful Little Propagator.—

One may be easily made from an empty box. Cut the two sides and front so as to form a good slope (says an exchange), leaving sufficient depth to hold small pots standing on a good layer of cocoanut fibre. An odd slip or two of glass to cover closely over the top is required. Nail four strips of wood to form the legs at each corner of sufficient length to allow a small oil lamp and a large tin baking dish to pass just freely under. Carefully trim the lamp once a day, and then fill the tin dish with hot water. Put this on top of the lamp and allow an hour or two to pass before putting in the pots or seed, &c. As the first growth above the soil appears give a little air by raising one piece of the glass, allowing more air and longer time each day until the seedlings can come out of the propagator, and go in a sunny window or greenhouse.

—Stem Rot in Carnations.—

This is a serious disease, and one that is very difficult to control. It is caused by fungi, which spread in the soil in the same manner as the roots, and in this way they produce diseases by destroying the tissues of the plants upon which they feed. Diseases of this nature are the outcome of some unfavorable conditions, planting too deeply, or imperfect drainage; hence the necessity for careful preparation before placing out plants and planting them in a proper manner. Prevention is better than cure. Stem rot is the dread of carnation growers. It, however, is not primarily a rotting of the stem, but a wilt disease manifesting itself first by a wilting of the leaves of some of the shoots often on one side of the plant only, and in nearly all cases a portion of the plant is at first affected, more particularly in the early stages of the disease. This disease always progresses upwards, and the affected branches soon droop and die, until finally the whole plant follows suit. There does not appear to be any cure for this disease, as it strikes and enters the plant at the root; it baffles the carnationists like cancer baffles the doctors. When a plant dies from the disease the soil should be renewed before setting another in the same position.

—Woodlice in a Green House.—

Woodlice seek shelter during the day in any crevice or spot where they can hide themselves. Where it can be done without injury to the plants, boiling water should be poured into any place where they are likely to congregate. They may also be readily traped by cutting Potatoes in two and scooping out some of the centre. Then lay these Potatoes with the hollow side downwards, and when examined next morning the woodlice will be found sheltering there, when they can be readily destroyed by dropping them into a bowl of boiling water. If these hollowed out Potatoes are laid on a hard surface, a notch or two must be cut in them in order to allow the woodlice to enter, otherwise they will be unable to do so. Another good means of trapping these pests is to take some small clean pots, then place in each a freshly cut piece of Potato and fill up with a little dry moss or hay. These pots must be laid on their sides in the most likely places and examined the first thing in the morning, when the pests found therein may be destroyed.

—A Remarkable New Sunflower.—

A new sunflower is referred to in a recent "Garden" as a very striking flower, with a broad band of chesnut red round the base of the yellow petals, and is the result of a cross made between Helianthus annuus (the common annual yellow sunflower) and H. lenticularis (the common wild Sunflower of North America).

—Placing Window Plants in Rain.—

One frequently sees Ferns, Aspidistras and Palms, also other kinds of plants, put outside during rain showers or under the hose so that the leaves may be washed clean. It is a very good plan to treat the plants in this way when they are placed in a shaded position. The mistake generally made is to expose the plants to sudden bursts of strong sunshine as well as to the rain, with the result that many leaves which have never before been exposed to the sun's rays get badly scalded. There would be no risk if the plants were taken indoors again before the sun shone, or if they were put in a position not exposed to the sunshine.

—Soil for House Plants.—

To keep the soil of house plants sweet and hence encourage growth: Stir gently the surface, guarding against bruising or breaking any roots near the surface by following the lines of the roots rather than ripping them upward. The effect of stirring the soil of plants is similar to that of hoeing garden plants. To keep ferns lnxuriantly green, spray with lukewarm water by using a small rubber sprayer or whisk. This use of the whisk has several advantages. It aids both the whisk and the fern: the former, in that the straws are cleansed and refreshed; the latter, in that breathing pores are freed from dust, thus giving the plant health and beauty.

—Are Unwieldly Names Detrimental to Roses.—

This matter was brought rather prominently to my notice by the remark of a large grower, who said that the name of a certain rose "absolutely kills the variety," also that he did not believe it would ever become popular under the circumstances. I am quite averse to a long, ungainly name, says a writer in the "Garden," but I imagine if a rose possesses real merit, its name will not prevent it being grown. I remember when Frau Karl Druschki came out there was a cry raised against its name, but it is now in almost every garden in the land, and familiarly known as Frau Karl or in the trade as Druschki.

I remember the introduction of a French rose named Fiancailles de la Princesse Stephanie et de l'Archduc Rudolphe. Of course, this was difficult, but if the rose had any real merit it would be still grown to-day. I daresay to foreign ears Mrs. Wakefield Christie Miller sounds just as bad as many of the German names of roses do to us.

—Amateurs as Specialists. —

The old proverb, "What is worth doing is worth doing well," applies with more force to amateur gardening than it does to those who make it a profession, for the amateur having more time and a far smaller field can apply himself to much closer investigation than is possible to the professional. The gain to the amateur is manifold; for example, by becoming a specialist he finds greatly increased interest in his favourite plants; he develops his power of observation and reasoning; he has opportunities of displaying his skill to appreciative friends. All the great specialists who have won fame or fortune were at one time amateurs like you or I (writes "The Gardening World"). One produced a new grape, another a new potato, another a new dahlia, and so on. You could as easily succeed. Why not try? It is worth attempting. The field is so immense that there is scope for every one, not merely to improve a plant, but to produce entirely new kinds of plants. At the same time learning that he may also teach—by experiment—the best method of cultivating any speciality. One man may take up a shrub, another a flower, each as his fancy dictates; and by careful study even the humblest may achieve as much as the best equipped amateur. For ladies, invalids, and those who suffer from nerves, as well as for men of all ages and conditions, there can be no better amusement, investment and study, than that of being garden specialists.

—Camellias in Pots.—

To grow Camellias well, in pots, care and regularity are necessary, as if neglected they soon fall a prey to scale and other insects. Nice healthy young plants can be purchased at a reasonable price, and these should be shifted into pots sufficiently large, draining them well and using a compost of sound fibrous loam, rather strong than otherwise, a sixth part of well-rotted manure free from worms, adding freely rough sand or road grit. Firm potting is essential. Although Camellias enjoy occasional supplies of liquid manure, none should be given until the pots are well filled with roots, that made from steeping a bag of sheep manure in a large tub of water—this being diluted till it asumes the colour of pale ale—being the best.

—A Flowery Land.—

The total area of the Scilly Isles is 3,600 acres, of which rather less than 2,000 can be profitably cultivated. Immense quantities of Narcissi are grown there for the English market. About 37 years ago there were eight varieties of these bulbs grown there. How these flowers came into the island is a matter of some obscurity. It is not unlikely that some of the varieties may have been introduced by Benedictine monks, who, through long generations, occupied the priory of St. Nicholas. One of the most striking sights to be seen at Scilly are the little boats laden with the fragile and fragrant flowers which struggle from the smaller "off islands," some dark and stormy winter morning, against surge and blast, to reach the steamer at St. Mary's pier. One consequence of the growth of the Narcissi industry in Scilly has been the discovery by the farmers of the value of glass-houses, for, mild as the Scillonian winter is, the marketable Narcissi cannot safely be grown out of doors So the beautiful flowers—now quite multitudinous in their variety as compared with the original eight kinds—are picked long before they are open,. and brought into the hot-houses, where, placed in bowls and vases, they develop size and beauty in a damp temperature of 70 degrees.

—Staking.—

We must not forget that as a rule staking is not an operation that can be done all at once, or, if the staking is, at any rate the tying is not. Never delay either operation after the need of it is perceived, and on no account tie a plant up to its stick as if it were a bundle of faggots. Strong dense plants should have three efficient stakes to each plant. This will mean that only a third of each plant will be tied in to a single stick, and the result is that light and air will penetrate to the heart of the plant; and, so far as appearances go a subject thus treated will look far more natural and beautiful than if it is encircled with but one tie binding it close together. Tie plants to their stakes while still young and straight, but do not forget that as they grow bigger they will need more tying higher up the stems. Strong twine is the best material to use for all heavy sturdy plants, and it is a good thing to study the natural growth of the plant before tying, that care may be taken not to destroy more than possible the individual character and habit. For many things it is a good plan to tie the twine round the stake first and then to encircle the plant; this is especially to be recommended in windy situations.

—Care of Tools.—

Gardening work is rendered much more laborious than it need be if the workman's tools are not kept in proper order. Spades, hoes, and all tools should be kept clean and bright; with dull, rusty, or half worn-out implements the work takes longer to do, and is not so well done. It is trying to one's temper to have to work with unsuitable tools. Gardeners get attached to a spade, and persist that it is impossible to do effective work with it. A small grindstone is in using it until it is so worn away not an expensive article, it will last nearly for ever, and is most useful for sharpening spades, hoes, knives, or other implements upon. No tool should be left out at night; only the careless or lazy man would neglect to take it to the shed, where it should first be cleaned, dried, and hung up. Tools which have to lie by for a time should be wiped with a rag on which a little kerosine has been poured, this simple precaution prevents rusting.

—Growing Ferns Indoors.—

The best soil for ferns in general is a light, porous loam or leaf mold, one-half, and not too finely broken up, and the other half well rotted manure and sharp sand, equal parts. This should be well mixed. When potting the ferns, drainage should be provided for by filling in first with charcoal, coarse gravel, or something of the kind. Remember that ferns object to stagnant moisture at their roots and over-supply of water. While care in watering must be followed, and while it is a good plan to water plants by setting them in the soil so that the water will be certain to reach the roots, one should watch against mistreatment of plants in either extreme, that of soaking the soil until it becomes sour or allowing it to become too dry. Ferns, as a rule, require a soil kept on the moist rather than on the dry side, therefore provide for good drainage. Give the plants plenty of light, a moderately warm and moist temperature, and they will soon adapt themselves to the conditions of the living rooms.—Floral World.

—Moving Evergreen Trees.—

To move evergreens in summer, if it has to be done, needs care. First of all a trench should be dug around the plants of about 2 ft. from the main stem. In doing this any roots encountered should be cut cleanly off. It is probable that you will not find many roots, but the distance they travel from the main stem varies according to age, condition of the soil, and other matters. Then tunnel underneath, tie some stout canvas or mats around the mass of soil to keep it in place, put some pieces of wood around to prevent the ties cutting into it; then by making an incline to the bottom of the hole at the side the plant is to be taken out, it may by means of planks and rollers be drawn therefrom and removed to its new position. If to be taken some distance a low trolley is very helpful. In planting great care must be taken to work the soil firmly all round, and after it is finished a good watering will be beneficial. Frequent hosing is of great help, as it tends to keep the foliage fresh till the roots are again active.

—Japanese Pagoda Tree.—

Of the many beautiful trees and shrubs in cultivation a great number come from Japan. The Pagoda tree (Sophera Japonica) is one of them. Being a round-headed, symmetrical tree, it is well to plant by itself rather than in a group, and in such a position its beauty, when in flower, is the when, the superfluous water having better enjoyed. The blossoms are cream-coloured, and the panicles are, under favourable conditions of growth, so large and so numerous as to make a really great display, really weighing down the branches. Pods containing bean-like seeds follow.—"Exchange."

—Charcoal.—

Wood, burned to a powder, would be described as wood ashes by gardeners and not as charcoal. Charcoal to be of service to gardeners must be in the form of lumps of varying, yet of moderate size. For instance, it is often used as an ingredient of potting composts. It serves to aerate the soil, to help the drainage by making the soil porous, and it also serves to hold the constituents of plant food in a gaseous state or in the form of a salt. In this latter instance it might be said that charcoal was a manurial agent. Charcoal in itself consists chiefly of carbon which cannot be utilized by plants as a manure. Generally it may be regarded rather as an outdoor servant than as an element or constituent of plant food. When wood is burned to ashes the latter are rich in potash. If the wood were young rather than old there might be some potash in conection with charcoal, but certainly not so much as in the case of wood ashes. The above will explain the preparation of charcoal for horticultural use, and it is generally used for increasing the porosity of the soil as in the case of plants, whose roots are of a delicate nature, and want careful treatment. Charcoal has a great power of absorbing the various things that may be in the soil, and when it gives up these to the roots it might be described as a manuarial agent.

Gloxinias.

Gloxinias are, among the easiest and also most beautiful of all plants when really well grown, and deserve to be taken up and grown in the same spirit and same manner as the roses, dahlias, and carnations are now by some of our very best amateur growers. Of course by their not being so hardy as the plants above mentioned, and needing the protection of frames or glass houses, they will never be grown to the same extent as the roses, &c. Still, although they may not be everybody's flowers, there are those who like them better than any other flowers, and we all know it is the man with the "hobby" that always does them best, and obtains better results than any other grower.

The Gloxinias from which the present garden varieties take their origin are natives of Tropical America, and were so named in honour of Benjamin P. Gloxin, a botanist of Colma. Their propagation from seeds is simple—as easy, in fact, as that of Begonias—and, with a little care and generous treatment as to temperature in the early months of the year, they may be depended upon to produce a most gorgeous floral display.

Gloxinia seeds are excedingly minute, so that some care is necessary in the sowing and the preparation of the pots and soil for their reception. A shallow seed-pan or, failing this, an ordinary flower pot should be carefully crocked to within 2½ in. of its top, and on the crocks a layer of rough fibry material placed to prevent the soil washing down into the drainage, and this covered with a compost consisting of equal parts of loam and good leaf mould, with a fair sprinkling of fine potting sand to the depth of about 1½ in. The compost should be well mixed, baked to get rid of insects and destroy fungus spores, and passed through a fine sieve. Some pure leaf-mould should then be taken, well baked and rubbed through a very fine sieve (such as is used in the kitchen for straining gravy), placed on the top of the compost to the depth of about one-eighth of an inch and carefully levelled. The pot or pan must now be placed in water, the level of which should be just below the top of the soil, and allowed to remain therein until the whole is thoroughly soaked, been allowed to drain, the seeds may be sown.

—Sowing the Seeds.—

Gloxinia seeds being so very small, it is impossible to scatter them evenly and thinly with the fingers, and they should therefore be mixed with a little fine silver sand, and the mixture scattered carefully over the surface of the soil. No covering is necessary, or at the most a very slight sprinkling of the fine-powdered leaf mould. It may be here stated that the object of having the top layer of pure leaf mould is an important one, and should not be overlooked when dealing with Gloxinia, Begonia, or other minute seeds; it does not readily "cake" as pure loam would, nor is the troublesome liverwort, which so often develops on the surface of pot soil likely to appear, and therefore the inevitable loss of a large percentage of the minute sedlings will be avoided.

The pots may now be plunged in fibre in a propagator or other heated structure where a temperature of 65 to 70 deg. (the latter for preference) can be maintained, covered with a piece of glass to conserve the moisture, and the whole heavily shaded, a piece of brown paper being well adapted for this purpose. The soil must not be allowed to become dry, and whenever water is needed it should be applied by immersing the pan nearly up to the rim and not by means of a rose or syringe overhead; warm water (70 deg.) should always be used. The propagator should be kept close and only opened for a short time morning and evening to allow the stagnant air to become changed, and at the same time the inside of the glass must be wiped dry; neglect of this may result in the wholesale damping off of the seedlings.

In about ten days the tiny plants will begin to make their appearance, and the brown paper shading must then be removed and full exposure to light given, but protection from the sun's rays must be afforded by means of tissue paper or light muslin. While the first pair of rough or true leaves are in process of formation is the best time to prick out the seedlings into shallow pans or boxes, using a compost as before, but omitting the layer of leaf mould on the top. At this early stage pricking out is a somewhat tedious and troublesome operation, but it is important to take it in hand before the little rootlets have had time to run far and thus avoid a severe check to the plants. For lifting, a small zinc plant label, in the pointed end of which a V-shaped notch has been cut, will be found a very efficient tool, as it may be bent to any angle required. Each plant should be levered out of the soil by means of a large match with one end pointed, carefully lifted with the notched label, and deposited into a small hole made in the new soil with a pointed stick and carefully dibbled in. In this way it will not be necessary to touch the plants at all with the fingers. As already stated, this will require time and patience, but it is surprising how quickly and neatly it may be done with a little practice. The seedlings should be planted about 1 in. apart, and the pan containing them then immersed in a vessel of water as described above, allowed to drain, and then be put back again in the propagator and kept close for a few days till root-action is again vigorous.

—Growing On.—

From this time full exposure to light (with the pans near the glass), but not to direct sunlight, must be given; a sturdy and robust growth will then result. As soon as the leaves begin to touch one another a further shift must be given, this time planting singly in 2½-in. pots, carefully crocked and filled with soil consisting of loam two parts, leaf mould and fibrous peat of each one part, with about half a part of coarse potting sand, the soil being made moderately firm about the roots, and the whole moistened by standing the pots for a few minutes up to their rims in water.

From now onwards the plants should be shaded from bright sunlight and kept on a shelf near the glass in a temperature of 60 deg. to 65 deg. The soil should be kept moist, but the leaves must not be wetted. When the roots begin to work well round the sides of the pots —which may be ascertained by carefully turning out the ball of soil by inverting the pot—the final shift should be given into 5-inch pots, this size being the most suitable for flowering in the first year. The compost for this potting must be carefully prepared, and consist of good mellow fibrous loam three parts, lumpy peat one part, leaf mould one part, and a fair sprinkling of coarse sand to keep the soil porous; a little guano may also be added with advantage.

Gloxinias enjoy during growth a fair amount of moisture, but during the flowering season somewhat drier suroundings will result in a prolonged flowering period. The best temperature to grow Gloxinias in is about 60 deg. to 65 deg., but they will, when once started, do quite well during the summer months in a greenhouse in which there is no artificial heat.

In conclusion, let it be impressed on those contemplating the culture of these charming plants to always procure the best seed obtainable, and probably what is known as "mixed" seed, producing as it does a great variety of colours and shades, will give the most satisfactory results, with every possibility of obtaining some novelties as to size and colour.

The Budding of Roses.

An amateur rosarian should always have a few stock handy for "working" or budding himself. Perhaps he may want to duplicate some of his own varieties, or he might have the chance of getting a bud or two of some coveted novelty from a brother rosarian, and if the stock be ready in his own garden all difficulties disappear. The operation of budding is simply and easily learnt, especially if one has the chance of actually seeing it done. It is essential that the stock be ready—that is, the bark must come away from the wood easily, showing that the sap is running. The only things necessary are a budding knife (cost 2/), which must be sharp, some budding cotton (3d. a ball), and a deft pair of hands.

Commence by carefully removing leaves and thorns for 4 in. along the stock, where the bud is to be inserted. Then the bud must be prepared. This is done by taking the cutting from which the bud is to be taken, and insert the knife about half an inch below the bud, cutting near half-way into the wood of the shoot, continuing it with one clean slanting cut, about half an inch or more above the bud, so deep as to take off part of the wood along with it; then with the thumb and finger, or point of the knife, slip the woody part of the bud out, and observe if a tiny piece of wood still remains over what is called the eye of the bud, if it does, then the bud is perfect, but if not, then it is useless, and another bud must be cut. When this is done, place it in the mouth, and with the knife make a horizontal cut across the branch to be budded, right through the bark to the hard woody part. Then make a slit downwards perpendicularly to the first cut, also going through to the wood, then neatly, with the flattened handle of the knife, separate the bark from the wood. Into this incision slip the prepared bud, right down so that the leaf stalk is about half an inch below the first horizontal cut. The next operation is to cut off the top part of the "shield," as the inserted bark is called, even with the horizontal cut first made, in order that the bark of the stock and the bark of the shield shall exactly coincide at the transverse cut of both.

Then, commencing from the bottom, tie the two together with the budding cotton, proceeding upward, closely round every part except the eye of the bud itself, and continue it a little above the horizontal cut, not too tight, but firm enough to keep the parts well together and exclude the air. At the end of ten days the tie may be loosened, and if the bud has taken, the tiny piece of leaf stalk will fall off and the bud will appear green, but if it has failed it will be dried looking and black.

Keep the stock well watered and all growth, other than that of the inserted bud, cut back. Very little practice will enable one to be most successful in this interesting operation. A very pretty effect can be secured by working various kinds of roses on to one. For instance, most of us have a yellow Banksia growing on trellis or arch, and this Rose is a first-class stock.

Some Diseases of the Rose.

Some three or four hundred different species of fungi are recorded in books as attacking the roses of different species; but, fortunately, only four of them cause serious trouble and anxiety to the rose grower. The diseases they produce are too well known, at least by name, to every rose grower; but possibly the symptoms are not quite so well known.

What is Disease?—Perhaps it is necessary to point out that the fungus is not the disease, but its attack sets up a condition of disease by (1) crippling the foliage and in other ways interfering with the normal performance of the life-work of the plant, (2) robbing the plant of food intended for its own use and needed for its own development, and (3) forming poisons which destroy or damage little or much of the host's tissures. It is quite clear that wrong method of cultivation, i.e., failure to provide the proper environment for the plant, will also cause disease; but there is one great and important difference between diseases due to the attacks of fungi and those solely due to imperfections in an inanimate environment, and it lies in the contagious character of the former.

Dissemination of Disease.—Canker is as catching as measles, rust as infectious as whooping cough, black spot as contagious as smallpox, and mildew as catching as a cold. Like these human diseases, those of the plant may pass over individuals, and even whole races may be comparatively immune. Like them, too, the condition of the prospective victim and the nature of its environment, which so much determine his condition, to a great extent determine whether or not the plant shall succumb to their attacks.

The Value of Sturdy Plants.—If one wishes to keep a plant free from disease, one must keep it in health, which is to say, plants really healthy rarely (not never) fall victims to the attacks of fungi. The first principle, then, is to see to it that our plants are grown so as to be sturdy and strong; open to the light and air and sheltered from cold draughts, but not in a closed-in space so that air has no free circulation; in soil well drained and sweet, moist, but not so as to encourage the development of sappy growth; rich in plant foods, but not overrich in nitrogenous matter.

Prevention Better than Cure.—The next point to remember in dealing with diseases caused by fungi is that when once damage has been done, say, to a leaf, actual cure is impossible, i.e., the particular leaf damaged cannot be repaired, though the plant may develop new foliage in its place. So all our efforts must be, when once the attack has begun, towards prevention of its spread. Thus we come to the bedrock fact "Prevention is better than cure," and may consider what preventive measures to adopt in dealing with these four diseases, beginning with the most virulent.

Mildew.—The fungus giving the mildewed appearance grows outside the plant, merely sending suckers into it to obtain nourishment. Hence its presence is quite evident, and it may be detected by careful observation at its first onset. It attacks all the growing parts, causing the leaves to become curled and incapable of performing their functions. Shoots and buds are also attacked. The powdery appearance of the mildewed leaves is due to the presence of myriads of spores, each capable of reproducing the fungus in a fresh centre. As the fungus is itself on the outside of the plant, it may be killed by suitable applications, and either plentiful dusting with flowers of sulphur while the leaves are damp with dew or spraying with sulphide of potassium (liver of sulphur) at the rate of 1 oz. to 2 gallons of water. It is important to note that mildew is always most virulent when the roses have received a check. Good drainage, combined with a dust mulch formed by a hoe, will do much towards avoiding atack, and at the same time, where mildew is prevalent, choice may be made of those varieties which, in the particular district, resist the attacks of mildew best. Probably no varieties are perfectly immune, but some are less prone to attack or suffer less from it when it comes than others.—"The Garden."

Layering Carnations.

Carnations are being layered this month. The operation is quite an easy one. Cut away all the old flower stems first. These are no use to you. Next scrape the surface soil away from the base of the plant. This you do to allow the stems to spread and bend down more easily. Lay each section of the plant out in as direct a line as possible, making the crown the hub of the wheel. If the ground is light and sandy, no new soil need be brought to help in the rooting of the carnations; but if it is heavy, it will be necessary to bring some light material to lay the shoots in when you have made a cut at the point where you desire the new roots to form.

The light sandy soil permits a freer rooting than a medium that is heavier. Bend the shoots into position, and build the soil up underneath anything that cannot be brought down with ease. We do not mean that you should bank up twelve inches of earth to catch a shoot that is high up on some old dry stem. The building up should never be more than a few inches at most. The elevated pieces must be left alone if it is not possible to bring them down by an easy bending. It will not do to break the growths in the process of layering. The idea is to leave the shoot attached to the parent plant, from which it will draw sustenance while the portion where the cut is made sets up a rooting on its own.

Have some fine wire "hairpins" (none of the family will use thick enough wire), ready for pinning down the shoots after the cuts are made. These you make yourself. Lengths of wire turned on one end like a shepherd's crook will do as well as pins.

Now set about making the cut in the stem. Do this with a sharp knife through a joint at a distance that will let the bending be done without breaking the stem. Where the piece of growth sits nicely in the soil will do. Don't cut through the joint. Halfway in, and then a third of an inch along the shoot will do all that is required. Be careful in handling the stem now, or you will break it off. Put a pin on either side of the cut, to keep the shoot firmly in the ground, and then build the soil round and over the part. Use damp soil if possible, as this is no trouble to moisten. Stuff that is too dry is difficult to saturate. Go round all the plants you wish to propagate in the above way, working carefully and cleanly, and you will soon have an increase in the carnation stock. Keep ground continually moist.

Old plants with very dry limbs and little new grass had better not be used. Vigorous healthy stock layers best. One year old plants should not be layered, unless you are trying carnation growing for shows. All the sorts do better as two year old plants. When we say "do better," we mean they make better growth and bigger plants, and consequently flower more freely. The yearling carnation, when restricted to a few stems with a bud or two or each, produces the best show blooms. Layering is done to increase your stock, not to assist in the improvement of the plants themselves.

Pansies and Violas from Cuttings.

In any large bed of seedlings in full bloom, I mean of course those grown from first-class seed, look at each one individually, and I guarantee you will find amongst their number at least half a dozen, of which you will make the remark that you have never before seen the like of. You let them all go to the rubbish heap at clearing up time, and next year you look for repetition of these plants amongst your new seedlings, in vain, and then you say, "Oh, wish I had kept some cuttings last year.' ' A further reason in favour of cuttings is that those taken from seedlings of the previous year give finer flowers the ensuing summer season. Cuttings, which should be taken from the old plants with little portions of the root attached, a bed of sandy soil and leaf mould should be made, and stamped together firmly in a not too open place. Insert the cuttings at least 2 in. apart. Provide a moveable frame, but do not cover except on hot days, but leave exposed to full light and air, and keep the soil moderately moist, but not drenched, or the cuttings will rot off. In autumn plant out in permanent positions, and the fine display of fine large early blossoms will more than repay any trouble you may have taken.—F.J.

Mulches and When to Apply Them.

The summer mulching of various plants is an important phase of gardening, yet it is one that there seems to be a good deal of confusion over, more particularly in the minds of amateurs. At the outset of these notes it may be as well to consider the object of mulching during the summer months, and this may be briefly summed up in the following sentence:—For the preservation of moisture in the soil and, in some instances, the providing of food for the plants. Then the substance of which the mulch is composed must be considered, and there can be little doubt that the best is short, partly decayed stable farmyard manure. Even a mulch of fine soil will frequently be of considerable advantage. Having thus decided why mulching should be done, and the best material for the work, we may now consider when the mulch should be applied, and to what crops it is likely to be of especial benefit. There is no doubt whatever that the majority of mulches are applied far too early in the season, i.e., before the soil has become thoroughly warmed by the sun, with the result that the roots are kept in a cold medium for a considerablly longer period than they would be were the mulching material withheld for a time. Again, it is useless putting on a mulch to preserve moisture when the soil is in a comparatively dry condition. These two points fully grasped, the beginner is not likely to go far wrong; he will know that the mulch must not be put on until the soil is thoroughly warmed, but unless artificial watering is intended, before the spring rains have been evaporated.

Next comes the question—To what plants may the mulch be given with advantage? Generally speaking, all newly planted trees and shrubs derive great benefit from a mulch intelligently employed, and the same remark applies to herbaceous plants where the soil is of a rather sandy character. Then there are plants which naturally delight in a moist rootrun, and these will very much enjoy any attention given them in this respect. To whatever plants it is applied, however, it is wise to keep the manure from coming into actual contact with the stems; in many cases it may not do any harm, but sometimes serious injury is caused, and it is best to err on the safe side.

An Interesting Plant.

The wild rice of Canada (Zizania aquatica) is an annual aquatic plant, growing only in fresh water, and its seeds, notwithstanding the numerous cereals that are now cultivated, even to-day form the chief farinaceous food for 30,000 North American Indians. It is described as a remarkable, useful, and when in full blossom, a strikingly handsome grass, every stem being crowned with a large panicle of flowers, 1½ ft. to 2 ft. long, and about two-thirds as much wide. The male flowers are confined to the lower part of the panicle in graceful, arching racemes, the female to the upper part on stiffer ones. Apart from any economic value it may possess, this plant is certainly worthy of cultivation for its beauty alone in shallow ponds and ornamental tanks. When grown in good soil, it forms a most stately grass, with stems standing 9 ft. to 12 ft. above the water, with narrow, pointed leaves from 2 ft. to 4 ft. long, 2 in. to 2½ in. wide, and of a deep, vivid green colour. Exclusive of its utility as a seed or rice-bearer for the human species who inhabit the country where it grows wild, the sweetness and nutritious quality of the seeds attract an infinite number of wild fowls of every kind, which flock from distant climes to enjoy the rare repast, and by it become inexpresibly fat and delicious. White men wherever the plant grows highly esteem the rice when prepared for food as the North American Indians prepare it, as a breakfast cereal. In a bulletin of the United States Department of Agriculture it is stated that the available supply of wild rice now sells at from two to three times the price of ordinary white rice. The seeds will not keep in a dry state, as most seeds do; they must be transported in water, in wet moss, or in mud, or even in ice. Apart from the value of the Canadian wild rice as an ornamental plant, suitable for planting in a water garden or a mud flat, it is well worth introducing from an economic standpoint.—Australasian.

Mealy Bug.

Mealy bugs is one of the most troublesome pests the gardener has to deal with. This insect, which multiplies rapidly, can easily be identified by its pinky red body which is covered with a white mealy powder. Once mealy bug obtains a firm footing in a green house nothing but the strongest and most persistent measures will eradicate it as it moves about rather freely; therefore prompt remedies must be applied as soon as it is discovered.

To clean plants badly infested they must be either washed or syringed with a strong but safe insecticide. A good and effectual insecticide can be easily made up as follows: Dissolve ½ lb. of soft soap and ½ lb. Gishurst Compound in three gallons of boiling water and add a wineglassful of paraffin mixing the whole thoroughly with the syringe while hot and allowing it to become cold before using. Large plants badly infested should be well syringed with the mixture, first laying them on a sheet of corrugated iron and placing a tub at one end for the insecticide to run off into. The mixture can then be used over again. Another effective and economical method of applying the insecticide to small plants is to place the solution in a tub taking the plant in the hands, being careful to cover the soil with one hand as much as possible to prevent it falling out into the receptable. Dip the foliage several times wetting every portion thoroughly and afterwards place the plants on their sides to drain. Where the attack is but slight there is nothing more effective than methylated spirits. A camel hair brush should be dipped in the spirit and the insects lightly touched with it. Every one that comes in contact with the spirit will be destroyed. I have never found methylated spirits to injure the tenderest foliage. Mealy bug frequently hides in cracks, crevices, and such like places, therefore where houses are badly infested all woodwork should be scrubbed with the above solution and the walls treated with lime and paraffin, afterwards stopping all cracks in the woodwork with putty.—"The Gardening World."

Fern Balls.

It is a great pity that there are not more good specimens of the fern ball seen in our homes, for as an ornamental addition to a room it is very desirable, if well grown.

When first purchased they should be thoroughly soaked and then hung in the light. When growth has started they should be regularly treated, every two weeks, to a bath of manure water. They should never be allowed to become dry. While the manure water seems to be an essential in the treatment of fern balls, in using it there is a liability of being obliged, speedily, to make a quick choice between your fern ball and your family. The manure water will start the ball growing, but it will also start a wave of disapproval that will be quite convincing. However, if you care for a fern ball you must contrive to treat it as above suggested.

Fern balls may be used as table centre pieces. Holes are bored in them with a pencil and cut flowers inserted. Using them alternately keeps them in good condition and keeps on hand an ever-ready table decoration. When the foliage has begun to wither the ball should be stored so that it will not become dried out. Burying it in the ground for a few weeks before starting it into growth will materially benefit it and assist its start. It would be well to watch the string that binds the moss as it is liable to rot out. A little attention to this detail will prolong the life and usefulness of the fern ball.

Watering.

The fact that "circumstances alter cases" is especially applicable to all gardening matters, and the following hints on watering may prove useful, as much injury is done to plants both by over-watering and under-watering. It is well to remember that families of plants have their individual peculiarities in very much the same way as human beings, so that while copious water makes some plants thrive, it will cause others to decay, and here it is that some knowledge of the native habitat of the plants becomes most useful. Gardeners will learn by observation how much water is necessary to their plants, and will know by the appearance of the soil when it is required. A general rule is that if the surface feels dusty to the finger-tips it is over-dry; if it sticks to one's fingers it is too wet; but if there is a feeling of moisture without any of the soil adhering, it is just right.

It will be found that plants thrive by watering at one time rather than at other times, and by far the best time to give it is either early in the morning or late in the afternoon, but never when the sun is most powerful, as at middle-day. In using a hose or watering pot care must be taken to let the water fall gently and not dashed against the roots of the plants, although it is advisable to refresh the foliage by an occasional watering, which serves to cleanse it from dirt and insects.

Another important rule to remember when watering is that the ground must be thoroughly soaked; give enough to penetrate to the lowest root, for there is nothing so harmful to plants as a mere sprinkling. To conserve the moisture in the soil, pulverise the surface to a depth of two inches after watering, as in this way plants get the full benefit of the earth's chemical properties, and their vitality is increased.

Vegetable Garden

Vegetable Calendar.

Summer gardening on the plains is very much a matter of hoeing, watering and mulching. At any rate, it is the secret of successful work. We heard the case put very clearly by one of the Messrs. Hackett the other day to a customer who had handed in a list of pretty well every known in and out of season vegetable. "Have you plenty of water?" he asked; "plenty of manure, and plenty of interest in the business end of a good hoe?" On being assured that the prospective gardener was well fixed in these three essentials, he proceeded to cut out about two-thirds of the list with the remark that there "were plenty left." Not good business, perhaps, but very kindly and helpful. Probably good business too, for as we thought at the time, it will be a long while before that young gardener takes his custom elsewhere.

The great standby of the average amateur gardener in the summer is the French bean. Most of the early sowings are fruiting now. To keep the plants healthy and the later-sown plants growing, keep the ground well hoed, mulch if possible, and sprinkle between the rows a little superphosphate, not more than 1lb. to, say, 30ft. of row. Poultry manure is even better or as good. Do this once a fortnight, and keep the bushes well picked, and a bed of beans will give an astonishing amount of very delicious vegetable in return. It is better to throw surplus beans away or boil them up for the fowls than to let them harden. If you let the plants get ahead, one may be picking beans which are past their best all the season. Make a sowing once a fortnight from now on to February for a constant succession. Candian Wonders and Improved Emperors are standard sort, but it is well to make, say, alternative sowings of one of the wax butter or stringless varieties.

When well grown and well cooked they are delicious, though the lighter yellowish colour of most of them is rather against them. Lima Beans are well worth growing now that the weather is warming up. The beans should be picked when young, and not left to harden in the pods.

Now that tomatoes are down to moderate prices in the streets, it may hardly seem worth while to put out plants, but the home grown fruit possesses a freshness and flavour which you cannot buy. This is especially so at mid-summer, when the quicker it is eaten after picking the better it will be. If your plants have grown leggy, it is a good plan when planting out to layer the long stem about an inch below the surface. Roots will be put out at the joints and will add to the strength of the plant. Don't, however, forget about it when hoeing. There are many ways of training the bushes, the most usual, perhaps, is not to do it at all. Oftentimes you get as big or bigger crop by this method. Pruning to a single or double stem for late grown plants does not increase the quality or quantity of the fruit, even if carried to the extreme limit of neatness and symmetry, but a certain amount of training, even if it is only over some boughs, for the reason that it lets in air and sunlight into the body of the row or plant, and air and sunlight are the very best preventitive of the moulds, rots and fungi generally which play such havoc in many gardens. The slug and snail, which seem to have developed an abnormal fondness for ripe tomatoes, are to a large extent left lamenting. The most simple method is to run a couple of lengths of 3in. mesh wirenetting on each side of the row. Each length to lean outwards forming a roughly-shaped V or trough. We prefer to lay a length of wire, say, 2ft. wide, 1ft. or 18in. above the plants and keep them to a single stem till they begin to get a grip of the netting, and then let them go their own sweet way. Some old water piping for standard crosspieces and rails make a very neat job, with a few bits of fencing wire to bolt them together, and will practically last for ever. By this means you keep the fruit well above the ground with a free circulation of air. There is plenty of room for hoeing and mulching, you keep your rows tidy in appearance, and you reduce training to a minimum. A single row of upright wirenetting along the length of the bed serves the same purpose, and is perhaps better for earlier plants, but requires more attention in the matter of tying.

Naturally one wants to grow the plants as well as train them. More tomatoes probably are delayed in fruiting by too much water and too much nitrate of soda or sulphate of ammonia than by any other cause. Both are good, of course, in their place, but their principal mission is to make growth rather than fruit. Keep the plants on the dry side, if anything, till they have set their first clusters, then turn on the water tap till the fruit is begining to ripen, and then ease off a bit. If the ground is decently manured before the plants are put in they won't want any addition at first. A pinch, and only a pinch, of sulphate won't hurt them if they seem to hang back a bit at starting. Afterwards, when the bushes have set to flower and are making vigorous growth, a weak does of liquid manure twice a week will help things on a lot. If you are using natural manure use it weak and often. Just enough to colour the water a pale straw, and if artificial (there is nothing better than super) a handful sprinkled along ten feet of row, once a week, and hoed in, will keep things moving.

Fertilizing Melons.

The melon has one peculiarity which must be well understood, or failure to obtain a crop may result. This is, that if one fruit is "set" a few days ahead of others on the plant, it has power to absorb so much nourishment as to starve the later comers, and prevent their growing to any size. To counteract this tendency, it is necessary that all melons deemed necessary for a crop should be set within about twenty-four hours of each other. Setting is accomplished by transferring pollen—a fine, yellow powder—from the anthers of male flowers to the stigmas of female flowers; the female flowers can be readily distinguished, as they carry an embryo green fruit under their yellow petals, whereas the male flower has only a thin stalk. As there is always a great excess of male flowers, gardeners pick one off, remove its petals, and then insert the remaining, central part into a female flower, leaving it there. This method is generally effectual, and if six female flowers can be so fertilised on one day, the operator has done his best to secure a crop. If there are only one or two female flowers open at once it is best to pick them off and wait till there are several ready at the same time, even when you are depending on natural fertilization. Whichever it is, it is important that all the melons should have an equal start. The middle of the day is the best time to operate on the flowers.

Potatoes.

Potato boxes, constructed from quarter-inch deal boards, 24 inches long, 12 inches wide and 2½ inches deep, provided with stout cross handles 1 inch thick, and standing 4 inches clear above the top of the box, are universal in Jersey, says an Exchange. The seed size tubers are picked up in these boxes straight from the ground, taken to the storeroom and stacked up in tiers. About three or four months before planting time, and before growth commences, they are graded according to size, and set up on end in their boxes to sprout, free circulation of air being given at all times, except during actual frost, and growth is confined to one or two strong sprouts.

The following advantages result from the above method. A sprouted tuber given favourable weather comes up at once, and an earlier crop results. Should the weather be unfavourable, planting can be delayed until the soil is in a suitable state, when, once in the ground, the sets go on without a check. At planting time the boxes are taken out as they are, the sets are put direct from them into the trenches, and the result is a perfect set with sprouts undamaged. I have dwelt on this at length, as upon the proper selection and treatment of the sets the crop to a great extent depends.

— Soil and Preparation of the Same. —

The quality and quantity of ground to be set aside for Potato culture must, of course, be determined by the cultivator. Potatoes may be and are grown excellently in nearly every class of soil, although the best results may be expected from sandy loam. It is just here, however, that a little judicious experimenting, together with an intelligent observation of your neighbour's crop, may come in useful. Take notice of those sorts which do well in your immediate neighbourhood on soil similar to your own, test their keeping and cooking qualities where possible, and make your selection of varieties accordingly. Should you desire to grow for the show table, the appearance of the tuber must also be studied. I have no hesitation in saying that tubers quite suitable for both purposes may be obtained by observant selection.

As regards preparation of the soil, for my own part, whenever possible, I practice and strongly recommend autumn digging and manuring, then leaving the ground rough to get the benefits accruing from frost and rain. Give a liberal manuring with half-rotted stable manure, trenching the same in at least 1 foot. By this process there will be a friable, mellow top crust at planting time, which will work evenly and easily. I am well aware that on the point of autumn digging and manuring expert opinion differs; however, I contend that ground so prepared in nine cases out of ten is in a far more suitable condition to receive the sets and gives better results than when prepared and planted straight away in spring. Where good natural manures cannot be obtained, artificial must be used. There are at the present time many excellent sorts of Potato manure on the market; but for those who like to prepare their own, the undermentioned is an excellent mixture: Three parts superphosphate, two parts kainit and two parts sulphate of ammonia. Sow it broadcast over the ground before commencing to plant at the rate of 8lbs. to 10lbs. per square rod. This mode of application encourages root formation and the tender rootlets run less risk of damage by contact with the strong chemicals than when the manure is sown in the trenches in quantity.

— Planting. —

The principle to guide us here must be to see that sufficiant space is given to every plant to mature and absorb sun and air, according to the character of the variety and the state of the soil. There is no doubt that close planting is a source of disease, resulting as it does in a drawn weakly haulm, which, when saturated with moisture and without sufficient space for air and sun to penetrate and dry it falls a prey to disease and the crop is worthless. With care in planting the opposite result would probably have been obtained.

The following are safe distances to plant: Early varieties, 1 foot from set to set, 18 inches to 2 feet between the rows; second earlies and small top varieties, 12 inches to sixteen inches from set to set, 2 feet to 2½ feet between the rows; main crop—15 inches to 18 inches from set to set, 3 feet to 4 feet between the rows.

— Cultivating. —

If good results are desired this must be carefully attended to. As soon as the growth shows above ground lightly fork or hoe carefully between the rows, thus keeping down weeds and making the soil more suitable for earthing up. Careful attention must be given to earthing up as growth progresses, and when it is apparent that the haulms will be bruised by further working among them the final earthing should be given, taking care to draw the soil well up around the stems and not to leave a hollow for the reception of moisture around them.

— Disease. —

The old saying, "Prevention is better than cure," is very applicable to Potato culture, and those who wish to raise a crop of good-clean, sound tubers, free from disease, should spray their crop occasionally during the growing period with some good preparation of Bordeaux mixture. The result will more than repay for the trouble taken. Earthing up will prevent spores of the potato disease being washed from the haulm to the tubers in the event of the former being attacked.

— Ants. —

Ants are usually more of a nuisance in a garden than a pest. Some people blame them for cutting the leaves of certain plants, but it is doubtful. The worst thing they do is to carry aphides or perhaps scale from one part of a plant to another, as they feed upon the sugary excrescences from the excretory tubes of those animals. There are many things that are disagreeable to ants, such as carbolic acid, and a little of this scattered round about the entrance to their nests would help to drive them away. In some cases they are not easily driven away, but if they are persistently harried by one or other means they leave the grounds.

— Slugs and Snails. —

One of the oldest remedies for slugs is qpicklime, which is most effective when scattered over the slugs while they are out feeding at night. A good guard against slugs is to have the ground perfectly clean, with nothing in it except the plants intended to be grown. They are very fond of certain cultivated plants, but it is certain that grass and other herbage give slugs both food and shelter. A great remedy, therefore, is to keep the ground thoroughly clean whether plants are being grown there or not. For instance, the ground should not be allowed to lie in a weedy state during the autumn nor winter. As soon as it becomes vacant it should be turned over and left in the rough if not wanted at once.

Soils and Manures.

— Fowl Manure. —

Fowl manure is most valuable when gathered daily or weekly from the fowl house and laid in some shed where it will get quite dry and keep in that fashion until used. It can then be distributed over the ground for the crops intended. If dry, it is chiefly a nitrogenous manure. If allowed to get wet it loses some of its nitrogen and the remaining manurial value would largely depend upon the phosphates it contained. In preparing ground for Onions, Carrots, Parsnips, Beet, etc., the top spit of soil might have a dressing of fowl manure simply hoed into the soil when preparing the ground for sowing. You can, however, use it for a great variety of crops, and if dried it would be very powerful, and we caution you not to use too much of it on any any piece of ground nor allow it to get in heaps or lumps. It should be evenly and equally distributed.

— Coal Ashes and Heavy Soil. —

Coal ashes are not a manure, they merely alter the mechanical condition of the soil, making it more porous for water to drain away. Road scrapings are much more valuable as well as the scourings of ditches, consisting largely, it may be, of sand, and indeed any vegetable matter may be employed. In the course of a few years as this vegetable matter decays the soil will become dark in colour, indicating a greater fertility. Of course, it is possible to overdo it with decaying vegetable matter, but a dressing of lime would counteract the acidity of sourness that might be brought by such heavy applications of vegetable matter.

Hens and Potatoes.

A correspondent to the "Rural New Yorker" contributes the following interesting experience of raising two crops on the same piece of ground at the same time. Possibly the American hen is less enterprising or less curious than her Australian sister. He writes :—

The best crop I have found for a henyard is the potato crop. I once grew the finest crop of potatoes in my henyard that I ever grew, and at the least expense. All I did was to plant the potato seed and dig the crop. The hens did the weeding, harrowing, fertilizing and keeping the bugs off the vines. The potatoes were the finest I ever grew, not a scab or blemish of any kind, as the ground was free from a worm or larva of any description. I had one half-acre and dug 100 bushels of potatoes. It took 200 hens to care for the half acre. I found by experience that a lesser number of hens will not keep the weeds down nor the bugs off, but a larger number of hens will make the land too rich. All the droppings of the year go on to the crop. By this plan there is no moving of fences nor fouling of the land. How do I prevent the fowls from scratching out the new potatoes? I place on top of the ground all the potatoes the fowls can eat and I find they will not dig out any of the potatoes. They are like bipeds without feathers in that they don't dig when they have what they want without exertion. I scatter the grain well over the yard and right over the hills of potatoes, and the hens keep the whole surface scratched over, and not a weed appears. I give some green food at the evening feeding. I grew a crop adjoining this henyard and secured a yield of one-half as many bushels to the acre.

Distribution of Fruit and Vegetables.

Adelaide is probably more richly blessed than most cities; at all events there must be few which can within a ten-mile radius produce such a varied assortment of fruit and vegetables of such excellent quality. Our fruit shows are no doubt equal to anything exhibited in any part of the world. So far, then, we have every reason to congratulate ourselves. So far, and no further. It is not too much to say that, when this luscious fruit and excellent vegetable leave the orchard and garden, we lose points to a tenth rate provincial English town, and are simply not in it compared to an American or European city of equal importance. What is wrong? Just everything. Packing, display, distribution. We as consumers do not pay enough for our packing and advertisement, and far too much for distribution. What is tthe remedy? Just one word—co-operation.

Co-operative work fair to both producer and consumer. Surely it is possible. It has been, on the whole, successful in handling the big wholesale problems of the industry; cannot it get down to the retail side of the question? Not worth while. It seems to us that it is very much worth while. We do not believe that at present 10 per cent. of the households of the city and suburbs eat as much fruit and as varied fruit as they would were it more easily procurable and at least 50 per cent. simply do not know what fruit is as a healthful, regular article of diet. The position is not so bad in vegetables, but there is room for improvement even there. At present the grower says in effect, "I can grow good fruit, but I can't make anybody eat it." The sooner the grower recognises that he not only has to grow the fruit but makes it his business to make the consumer want to eat it, the better it will be for both parties. How can the grower make the consumer want to eat his fruit? Easily. In three words.

Pack it nicely.

Talk about it loudly.

Deliver it cheaply.

Are these not just the three things which he does not do and which he does not seem to think are in any sense his business? Of course they are. Yes; just those three things are to-day selling millions of tons of fruit and vegetables over the world. Why, when applied to the good fruit grown at the Reedbeds, Paradise, Uraidla, etc., should it not be equally successful in selling more fruit? What is the position? We believe it is to be that while the average grower gets no more than he earns, the average consumer pays for much more than he gets. "Cheaply grown and dearly sold" applies very truly to fruit and vegetables in and around the fair city of Adelaide. The question is: Why?

In the first place it comes down principally to a question of distribution. What are the sources of supply available to the ordinary householder? We have a wholesale market, a retail market, fruit and vegetable shops, perambulatory barrows, and itinerant hawkers (many hawkers, in fact), and whichever way you look at it, the way is long from the orchard or garden to the consumers' table, and fruit and vegetables are apt to stale on the journey. The very essence of the business should be promptness between the earth in the growers' garden and the cooking pot on the consumer's stove, and the present roundabout methods do not exactly lend themselves to promptness, or what naturally follows, cheapness.

At first sight it may appear that the sources of supply mentioned are adequate and liberal, but such an idea will hardly bear close inspection. We can certainly go to the wholesale market and buy a bag of potatoes, a bushel of peas, a case of tomatoes or fruit, and get it first hand, but having purchased it we have to get it home, and in any case the average householder hasn't time to do his marketing, and the housewife hasn't the inclination and doesn't want wholesale quantities, anyway.

We can go to the retail market at stated times and buy, we believe cheaply and well, but few people care to spend an evening bargaining for a week's supply or carting the things home. We have seen paterfamilias wrestling with a bag of potatoes, materfamilias with a couple of bulky cabbages, and their assorted offspring with various packages, from a bundle of asparagus to a peck of peas, but the spectacle was not encouraging, nor when the time, temper, and tram fares are taken into account, was the result particularly economical.

We can buy our fruit and vegetables at shops, but considering that out of every 1/, we pay 4d. for rent and taxes and 4d. for the shopkeepers' profit, handling and wastage, we buy what we want at a pretty dear rate. Some shops display their goods well, and some do not. There still remains the question of getting one's purchases home.

The barrow men are said to fill a long-felt want. On the score of display they certainly do all that can be expected of them. Some people even say that they depend more on display than on the merit of the goods they have to sell. In any case, they sell only in small quantities, and many people have a decided objection to publicly buying their household supplies in the open street.

The final resort for the average householder is the "vegetable man," who may be daily seen traversing our suburban high roads and bye-ways. Poor fellow; he gets up early and often washes himself, which is apparently more than his attendant "boy" often does. Certainly he has our sympathy, for he at all events earns all he gets, which is not a great deal. Think of the weary miles he travels for his scattered customers. Think of the nerve strain of being reasonably polite to a fussy housewife who won't have two-pennyworth of beans which he has, but wants two-pennyworth of peas, which he has not, or being obliged to listen to an animated discussion as to whether the family is to be regaled on rhubarb or gooseberry, in both of which commodities he is short, and being obliged for his own sake to put in a word as to the rival advantages of stewed cherries. Is it any wonder that one often meets the "vegetable man" coming with a still laden basket (having successfully dodged a dog, which he cannot properly and justly kick because the "missus" is looking on,) from our suburban homes with a face which suggests a visit to the dentist and quite forbids a casual remark as to the state of the weather. The trouble of the thing is that he is a quite unnecessary, rather cumbersome and very expensive link in the chain which begins in the garden and ends in the kitchen.

(To be Continued.)

In packing fruit, whatever size cases are used grade the fruit to size and ripeness, fill to the brim, give a gentle shake to settle all down, and finish the packing in such a manner as will ensure its opening up in the best condition for consumption.

Influence of Light on Fruit.

Experiments have been made to ascertain the influence that light exercises on the development of fruit, says The Mark Lane Express, and the results are interesting. The experiments were made by letting the fruit ripen (1) in bags that shut out all rays of light; (2) in transparent bags giving an attenuated light; (3) fruit exposed to full daylight. The trials were made on grapes, cherries, pears, apples, &c. From the results it would appear that light is absolutely necessary only during the first stages of the formation of fruit and grain. After this initial stage had passed the fruit seems able to complete its development and maturity equally well in obscurity as in full light, although under the influence of the latter a greater amount of dry substance was acquired. It was observed that the best results were obtained when the growing fruit was under the influence of an attenuated light, and also that the acidity of the fruit was then diminished.

Oranges and Lemons.

The principle orange growing countries of the world are the United States, Spain, Italy, and Palestine. The American orange industry is located in California, Florida, Louisiana, Texas, and Arizona and the total annual production is estimate at 2,000,000 boxes. About three-fourths of the American production comes from California, the number of boxes shipped in the 1911-12 season being 13,745,952, and in 1910-11, 15,695,450. The heavy freeze some months ago will reduce the 1912-13 yield much more than 50 per cent.; it is not yet possible to estimate the full damage to the crop. The total acreage runs about 110,000. The Florida production has previously run from 3,500,000 to 4,000,000 boxes annually, produced on an estimated acreage of 59,000 but the crop of the present season is expected to amount to 6,000,000 boxes or more, and the output of years will doubtless average that much or more. The number of pounds of oranges shipped in 1911 from the principal foreign producing sections is given as follows:—Spain, 869,725,553; Italy, 282,945,860; in Jaffa (Palestine), 68,890,130; Japan, 14,158,559; Porto Rico, 13,076,880; Cuba, 3,609,817. California has furnished about 40 per cent. of the total orange supply of the world. The only sections of the world producing lemons in commercial quantities are southern California and southern Italy, especially Sicily. The acreage in lemon trees in California in 1912 was 31,478, and the production is given as about 2,000,000 boxes as compared with American importations of 1,812,000 boxes. In Italy about 50,000,000 lbs. of lemons are produced annually. Boxes of lemons as received in New York from Italy run from 68 lbs. to 78 lbs. per box.—Grocers' Journal.

The Cider Mill.

Cider-making may be divided into two separate classes: Preparing sweet cider for consumption, and the making of cider into vinegar.

In putting a first-class article upon the market, of course, both classes must be entirely free from adulteration. Cider may be preserved sweet in two ways—by heating and sealing, or by pasteurizing. The former method will always leave a decided cooked flavour, therefore the pasteurizing method is the best.

The common way of making cider vinegar is to allow the cider to ferment and change to vinegar.

This is a very unsatisfactory method, for several reasons. The strength of the vinegar increases year after year, and the time required in which to convert the sugar to alcohol, and the alcohol to acetic acid, of proper strength, is too long to be profitable.

Therefore, the use of vinegar generators is the most satisfactory method of vinegar making. Unlike most industries, a complete cider and vinegar plant may be put into operation at a relatively small cost, and increased as to capacity as required. A cider plant may also be used in the handling of other fruits, such as berries, grapes, &c.

Every community where fruit is grown to any extent should support a cider mill, which will, by making a market for the culls, induce apple growers to sort apples closer, selling only first-class stock. Clearing up the windfall apples would help check the orchard pests, and bring to the apple grower an income from what to many is a total loss.—Wisconsin Horticulture.

Cherries Preserved in Brine.

An industry which has reached important proportions as an Italian export, consists of cherries preserved in the following manner. They are first placed in the fumes of sulphur and then packed in casks with very strong brine. The chief place of export is to the United States. On arrival the fruit is sorted out, the best being sold for the purpose of flavouring some of the various stimulants, which, under different names, form the speciality of American bars, the second best are preserved in brandy in the usual way, and the remainder are used for the general purposes of confectionery.

Peach Brown Rot.

The following directions are given in Bulletin No. 2 of the Missouri Board of Horticulture :—

After petals drop, spray with 8.8.50 self-boiled lime-sulphur.

A month before the fruit ripens, spray with 8.8.50.

Preparation.— 8lbs. fresh stone lime and 8lbs. of sulphur to 50 gallons of water.

Place the lime in a barrel, and pour on enough water to almost cover it. As soon as the lime begins to slake, add the sulphur, which should first be run through a sieve to break up the lumps. The mixture should be constantly stirred, and more water added as needed to form a thick paste at first, and then gradually a thin paste. The lime will supply enough heat to boil the mixture several minutes. As soon as it is well slaked water should be added to cool the mixture and prevent further cooking. It is then ready to be strained into the spray tank, diluted and applied.

It is very important, especially with hot lime, to cool the mixture quickly by adding a few buckets of water as soon as the lumps of lime have slaked down. The intense heat, violent boiling, and constant stirring result in a uniform mixture of finely divided sulphur and lime, with only a very small percentage of sulphur in solution.

Mr. W. J. Allen says that when making the lime-sulphur at the N.S.W. Government orchards, they have found it necessary to cook the wash much longer than is recommended.

Prevention of the Growth of Suckers from Stumps.

The best way to effect the destruction of suckers or to prevent their growing is, if the trees are to be ring-barked, to ring-bark in a different fashion to the usual method of cutting out a ring of bark and sapwood. Cut straight in for the upper part of the ring, but cut down slantwise at the bottom part, leaving the bark standing up like a fringe, removing, of course, the detached ring of bark. Then with an oilcan or teapot, pour behind this fringe a small quantity of "Peardoom." Or make a mixture of 1 lb. white arsenic, 1¼ lb. soda crystals, ¼ lb. saltpetre, 1 gallon water, diluted to double the quantity, if necessary. This mixture will destroy not only the trees but the roots, and consequently no suckers will appear.—Queensland Journal.

Age of Apple Trees.

An interesting note on the longevity of apple trees appears in an English paper, which says :

The oldest apple tree we know of is the original tree of Bramley's Seedling growing in one of the orchards at Southwell, Notts. This, we believe, is over eighty years of age. It is a grand old veteran, but, as may be expected, showing signs of age in the partial decay of some of its limbs ; but to all appearance to the contrary its life may be extended to considerably over a hundred years.

We were speaking on this subject a few days ago to an old Scottish gardener, who said that about three years ago he revisited the home of his childhood—a garden of which his father took charge in 1844, near Glasgow. At that time there were some large Keswick Codlin Apples trees in the garden at least twenty years of age. They were there still, thus making them upwards of eighty years old.

The first time Ribston Pippin is mentioned is in the catalogue of the Brompton Park Nursery in 1785. The original tree was raised at Ribston Park, Knaresborough, where it was blown down in 1910. It was afterwards supported by stakes in a horizontal position, and continued to produce some fruit until it died in 1835. Soon afterwards a sucker from the roots of the old tree grew up and formed a tree, which, we believe, is still alive.

Five Apples a Day.

Some imaginative American apple growers have had a dream that if every citizen of that great and glorious country, and his wife and little ones, ate five apples every day the result would be health and happiness for the inhabitants and profits for the growers. Such a diet has been proposed for the salvation of the nation. The physicians might relapse into a lean and hungry state and refuse to eat apples, but when physicians are poor the nation is happy—such is the logic of the inspired apple growers. With every person on a diet of five apples a day the United States would present a fat and jubilant aspect to all creation. It would become a nation of no disease, no grouches, and few physicians, and all apple growers would be listed with the idle rich. No suggestion having as its origin the desire of producers to sell a product ever before had such an altruistic secondary motive.

The dream is alluring, says an exchange, and it is perhaps useless for an ordinary unimaginative, statistical person to reply that if every person, infants included, were on a five-a-day diet the supply would be exhausted in a month. It lures in spite of statistics of production and transportation. Its only drawback lurks in the thought that after a month there might be no apple pie, dumplings and no cider.

Starlings, sparrows, wattle birds and silver eyes will do much damage to fruit crops, and should be destroyed without remorse. Fruit growers should combine and set apart a day each nesting season for destroying as many of these feathered pests as possible, and in a few years their pockets would benefit to a very appreciable extent. Sparrows may be destroyed at any time by strewing poisoned wheat on any freshly dug plot of ground, provided, of course, that domestic animals are not allowed access to it. Sparrows are very cunning, and will not touch seed spread about on undug ground, but with newly turned up ground they seem to think that the seed has been turned up with the soil, and will eat it greedily.

The Custard Apple.

Though little known in Adelaide, the custard apple, which, of course, is not an apple at all, is well known in Sydney, where a considerable quantity is imported from Brisbane and northern towns of Queensland. It is not attractive to the taste at first it is said, but we have heard it described as a "fruit salad with the sugar and cream thrown in." The fruit sold in Sydney at 6d. and 1/ each, is about the size of a cricket ball, rough and somewhat pineappley in appearance with the colour rather resembling a passion fruit. Some varieties, of which there are many, grow to a much larger size, 20 lbs. being about the limit. The pulp, when ripe, is very soft and mellow and is usually eaten with a spoon. The word custard is very appropriate. It is too much a tropical fruit to ever become widely grown in our State, but probably it would grow and fruit in some districts under specially favourable conditions. Heat and moisture are necessary, the former, at all events, we can generally supply. It can be readily grown from seed but does not come true. It is said to travel well so there is no reason why it should not be seen more often in Adelaide. It is growing in favour in South Africa and we find the following interesting note on the subject in a recent issue of the Union Agricultural Journal in connection with a specimen illustrated which weighed 21 lbs., which is, it remarks, by no means ab-

The custard apple has a very wide range in South Africa; it is grown successfully in the warmer districts of the Transvaal, Natal and Cape Provinces. Propagation is simple, as the tree grows readily from seed, but as in the case of most other fruits, it cannot be depended upon to reproduce itself "true from seed"; recourse therefore is had to grafting.

From what may be gathered from Indian writers on the subject it would appear that the custard apple tree has a decided weakness for growing out of cracks and crannies on rocks, old walls, and other similar situations. Possibly in the wild state this may be the case, and so assuming the correctness of this statement one is unprepared to read that "a deep stony soil is generally suitable, but alluvial produces good specimens." From what the writer has seen in South Africa, both the best grown trees and the finest fruit are produced in the deep free loams. It is necessary, however, for the tree to succeed that a frostless situation is selected in which to plant it, that plenty of room be allowed for the spread of its roots and branches, and that it receives such attention with the pruning shears and cultivator as is meted out to any fruit tree when planted in orchard form. When single trees are grown in a garden it may be possible to afford them plenty of liquid cow manure, and to this particular dressing they seem to respond more readily than to any other. In the case of a small plantation this system would be more difficult to carry out, but in case cow manure were obtainable it should certainly be used and a complete fertilizer applied biennially. The custard apple is supposed to be one of those fruits for which a taste must be acquired. One Indian writer states he has "never met a European who was partial to it"; from what one can see and hear in South Africa, there is no need to acquire a taste for it, the taste is here, but sufficient of the fruit to gratify it is absent. That this should be the case considering the ease with which the trees can be grown, would in an older country appear remarkable, but in South Africa it is not singular, when one considers the size of the country and the numerous other channels, even in fruit growing, which invite the attention and energy of our farmers. It must not be assumed, however, that nothing has been done in the production of this fruit; the trouble is that too little effort has been made and insufficient notice taken of its possibilities. There is every reason why further planting should take place to supply our own markets. It is possible also that in time an export business will develop, as the custard apple is in a class by itself as a shipping fruit, and can be sent with success from South Africa to almost any part of the world—R. A. Davis, Chief Division of Horticulture.

Summer Pruning.

Summer pruning is often done while the rapidly-growing shoots are young and succulent, by nipping off their points with finger and thumb, and is more generally known as "pinching" than pruning, though it is pruning to all intents and purposes, and is powerful for good or evil according to the time when it is done and the amount or lack of intelligence and knowledge put in every pinch. During the last few years the tendency has been towards doing this work at a later date than formerly, when most of the shoots have become too tough, and woody in texture for pinching, and must be cut off with the knife or secateurs to sever them in a neat, workmanlike manner. Do not just break the shoots and leave them on the tree to wither and fall off on their own accord. No advantage is gained by this, but the disadvantages are obvious. Light and air is kept out of the centre of the tree; it makes your trees look unsightly; and double work is entailed, as the tree must afterwards be gone over to remove the fractured shoots.

The time for summer pruning depends on the climate, the soil, the variety, and very often the individual characteristics of the tree, so that it is hard to state the exact time to begin.

Summer pruning comprises several varied but related operations, such as disbudding or rubbing off unnecessary buds, which is done in early spring as the shoots are bursting, and if necessary continued during the summer. An immense amount of good may be done by alert orchardists in the eration of disbudding. It is better to prevent unnecessary growth at the start by rubbing off the shoots than by cutting these off afterwards. A walk through his orchard in early spring will enable the fruitgrawer to eliminate these buds where shoots are not required.

The objects of summer pruning are :—

1. To regulate the growth of the tree and suppress superfluous shoots and branches.

2. To maintain a proper balance of the tree by retarding the growth of the strong shoots and so deviate the sap to the weaker growth.

3. To induce the formation of fruit spurs exactly where they are best placed—that is, on the under part of the tree.

In young trees the principles of summer pruning are restricted to disbudding and regulating the growth, and in the case of older trees to promote fruitfulness. To properly shape a young tree the best instruments are always with you—viz., finger and thumb.

Packing Apples.

(By E. Meeking, Senior Fruit Inspector, Victoria.)

—A Plea for the Introduction of the Diagonal-Numerical System of Packing Apples.—

The old adage "Show me a man's friends, and I'll tell you his character" may well be transposed for application in a business sense by saying, "Show me a man's goods and I'll judge his commercial status." This is particularly the case in an industry such as our oversea fruit export trade, in which our fruits are consigned to markets at the other end of the world, and where the buyer (who seldom or never comes into personal contact with the producer or seller) has no standard whereunder he may judge the commercial standing of the latter except by the general appearance and quality of his wares. The contention often quoted by many of our exporters, that buyers on the London and Continental markets take no note of the appearance and make-up of the packages enclosing our fruits, but that these solely judge the fruits on their own merits, is not altogether correct. Packages encasing commodities such as fresh fruits which are sold in their original containers are, from a marketing point of view, part and parcel of the goods themselves, and the attractiveness, or otherwise, of the packages may rightly be considered as having a great influence on the mind of the buyer—in short, to be a factor of prime importance in determining the value of the goods. Fruits carefully graded with regard to size, color, and general quality, put up in distinctive and attractive packages, and branded with grade marks, in a sense, sell themselves, as they save the agent and buyer an infinite amount of trouble in determining their value. Of course, bad fruit cannot be expected to realise high prices, even if enclosed in good packages, but, all other things being equal, there is little doubt that consignments put up in attractive manner will realise better prices than will consignments where such has been neglected.

The object is to show that up to now sufficient consideration has not been given by our exporters to this aspect of the subject, nor, also, to the fact that the introduction of new and improved methods, both in the style of package used and in the manner in which our fruits are packed, is of urgent necessity if we wish to maintain the position we have already established in connexion with our oversea fruit export industry on the London and Continental markets. It is intended to further show that the best means whereby this desirable end may be attained will be by the general adoption of the so-called numerical system of packing fruit.

—History of Numerical Packing.—

This system originated some years ago in California in connection with the packing of oranges for transport over long distances. The pack, which was termed the "diagonal pack," was not at first instituted with the idea of adopting a numerical standard, but was used because it furnished the best system of putting up fruits with the maximum of tightness combined with a minimum of bruising. It was later discovered that, in order to put up fruits of various grades, a numerical system of packing could be applied under the diagonal pack. After California had been packing for some time under the numerical the system gradually spread through the Western States of the United States and Canada, being voluntarily adopted by the growers themselves, and its superiority over the older methods is now so universally acknowledged that it has been made the subject of legislation within the past three or four years in both countries of the American Continent.

— Capacity Standards and Numerical Standards Contrasted. —

In this country an attempt has been made to protect the purchaser by the passage through the Legislature in 1906 of the Fruit Cases Act. Under this measure, cases of various sizes based upon the imperial bushel standard have been adopted. In order to suit the packing of different varieties of fruits, and also to meet the varying requirements of the local, inter-State, and oversea export trades, these packages vary in shapes as well as measurements; but the cubical capacities of all cases have been fixed to provide that, as nearly as possible, these shall contain, by measurement, either two bushels, one bushel, or one-half bushel of fruit as may be required. Although these standards by measurement are a great advance on the old haphazard methods of putting up fruits in any sized packages, and although they have proved of much benefit to the trade by suppressing, or, at least, lessening the dishonest practice of selling fruit in under-sized cases, yet it would appear that, for many fruits to which a numerical standard may be applied, the capacity standard does not nearly give so good a guarantee to the purchaser as does the numerical standard. This is particularly so when, under the numerical system, the purchaser becomes thoroughly acquainted with the meanings of the trade descriptions which are placed on the outside of packages. Before proceeding to explain why this is so, it may be well to state that, while the wholesale trade, and particularly the oversea export section of that trade, is under review, yet the numerical system is also eminently adapted for a local single case retail trade. In the Western States of the North American Continent, two sizes of cases, or boxes, as they are termed in America, have in the past been generally adopted by the growers for numerical packing. These are respectively called the "standard," or Washington box, and the "special," or Canadian box. The inside measurements of these boxes are as follows—

"Standard" (Washington), 10½ in. x 11½ in. x 18 in.—2,173 cubic inches.

"Special" (Canadian), 10 in. x 11 in. x 20 in.—2,200 cubic inches. They are usually constructed of spruce and pine cut as follows—Ends, ¾ in.; sides, ⅜ in. (one piece each). Tops and bottoms (two pieces each), 3-10 in. to ¼ in., according to the strength of the material used. Growers in the Western States of America in the past used both boxes, because it was considered that both sizes of packages were necessary to provide for the packing of all grades of fruit. This idea is now, however, discarded, as it has been found that for all practical purposes the Canadian case is sufficient. For shipping purposes they should go twenty-four boxes to the ton (40 cubic feet measurement). The tops and bottoms are fastened with four cleats, each ⅜ in.. x ¾ in. x 11 in.

—General description of various kinds of Numerical Packs.—

In packing under the numerical system, three kinds of pack are used, viz., the 2-1 pack, the 2-2pack, and the 3-2 pack. The 2-1 pack is so called because the fruits, in counting the rows laterally, are arranged from one end of the box to the other in two long rows, plus one short row, or two short rows, plus one long row, as the case may be. It thus takes three apples to reach diagonally across the full width of the box. This pack is seldom used in the Canadian box, as this box is too wide to permit any but the largest sized apples to reach right across the case in diagonal rows of three. It may, however, be widely used in the Australian so-called "dump" case. In the 2-2 pack the fruits are arranged in rows of two across the box. It thus takes four fruits of this pack to reach diagonally from one side of the box to the other. In the 3-2 pack, if the count is commenced at one end of the box and counted horizontally to the other end, it will be seen that the apples are arranged horizontally in rows of 3's and 2's alternately, and that it takes five fruits to reach diagonally from one side of the box to the other. The fruits in all the above packs should be so arranged that the rows run in direct lines lengthways, and also in straight lines diagonally. For instance, in describing a pack, we might say that it was a 2-2, 4-4 or a 3-2, 8-8 pack. This would indicate that in the first instance there wonld be four rows with four fruits in each row, making a total of sixteen to a layer. As in the Canadian case, all 2-2 packs are four layers, or tiers, as they are named in America, deep, we would thus, in the pack under notice, have 16 x 4, or a total of 64 apples to the case. In the second instance there would be two rows containing eight fruits, and three rows containing eight fruits—8 plus 8plus 8 plus 8plus 8, making a total of 40 fruits to the tier. With five tiers of apples in the case, this would give us 40 multiplied by 5, equal to 200 fruits to the case. In the 2-1 and 3-2 packs a variation in the number of apples to the tier is often necessary. These will be described more fully later in the explanatory notes on the various schedules. To start the 2-1 pack, the first fruit must be placed in one of the corners at the end of the box nearest the packer. The left-hand corner is the one usually chosen for this and all other packs. The second fruit should be placed in the opposite right-hand corner. The third fruit should be placed between these two fruits, and the fourth fruit should be placed in line with fruit No. 1 (i.e., in the left-hand corner), at the end nearest the packer. To start the 2-2 pack, the first fruit should be placed in the left-hand corner of the end of the case nearest the packer. The second fruit should be placed against the end of the box about midway between the edge of the first fruit and the opposite side. The third and fourth fruits are fitted into the spaces between the first and second placed fruits. If these first four apples are carefully packed, the rows of the tier fill easily. In the 3-2 pack, a fruit is placed in each corner, with a third apple midway between. The fourth and fifth fruits are placed in the two spaces between the first three fruits. In all these packs, when the first tier is completed, it should be sufficiently tight to permit the box being held on end without the fruit falling out. To obtain the requisite tightness of the first tier, the apples should be placed in position rather loosely until the apples in the last rows of the tier are to be placed in the case. The portion of the tier already packed should then be tightened by the packer inserting his hands at the end of the tier and pulling the apples towards himself. The remaining apples required to complete the tier should then be inserted at the end of the case farthest from the packer. After the first tier has been packed, the second tier should be so packed that no fruits in this tier should directly rest upon the fruits in the tier below. This principle should be observed throughout, until the packing of the box is completed. The rows should be straight, both lengthways and diagonally.

The apples must be carefully selected with regard to uniformity in size, color, and general quality, if an attractive and properly packed case of fruit is desired. If the fruits are not carefully selected with regard to equality in size before being placed in the case, the required number corresponding to the grade of the fruit cannot be packed. For example, if it was intended, when commencing to pack the case, to pack 175 fruits, this could not be accomplished if the packer were to introduce fruits which rightly belong to the grade which would run 200 fruits to the case. He would discover that his pack would be thrown out of line in many directions, and a buyer on examining the top layer would know at a glance that the case was incorrectly packed, even if the trade description indicated that the case contained the requisite number (175 fruits).—Sept., 1913. Victorian Journal of Agriculture.

Valuation of Manures.

In manuring for a crop it is not necessary to supply all the constituents of food that the plant requires, since experience has shown that in orchard practice the plant is able to secure for itself from the soil a sufficient supply of certain elements of plant food. Other constituents again may be deficient, either from the nature of the soil or from the strain put upon it by the removal of crops grown. The manurial constituents which have been found to be most beneficial when added to the soil are nitrogen, phosphoric acid, and potash. Lime has also often a marked effect on crops, but this is due not so much to its action as a plant food, as to the effect produced on the other constitutents of the soil. The form of combination of the constituents of a manure considerably affect its value, since these must be in certain conditions to be available. This available condition is generally secured when the constituents are soluble in water or in the acid juices secreted by the rootlets of plants. Hence increased value is always given when the constituents are in a soluble form, as they are then more readily assimilated by plants.

— Nitrogen. —

The activity of nitrogen in various forms of manure is a subject that has received much attention. The results obtained by Wagner, in which the experiments lasted over several years, and were made with different crops, are as follows: —Nitrate of soda; 100; sulphate of ammonia, 90; blood, powdered horn, and green crops, 70; steamed bone-dust, fresh guano and meat guano, 60; farmyard manure, 45; wool dust, 30; powdered leather, 20. These numbers give a good general indication of the comparative value of these numbers, but the nature of the soil and seasons will cause the effects to vary to a certain extent.

— Phosphoric Acid. —

This constituent in manures is generally in combination with lime as phosphate of lime. Since, however, there are four different forms of phosphate of lime and since these differ, both in their commercial value and in their efficiency as plant food, it is important to know which of these forms the manure contains. There is probably more confusion with regard to these than with any other constituent of manure. In natural raw phosphates the phosphoric acid is in the form of tricalcic phosphate, which is insoluble in water. The manufacturer of superphosphate of lime, however, converts it by the action of sulphuric acid, into monocalcic phosphate, which is soluble. The amount of the latter is generally expressed by manufacturers and vendors as "soluble phosphate." When this is done the amount does not represent the true monocalcic phosphate, but the amount of the original tricalcic which has been rendered soluble. This, of course, expresses a higher percentage, the ratio of monocalcic phosphate to "soluble phosphate" being about 1 to 13. Under certain conditions a portion of the monocalcic phosphate becomes converted into a less soluble form—that of dicalcic phosphate—or, in some cases, into the phosphates of iron and alumina. In these forms it is known as retrograde or reverted phosphate, and while insoluble in water, it is soluble in a solution of ammonium citrate, consequently it is generally known as citrate soluble phosphate. In basic slag the phosphoric acid is in the form of tetracalcic phosphate, which is also more or less soluble in nitrate solution, and therefore of higher value than the tricalcic phosphate in bones, phosphatic guano, rock phosphate, etc. Wagner, before quoted, gives the comparative values of various phosphatic manures, as follows:—Superphosphate of lime, 100; basic slag (finest), 61; basic slag (fine), 58; raw guano, 30; basic slag (coarse), 13; bone meal, 10; coprolite powder, 9.

— Potash. —

As all the salts of potassium used as manures are soluble in water, the potash present may be considered to be of equal value in the various manures, and consequently, potash manures are valued on one basis, viz., on the amount of potash they contain.

— Commercial Valuation of Manures. —

For the purposes of valuation, the money value is sometimes expressed as the value per pound of the constituent, or, as is more generally the case, the price per unit, when it is known as the "unit value." This unit value represents the value per ton of the manure for each one per cent. of the constituent present. — Lincoln Journal.

San Jose Scale.

The life history of this scale is particularly interesting. The young insects which are born alive are provided with legs, thus enabling them to crawl out from beneath the scale under which they were born and search for a place to settle. This takes a very short time. At this stage they are so small that it is difficult to see them without the aid of a strong glass or microscope. They are yellow in color while in this stage of development.

When they have selected a suitable place, they begin to work their sucking tubes (which are remarkably long for the size of the scale) into the bark, leaf or fruit wherever they are situated and begin to suck the sap from the tree. The insect now loses all power of locomotion and the scale is slowly formed over its back. At first, this scale is composed merely of a waxy secretion which exudes from from the back of the young insect. As the insect beneath the scale grows, it molts or sheds its skin and this forms another layer to the scale itself. As it becomes older, it turns to a distinctly darker color, due to the weather and the addition of the molted skin from the insect beneath it.

It is very easy to distinguish between the male and female insect. The former makes a scale which is oval, or elongated in form, while the latter makes a circular one. Although the female loses her legs, wings, and eyes, she retains her sucking tube and still continues to suck the sap from the tree and all her vitality is given up to producing young. The male insect is not so hopelessly fastened beneath its scale, but very soon develops very small lace like wings, legs, two pair of eyes, and feelers or antennae. The male insect lives but a short time and takes no food.

To show how rapidly the female multiplies, it is estimated that an average of 1,608,040,200 females would be produced from a single female in one season, with probably at least an equal number of males, a total starting from a single female of 3,216,080,400 individuals!" It is very fortunate that all of these do not reach maturity.

Watering.—A splendid method of watering fruit trees in a small garden is to sink two or three earthenware pipes, say 2 or 4 in. in diameter, and about 18 in. or 24 in. long around the tree, one end of the pipe being flush with the ground. When watering is necessary all you need do is to fill these pipes, and the water will gradually permeate where most needed around the roots. Liquid manure may be applied with great effect in the same manner. Simple, but how many know of the above practical idea and its saving of the water bill?

The Causes of Infertility.

The following extract is from the Presidential Address delivered by F. B. Guthrie before the Agricultural Section of the Australasian Association for the Advancement of Science. Melbourne. 1913:—

In all these cases we have toxic conditions which are quite distinct from the infertile condition brought about by soil-exhaustion, conditions which are not dependent upon the richness or poverty of the soil, and which no amount of manuring in the ordinary sense will remedy. Indeed, when we consider the large stores of plant food in average and even in poor soils, the comparatively small proportion removed by even the most exhausting crop, and the fact that this store of plant food is being constantly rendered available, it becomes difficult to realize that a few years' cropping can effect such a complete removal of plant food as we must assume to take place if the soil is exhausted in the manner usually recognised.

As a matter of fact analyses of European soils go to show that under continuous cultivation there is little or no differences in the mineral content of the soil. In short, the inferior crop-producing power of a soil after repeated cropping is due to other and more obscure causes than the simple depletion of the soil in plant food.

It is open to doubt whether such a thing exists as an infertile soil, that is one which will not give satisfactory results under proper treatment. Plants, we know, can be grown in ignited sand or distilled water if the proper nourishment is supplied. The barren regions of the earth are all capable of being made reproductive under proper treatment, witness the alkali-lands of Texas, and the salt lands of Utah. Even the desert yields abundantly in the fortunate places where springs occur or where the land can be inundated by rivers. On the other hand misapplied energy may convert a fruitful country into an unproductive one; and much of the desert and sterile land has once been fertile, and has been brought to its present condition by unthrifty husbandry.

Travellers in Palestine tell us that its numberless hills are covered with the ruins of what have once been populous cities, a certain sign that been not only fertile, but cultivated to provide food for the town populations.

Sir Frederick Treves, the most recent visitor, records his impressions of this country in his work, "The Land which is Desolate," contrasts the promised land "that floweth with milk and honey" with the "poverty stricken, miserly, thread-bare country" of to-day.

The plain on which the ruins of Babylon now stand is still covered with a network of old canals which served both to irrigate and to drain what was in ancient days extremely fertile country, but which is now divided between desert and marshes. Herodotus testifies to the remarkable fertility of Babylon in his time when it was a great commercial centre.

Profesor Heeren in his work on the "Commerce, &c., of the Principal Nations of Antiquity," tells us how the discovery of a new path to India across the ocean converted the great commerce of the world from a land-trade to a sea-trade, and thus Nineveh "sunk to its original state of a stinking morass and barren steppe."

This is that same Nineveh, the capital of a country which its king described as "a land of corn and wine; a land of bread and vineyards; a land of oil-olive, and of honey."

There are many other instances where great and populous centres have flourished at the expense of the surrounding country which they have finally impoverished and involved in their own ruin; and this is a danger, probably the greatest danger, with which rural Australia is faced to-day.

Iron Sulphate.

Iron sulphate has the following properties: (1) It is a direct and indirect plant food; (2) it retains ammonia and phosphoric acid in soils, and it aids nitrification; (3) under certain conditions iron sulphate (green vitriol) decomposes water in the soil, liberating nascent hydrogen. This hydrogen combines with the nitrogen of the air (present in the interstices of the soil) forming ammonia; (4) nitric acid is retained in soils by iron; (5) in the case of those plants which develop a large amount of chlorophyll, iron sulphate is most beneficial; (6) it has been proved that when an "iron sulphate solution is injected into the sap of unhealthy trees, it acts with beneficial effects"; (7) a 10 per cent. solution of iron sulphate destroys certain fungi that attack vines; (8) iron sulphate prevents chlorosis in trees, shrubs, etc.; (9) iron sulphate destroys the spores of fungi, the foes of vegetation present in dung, and it also fixes the ammonia, preventing its evaporation or loss; (10) iron sulphate, as a top dressing, destroys moss n orchards."—From "Manure for fruit trees," Griffiths.

Apple Export Prospects.

Messrs. G. A. Prevost & Co., Currie Street, Adelaide, advise receipt of the following:—

By cablegram from their London Selling Agents, Messrs. Nothard and Lowe—

"Lowe returned from America where late boxes of Apples will be extremely short. The prospects for the opening for early Australian apples consigned to us appear excellent."

By Mail from their German Agents—

"We want to say that prospects for the coming season seem promising, as we have a poor crop in our country, and we hear at the same time that United States will have a very much smaller one than last year."

The Farm

Lucerne Hay.

When lucerne is carelessly handled in hay-making there may be considerable loss in weight, and still more in actual feeding value. In Bulletin 35, Colorado Experiment Station it is stated that in average lucerne from 40 to 60 per cent. of the crop consists of stems, the balance being leaves. As the hay dries the leaves become brittle, and, together with the finer stems, are easily broken off in the process of hay-making. It is calculated that in Colorado the loss from this cause ranges from 15 to 16 per cent. of the total crop by weight. These leaves are the most nutritive part of the crop. In his standard work on "Farm Foods," Woll states that in clover the leaves contain more than half the flesh-formers of the whole crop. A similar estimate may safely be assumed for lucerne, and the importance of saving the leaves during haying is thereby emphasised. In making lucerne hay, the crop as left by the mower should be drawn into wind-rows before it reaches the brittle stage, and allowed to dry still more in that position until it is ready for carting. In rows the material will be sufficiently compact to hold most of the leaves when ready to lift, and, moreover, this kind of drying will preserve the colour better. Where a crop has been left too long in the swathe of an afternoon a dewy morning next day will often allow it to be raked together with little loss. On dry bristling lucerne the horse-rake is a bad implement—and it is worst naturally when the crop is light.—Journal of Agriculture, Victoria.

To Poison Crows.

In preparing bait for poisoning crows and eagle hawks, etc., the following method has been used with success (writes "The Western Mail) :—

Care must be taken not to handle the mixture with the hands, but use a stick or board. Take a pickle bottle, pour into it about two inches of cold water; take a stick of phosphorus and break it in half, put in the bottle, then add about a wineglass of bisulphide of carbon to dissolve it. Shake well. Get an oil drum or kerosene tin, pour into it about three pints of cold water, add 2lb. sugar, and the mixture from the pickle bottle; mix well; add as much pollard to make a stiff dough. It can then be put in a bag and carried to where a sheep or other animal is dead. Skin the animal, lay skin flesh side up. Open brisket, collect all blood, take as much pollard and mix with the blood as well make a thin paste. Spread over skin, nail skin to log or fence, flesh side out. Paint remainder over the carcase. The pollard that is not used will keep for weeks, if kept in a cool place.

Cyanide of potassium is perhaps a better poison than strychnine; first, because it is far more rapid; second, it has not a disagreeable taste; third, if left about or dropped accidentally, it will be decomposed by the air and become innocuous. It is very deadly, and even the vapours from it are poisonous if inhaled to any extent. It is used just like strychnine. The powdered cyanide is placed in a bait suitable for the particular vermin it is laid for.

Mixing Fertilizers.

It has been known for some time that the application of a mixed manure consisting of phosphates and potash salts yield better results than when the two ingredients are applied separately, and that has been especially remarked of mixtures of basic slag and kainit or other potash salts.

Investigations show that the action of the salt has the effect of rendering the phosphoric acid more quickly available; thus the percentage of citrate-soluble phosphate in the slag rose from six to ten per cent. in the mixture. Kainit, common salt, muriate of potash and sulphate of potash all acted in the same way. Similarly the fertilising effect of bone meal was increased by admixture with salt, so that it may be regarded as a fact to be acted upon that basic slag and bone meal are rendered more quickly available as plant food by being mixed with kainit or other potash salts, or, indeed, common salt.

The experiments brought out a second point which is worth noting, namely, the unfavorable effect of lime on the action of bone meal. By mixing carbonate of lime with bone meal the effect of the bone-meal was reduced by more than 25 per cent. The additional lime partly prevented the phosphoric acid in the bone meal from becoming available for plants. Bone meal is therefore not a suitable manure for soils with plenty of lime, while, on the other hand, its action is favorable on sour soil rich in humus.—Exchange.

Dry - Farming.

Dr. William MacDonald, of the Union Department of Agriculture, one of the first authorities on Dry Farming contributes an article on the subject to The Nineteenth Century under the heading "Rainless Wheat" from which we extract the following :—

The last romance of agriculture, the most daring of its many triumphs, is the Conquest of the Desert. Pictured in the winsome song of the Psalmist, the sonorous prose of the Hebrew prophet, and visioned in the pages of a modern seer, it has remained for the latest science, the deep-set share, and the diligent harrow to complete the ancient prophecy and to produce a harvest of corn from a rainless land.

To understand what has been accomplished, it will be necessary to sketch the rise and progress of this new branch of agricultural science known as dry-farming. In the study of dry farming we are led at the outset to ask what is the real meaning of the term "Desert." The dictionary defines it as a "barren tract incapable of supporting population, as the vast sand plains of Asia and Africa which are destitute of moisture and vegetation." Such a definition is apt to mislead us, for what is now a desert region may be transformed in a few years into a country of fertile fields capable of sustaining a large population. The most striking illustration of this fact is to be found in America. Spread out an old map of the United States of less than fifty years ago, and you will see that vast region marked "The great American Desert" stretching from the Missourie to the Rockies. What has happened? In the space of a single generation, an army of settlers has invaded this country, and six trans-continental railroads bring the comforts of civilisation to the farmer's door. Next, turning to the British Empire, we note that desert region of Australia so quaintly called the "Never-Never-Country," on the fringe of which farmers even now are settling. And, coming to South Africa, we mark out the Kalahari Desert, or, as it is termed in the native tongue, the "Great Thirst Land." Even there the white flag of the surveyor can be seen staking out a fifty-thousand-acre farm from the silt-laden waters of the Orange River to the restless crest of a barren, blood-red sand dune. The lesson of all this is plain. In our dry and desert lands we possess a priceless heritage; and if there are any who still think that there are no more good farms to be had in our oversea Dominions you may remind them of that saying of Emerson: "The last lands are the best lands. It needs science and great numbers to cultivate the best lands and in the best manner."

— What is Dry Farming. —

At a recent lecture on "South Africa," delivered by the writer before the Royal Colonial Institute the question was asked: "What is dry farming?" Dry farming may be defined as the conservation of soil-moisture during long periods of dry weather by means of tillage, together with the growth of drought resistant plants. Dry farming differs from ordinary farming in that the chief object of the dry-farmer is to prepare his lands to receive and retain as much rain as possible. This is accomplished by the use of moisture-saving fallows.

"Dry farming" is a new term which was first used a few years ago in Western America. In Utah and some other parts of the United States it is called "arid farming." Still another term is "scientific soil culture." For the sake of uniformity, all experiment stations, agricultural societies and the rural Press would do well to speak of dry farming and dry-land agriculture.

It is sometimes said that dry-farming is a new agricultural practice. But it is not so. Even in America the farmers of Utah have been raising crops on their dry lands with a rainfall of less than 15 inches for over half a century. More than that, dry-farming has been practised since the dawn of civilisation in Mesopotamia, in Egypt, and in North-western India. And, as Professor Hilgard, of California, remarked to the writer, "the great depth of soil in arid regions as compared with that of humid climates undoubtedly explains how the ancient agriculturists could remain in the same country for thousands of years without having any knowledge of scientific agriculture." Most farmers are aware of the fact that the roots of plants go far deeper in dry regions than in damp climates, now, if the roots of plants can penetrate to great depths, so surely must the moisture and air. It would thus seem as if an All-wise Providence had amply compensated the agriculturist of the arid regions by giving him in many parts of the globe great depth of soil combined with an almost inexhaustible fertility. Such, at least, is the lesson of history.

Summing up, we may say that desert regions are specially adapted to dry-farming, because as a general rule desert lands are deep lands, in which the scanty rainfall can be stored for a long period; and though arid soils are usually poor in humus, they are much richer in nitrogen than the soils of humid regions. It has been shown that the nitrogen-fixing germs are actively present in large numbers in dry soils. Finally, desert lands are usually free from malaria, and are thus well suited to colonisation.

— The Principles of Dry-Farming. —

As the writer has elsewhere pointed out the English agriculturist Jethro Tull is entitled to be called the "Founder of the Principles of Dry-farming." It is true that Tull saw as through "a glass darkly." To-day we see more clearly. But the principles which we have adopted are merely the amplification, nothing more, of those fundamental methods of tillage so plainly set forth, one hundred eighty-two years ago, by the genius of Jethro Tull.

In his agricultural class (1731) entitled The New Horse-Hoeing Husbandry, or An Essay on the Principles of Tillage and Vegetation, the inventor of the corn drill wrote: "For the finer land is made by tillage the richer will it become and the more plants will it maintain." This axiom has received ample confirmation on the arid lands of the United States and the British Empire, where the deep ploughing of the virgin prairie and the thorough pulverisation of the stubborn veldt sets free aeons of fertility.

It was Tull who first enunciated the three great principles of the new farming: (1) Drilling; (2) reduction of seed; (3) absence of weed. And he left a happy epigram which at least is true for the sunlit lands oversea; "Tillage is manure."

The principles which we have adopted in our experiments on the Government Dry-Land Station at Lichtenburg, in the Transvaal, and which are now being extended to the other dry land stations throughout the Union of South Africa, are eight in number, namely: (1) Deep ploughing; (2) pure seed; (3) thin seeding; (4) drilling; (4) frequent harrowing; (6) weedless lands; (7) new varieties; (8) moisture-saving fallows.

— Moisture-Fallows and the Soil Mulch. —

We believe that our success has been due mainly to the use of moisture-saving fallows, in which the rain is stored up in the soil for the use of subsequent crops. The supreme need of South African Agriculture is not fertility but moisture. Consequently, all our cultivation is directed to establishing a moisture-saving fallow which may be maintained for periods of three months, six months, or one year. Such a fallow is deeply ploughed in the first place, and then kept constantly tilled to prevent the formation of a soil-crust which would permit the moisture to evaporate. This treatment results in four things: (a) storage of rainfall; (b) destruction of weeds which are moisture-robbers; (c) admission of sunshine and air; (d) encouragement of beneficial soil-germs.

Messrs. Russel and Hutchinson, of Rothamsted, recently demonstrated that intense sunlight destroys those harmful soil organisms which prey on the plant food making bacteria. The illuminating researches of these scientists enable us more readily to understand the spontaneous and marvellous fertility of the lands of South Africa which are bathed in sunshine.

The germ life of arid lands is a subject worthy of the attention of the Universities of the Empire.

The well-known term soil-mulch is deserving of a brief notice. It may be defined as "any material which is spread upon the soil to shade the surface from the sun and to break the connection between the water-bearing subsoil and the exposed surface." Examples of mulching are familiar to everyone. Turn over a board or stone lying on the ground, and you will find that the soil beneath is moister than the ground around it, since the pores of the earth, or capillary channels, have been closed, and the current of moisture passing upward to the surface has been stopped. In the garden, leaves, straw, and manure are commonly used. But the most practical mulch is made of loose, dry soil. This is done by frequently stirring the surface of the ploughed lands with a harrow or cultivator. The soil-mulch is also termed the soil-blanket.

Now the question arises: "How deep should the soil-blanket be?" The reply is: From two to six inches, depending on the state of the weather, the soil, and the crop. In orchard cultivation, during a drought, the soil blanket is often made six inches or more, but for cereals it should seldom be thicker than two to three inches, as they are surface feeders.

— Summary of Results. —

It is doubtful if, since the time of Tull, any soil has had a severer test of his profound but forgotten principles than the dry lands of Lichtenburg in the Western Transvaal. Let us summarise what has been accomplished there.

We have shown:—

(1) That by our system of tillage we are able to keep the soil seed-bed moist for a whole year. This means that, so far as moisture is concerned, we can plant a crop at any season—a most important matter in South Africa. This result has been attained by the use of moisture-saving fallows, constantly harrowed, and kept covered with a dry-soil blanket which checks evaporation.

(2) That it is possible to grow dry land winter wheat and to harvest it before the season of rust.

(3) That drilling, as might be expected, is far better than broadcasting, saves seeds, places the grain in the moist seed-bed, and gives a more even growth.

(4) That thin seeding, for wheat 30 to 40 pounds per acre, gives larger returns than more lavish sowing. This is due to the fact that each individual plant has more moisture, sunlight, and food if given ample space.

(5) That the durum wheats have given the best results. They are the wheats which have extended the wheat-belt into the most arid regions of Western America.

(6) That the durum wheat—Apulia—has been grown under our dry-farming system without a drop of rain falling upon it from seed-time until harvest, which proves the efficacy of the moisture-saving fallow, and is a record in modern agriculture.

— A German Testimony. —

A short time ago a fair-headed, blue-eyed Viking was sent from Berlin to Windhuk to grow two blades of grass where but one grew before, in the person of Mr. Walter Richter, the Agricultural Adviser to German South-West Africa. He spent several months in British South Africa investigating our soils and crops with the skill, the patience, and the industry for which his race is so justly renowned. To our question: "What do you consider the most instructive part of your tour?" Mr. Richter replied without hesitation: "The Dryland Experiment Station at Lichtenburg. There I saw durum wheat being harvested which not only had been grown on a poor shallow soil, but actually never had a drop of rain upon it from seed-time to harvest. There, also, I saw dry land which is never dry the whole year round.

I go back to German South-west Africa filled with a new hope, for now I am convinced that dry-farming is destined to revolutionise our agricultural industry. Truly, as the motto of your Congress puts it: "The destiny of South Africa is on the dry lands."

Every great movement is indissolubly linked up with the personality of a few earnest workers. So it is with dry-farming in South Africa. The signal success which we have achieved is due in large measure to Captain Heinrich du Toit, a brave Boer officer of the former Staats Artillerie who bore a charmed life, as shown by marks of twenty-two bullets. Captain du Toit returned to the peaceful life of a Cape Farmer. When the Government dry-land station was established he was appointed manager—a post which he still holds. He has since become the tireless missionary of the new agriculture amongst the Dutch and the English settlers on the dry lands of the Union.

— Moisture Bank and Humus Bank. —

Hardly a season passes but we hear of crops that have failed because of lack of rain, and this complaint is not confined to any particular dominion, but is more or less common to all parts of the Empire. Search the pages of the rural magazines, consult the columns of the daily Press, and, sooner or later, your eye will light on that sombre line: "The crop has failed this year owing to drought." And the amazing thing is that no remedy is ever suggested, no preventive is ever proposed. Decade after decade, year in and year out, drought finds the farmer unprepared, watching sadly his withering crop in sun-scorched waterless soil.

The Alpha and Omega in the fight against drought is the moisture-saving fallow. Without it all effort is useless. With it all soil-drought disappears. Suppose we start with the bare moisture-saving fallow and we conserve six inches of rain out of a 12-inch annual rainfall. We hold the fallow for a year and then sow our wheat in a moist seed-bed. The second season another twelve inches may fall in the field, of which, say, six inches are utilised by the plants, and so, at the end of the second year, instead of one or two possible failures, we reap a 30-bushel* (12-inch rainfall) crop of wheat.

The establishment of a moisture savings bank to pay cash on demand is the fundamental principle in dealing successfully with recurrent seasonal droughts. This practice is strongly advocated by the foremost Australian authority on dry-farming, Sutton, who writes:

In dry districts a proper system of fallowing is therefore an essential of success, and the general adoption of a proper system in our wheat districts is a factor which will do more than any other to remove wheat-growing from the area of speculation and place it on a sound and solid basis. With a proper system in practice, the rainfall of the previous, or a portion of the previous year, can be stored, conserved, and utilised for a subsequent crop.

And he closed an attractive address to an assemblage of farmers with these words: "Go back home and fallow till harvest time, and when the harvest is over, start to work the fallow and keep at it until seed-time."

It may be said that the practice of growing crops on only half of the arable land and maintaining the other half in clean fallows means a good deal of extra labour. That is so, but it also means a certain crop in seasons of drought. It may be said that the continuous cultivation of the moisture-saving fallows will eventually burn out the vegetable matter in the soil. It may be so; but the remedy is at hand. On worn-out fallows you can always grow green legumes, fill the soil with nitrogen, and so gradually establish a humus bank. These two saving banks—the Moisture Bank and the Humus Bank—will secure the farmer against the severest drought and make possible a permanent fertility on the dry-lands of South Africa.

— The Year of Drought. —

The prospect of a year of drought is the favourite topic of conversation for those lukewarm Laodiceans who, by idle criticism, vainly try to check the progress of dry farming. Drought to the intelligent dry-farmer is no more than a passing storm to the skilful mariner at sea. Before us lie two authentic records of farms where the year of drought brings no dismay. These records are taken from the admirable work on dry-farming of the most eminent American authority, Dr. John H. Widtsoe, of Utah. The first farm belongs to Senator Barnes, of Utah, and is situated in the Salt Lake Valley. The climate is semi-arid, the summers are dry and the evaporation large. Over a period of nineteen years crop and rainfall records have been most carefully kept. There has been only one crop failure, and that was the first, when the land was not yet properly tilled. The heaviest crop of wheat, 29.8 bushels, was harvested in the year 1902, when next to the lowest rainfall occurred, which varied from 10.33 inches to 18.36 inches. Moisture-saving fallows followed every crop.

A second and equally instructive record is furnished by the Govern-

*Widtsoe calculates the crop-producing power of rainfall as follows:

One acre inch of water will produce $2\frac{1}{2}$ bushels of wheat.

Ten acre inches of water will produce 25 bushels of wheat.

Twenty acre inches of water will produce 50 bushels of wheat.

ment Experiment Farm at Indian Head in Saskatchewan, Canada. Here also reliable records have been kept for the same period—viz., nineteen years. Not a single crop failure is recorded. The highest yield was forty-nine bushels to the acre, the lowest seventeen. During this period the rainfall varied from 3.9 to 20.22 inches (snowfall not included—varying from 1.3 inches to 2.3 inches of water). Here also moisture-saving fallows followed every crop.

These experiments clearly show that the year of drought need not be feared when the principles of dry-farming are properly carried out. In the conservation of soil moisture lies the ultimate conquest of drought. And in place of the barren desert, abandoned homes, and dying cattle, we can now paint a new and glowing picture. There, under a serene and cloudless sky, lies a panorama of green and chocolate brown—mile after mile the growing wheat and the deep-stirred, water-holding fallow. No rain may fall for many a day, but the husbandman is untroubled. For he knows that his seed has fallen upon good ground, and that, from far below, those life-streams are flowing ever upward which will carry his hundredfold corn white unto the harvest.

The popular proprietor of the Kalgoorlie Hotel (Mr. Charles Hones, who, it will be remembered, previously had the Theatre Royal Hotel) extends per medium of advertisement in our columns, a special invitation to country visitors to give him a call. Situated a few doors past West's Picture Palace, the "Kalgoorlie" has, since coming under the management of its present proprietor, enjoyed the reputation of being an hotel where everything that is best is dispensed. The genial proprietor (Mr. Hones) is ever most solicitous for the comfort of his patrons, while the menu of the hotel is described by those who have given it attention as being equal and in many respects superior to that obtaining in continental hotels. The liquors stocked are of the best brands, and the accommodation is in every respect first class. Everything in and about the house is fresh, clean, and comfortable.

In ten years Australia's yield of butter has increased by 92 per cent. Half the annual yield of 193,000,000 lbs. is exported.

Ostrich Farming.

Last month we printed an article on Ostrich Farming in South Africa. The following interesting article on the industry in America is from the Agricultural Gazette of N.S.W. :—

— The Industry in America. —

All the large ranches are irrigated from a main ditch running through the property, so that provision may be made for supplying water to the feeding paddocks which are alongside, and also in order that ample water may be provided in the run and feeding paddocks for the birds' drinking purposes, and to allow of their bathing when they so desire.

The feeding paddocks or "corrals" as they are invariably called in America, are arranged side by side along the main ditch, and each run paddock has five or six feeding paddocks attached to it.

These feeding paddocks are from 6 to 10 acres in extent, according to the area of the run paddock to which they are attached, the idea being to have the total area of the feeding paddocks for each run paddock about one-third of the size of the run paddock; thus if there are six 10-acre feeding paddocks attached to one run paddock, or a total area in feeding paddocks of 60 acres, the run paddock will be about 180 acres. On some of the ranches the whole of the run paddocks are used as combined run and feeding paddocks, although there should be some kind of strong growing perennial grass planted in all the run paddocks.

The feeding paddocks are only made available one or two at a time. They are planted with various leguminous plants, such as alfalfa (lucerne), clovers, field-peas, or cowpeas; while some are kept for cereals, such as barley, oats, wheat, and millets of various kinds; the idea being to have some kind of green feed all the year round.

— Lucerne. —

Lucerne is the main stand-by among the legumes, and barley and the millets among the cereals for winter and summer feed respectively. The run paddocks are sown with some kind of hardy perennial grass that will grow without much irrigation. If irrigated, this portion of the land is only as a rule subjected to what is called " wild flooding."

All the paddocks that are irrigated are allowed to dry well before the birds are allowed in, as the ostrich does not thrive with wet feet.

The men looking after the birds see that their water supply is kept up, collect the eggs and any loose feathers lying around daily, look after and at once isolate any birds showing signs of sickness, and so on.

When any of the birds are fit to be plucked the mob containing them is driven to the plucking crushes. As each bird is to be deal with, a bag, in the form of a large stocking, is put over its head, when it at once submits to any operation that is necessary to denude it of its valuable feathers, which are invariably clipped, although the operation is called " plucking."

— Mating. —

The idea in the minds of many people that ostriches " mate " for life has been quite exploded on these large ranches. If two birds of opposite sexes are kept together for any length of time they will form a sort of attachment, but let either one out among the flock on the ranch they at once take a freer view of their duties in this respect.

The greater number of birds in the Arizona ostrich farms are of South African stock and type, but it has been recently demonstrated that an infusion of Nubian or Red-necked blood has increased, not only the physical stamina of the birds, but also their capacity for producing valuable feathers.

The ostrich breeder has always to contend against the possibility of a proportion of his young birds reverting to the wild type, and thus, while, perhaps producing an equal weight of feathers per year, producing them of an inferior quality as far as the greater proportion is concerned.

Although the birds having the most valuable feathers are the ones utilised for breeding, still there seems a tendency in the progeny to get back to a more mediocre type.

Experts say that this is largely because the breeding of ostriches in captivity on scientific principles has not yet extended over a sufficient number of generations to fix the improvements that have undoubtedly been made in their feather-producing capacity by careful selection. In this regard there is yet great work to be done by those who thoroughly understand the art of type-fixing in animals.

In selecting breeding birds, too often are the males only carefully selected, while the inferior females are less carefully culled out. In this way, too, much reliance is placed upon the power of the male animal to reproduce his kind from inferior females, and while the resulting birds are usually better than their inferior maternal parent it takes many generations to get the inferior points of the progeny brought up to even a fair standard.

To breed first-class ostriches a good type of female bird is more important than a good male type, and this is especially so at present owing to the types, even in the best males, not having yet become permanently fixed.

— Hatching. —

All the eggs proposed to be used for hatching are first carefully selected and numbered or marked according to parentage, and after this is completed their numbers are again reduced by excluding all but the largest and most correctly formed; the rejected eggs are sold to those who work them up into ornamental or useful articles

The ostriches are all kept in mobs or flocks, according to age and ability to agree. Those of similar age have often to be divided into several small flocks because of their fighting propensities, and their general practice of worrying the weaker members. It often happens that birds of a previous season, or of the earlier broods of the same season, have to be put back, according to their size and general physical condition, among younger companions; while particularly aggressive, specially developed, or quarrelsome young birds have often to be paddocked with their seniors to reduce them to a reasonable state of conduct.

The feathers, when taken from the birds, are roughly classed by girls, and are tied in bundles weighing from about ½ lb. to 1 lb., and are sent direct to New York, to be made into the feathers of commerce.

The eggs are hatched in incubators, and the young are thus never in the care of their parents. They are kept in what is called the "chick-run," and are specially cared for until old enough to be out to "shift" for themselves in the large ranch paddocks.

The ostriches are valued, not from the point of view of general appearance, or from their productivity in feathers, but from their producing power of the higher grades of feathers, the inefficient in this regard being constantly weeded out, and too often sold to the inexperienced inaugurators of new ostrich farms.

Good birds require no more food or attention than mediocre or inferior ones, and as there is a tremendous difference between the annual returns from the best birds and even the second grades, it is more important to keep only the best in this class of farm stock than it is in any other. The ostrich has only one use—feather production—while any other class of farmbred stock has alternative uses to which it may be put; and this makes it all important from the point of view of those entering the industry that they should rigidly exclude from their early purchases all but the very best birds obtainable.

The ostrich lives to a great age—far longer than any other class of farm-bred stock—so, if a good start is made, and the farm managed with reasonable intelligence, the flocks are a practically permanent source of income, and the yearly increase of the farm is fully stocked may all be sold.—Agricultural Gazette of N.S.W.

An Enemy of the House-Fly.

"The little brown ant has at last come into its own, says the "Sydney Daily Telegraph." He has long been looked upon as a curse, but is proving to be a blessing in disguise. The remarkable freedom from house flies in Fiji, at this season, is now understood. The great majority of them are destroyed by the ant while in the egg or larvae stage. The discovery is of remarkable interest and importance to all tropical countries.

The scarcity of house flies during the present dry spell has been a matter of common remark in Fiji. The open manure pits that are to be found on every side, would appear to offer ideal places for the flies to breed, and still very few flies are to be found, even about the stables.

Dr. J. F. Illingworth recently began investigations to ascertain what was holding the flies in check, and if some parasite could be bred, then its great value to mankind would at once be recognised. Early investigations showed that there was a remarkable scarcity of maggots, even in the unprotected manure pits. Ants, being everywhere in abundance, were not taken into account at first. Soon, however, their great numbers over the fresh manure led to closer observations and the discovery that they were carrying the eggs and newly-hatched larvae of the house flies. The egg or young maggot was held by one end and elevated above the head of the ant while he was making his way way over the uneven surface of the manure. It will be easy to understand why this discovery was not made before when we recognise that the egg of the fly is only about 1-25th of an inch in length, and the newly-hatched maggot only slightly larger.

Further observations revealed the fact that the ants destroy larger maggots of the house fly in great numbers; in some cases even when they have reached full size. The rapid heating of the manure, or the myriads of mites, which are to be found in the manure irritate the maggots so that they come to the surface from time to time. If they appear among the ants, which are swarming over the surface, they are at once pounced upon, and after a rough and tumble the superior numbers of the ants win the day, and the maggot is dragged off to their nest. In one experiment, five full grown maggots were dropped down among the ants at one time; within twenty minutes the maggots were conquered, and in ten minutes more were being drawn into the nests of ants. The wonderful reproductive ability of the house fly, even in cold countries, where they are killed off by the winter, suggests the unthinkable hordes that would plague us in a warm country like Fiji, if they were not held in check. Dr. L. O. Howard, in his volume on the house fly, estimates that one female fly that escapes the winter, laying 120 eggs in April, would result is 5,598,720,000,000 adult flies by 10th September if the conditions were perfect for reproduction. The number is unthinkable, much less can we imagine what the increase would be in a tropical country where breeding goes on the year round. The indications are that the little brown ants are the principal factors in the destruction of the great majority of house flies in warm countries.

Every year over 16,000,000 sheep and lambs are slaughtered in Australia for export, and beef totalling over 100,000,000 lbs. is sent out annually for oversea consumption.

Australia's wool clip has increased by 33 per cent. during the past five years. The latest "tally" shows that there are over 93,000,000 sheep in Australia, a larger flock than any other country possesses.

Australia's 2,000,000 dairy cows have produced in one year 500,000,000 gallons of milk, from which 193,000,000 lbs. of butter, 16,000,000 lbs. of cheese, and 12,000,000 lbs. of condensed milk were made.

Concrete Silos.

By J. Wilson, Silo Builder, Journal of Agriculture, Victoria.

The advantage derived from the construction of silos by using concrete bricks made from the material found on most farms, namely, gravel and sand, with the addition of a proportion of cement (six of sand to one of cement), is steadily being recognised. The silo so built is fireproof, white ant and mouse proof, as well as being durable. The proportion of cement used is so small that it is hardly noticeable in the matter of cost, only sixteen casks of cement are used to make the bricks and set them in a 70-ton silo. Farmers who elect to build silos or farm buildings generally for themselves with the aid of farm labour can now do so with a brickmaking machine and the use of average intelligence. The necessary material, sand and gravel, or sand, is usually to be found close at hand. The sand should be sharp, and washed clean, as both clay and loam are drawbacks, particularly the former. An up-to-date machine made entirely of steel can be had for a nominal sum. The machine makes a hollow brick 24 ins. by 6 ins by 6½ ins., and is lifted from the brick, thus preventing any possibility of the block becoming cracked or strained. The weight of a single brick is about 30 lbs., and considerable care and thought has been expended over the construction of the machine; its usefulness for silos or buildings is fully assured.

To build a 70-ton silo, 850 blocks of the size mentioned are required, and one man, with the assistance of a lad, can make them in a week, and the building should not occupy more than ten to twelve days to erect. The bricks must be properly cured before laying: this is accomplished by sprinkling them with water night and morning for a fortnight, so as to prevent them from drying too quickly. In building the blocks are set in cement mortar of a mixture made of four parts of sand to one part cement in the same manner as ordinary bricks. It is advisable not to mix more mortar than can be used in half an hour, as set or hardened cement mortar is quite useless. To insure success, the initial set should not be disturbed.

— Foundations. —

Level a site for a diameter of 16 feet, fix a centre point by placing a 2in. pipe firmly in the ground so as to receive a 2-in. pole; from this centre attach a piece of quartering, 7ft. 4in. long, to act as a trammel which will describe a circle having a diameter of 14ft. 8in. inside measurement. Care should be taken to fix the pole plumb so as to obtain an accurate circle. Cut out a trench 6 inches deep and 12 inches wide, the bottom to be level. A double wall is laid in the trench for the first course, and then single walls to the top.

The blocks break joints at 12 inches in succeeding courses, which allow the hollows in the bricks to come over each other.

— Reinforcing. —

During the course of construction the walls should be reinforced by laying on the top of each course ordinary fencing wire (any old wire lying about the farm will answer the purpose), clipped together at joints, and built in with the blocks. Three rows of wire to each course for the first 4 feet, and for the remainder two rows of wire. The height of a 70-ton silo is 21 feet, and inside diameter 14 ft. 8 in., and requires 850 bricks, each 24 inches long, of this number 45 would be required to form the footing course. Port holes, or doors, are formed in the following manner:—The first or bottom door commences six courses from the ground, one brick being left out for four courses; there are three such doors to a silo, allowing six courses between each door, size of opening will be 2ft. by 2ft. Form the doors of galvanized iron, 24 gauge, cut 3ft. by 2ft. 6in., and nailed to three strips of 3in. by 1½in. hardwood 2 feet long. Door frames are built of 6in. by 1½in. hardwood, and checked out 1½ inches to receive ledgers of doors.

The inside face should be bagged smoothly, so as to be free of mortar projections, and the joints of exterior struck smoothly with a trowel.

Build in on the top course of bricks eight bolts, each 10½in. by ½in. long, for bolting down the plates of the roof, four plates of 4in. by 2in. are used, and the purlins are propped up with 4in. by 2in. studs, bolted to the plates at the bottom, and halved out 2 inches at the top, to receive purlins. Fix two braces 3in. by 1½in. from centre studs to ridge purlins; two purlins are used to form ridge. All timber used is of hardwood. Cover with corrugated iron, 9ft. sheets, and fasten with spring head nails, nailing the iron every second corrugation. The concrete silo is one of the types erected for farmers, on terms, by the Department. Application forms for the construction can be obtained from the Department of Agriculture, Treasury Buildings, Melbourne, together with particulars of the general conditions under which the silo is erected. The cost of erecting a 70-ton concrete silo complete, with elevator, is £55, subject to slight variation on account of distance from Melbourne and cost of cement.

— Material Required for a 70-ton Concrete Silo. —

Hardwood, 4 in. x 2 in., six 18 feet, three 16 feet, purlins plates and studs.

Hardwood, 6 in. by 1½ in. three 9 feet, door frames.

Hardwood, 3 in. by 1½ in., two 18 feet, braces for roof.

Galvanized corrugated iron, 26 gauge, 9 feet, eighteen sheets.

Galvanised plain iron, 24 gauge, 72 in. by 36 in., three sheets.

Galvanized ridging, 26 gauge, 16 inches, 18 feet.

Spring head nails, 2½ inches, 3 lbs.

Wire nails, 3 inches, 5 lbs.

Cement, sixteen casks.

Sand, 16 cubic yards.

Bolts, nuts, and washers, eight 10½ in. x ½ in., two 6½ in. x ⅜ in., ten 4½ in. x ⅜ in.

— Material for 30ft. Elevator. —

White deal, 6 in. x ⅞ in., T. and G., nineteen 20 feet.

White deal, 6 in. x ½ in., T. and G., four 15 feet.

Oregon, 6 in. x 1½ in., one 8 feet.

Chain, 60 feet, 1 9-16 pitch, No. 45 link.

Thirty Oregon slats and attachments for No. 45 link.

One 8-inch diameter sprocket wheel, 16 teeth, 1 9-16 inches pitch.

One 8-inch diameter by 11¾-inch pulley.

Two adjustable bearings.

One 22 teeth, 10½-inch diameter, sprocket wheel for No. 52 link, 1½ inch pitch.

One 10 teeth 5-inch diameter sprocket wheel for No. 52 link, 1½ inch pitch.

14-ft. chain 1½-inch pitch, No. 52 link.

Eight 2½-inch by ½-inch bolts, nuts, and washers.

Eight ½-inch washers.

Two sheets 72 in. by 36 in., galvanized plain iron, 24 gauge.

4 lbs. 2-inch, 2 lbs. 3-inch, wire nails.

Posts of any size can be made in the moulding machine by blocking off at either end, and the fastening holes for each post can be regulated according to requirements.

— Concrete Fence Posts. —

The manufacture of concrete fence posts is yet in its infancy, but such posts undoubtedly show superiority over the wooden ones. They are usually made 7 feet long, 5 by 5 ins. at base, tapering to 5ins. by 3in. at the top, with holes placed at suitable intervals for either plain or barbed wire. To these concrete posts timber can be bolted to carry gates and any class of fence. Plain wire, barbed wire, or wooden pickets can be readily attached.

The machine for moulding the posts is constructed of steel throughout, with collapsible sides and ends, so that a man, with the assistance of a lad, can make 100 posts per day of eight hours' labour. Reinforcing is recommended with some form of metal (old fencing wire, either plain or barbed, or hoop iron will answer the purpose). The superiority of such posts over wooden ones is is self-evident. They are fireproof and rot-proof; weeds, leaves, and rubbish which usually accumulate around the base of fence posts may be burnt without the slightest injury to the post. It is practically everlasting, and in many localities prove equally as cheap as a wooden post, since it must be remembered that the first cost of a wood post is not the only one; a wood post may rot away or be burnt, and the cost of maintenance must be considered.

COOL ROOFS.

It often strikes one as strange how few people wear white clothes here in the summer. South Australia is frequently as hot as Africa and many Eastern countries, but Australians do not seem to have realised how to protect themselves from the sun. Whoever heard of an Arab in anything but a white robe? Yet when the temperature is 110 in the shade here in Adelaide you will frequently see unfortunate individuals in blue serge suits! And again one of the first things noted in the East is the fact that nearly every building is white. Why then all this whiteness? Simply because thousands of years ago, probably when Australia was still covered by the sea, it was realised that white reflects the sun's rays while colors absorb them. This fact will be fully realised by Australians sooner or later, and then there will be no more painting roofs red, which is surely a most foolish custom, inasmuch as it is practically attracting the sun to the iron, which alone is a powerful conductor of heat, as anyone will witness who has been on a roof on a hot day without his boots. Of course the difficulty has been to obtain a white paint that was suitable for roofs, all paints naturally would not do as the heat quickly dries out the oil, leaving the pigment to flake off without its binding. Whitewash, until recently, was the best known preparation, but this soon becomes discolored and washes off with the winter rains, so that when "King's Compo" was introduced into this State three years ago it met with an immediate demand. "King's Compo" is put up in dry form to be mixed with water, and when applied to a roof a chemical change takes place and in a few hours it hardens till it practically becomes a solid sheet of pure white concrete on the iron and like concrete, is practically everlasting. The Superintendent of Public Buildings has realised the remarkable efficiency of this composition since its inception and has used it exclusively on numerous public buildings and State schools throughout the State, and that, together with the fact that 20 tons or over, 1,000 tins of "King's Compo" have been sold during the past twelve months, is the highest proof of its utility and the satisfaction it is giving to its users.

Angora Goats in the United States.

There are a million Angora goats in America, and yet they import annually over 30 per cent. of the mohair used in their domestic manufactories. The banner goat farm of America is located in Texas and numbers 10,000 head of grade and pure bred Angoras. Last year the owner of this ranch realised a nett profit of 1 dollar per animal from his flock. There are several other pretentious goat farms throughout New Mexico, California and Oregon. The largest goat ranch in the Mississippi valley has 2,000 head, but the average flock in this country, is from 100 to 500 animals. The custom is to shear the goats early in April. Ordinary hair sells from 35 to 55 cents. a pound. This common grade of mohair, which commands no especially high price, is that whose length is less than twelve inches; the ordinary fleece of one year's growth measures about ten inches in length. 'The average mature doe will shear from six to nine pounds of mohair each year, while the full-grown buck will yield from 10 to 15 pounds. Previous to shearing, the flock is graded into classes of does, bucks, kids and wethers. The fleeces are marketed according to their classification. The American Angora Goat Association, maintains a special mohair warehouse in Boston where the fleeces of practically all the Angoras in this country are marketed. At this depot the fleeces are carefully cleaned, regraded if necessary, and baled ready for consignment to the manufacturing plants, where the raw mohair is converted into clothing, rugs, book bindings, shoes and gloves. One very beautiful fleece which was twenty-two inches in length sold for 6.50 dollars a pound, the record price for raw mohair in this country. Four dollars a pound is about the ordinary top figure.—Farm and Fireside.

Woburn Experiments.

— Wheat Land. —

Since 1876 the scope of the experimental work at Woburn has greatly extended, and some three years ago Charity Farm was taken over, situated more than a mile away, but having the advantage of being equipped with farm buildings, though in contrast to the Woburn holding the soil is of a heavier character. The thirty-seventh continuous crop on wheat on the stackyard field indicates the marked benefit to be derived from liming on land that is naturally deficient in that substance. The soil, too, has been rendered acid and sterile through repeated applications of sulphate of ammonia; and the lime-dressed land, at the rate of two tons to the acre, has for 16 years shown the benefit of this course of treatment. It is significant that half a ton of lime to the acre put on one plot in 1905 now shows signs of being worked out, so that there would appear to be a definite relationship up to a point of the amount of lime applied and the duration of its effects. It might be added that the season in England has not been favourable to cereals on light soils, especially spring-sown corn, which had not the strength to withstand the drought in June. The nitrate of soda plots looked well towards the end of July, and the farmyard manure and rape-dust dressing showed no marked difference, both doing satisfactorily.

— Barley Crops. —

Barley, also in its thirty-seventh year, had not perceptibly felt that blighting and strangling effect of the June weather. The 1912 lime dressing produced a marked benefit, and the effect of a dressing of one ton to the acre in 1905 is now disappearing, affording valuable information on the duration of the action of lime as applied to land on which white crops are grown. In an enclosure on the same field various clovers and lucerne are being tested, and the effect of treated or inoculated seed is being tried. Excellent hay crops, as much as three tons to the acre, have been carried ; while of lucerne, the best results have been secured from the Russian seed, the Provence and the Canadian following in the order named. The American is stated to be inferior.

— Manuring Trials. —

In another field green manuring trials are taking place, ploughing-in being resorted to, in contrast to the feeding off, which is tried elsewhere. It is the intention to take an oat crop to test the effect of stored up nitrogen in the soil. Some magnesia experiments illustrate the influence of this substance on wheat, the application being made prior to sowing. The effect is a darker plant and improved tillering. The latter objective is sought in another way by trenching, the seed being sown in a trench, covered, and allowed to shoot. The new shoots are then covered with soil until the service is level. By this means it is claimed that the tillering improves, and the yield is, of course, greater; but the points at issue are the practical possibility of such a system, the cost, and whether thicker seeding would not partly remedy this.

On another part of the farm the effect of nitrate of soda on catch crops—mustard and trifoleum—is being closely observed. Other interesting tests are the comparison of varieties of oats, thick and thin barley seeding, and the manurial treatment of permanent grass. A new nitrogenous fertiliser—nitrate of ammonia—is being contrasted with the older established nitrate of soda and sulphate of ammonia.

— Pot Culture Experiments. —

Pot-culture experiments have been carried out since 1897, the station for this purpose being established mainly through a bequest from the late Mr. E. H. Hills. The cost of equipment was £1,200, and the station is said to be the best of its kind in the country. Some of the experiments now in progress are designed to show the influence of zinc, copper, manganese and cerium salts on the wheat crop. The relationship of lime to magnesia in soils, and the solubility of basic slag, the latter an important practical point, are being observed. There are also experiments in the eradication of the wild onion, the influence of sulphur on crops, the effect of spraying barley with sulphate of copper, and lastly, experiments on the heating of soils, a branch of research originated by Dr. Russell.

— Tuberculous Cattle. —

Some important calf-rearing experiments at Woburn will soon be brought to a close, the intention being to demonstrate that by healthy rearing, calves from tuberculous mothers can be kept healthy. A little more than two years ago the institution procured a number of tuberculous cows expectant of calves. They had some difficulty in getting them, for farmers are unwilling to admit that any of their cattle are diseased. They were obtained, however, and housed and isolated at Charity Farm, where they calved. The young were at once separated from their mothers, and every step was taken to ensure that they could not be further tainted. They were removed to a distant part of the farm, attended by men who had never been near the cows, and fed on alien sterilised milk. Many died, but nine bullocks and six heifers survived. The first were fattened off and last May were slaughtered, the carcases being fully examined for any sign of tuberculosis. None was found. The heifers and their calves will be slaughtered shortly for a similar test. Dr. Voelckler stated that a satisfactory conclusion might be drawn that animals, though born of tuberculous parents, if kept isolated under healthy surroundings need not themselves be tuberculous. The result of further experience in this direction will be awaited with much interest by graziers throughout the world.—Dalgety's Review.

Horse Breeding

H. W. Potts, Principal, Hawkesbury Agricultural College.

The possible advance of horse breeding in Australia appears today more promising to studmasters and farmers than at any period of agricultural progress in our history. The prevalence of prosperous seasons, and the rapid alienation and occupation of lands under closer settlements conditions, provide factors inducing keener attention to the horse-breeding industry. Experienced breeders, responsive to the encouraging prices offered for well-bred draught stock, are exhibiting admirable enterprise in the purchase and importation of stock from the finest studs in Great Britain. Evidence of this is apparent in the size and quality of the stock exhibited of late years at the leading shows and horse parades. A distinct and welcome change is being introduced in type and conformation in Shire, Suffolk Punch, and Clydesdale, more especially in the case of the last-named.

To the breeder of a bygone day, the modern Clydesdale does not appeal. The thick-legged, coarse-feathered, sturdy animal, which was once most favoured, is giving place to a horse of finer conformation, better bone, and freer action. The old conception that weight provided the main feature in an animal's value, is being modified by the more attractive and profitable qualities of gameness and activity, combined with a long sweeping stride, well-flexed hocks, soundness of leg and foot, and light, sparse feather.

New South Wales possesses many notable advantages for the horse breeder in soil, climate, environment, and extensive areas. These ensure a degree of stoutness, vigour, and freedom from disease rarely manifested in the horse elsewhere. It is a recognised axiom that a warm, dry climate, associated with a good soil and natural pasturage spread over undulating country, beneficially influence the type and character of the horse raised there. That has been demonstrated in Arabia, where the finest horses in the world have been bred.

Horses bred on hilly country grow muscular and hardy. They acquire a quick sense of judgment, develop smart and even action, keen sight, and grow sound legs with tough, well-formed hoofs.

The successful breeding and management of stock depends, in a large measure, on the judgment, training, foresight, and aptitude brought to bear on the varied phases of the industry by the farmer. The selection and mating of parent stock to secure satisfactory results is no mean task. Darwin states :—

Not one man in a thousand has accuracy of eye and judgment sufficient to become an eminent breeder. If gifted with these qualities and he studies his judgment for years, and devotes his lifetime to it with indomitable perseverance, he will succeed, and may make great improvements. If he lacks any of these qualities, he will assuredly fail.

This expression of opinion by such a revered scientist was obviously intended for those who select special lines of work in breeding, —the class of breeders to whom in endeavours to produce new types we may credit our valuable breeds of sheep and pigs. The quotation is advanced only to emphasise the need for thought and observation on the part of the farmer when raising stock.

The average careful breeder can do much not only to maintain the distinguishing features of the type he wishes to reproduce, but by shrewd selection and the adoption of rational methods of management and feeding of the young stock, to steadily effect improvements and more nearly approach the ideal standard of type.

In all young countries such as Australia, the demand for horses responds to the prevailing natural conditions. Here we have unlimited areas of land, thinly populated, and eminently suitable for agriculture, irrigation, and stock raising. Land values being low, horses are more essential for the successful conduct of the primary industries.

Many farmers advance the argument that the breeding of draught horses has seen its best day, and that a reaction is within sight in favour of motor machinery. So far, however, no reliable data can be shown to suggest that this can occur in a country where feed and water are plentiful, and no apprehension need be felt on this score. The prices offered for reliable draught stock must, for a long period to come, be sufficient inducement. For several years the demand has been exceptionally good, and the presence of the factors operating to create this healthy market still exist, and in a more intense degree than ever. Many breeders appear content to raise a useful stamp of draught horse, of good constitution and free action, which can be sold at three years old at a reasonable figure. Weight continues to attract attention, combined with quality and conformation, are looked on with favour.

A horse endowed with courage, activity and stoutness, and also showing depth of body, short coupling, heavy muscle, with good bone, sound feet and docile temperament, must always have a ready sale.

— The Crossing of Types. —

It is a popular practice to cross types in order to increase some special quality that may be deficient in sire or mare, or both. This may be in response to the recognised principle that the first-cross progeny of any domestic breed is of exceptional merit, but there are serious objections for results do not always justify the practice. The Shire has frequently been crossed with the Clydesdale with the avowed intention of producing stock of greater height and weight, but the experience already gained here corresponds with that obtained by breeders in England and Scotland. The resultant cross has not given satisfaction, in so far that weight and height were secured at the expense of action. The smart movement and gameness of action so prominent in the Clydesdale, was replaced with the somewhat clumsy, deliberate and slower gait of the Shire. Other cases could be cited to illustrate this, but sufficient has been said to warn breeders of the possibility of error in this direction. It is fair to urge that there are more likely to be reliable results in breeding out faults by the intelligent mating of parents of the same breed than by crossing different breeds. Selection within the limitation of the one breed is much more likely to prove satisfactory.

— The Choice of a Sire. —

There is no other point connected with the breeding of horses of more importance to success than the choice of sire. A definite ideal must be in the breeder's mind in relation to type. Pedigree is an essential, and purity of lineage cannot be too strictly insisted upon. The next inquiry must be for the Stock Department certificate of soundness and conformation, freedom from hereditary disease being only ensured as the result of the examination by a qualified Veterinary Surgeon. The transmission of disease has been painfully apparent in the past, but breeders have no excuse now for employing unsound sires. The main object of the breeder is to secure strength, and at the same time the staying power that enables a horse to do a hard day's work for a lengthened period.

The sire must be active, intelligent, though full of determination. Beyond all dispute the best evidence of a horse's staying power and length of service in the heavy breeds, is balanced action—the movement and stride that enables a horse to cover the most ground with a maximum of ease and a minimum of friction and wear. True action has a special value in both sire and mare, for where the feet are raised and placed in precise and regular form in walking and trotting, there is resistance to bone and joint troubles, and there is also lengthened service. An evenly balance body would lose its value on ill-shaped feet, or abnormally dropped legs.

Constitution and stamina are also needed to withstand the stress of continuous work.

The indication of a general nature must include a good barrel or middle piece, showing ample space for digestion, and vigorous heart and lung action. A slack-loined horse is more or less " soft," and a tucked-up barrel, sometimes termed " herring-gutted," also betokens lack of stamina. Ample girth, depth through the loins, and fullness at the flank all favour constitution.

It is not an uncommon thing to see a " washy " horse which is big in the barrel, but which with stress of work soon falls away in condition and exposes his true type with a lightness about the girth and loin. A fleshy heavy head, should not be favoured; while, on the other hand, a lean head, wide in the cheek, with a good space between the branches of the lower jaw, denotes constitution, as also does the bright, lively eye, and quickly moving forward ears.

Weight and substance with a good top and quality of feather are required. The condition of the skin must be closely examined.

A good temper and kind disposition invariably accompany intelligence and good manners.

An examination of the legs, for durability, must not be overlooked, and should result in the discovery of clean, flat bone, with tendons distinct, free and clear from the bone. Sloping pasterns of medium length are desirable. The closest scrutiny should be made of the structure of the foot—a firm, wide heel, strong, horny crust, healthy frog, and level placing must be shown.

— General Overhaul. —

A general overhaul of the animal in the action of walking and trotting affords the opportunity of estimating his character, and many features that it is impossible to outline, also aid in arriving at fairly sound conclusions. A prominent breeder states that " we should not select as a result of the animal possessing some specially good quality, but rather select him from the absence of faults and the general accumulation of harmonious and worthy qualities in disposition, conformation and stamina." The exaggerated development of any single meritorious point is not compensation for some flagrant deficiency.

Performances or exhibition in the show ring do not always afford the most reliable evidence of a sire's capacity for leaving sound stock, but these, in conjunction with the proved excellence of his stock, are the best guarantees to owners of mares. It is only necessary to review the show records of those sires well known to the Hawkesbury district, " Plucky

Willie" and "Darnley Again," to illustrate this contention. Year after year, these sires have occupied premier places at the Royal Agricultural Society's shows in Sydney. Not only have they scored in the highest positions, but their stock have gained exceptionally high awards in the show ring, and excellent prices at the horse sales. The knowledge of pedigree, stoutness, prepotency, quality, weight, action and other desirable qualifications is thus eclipsed in guiding the breeder by absolute evidence of the very best kind.

— Service Fees. —

No owners of a mare should hesitate to pay a reasonable fee for the services of a pedigreed sire, that is sound in sight, limb and foot, and that possesses a certificate of registration, and a good local reputation. It is at this stage that a farmer should exhibit enough courage to resist the blandishments of the man with a cheap, unregistered stallion, and by so doing he is rendering yeoman service to his country. The complete exclusion of unregistered stallions would prove an immense gain to our farming community.

Farmers have the settlement of the difficulty in their own hands, and they can approach it with the knowledge that an inferior colt got by a cheap, unsound sire, costs as much to feed and rear as a purebred. The latter will always repay a reasonable outlay on service fees. It is a wise expenditure, even if the mare has to be sent some distance to a reputable sire.

— The Influence of the Mare. —

There is diversity of opinion amongst farmers as to the age at which a mare should first be stinted. Happily, adverse criticism has met the practice of putting an immature two-year-old filly to the sire, for it is unreasonable to expect a young mare of that age, whilst still growing, to assume the additional task of producing a foal, as both mother and foal must suffer in development. It appeals to any fair mind that the most rational practice is to wait until the animal's body and functions are fully matured and her growth complete. The earliest age recognised is from three to four years, but some discretion must be exercised in each case, seeing that certain fillies are precocious and mature quickly, whilst others are slow.

Neither is it always advisable to breed from old mares, seeing the result is often disappointing. Occasionally it happens that a farmer works a mare continuously until she gives evidence of being worked out. She is then looked on as only fit to turn out and breed from. This class of mare is not altogether satisfactory. It often haphapens that she fails to secrete enough milk to nourish a foal; at other times the foal is a weakling and hardly worth rearing; and again, difficulties in fo ling often present themselves owing to the hardened or atrophied condition of the muscular mouth of the womb.

Successful breeders invariably select young, vigorous mares for stud purposes.

A mare is always sexually more fit for service and in the best condition for impregnation when she has been given regular work during the previous winter, for when kept in idleness, there is a possibility of an infertile service, or (if put in foal) the progeny is not vigorous and sturdy.

The selection of a mare for breeding purposes is to some extent controlled and determined by local conditions, combined with the circumstances of the owner, and in order to ensure good stock it is advisable to be guided by some general principles.

— Grade Mares. —

We recognise that grade mares are useful to breed from. Frequently our necessities give us no other option, but, however much the limitation is to be deplored, the best should be made of the situation, and only the cream of those available set apart for breeding purposes. We all readily admit the need for more pure-bred mares of the right type, soundness and conformation, because from these only can be produced pure-bred stallions, suitable for our requirements. Pure-bred mares pay handsomely for their keep, both in their work on the farm and in the excellence of their foals, and inquiry is therefore as essential to success as discretion in selection. It is not enough to have a mare of good quality and stoutness with a local reputation. More remote evidence in relation to breeding, type, and pedigree on both sides for at least three generations should be available as a safeguard against the intrusion of some defect or objectionable characteristic in the progeny.

Deficient heart and lung action, weak sight and ill temper in the foal are often traceable to the mare. She should be roomy, staunch, of even temper, gentle disposition, with strong maternal instinct, and a reputation for being good in the collar and quick in moving. Sluggish mares transmit their objectionable habits.

In connection with freedom from hereditary disease or unsoundness, it may be specially emphasised that it is of great importance to the owner to have the mare examined by a qualified veterinary surgeon to determine whether or not either of these defects are present in any form. At the same time appearances often mislead the best judges, for splendid stock have been bred from mares showing no special fitness, though evidently possessed of a capacity for transmitting vigour and quality.

— Balance. —

A brief inspection of the future mother should include a keen examination of the way she stands. Correct balance on the ground, standing, walking or trotting, with even movement, is essential, for balanced action is the source of a mare's ability to do a long day's work and to come home comparative fresh, showing minimum waste of power. Any tendency to awkward pace, or abnormal spreading of the feet inwards or outwards, means unusual wear, and early suspension from work. The shoulders contribute in no small degree towards the perfection of balance and enable the animal to walk and trot with level, active carriage, and game, even movement, and they should be fairly oblique and broad.

Symmetry, quality, stamina, stoutness and substance are to be estimated, as well as character and staunchess. The short ribs and hips should not approach each other closely. Roominess is gained by broad and prominent pelvic bones, and width across the loins. The udder, or mammary glands, should be firm and well shaped, and should have clearly defined teats. Vigorous heart and lung action is evidenced in the angle and space of the girth, and size of the chest. The ribs should be well sprung, enclosing a capacious barrel.

The legs should be well moulded from the forearm and thighs downwards, terminating in sloping pasterns, and sound, round, wide feet. The knees should be broad and massive, and the hocks well placed, firm and clean.

The lean, fine head, soft but quick intelligent eye, with active ears, are indications of a good disposition.—Agricultural Gazette of New South Wales.

(To be Continued).

Guernsey Cattle.

The Guernsey, unlike the Jersey, is not what might be called a pretty looking animal. The cows of this breed lack those deer-like characteristics which have made the Jersey both a pet and an ornament. None the less they are notable for milk making capacity of a high degree. Because of a wider recognition of this fact the demand for them is growing is both America and England. Mr. Callaghan, Dairy Expert of New South Wales, is a strong advocate of the breed, the stock imported by this department having proved of great value in the dairying districts of that State.

— A Distinct Breed. —

By a not unnatural association of ideas, many people are under the impression that, as applied to dairy cows, the words Jersey and Guernsey are interchangable terms. Nothing could be wider of the truth. Each type is quite distinct from the other, and are essentially different. Thus, for instance, the hair of the Guernsey is longer and coarser than that of the Jersey. The Guernsey is fawn or lemon in color with patches of white. A special feature of the breed is the rich orange color which appears in the skin, and notably in the ears. As a rule the deeper orange is the hue of this marking, the more is the cow prized, though actual results at the bail do not appear to give encouragement to this preference. There are notable differences in the heads of the pure bred Jersey and Guernsey. The shapely dishing and curving of the former is not found in the Guernsey. Generally speaking the latter is a larger animal than the Jersey, deeper in the flank, and in the rib. A characteristic of the Guernsey is a large, square udder, and the teats are both of good size and well set on. The cows generally produce large quantities of milk of a good butter fat percentage. By some authorities they are regarded as better cows than the Jerseys. At important trials both in America and England they have more than held their own against other dairying breeds. A feature of the Guernsey is that they are generally speaking of a hardy disposition and are good doers.

— The Ideal Guernsey. —

According to the standard laid down by the English Guernsey Cattle Society, the ideal Guernsey should possess a fine long head, expanded muzzle, large eyes, and quiet and gentle expression. The horns should be yellow at the base, curved, but not coarse. Black markings on the nose are a defect. A clean throat and a thin and rather long neck are required. The animal should not be heavy at the shoulders. The back should be level to the tail, and broad and level across loins and hips. Importance is attached to a good rump. Thin withers, long and thin thighs, a barrel long, well hooped and deep at flank, are characteristic features. A mellow and flexible hide is essential, one well and closely covered with fine hair. Yellow markings inside the ears, at the end of tail, and on the skin generally are indications of quality. The udder is an important feature. It should be large, but not fleshy, the fore part extending well forward. Full in form, it should come up well behind, the teats need to be rather large, wide apart, and squarely placed. The milk veins should be prominent, long and tortuous, while in general appearance the animal should give every indication of having a good constitution.

Farmers of Forty Centuries.

The chief object of this book by F. H. King on Agriculture in China, Korea and Japan is to show what soil is really capable of producing provided unremitting care and plant-food is lavished upon it. And the results are certainly astonishing as are the wonderful ways and means by which every scrap of waste, either animal or vegetable, is collected and stored up to be returned to the soil. In China with its swarming millions of population, where families are large and holdings small, the strictest economy in all the branches of life have to be rigidly practised or famine stares them in the face. Roads are made the least possible width; banks between rice fields are made to bear crops of beans or peas; ridges are so arranged that they can be planted on both sides as well as in between; fruit trees are trained so as to take up the least possible room and at the same time produce the greatest possible number of fruit-bearing branches; whenever possible a second crop is sown in the first in order to save time, such as cotton planted in the wheat, or clover in the rice or barley.

Sometimes there will be even triple crops growing at once such as wheat ready to harvest, beans two-thirds grown and cotton just planted. Even ponds are made to take their part, being either used to breed and fatten fish in or periodically drained and the rich vegetable deposit at the bottom used for compost.

These composts form a very important part of Chinese plant-food economy and are either formed by making pits in any waste corner of a field—preferably beside a canal or pond—and into it are thrown any coarse manure, ashes, roughage in the form of stubble, leaves, weeds, or other refuse on which is poured the liquid mud or ooze from canal or pond. When full and well rotted it is transported to the fields. Another very useful purpose these pits serve is that by reason of the field draining into it they catch all the surface washing preserving them to be returned to the soil, instead of being washed out to sea and lost.

Another form of compost is obtained by making a stack of alternate layers of fresh clover or any other leguminous crop and liquid mud and plastering the whole carefully over with mud and leaving it to rot.

In Japan a somewhat more complicated form of compost is made by erecting a small building with a water-tight floor. In one half of the building the stack of greenstuff, straw or leaves and liquid mud is built up and kept moist to maintain a temperature below that of the body. Left to stand six weeks, it is then forked over to the other side and left for another period before it is ready for the fields.

Green manure is applied in the form of clover generally sown in rice or barley and after one or two cuts ploughed in. For vegetable gardens liquid manure is greatly used, receptacles are constructed for the reception of animal excrement which is soaked and then fed to the plants in a diluted form. Some of the photographs with which the book is profusely illustrated, show the wonderful size and great variety of the vegetables that answer to this careful treatment. The author gives a list of nearly seventy varieties of vegetables he saw exposed for sale in one market alone—a collection which would surely put Convent Garden to shame.

Naturally with all this great expenditure of labour and plant-food large returns are expected and besides the two crops of rice grown each year another crop or even two, of cabbage, rape, peas or beans, are obtained from the land, making 3 or 4 crops a year from the same field.

One thing the author particularly notices and that is the scarcity of flies which he attributes to this constant clearing up and usage of all waste and garbage, the breeding place of these plague-carrying pests. Therefore the general health of the people should benefit greatly.

In some countries, as for example Egypt, where flies swarm and in consequence opthalmia is permanent, the filth lying around and in the villages is indescribable. The fellah makes no attempt at the systematic collection of human or cattle waste such as the Chinese practise, but wherever the filth of generations happens to collect, it is removed and spread on the fields. But in Egypt they have great villages consisting of pigeon-cots for the collection of the valuable guano and of this practice existing in China the author makes no mention.

As regards rice cultivation, transplanting seems to be the method chiefly in vogue although according to the author's statistics, the yield seems to be no greater than that obtained in Egypt where the rice is sown broadcast. In Egypt Japanese rice will yield 80 bushels to the acre which is apparently only the best it can do in Japan and China when highly fertilized together with the added cost of labour for transplanting.

Straw and roots are greatly used as a fertilizer by laying it between the rows of rice and trampling it with the feet into the soft mud to rot.—Tropical Agriculture.

Mosquitoes.

Perhaps it is not generally known that many farmers have large incubators on their farms where they hatch immense numbers of mosquitoes' eggs.

There are several varieties of mosquitoes, just as there are several varieties of chickens. Their eggs can be hatched in any still water, anywhere. A rain water cistern is a good place, so is water left standing for some time in a barrel or ditch, in a pail or can, a swamp or marsh.

One species of mosquitoes lays their eggs on their sides singly, while another lays them by the hundred and glues them together in the shape of a boa. They are glued together and rest on their ends.

There are four stages in the life of a mosquito. The egg, the larva, the pupa and the imago or winged insect.

The first part of a mosquito's life (like a frog's) is spent in the water.

The eggs hatch in one or two days and are then called larvae. They remain in the larval stage six or more days, when they gradually reach the pupa stage, in which they remain two or three days before their wings grow sufficiently to fly away as full grown mosquitoes to suck the blood of man, beast, or bird.

However helped and guided by our friends, masters, and predecessors, each of us determines for himself, in the critical moments, what his life is to be, when it is right. —Ruskin.

Apiculture as an Occupation for Women.

The reasons for keeping bees are many and various, and the business appeals to man, woman, youth and child. Bees have been a part of the conscious life of man from the beginning. Not only have they sweetened his daily bread with beneficent honey, but they have also set him an example far more uplifting than any other insect or animal creation.

Beekeeping is the one line of work that the busy woman or the woman of leisure can take up as a remunerative occupation. All beginners should be provided with a silk bee-veil and rubber gloves, because bees do not often attack rubber. They should also visit the bees often and keep up the acquaintance, but should not approach the front of the hive. Always approach a hive from the back or side. It will protected by veil and gloves any one can handle bees without being stung. However, most people become immune to the poison after being stung a few times. When bee management has been properly learned bees are as easily handled as birds. Women can care for bees because there is little attention necessary unless one wishes to feed for early brood-rearing, or there is foul brood in the vicinity.

When the swarming season is at hand, and one is provided with a new sectional hive with frames properly fitted with brood-foundation starters, and a queen and drone trap, the bees may be allowed to cluster in the trap or they may be left free to cluster elsewhere. If they cluster on a bush, cut the branch and lay it before the hive, preferably on a large sheet of cheap muslin. Then tap lightly with a stick, and you will soon experience a thrill of enthusiasm. The bees will march into the hive in regular order.

Women who keep bees are of great benefit to their homes aod communities. The honey supplied is the most healthful and purest sweet the world knows, and is useful in a variety of ways. It may be used in its natural state on the table, in fruit canning, cooking, baking and candy-making—in fact, in anything that sugar and water are used in. It has greater sweetening power than most of the manufactured syrups, and, besides, possesses great medicinal value.

As a remunerative occupation for women it has been my experience that it is extremely profitable, clean, and healthful. When bees have been properly cared for during the winter and spring, and a proper method employed during the summer, a single swarm can produce from 50 to 200 one-pound sections of surplus honey which can always be sold at good prices. It is a business that can be carried on with one or two hives or one or two hundred. It can be carried on at home, thus affording a great opportunity for self-improvement. There should be at least one or two hives of bees in every garden, especially in the rural sections of our country, as the bee is the best pollenizer, and perfect pollenization means perfect fruit and grain.—Gleanings in Bee Culture.

Hawkesbury Agricultural College.

The following are the returns of 47 cows, which have completed a period of lactation since the last returns were published.

As three of these cows have been milk for more than twelve months they have not been included in the order of merit, but, as their returns are above the average, they have been added to the list.

The first three cows produced butter worth £18 9/10., £14 5/, and £13 18/4., respectively, or an average of £15 11/-; and the last three,, £7 3/4, £6 14/2, and £5 16/8, respectively, an average of £6 11/4.

It will be noted that, although the first three are a trifle behind the cows which held pride of place last year, the last three have an average of £6 11/4 as against £4 12/9 the previous year.

The average for the whole herd is £13 3/6 as against £10 9/4 for last returns, which may be considered very satisfactory.

The Kerry-Jersey crosses are still well above the average, although they do not show to such advantage as previously, but this is probably due to the fact that most of the cows of this cross are getting aged. Since they have given such excellent returns in this district, it has been decided to purchase some high-class Jersey grade heifers to mate with our Kerry bulls, and, judging by the previous performances of this cross, the result should be very satisfactory.

In comparing the College cows with other herds, it is well to bear in mind that our pastures are of such a character as to make it necessary to hand-feed the cattle practically all through the year, and, although well fed, they cannot be expected to give as good returns as if they were fed on the rich succulent pastures of most of our dairying districts.

All the milking cows are rugged during the coldest winter months, but this trouble and expense has been found to be more than compensated for by the larger supply of milk, and the fact that the cows keep in much better condition.

Table showing Milk and Butter yield of three best and three worst cows :—

1 Shorthorn—Jersey—Milk, 9,182 lbs.; average test per cent., 4.1; butter, 443 lbs.

2. Jersey-Kerry-Jersey, 6,210 lbs, 4.6 per cent., 342 lbs. butter.

3. Ayrshire grade, 7,304 lbs. milk, 3.9 per cent., 334 lbs. butter.

42. Ayrshire, 4,188 lbs. milk, 3.5 per cent., 172 lbs. butter.

43. Guernsey-Ayrshire, 3,428 lbs. milk, 4.0 per cent., 161 lbs. butter.

44. Ayrshire, 2,980 lbs. milk, 4.0 per cent, 130 lbs. butter.

Poultry Notes

Curves.

In the N.S.W. Farmers' Bulletin No. 66, "Ten years' egg laying Tests," by A. A. Dunnicliff, jun. Mr. Cuthbert Potts, of the Hawkesbury College, contributes a particularly interesting article on the average and frequency curves of the ten years' laying under review. We may perhaps be permitted to say that they bear out in rather a striking manner, what we have frequently maintained, that the selection of the individual "best" hen has no effect whatever on the average of the "strain" and still less, if that be possible, on the average of the breed to which she belongs. This theory is not popular in any sense but that does not prove that it is not correct. Curves, by the way, are largely used in scientific and experimental work and are merely a diagramatic illustration of a series of results (figures) showing more clearly and more quickly what has been done and what may be expected in any given line of work. The curves plotted by Mr. Potts have to do with the three popular breeds (it is of course evident that the greater the numbers involved the greater will be the accuracy of the curve) and some interesting deductions are made. Summarized the curve (egg average) of the White Leghorn can be slightly raised. In Silver Wyandottes the reverse is the case. Black Orpingtons have apparently reached their maximum, though there is evidence to question this. Expressed in figures Mr. Potts puts the limiting breed average of White Leghorns at 200, for the Black Orpingtons at 188, at 166 for Silver Wyandottes, that is with the "strains" or combinations of "strains" at present in N.S.W., under conditions similar to Hawkesbury and the present more or less indescriminate methods of breeding. The article is a thoughtful and helpful contribution both in its facts and its suggestions and should be read and studied by breeders who do not think that the teaching of competitions begins when A beats B and C brings up the rear.

— What does it Teach ? —

Where does it bring us and what of the future ? Broadly answered the reply is :—To the importance of the isolation (selection) of strains rather than the selection of the individual within the strain. Mr. Potts' curves do not in any way clash with the Pearl theory, of which we have recently had something to say, which is based on the principle brought out in the article before us. Dr. Pearl goes much further, that is all. What have they to offer to the commercial man ? Broadly speaking — Everything ! What to the competition breeder. In one sense and to some extent, nothing, especially the first flighters. The former because in the main he builds on average (type) laying which is inherited, the latter on exceptional (individual) capacity, which is not inherited. One builds on an originating constant force, the other on its varying expression. Put scientifically, one builds on "gametic" rock the other on "somatic" quicksands. That doesn't look like a scientific sentence, but it expresses a soundly scientific idea, at least as we understand.

— Strains. —

Years ago we used to believe and write of individual selection. It seemed so sane and reasonable, then things began to happen and bricks to fly. First we read of the "genotype," that was No. 1, then we heard and read of competition breeding and results and the Maine Experiment, and finally, two or three years ago, we read a paper by Dr. Pearl. Since that third brick hit us the name of best hen selection has been off as far as we are concerned. New words are constantly being added to the language, and though "genotype" is some ten years old, we may be allowed a few words as to what it stands for, what it means and how it affects selective breeding. This brick, as mentioned, was thrown by a man named Johannsen, probably a Dane, no doubt a professor and certainly sane. Nothing wrong in that pedigree. We mention it lest any of our readers should confuse the gentleman with a person of somewhat similar name who visited Australia some time ago who was a nigger, and a pugilist, whose sanity has recently been called in question. Returning to the professor and his doings. Briefly, he took some (nineteen) packets of beans, ordinary trade samples, showing in each the usual variation in size, some small, some medium, and some large. He sowed these beans and they produced in turn small, medium and large, but did so quite irrespective of the parent bean. A large "mother" bean was just as likely to produce a small as a large bean and equally a "small" mother was just as likely to produce a large as a small bean, though the average size of the whole of this second generation remained constant to that of the first ; he repeated it the following year with precisely the same result and may be doing so still. The beans of any generation were on the average the same as the previous or succeeding generation, but there was no slightest evidence that the children of small beans produced small beans or the children of large beans, large beans. The beans, whether small or large produced beans of all sizes but the average of the whole was always constant to that of the average of all beans. The name of selection of big beans to produce big beans, as far as the scientific world was concerned, became mud, and if it applied to beans for size, it applied to other qualities as well. Not only so, but it would apply to all similarity fertilized and constituted organisms. These deductions have been proved to be correct by many experimental workers, and are accepted now without question or comment. Applied broadly to poultry and admitting the obvious differences between a hen and a bean, we arrive at this position. We may assume that any hundred hens will lay from say, 100 to 200, the average will be 150. Birds bred from either will show similar variation, but the average will remain constant to that of the previous generation, viz., 150. It is a 150 strain and will stop a 150 strain. For the present we can leave it at that, but we have not finished with those beans.

— The Second Brick. —

Next we looked at competitions in this and other States. We can leave out the first one or two and so eliminate the aged birds, the birds bred for show only and birds whose laying capacity was notoriously low. What do we find, a slowly and very gradually rising or falling curve. Yet it is just in these later years that individual selection has had its chance. All we can say that if the individual high scoring hen has any influence on egg production, she has signally failed to show it in public in a broad and general way, but it would certainly be unwise to accept such conclusions as final.

— Other Evidence. —

Is there any other public evidence of the failure of the "best hen" to reproduce her kind? Yes there is in the first ten years of the Maine Experiment. It may be asked, Why? if the Maine test was so conclusive, was not it's teaching accepted as final. The answer appears to us to be simple. It took away the poultryman's best asset, but it did not give him anything in place of it. Naturally the poultry world in America said "Oh, well, if that is so, we will go on worrying with the old girl. If we keep on long enough we shall surely get somewhere." It was just the best thing to do. In Australia few knew about it and fewer cared, and it must not be forgotten that the "best henites" always had something to show from their point of view. Take the White Leghorn, for example. The reason for their improvement is patent, and "Sunnyhurst," "Ontario," Messrs. Padman, Kinnear, and Bertelsmeier, undoubtedly had relatively pure high average strains. How far they were intermixed or how they originated is not for us to enquire, nor is it pertinent to the point. They got great results—Good. Why? Was it selected best hen or the unselected strain that did the trick. There is no evidence as far as we can see in favour of the former. Certainly not as much as that their birds were constant to their own average. Sometimes one or other would pick six birds at the high end of his strain and win a competition. It is not too much to say that 90 per cent. of the White Leghorn breeders of the State very wisely bought from one or other or all, and the remaining 10 per cent. wished they could afford it. Some of these buyers interbred these strains or bred with an unknown strain of equal value, and having the luck to pick their high end birds for the competition, went right to the top of the tree. The breed as a breed has been kept down by the portion of low strain birds which has remained in the breed and the "best hen" idea is responsible for their continued existence.

— Relatively Pure. —

It is perhaps natural, if not polite, to ask why, if those breeders had such strains, are they not at the top to-day? In the main the answer is, we believe, that the strains at their best were never more than relatively pure (we mean, of course, in regard to egg laying) consequently there was about a 100 to one chance against keeping to a high average. When Mr. Brooks was breeding 1,400 pens as easy as shelling peas, he was on a temporarily pure high average wicket. Mr. Padman has been in the habit of scattering 1,500 pens throughout the competitions and breeding yards of Australia, and adjacent continents. It may be the "best hen." To us, however, it looks like the high average strain. There is a suggestive break in Mr. Padman's past records. Did the "best hen" go for a holiday or did a new strain clash or did the "third generation" come along? This year, for instance, he has apparently missed his line. It may be that or it may be that ill luck, which works more often against than for a breeder, is at odds with him this year. We have heard it said that the Padman birds have lost their vigour, to which we reply respectfully but emphatically—Rats. It is of course nobody's business, but if the home pens are keeping "constant to the average" of the strains he has been working with, the future won't be troubling him much. Theory, of course, says that the home pens ought to be doing extra well to balance some of the low enders at some of the competitions, but the low endedness is probably due to matters which are quite beyond balancing the average, such as moulting, or a "fault" in the strain. One can have six feet of steel bar, all the same material, the same making and the same finishing. Five will be perfect and one will "fault." It may be an air bubble or a grain of sand. Once in a hundred or a thousand times the steel will not remain constant to its average. Owners of 250-average birds have perhaps little to gain from Johannsen's beans, Pearl's roosters, or Raynor's moths—we have not mentioned them yet but they have their place. They may explain the why but they cannot add an egg to a bird which is already constant to the average of the highest lines in existence. Theoretically, of course, such strains must break down, and in practice they undoubtedly are somewhat given to that complaint. The most that science can attempt to do is to show why they break down and how to avoid it.

Moths and What They Lead To.

Principally, perhaps they lead to young moths and it is from this point of view that we wish to regard them. We do not of course forget their use as a means of healthful recreation to a perambulating entomologist, their vexations to the thrifty housewife, or their vocation as a source of revenue to spray pump manufacturers. Their principle mission is, however, to become fathers and mothers of little moths. Strictly speaking, we have not any great interest in the matter, but as an example and illustration of little chicken breeding they have their good points at least we have found it so.

A month or two ago, in quoting a paragraph in connection with inheritance in fowls, we came across the word Abraxas Grossulariata. We may confess that we had not the slightest idea of what it meant, whether it stood for a Russian nihilist, an ancient Greecian hero, or a new kind of fish, though each seemed out of place in the connection in which we found it. The office boy was equally vague, but thought he lived in West Adelaide. We did have a dim recollection of having met him before, but whether in a dictionary, a medical work, or a museum was quite beyond us. Evidently it needed enquiry. When in doubt ask a policeman was the burden of an ancient song. We took the advice but found that the guardian of the law was for once at fault, but expressed the opinion that a bloke with that name ought to get three months for disturbing the peace. When a policeman fails you naturally ask a bookseller, and we found a very obliging individual in Rigby's, who was sorry "but they were just out of stock but they could get it." This would have been a vexatious delay as as a last resort we asked for the last book on Mendelism and were given Punnett's 1912 edition. We opened it and about the first thing we struck was Abraxas etc., not only his name, but his picture and pedigree. We jumped at that lot at 6/.

— What we Didn't Know. —

When we began writing on Dr. Pearl's theory we knew probably a little more or a little less than the average man in the street. That is to say we knew that he was or had been a monk, that he experimented with peas, etc., that he formulated a great theory, that very many interesting experiments had been carried out, but of the actual details and working of the theory, we knew little, and of its scope we knew less. We had read a few popular magazine articles and looked through a book or two and found the latter something like a cross between Euclid's problems and a chemical formula. Our six shilling purchase and others quickly added to it speedily assured us of the meagreness of our knowledge and gave us a very wholesome respect for Mendel and his disciples. It is not a theory which can be swallowed like a cup of coffee, but It is a much more lasting source of interest. If we have interested anyone in its theory and application it is not a matter of regret, even aside from its practical possibilities. Its relation to poultry is of course a very minor detail. That it is "practical" to the subject in many aspects we have purposely shown in previous articles for it we could establish a connection between the theory and many known instances of inheritance, it would simplify the connection between it and Dr. Pearl's application of it in the particular instance under discuss on.

Abraxus Grossulariata.

The above, which is a moth, or rather the moth may not be very interesting in itself. It takes its importance from the fact that it throws some light on sex influence. We need not go into the various experiments which show that given certain parental conditions certain sex distribution in the offspring will follow. This is explained by the fact, experimentally proved, that in their original cells one sex or the other may repel or attract a given character. In this particular case the character of dark color (which is dominant to light color) and the character of femaleness are antagonistic. It is a most interesting experiment, the sex and colour distribution working out with mathematical precision. Its application to poultry is that the Pearl experiment show that similar repulsion exists in fowls in regard to one of the unit characters on which laying is based. The hen takes the place of the female moth and one of the unit characters follows on the same lines. The moth cannot transmit dark colour because she is a female and likewise the hen cannot transmit one of the characters for laying because she is a hen. This, of course, sounds very theoretical, but Dr. Pearl's results show that it is very "practical."

It is impossible to explain, at least we find it so, in detail, a theory founded on Mendelian laws without using Mendelian terms and as a correspondent told us, that treatment is worse than the disease, but perhaps it is possible to get at the hang of things without hurting anyone's feelings. First let us repeat Dr. Pearl's theory. It is

(1) That egg laying is based on two Mendelian unit characters.

(2) That by Mendelian law, birds of either good, medium, or bad laying capacity, can be bred with certainty.

(3) That the male bird is the principal influence and that a hen however good a layer, cannot produce high laying pullets except when mated with a male bird of certain breeding.

Each of the two characters has its corresponding absence.

The first of these unit characters Dr. Pearl calls L1 and its absence l1. Let us call them power and no power.

The second of the unit characters Dr. Pearl calls L2 and its absence l2. Let us call these Power and No Power.

Please note that one of the characters is printed in capitals.

It seems to us easier to conceive of a hen as having power or no power for laying than to think of her as having an alphabetical arrangement in her inside.

The two characters work differently.

The two characters are quite distinct.

First we will take the power or no power.

The first character power is dominant to no power, and as in the Rose and Single comb the first generation birds from parents which between them possess power and no power, will all possess power. Mated together they will give 3 power chicks to 1 no power chick just as they did in combs. For the present we can leave leave the question that only one of the power chicks will be pure. In practice a high laying strain hen mated to a cock from a high laying strain hen, must have and be able to transmit power to all their chicks.

The second character, Power and No Power, acts differently. Remember the Blue Andalusian, you get Black, Blue and White chicks, irrespective of sex. Black has 2 doses of Blue, Blue has one dose of blue and White has none. You get the same performance in the second character for egg laying qualified by sex but the results are the same.

Now for the influence of sex, it arranges itself beautifully as the

French say, the hen cannot have a double dose of this character, she can have one (the other she has swapped for the right of being a hen) but even the one she cannot pass on to her daughters unless her mate has the character either in single or double doses. Supposing this done and we get on the moth arrangement four possibilities.

Female, Power and No Power.

Male, Power and No Power.

It is the Blue Andalusian, .1.2.1 ratio plus the repulsion of sex. One of the cocks is equal to the Black chick, he has two doses. One of the cocks is equal to one of the Blue chicks, he has one dose. One of the hens is equal to the other Blue chick and also has one dose. The other hen is equal to the White chick, she has no dose.

Now how does the future hen stand.

On the first character she may have power (call it 100 eggs) or she may have no power (call it no eggs).

On the second character she may have Power (call it 150 eggs) or she may have No Power (call it no eggs).

She may have two of the qualities, one first character and one second character, but she cannot have more, consequently we have the chance of no-egg hen, a 100-egg hen, a 150-egg hen, or 250-egg hen. She must obviously be one of them.

The chances that no power and No Power will meet are remote, they are a possibility, the chances that the 100-egg power will meet the 150-egg Power in the originating cell are also remote unless man takes a hand—with the trapnest. Nothing else will do it. Care and feeding will raise the standard of any degree of power, i.e., its expression in laying quality, but it will not create a power which is not present.

We need not worry about the first character. Once that is pure it will keep on like a game of battledoir and shuttlecock between the two parties to the contract.

The second character is different, it can never be "pure" any more than the Blue Andalusian is "pure." The matter rests with the male. He can be of three sorts, he can have a double dose of Power, a single dose of Power or No Power.

If No. 1, he can be mated with a No Power hen and by giving one of his doses to the female chicks, which is all they want, every one is a 150-egg bird. If the hen he is mated with already has one dose of Power (which she cannot transmit) he can do no more, at least we don't see how he can. His pullets will still be 150-egg birds on the second character.

If he is a one dose bird, mated with a Power hen he will give half the pullets Power and half he will do nothing for, they will have No Power. Mated with a No Power hen he will also give half his pullets Power and half will be No Power. Here comes trouble, he passes on his Power to half his sons but the other half he leaves without.

These are the third class birds. To give them their due, they do their best, for, if mated with a Power hen, when the chicks appear it will be found that he has grabbed her quality and given it all his sons and left all his daughters unprovided for, they are No Power birds. You can see this arrangement beautifully in the moth experiments. This chap is evidently one of the causes of Mr. Pearl's zero birds. We were glad to find him for those pullets puzzled us. Mated to a no power hen on the first and second characters he ought to set a bright example of how not to do it. Perhaps the Government struck this line at the poultry stations; seems more feasible than a Roosters for Eggs explanation we have had in our minds.

— How to get the Two-Dose Male. —

That two-dose bird is an attractive proposition, not because he can get good layers from poor ones, that may be clever, but no one wants to keep that class of hen about, but because when mated with good layers he gets all good layers, he is double the value of his one-dose rival, he cannot get higher scoring birds but he can get more of them. People perhaps don't want to know his value, that is pretty apparent, but how to breed him. Is there any class of hen from which he can be bred every time. The answer is, Yes and No. About the most unsatisfactory kind of answer there is. The moths tell us, but we have had about enough of them for the present.

Frenzied Finance.

There was once a book published under the above title, it dealt with money making in America. This paragraph is about money losing in Australia. The American millionaires appeared to be going pretty strong in the money making line, the South Australian Dept. of Agriculture, at all events in connection with the poultry section, seem to be proceeding with equal vigour, but in the opposite direction. Have you noticed the figures "Hardshell," of the Evening Journal, published the other day? They were big enough not to want much looking for. Loss, £2,221 13/11. Not bad to begin with, add £300 interest on the £7,000 odd invested and you have £2,500, and that's only one year's interest, apparently the loss and the interest have been accumulating, sort of unbeknownst. An ordinary hen (we quote the same authority) is expected to make 4/ a year profit, so she must have done some pretty violent back pedaling at the stations. "What about frenzied finance up-to-date," we asked a poultryman the other day? "Don't know about frenzied," he replied, "but I call it d— rotten unless there are some pretty solid results."

— The Results. —

It is difficult to estimate the good that has been done to poultry breeding in the last few years or the direct return in freight, etc., to the State. There has been, we have been told and believe, a great expansion of the industry and consequent increase in business and money turned over, though we should be more convinced of the said expansion if it was reflected in the export figures. So far so good, but what brought these results. Was it the competitions and the price of eggs? Certainly it was. Now the competitions in some mysterious way, lost £150 last year over receipts. If you put it at £500 or £1,000 for the full term that ought to cover the total competition cost.

Roseworthy apparently lost last year £47 9/9 out of a total of £434 9/1. What did they get for the balance? If Kybybolite lost £280 on 2 years' competitions what did the Department get for the balance £450.

Why pay £2,500 for what you can get for £500 or £1,000. That certainly would be frenzied finance. What would be thought of a man who paid £5 5/ for a sitting of eggs he could get for £1 1/. Just one thing, viz., that there were still some mugs about. Unless our successive Ministers of Agriculture happen to have been of them and there is, of course, no evidence of the fact, but rather the reverse, they did not pay that money for something they had got for much less. What did they pay it for? Might we suggest putting the full strength of the Department on an explanatory Bulletin which might be entitled X-L S D., or How we Blewed that Boodle. Vulgar, but it would be more practical and instructive than say a brochure on "The Critical Revision of the Structural Phenomena of Egg Shells," for which we notice a considerable amount of information has accumulated. £1,000 or £2,000 or £7,000 or £10,000, are definite facts, and when expended should have an equally definite result.

— Experimental Work. —

We have seen it stated that the money was spent on experimental work. Well and good. We have a very hearty appreciation of its value. Experimental work is not, as we understand it, a vague and nebulous proposition, on the contrary it is something which sets out to prove or disprove a theory or emphasize a fact. It has a definite purpose, a definite method and a definite or indefinite result. Whichever it is, it is capable of expression on paper. It does not necessarily follow that it is directly profitable. Much experimental work is of course unprofitable though indirectly profitable. We cannot conceive that practical poultry experimental work is of necessity unprofitable. Whatever experiment you are conducting with a rooster (unless with an axe) it continues to grow flesh and when the experiment is over, can at least be sold to cover approximately its food cost. Whatever experiment you are conducting with a pullet, she will by the time the experiment is over, have laid to the value of from 1/- to 10/- over cost of food, depending on the length of the experiment.

— A Theory. —

We have thought the matter over carefully and the only solution we can come to is that someone propounded the theory to the Minister or Professor Lowrie, or whoever may be responsible for the the experiment work, said to have been accomplished, that roosters could be made to lay eggs. With their natural enthusiasm for anything which might assist the agricultural interest, they would doubtless see its possibilities from the farmer's point of view, indeed from everybody's point of view. That is our theory, but even supposing this to have been the basis of the experimental work it will be admitted that it took a lot of roosters to eat that money. Whilst not criticising such a scheme in toto, we would suggest that a far smaller number, say twelve roosters, would have been enough to begin with, and there would have remained a considerable amount to be expended for other purposes. Had such a preliminary experiment shown promising results it could of course been continued on a larger scale.

— The Profitable Hen. —

The ordinary common profitable hen exists, there is no doubt of it, the man in the streets knows it, the farmer knows it, the commercial man knows it, the suburban man knows it, "Hardshell" apparently knows it, but what we cannot understand is how the Agricultural Department comes to know it—except by hearsay. We do not remember to have read a definite official statement that the hen was profitable, but we have certainly gathered the impression that in a general sort of way she had earned the cordial approval of the said Department as a farm, suburban and commercial asset. That the Department has not arisen in just wrath and cursed a bird which has so invariably and so markedly "turned dog" on it, speaks volumes for its patience, courtesy and good feeling. From north, south, east and west the same tale of ingratitude comes. What are the figures :—

Roseworthy, loss £1,436 17/5.

Murray Bridge, loss, £53 14/3.

Kybybolite, loss £731 2/3.

Interest, loss unknown.

Rent, loss unknown.

Truly, a most ungrateful bird.

That Murray Bridge item is perhaps the most extraordinary. On a capital investment of £1,333 in 22 months out of an existence of under 30 months, the balance sheet shows a loss of £53, without interest. That is approximately £200 on a farm which was not hampered by competition expenses, was supposed to be stocked largely with the best laying breed and is said to have sold stock at remunerative prices. Poultry is profitable but on the figures the Department may be excused for having serious doubts on the subject.

— Another Theory. —

It is always interesting to get to the back of things when one party to a transaction shows a marked antipathy to its partner. It is of course obvious that the hen tribe doesn't like the official tribe. Starting on this assumption we have evolved a theory which we believe meets the case. It is based on the Mendelian principle. It is known that certain qualities are repelant. In other words the presence of the one in the atmosphere "inhibits" the other. Consequent by it would be posations, but it would be quite possible to show on Mendelian lines (with slight variations) that profit in the hen and officialism in man are always antagonistic, and always will be, and thus add another interesting document to the literature of the subject. In no other way can we account for the fact that 1,008 birds should lay £829 16/11 worth of eggs at a food cost of £285 0/8 and a gross profit of £544 14/3, and yet miss the bus by a street. The value of competitions is very great, their costs appear to be on a corresponding scale.

Experiments.

Last month we have the pleasure of congratulating every one concerned on their first poultry experiment. It may of course not have been their first, in fact we know it was not, for we have come across the par. again this time in the American Experiment Record together with other reference. This does not, however, detract from the laudability of our intention. It will be remembered that a grateful world was assured that eggs varied. Not only was this assurance gratifying in itself, but is a contribution (on the principle that every little helps) towards the few thousands we have had occasion to mention above. In connection with so pleasing an incident we ventured to suggest that though the subject might be exhausted as a matter for experiment, there were others awaiting research. We recall casual occasions on which people interested have mentioned points which appeared worthy of experiment. Not perhaps to be compared with The Great Experiment, but still of practical service. One suggested the Dead in Shell problem. A second thought the limit to which lucerne could be substituted for cereals and meals might be worth finding out. A third was interested in the housing space and yarding problem. The next had something to say on the table bird question. Yet another spoke of the age limit of profitable laying. The seventh suggested that the stations should continue to teach their maternal relatives in the second parental degree to extract by suctional methods the contents of ordinary commercial eggs. May be allowed to substitute another. Pedigree breeding records. As a beginning, if the trap nest record of six pens of sister pullets and their daughters were known we should have an idea of what any pen of sister pullets might be expected to do and produce. At all events we should have a beginning of a much better notion of blood relationship as a factor in poultry breeding. All these things and more may have been done. If so we have been singularly unfortunate in missing any record of them. That something has been we can see by the record before us. If the daily and week end papers think it worth while to inform readers that an Orroroo poultry breeder won six prizes at Lameroo they would surely think it more worth while to publish any practical information on points, such as the above. With all due respect to the Department, the poultry public is not vitally interested in what it thinks of the future of the industry or its past progress, but it would very keenly appreciate anything it may be able to show them of experimental result with necessary data for a just estimation of its value in individual cases. Any farmer in the State would be pleased to read anything Professor Perkins may have to tell them on, Cereal Growing, not because he is Principal of an Agricultural College, but because he has behind him a mass of experimental evidence. The necessary experimental work may not have been profitable but nobody questions its value. May be we pardoned for suggesting that there is a distinction and a difference.

More Blessings.

Blessings never come alone they say. We have lately got on the track of quite a lot of S.A. Poultry Station experiments, this time in the United States Experiment Record :—

— Cold Storage. —

In an experiment "to determine the effect of cold storage on evaporation in eggs, the average percentage of loss of moisture was 7.78 in small eggs and 7.703 with large eggs the difference is considered unimportant." We should say that it was particularly so to the farmer.

— Structure of Shell. —

Tests "with white shelled and brown shelled eggs in incubation showed that evaporation differed to the extent of 1 per cent. The results all point to the fact that the structure of the brown shells differs somewhat from that of the brown." Quite so, but the point is to let the hen know it.

— Variety Test. —

Tests of "48 representative eggs of various breeds of fowls are given. There weights range from 2 to 2.35 per egg." Interesting, of course, but don't the competitions give us a much more practical lesson about average breed weight of eggs.

— Sundry. —

Data on "the weight and measurement of eggs, thickness and weight of shell and the colour of eggs of various breeds of fowls are included." There may be a practical side to this !

— Periodic Increase. —

The average "weight of eggs of three White Leghorns and three Black Orpingtons illustrates the periodic increase and decrease in size of eggs." We have previously appreciated this.

— Feeding. —

A "feeding test of 12 months with eight pens of ten White Leghorn pullets each is referred to." In these days of competition feeding scales there does not appear to be very much need of experimental feeding with low grade birds, the figures given are 131 per hen for best pen. Still it was a well meant effort.

— Moisture and Ventilation. —

Experiments "were carried on to determine the effect of various degrees of moisture and ventilation in artificial incubation." We should say that on this showing it is 'Sudden Death.' However the average figures on 7 lots, i.e., 75 per cent. fertility, just over 50 per cent. hatch, just under 50 per cent. dead in shell and 22 per cent. deformed or weak, would probably be about the average. Many people get worse and some, fortunately for the perpetuation and increase of the hen tribe, get more. The experiment didn't hit anything much but it was a gallant attempt. It is satisfactory to be forewarned that if you put 100 eggs in an incubator you may take out 35 for infertility, 27 for dead in shell, 36 live chicks, of which 18 will be deformed or weak. There may seem to be a couple missing they were in the fractions. Taken all round it takes two to three eggs to make a chicken and that is average going."

The Summer Chick.

What is he? Well, in a word, about the most abused little mortal on the face of the earth. Is it really his own fault? We think not. Has he a place in profitable poultry keeping? Yes. Is he as valuable as his spring raised brother? No. That seems about to sum up the position. What are the charges brought against him. First, that the eggs he comes from are not as fertile, that more die in the shell and more when hatched are poorly, weak and bad. So he costs more to produce. Secondly, that he eats more and grows less. Thirdly, that he is, well, not to put too fine a point on it, apt to be a "lousely," and fourthly, that if he is a she, she misses the autumn high priced egg even if she does go strong in spring. All of which is more or less true. All the same very little of it is strictly speaking his own fault or unavoidable. We are not advocating the late hatched chick, we have had more than enough of him at various times, but he has never had quite a fair deal, we do not always discriminate between what is his fault and what is ours. The man who can hatch all he wants in September and October in any dry district is looking for trouble by hatching at any other time, but there are many who cannot and many who might regard the late hatched chick with a more favourable eye. The ideal poultry plant would be based on egg prices the same all the year round, continuous hatching, which would mean economy of incubator, brooder and rearing accommodation with an approximately 'constant income from eggs and cockerels and constant food and labour expenses. As it is there is a good deal of the principle of "feast and famine." We have too many eggs, too many chickens, too many cockerels, and too much work some part of the year, and not enough the remainder. If you have £500 worth of plant idle for six months it is costing money and it seems to us what we may call "the any other time" chicken might fill up some of the gaps.

— We and the Chick. —

One of the objections made is on the score of fertility, etc. Whatever foundation there is in this is our fault and not the chick's or rather its parents. We have never found that eggs from a pen mated in summer, and kept with shade, clean water, green stuff and free of vermin give a better or worse percentage than any other eggs. If the conditions are the same the results will be.

With regard to the eating and growing. A healthy chick, whether spring or summer raised, will eat the same, that is, about all it can get. If you are growing on open runs in the flush of the spring grass they will cost less of bought food, but not one in ten is so raised. Weight for weight a lb. of summer chick will not eat more than a lb. of spring raised chick. A lucerne patch with a sprinkler will get very close to spring conditions but a bare unshaded house or yard will not. It is not the chicks which make the difference, it is the conditions.

The vermin question is responsible for a lot of summer chick troubles. Put him on the same level in this respect and a lot of the difference in growth will disappear. The late hatched pullet certainly loses at the start but is there any evidence that she does not keep on longer. It is not altogether a question of the start, in fact it is very much more a question of what she will have done at the finish. How will the Dec.-Mar. pullet pan out on her two years' laying. On the cockerel side the advantage will be with the late hatched bird, but this is only a matter of pence, whereas the number of eggs is one of shillings. Before we get up and curse the late hatched chicken, it would only be fair to look back and find just how much of it was due to our own tiredness, neglect, or lack of knowledge. The late hatched bird costs more work, but whether it costs more money or earns less is not proven.

Chicken Feeding.

Bulletin 327 (New York Cornell University) contains an interesting account of a chicken rearing experiment. There does not appear to be anything absolutely new in it. There are evidently at least six ways of feeding a chick, and it is puzzling to know which is the better, but some definite conclusions are arrived at. There are some comparative figures which are useful in themselves and interesting as showing the similarity of methods and results with our own.

Seven hundred chicks were divided into seven equal lots. The total food consumed by each lot was weighed, any eaten by those which died being charged to the lot of which they belonged, cost of labour was also calculated. Briefly, the experiment set out to show how many out of 100 chicks would be alive 12 weeks late and what weight of food they would have eaten, what it wou,d cost and also cost of labour. Four lots were fed cracked grain (probably maize) the mash (maize meal, bran and pollard) in some cases, was fed dry, in some cases wet, moistened with skim or granulated milk. One lot were fed on wet mash only. The same food was given for the 12 weeks. One lot had a "speciality" ration and one a "variety" ration, they did not give any better results than the others.

Death rate. Except that one pen went wrong at the start and lost 89 (which weighted the general average throughout the test) the mortality of the others was about normal, 15 per cent. The best lot lost 9, and the worst 25. The wet mash chicks eat more, grew more and cost more than either the dry mash or no mash chickens, but there is no practical evidence that they paid more profit or in this case showed less loss than the others. White Leghorns were used. not stated, but no doubt White Leghorns were used.

The average weight of the chicks at 12 weeks was 1.117 lbs., the best lot were the cracked grain, wet mash and beef scrap with 1,170, the worst were the wet mash and beef scrap without cracked grain, 1.045. The no mash lot were 1.090, though they were a long way behind at the eight weeks stage, being much the smallest eaters, in the concluding four weeks they were the largest.

The total food consumed was slightly over 3½ lbs. per head. The cracked grain, wet mash, and beef scrap with nearly five pounds for 91 birds, were the largest, but there was nothing much in it, except that the 11 remnants of the 89 death lot appeared to eat 18lbs. apiece. Labour cost is estimated at about 14/- a hundred chicks for dry feeders, 16/- for mixed feeders, and 18/- for all wetters. In ordinary poultry keeping these differences don't count but on a 10,000 hatching plant they would.

Total costs, including all items, to sale of chicks, amounted to 1/1 a head, at which they showed a loss of about 2d. each.

The following is the official

— Summary. —

"(1) Chicks appeared to need both cracked and ground food. (2) Chicks grew more rapidly on moistened mash than on dry mash, other conditions being equal. (3) Chicks fed from the first on dry mash and grain were nearly as large at the end of eight weeks as those that had been started on a moist mash and later changed to dry mash. (4) Skim milk mash produced growth on less food per pound gain in weight than did dry mash. (5) Chicks that were given hopper-fed beef scrap from the first, in connection with cracked grain and ground food, made better growth than those started on a limited amount of beef scrap. (6) Chicks given a limited amount of beef scrap for the first 3 weeks grew better than those whose meat food was given in the form of eggs. (7) No ill effect was observed when beef scrap was hopper-fed from the first meal, if given in connection with a well-balanced ration. (8) When the other food given did not supply their needs, chicks ate sufficient beef scrap to cause high mortality from digestive ailments. (9) Sour skim milk proved of value for chick-feeding. (10) Sour skim milk fed in a moistened mash gave better results than granulated milk fed under the same circumstances. The experiments as a whole indicated that the feeding of both cracked and ground grain was more desirable than the feeding of either alone."

Home Notes.

Athletics for Women.

—Breathing Exercises and their Value.—

The art of deep breathing, once acquired, not only strengthens the lungs, but gives a full throat, a rounded chest, and in many ways improves the appearance. The right way to breathe is as follows:—Take a deep breath through the nostrils, keeping the mouth tightly shut; hold the breath while you count 10, and then breathe it out again, slowly, softly, and steadily. A variation of the above is done thus:—Shut the mouth, and close one nostril by placing a finger on the side of it, then draw in a deep breath through the nostril, count 10, then remove the finger, and breathe out again in the same slow, regular fashion. This exercise should be done several times with both nostrils.

Fencing is good. Skipping is another, also battledore and shuttlecock; and the advantage of these lies in the fact that they can be practised in the privacy of one's own house. In skipping the rope must, of course, be thrown backwards. Swimming among women, if not overdone, has an excellent effect on the figure. Every second woman you meet wishes to reduce her waist, hips, and figure generally. This she can accomplish by the following methods:—

1. Raise the arms high above the head—in fact, stretch them and the hands as high as posible; stand straight and stiff for a moment, and then—keeping the knees rigidly firm —let arms and hands go slowly downwards until the tips of the fingers touch the floor in front. After a time the body will become so supple that the palms of the hands will be able to press the floor, and this without the slightest bending of the knees. The above is known as the "setting-up" movement, and is constantly practised in the British army. 2. Another exercise that reduces the hips and waist is as follows:—Again stand straight and upright, balance carefully, and raise one leg as high as possible—after a time the knee will almost mount to the chest—then point the foot out in front, retain this attitude for a moment, and then bring the leg sharply downwards, placing the feet close together. Both legs must practise this alternately. 3. To acquire a well-rounded waist, the pupil must sit straight on a stool, with the feet held fixedly beneath it, and then turn her body, on its own axis, round and round as far as possible. 4. To widen the chest, stand in an upright position, touch the left shoulder with the right hand, and then slowly pass the right arm round until it is fully extended behind the back. This should be repeated with the left arm. Such exercises as the above must, of course, be done without corsets, before the bath in the morning, and before a second bath at night, or—failing this—previous to going to one's bed.

Boys' Clothes.

Some mothers, who are quite particular about what the girls should wear, think anything will do for the boys. Now this is a great mistake, for the boys are apparently quite indifferent to what they put on; yet our personal appearance has a very marked effect on our character, and so no dirty, untidy boy is ever likely to do full justice to himself. Don't try and "fake" your boys up—far from that; but care should be taken that a boy is neatly clothed. Especial care should be taken that he keeps himself clean. It is wonderful, though, what a natural affinity there seems to be between a healthy boy and dirt! So that especial care must be taken as regards the removal of this affinity. But there comes a time in a boy's life when he begins to think a little of dress—don't let this be teased out of him; it is a very healthy and natural sign of growth. He is finding his outward self-respect. Don't try and laugh him out of it; better far a few shillings wasted on gaudy ties and fancy waistcoats than your lad, growing now somewhat out of your dominion, should incline to slovenliness. Remember, too, neatness does much for a boy outside his home—an employer likes to see his people neat, though not dressed beyond their means, of course; and when your lad is sent messages for him it does him good, and his master good, too, for him to present a neat appearance. And what does neatness do for a lad inside his home? A good deal in many ways—in the home of his youth, as well as in the home he may one day make for himself. All wives would have an easier time if mothers insisted more on the habit of neatness in person and things with their boys.

Cleaning Gloves.

Kid or suede gloves can be cleaned by being placed in a small basin and covered with benzoline. After soaking a few minutes, knead and squeeze them well, and any specially spoiled part, such as the tips of the fingers, may be rubbed separately. After rubbing any part, immerse the whole glove, or it will be marked with the rubbing. Squeeze out one at a time, and draw quickly on the hand, and rub lightly and evenly over with a soft clean rag until perfectly dry. If the rubbing is heavy or unequal the gloves will be streaky. Draw the glove carefully from the hands and hang it in a current of air for a few hours. Benzoline is highly inflammable, and must not be used in a room with either gas or a fire; even strong sunshine is better avoided.

Summer Rules for Children.

The over-anxious mother feels that, according to some authorities, "it's pretty dangerous living anywhere," and she would add, "at any time." But the maternal heart does not feel the danger for herself, but for her children. A child should never be allowed to go out of doors before breakfast, unless he has stayed his stomach with a slice of bread-and-butter or a biscuit and a glass of milk. Exercise early in the morning is all very well if the night's fast has been broken, but to walk or play out of doors while the vitality is at the lowest ebb, and before the weakened system has been fortified by nourishment, is to court trouble. The wise mother will see to it that her children eat their three meals at regular hours, and that all vegetables and fruit in which they indulge are fresh and ripe. If her boy filches a sun-warmed cucumber from the garden and eats it out of hand, she need not be surprised at his sudden and violent attack of illness; and if he munches verdant apples between his meals, intestinal disorders will but be the natural result of this course. Children cannot too early learn habits of moderation and self-control, and if the mother demands the establishment of these habits, her anxiety and her children's illnesses will be the exception, not the rule.

Tried Recipes.

—Preserving Peas.—

Procure sufficient wide-mouthed bottles, which must be clean and perfectly dry. Select Peas fully grown, but not old; put them in the bottles, shake them down, cork securely, and cover the corks with bladder. Place the bottles in a large saucepan and pour into it enough cold water to reach within 1½ in. of the corks. Wood wool or hay should be wedged between the bottles to prevent them knocking together. Put the saucepan on the fire, where it should remain for two hours after the water has boiled. Then remove the saucepan, and when the water is cold take out the bottles, seal the corks, and place in a dry store. Another way is to fill the bottles with the peas and seal the corks. Then bury the bottles in a dry corner of the garden, taking them up as wanted. Great care must be taken that the bottles are perfectly dry before the peas are put into them.

—Fricandeau of Veal.—

Trim a fillet of veal weighing about 3 lb., and lard it evenly and thickly with strips of fat bacon. Slice some vegetables—turnip, carrot, onion, &c., put them in a stewpan with a few slices of bacon, the trimmings of the meat, a bunch of herbs, six or eight peppercorns, and salt. Place the veal on the vegetables, and pour in a pint of stock. Cover, and simmer slowly till the meat is quite tender, and baste frequently with the gravy. When done put the fricandeau in the oven for a few minutes till the bacon is crisp. Meantime strain the gravy, add a little glaze to it, and baste the fricandeau till it looks bright and shiny. Serve with a puree of spinach or any other vegetable.

—Jam Puffs.—

Roll out some good puff pastry very thinly, or if short crust or flaky pastry be used let it be about quarter of an inch thick. Cut the pastry into squares, lay a spoonful of jam (without stones) in the centre, and fold over like sausage rolls. Moisten the edges, and fasten them securely to prevent the jam from escaping.

—Baked Fish.—

Dress your fish nicely, salt to suit the taste, and lay it out flatly in a nicely greased dripping pan, leaving the flesh side up. Scatter small pieces of butter on the fish, and then bake until done, from 20 minutes to half an hour, according to size of fish; then pour over the fish a teacupful of sweet cream, and return to the oven until nicely browned. A very hot oven is required to bake fish in this way.

—Apple Jelly.—

Peel, core, and cut into slices a quantity of apples; throw them into cold water to prevent them from turning brown. When all are peeled and sliced put them in the preserving pan with sufficient water to cover them and the juice of three lemons to about 50 apples. When they are soft put them in a jelly bag or tammy cloth over a basin, and let them drain without pressing them. Add an equal weight of sugar to the apple juice, and boil till the jelly is ready to set; pass it again through a tammy, and add shreds of preserved citron. Pour into pots. If three-quarters of a pound of sugar be added to each pound of apple juice the jelly will be more firm, but not so good a colour.

—Apricot Marmalade.—

Choose perfectly ripe apricots, stone them, and remove any hard stains on the skin; cut them in two, and put them over the fire in a preserving pan with a pound of sugar to the pound of fruit. Boil for about a quarter of an hour. To test if it is sufficiently cooked put a little of the marmalade on the top of the fingers, and if on pressing the thumb on it and then lifting it the apricot marmalade forms a thread, it is done, and ready to be packed in jam pots. Be sure to stir constantly while the apricots are cooking, or they may burn. Break half of the stones, take out and blanch the kernels, and put them in a short time before the fruit is ready.

— Currant Pie. —

A most delicious currant pie is made by taking one cupful of ripe currants, one cupful of sugar and one egg; beat the egg and sugar together, stir in the currants, and bake it between two crusts. Moisten the edge of the under crust before you put the upper crust on, and press the edges tightly together, and the juice will not boil over. Cherry pie is nice made in the same way.

—Gooseberry Jellies.—

Take four pounds of white gooseberries, eight pounds of raspberries; put them in a wooden or earthenware pan, and stir or press them well to extract the juice. Put the juice in a preserving pan, adding half a pound of sugar to the pound of juice; let it boil gently for about half an hour, and skim as required. Test if the jelly is ready by putting some on a plate to set; if it remains liquid it will require more cooking. One must watch the syrup, and stir it frequently to prevent it sticking to the preserving pan and burning. When done pass it through a jelly bag, and pour into pots. Another method: Press the juice from the gooseberries, pass it through a sieve, and put double the weight of sugar that there is of juice. Mix very well together, and put it in a cold cellar for twenty-four hours, stirring it three or four times in the interval. Pour it into small pots, holding about a pound each; cover in the usual way, and keep in a cool cellar or a refrigerator, as this jelly is very apt to ferment if left in a warm place. It is, however, though difficult to keep, much superior to cooked jelly.

— Newcastle Pudding. —

Butter a small pudding basin, fill it with slices of thinly cut stale bread and butter sprinkled with sugar and grated lemon peel. Make a custard by mixing half a pint of milk with two well-beaten eggs. Pour this over the bread; let it soak for an hour. Cover with buttered paper and steam for an hour and a quarter. Turn out carefully and serve with fruit or sweet lemon sauce.

— Stewed Ox Tails. —

Wash the tails, divide them into joints, and trim them neatly to make them smooth. Put them in a stew-pan with a bunch of savoury herds, an onion stuck with cloves, a blade of mace, six peppercorns, a few celery seeds tied in a muslin bag, and a quart of water. Cook gently for two hours, removing the scum which will rise when the water begins to boil. As soon as the ox-tails are tender remove them, thicken some of the stock, add salt, and pour this sauce over the ox-tails.

— Cucumber Soup. —

Three cucumbers, two ounces of butter, two ounces of flour, a quart of stock, a pint of milk, cornflour, seasoning. Peel the cucumbers, remove the seeds, and cut them into thick slices; parboil in salted water, drain. Put them in a stewpan with the butter, and leave them by the side of the fire to cook gently for half-an-hour. Lift them out, stir the flour into the butter and cook without browning it; then return the cucumber to the stewpan, add the stock, boil up, skim, add the milk. Thicken with a dessert-spoonful of cornflour previously mixed with a little cold water; boil up for a few minutes. Serve fried croutons.

—Fish Cakes.—

Mix an equal quantity of fish freed from skin and bone with mashed potatoes, season with pepper and salt, add a piece of butter, some finely chopped parsley, and a few drops of anchory essence. Bind together with a well-beaten egg. Form the mixture into flat cakes, egg and bread-crumb these, and fry in deep, hot fat. Drain well, and serve hot.

— Potato Ribbons. —

Cut the potatoes into ribbons by peeling them round and round. Dry these gently in a clean cloth. Fry in deep hot fat; drain, sprinkle with salt and serve.

—Raspberry and Currant Tart.—

Pick the currants, and put an equal quantity of raspberries in a pie dish with sifted sugar. Cover with flaky pastry, brush over with white of egg, sprinkle with castor sugar, and bake for three quarters of an hour. Serve with cream.

—Jam Sauce.—

Put four tablespoonfuls of strawberry jam with half a pint of water and a dash of lemon-juice. Boil, strain, and thicken with a teaspoonful of cornflour mixed with a little cold water.

—Prune Shape.—

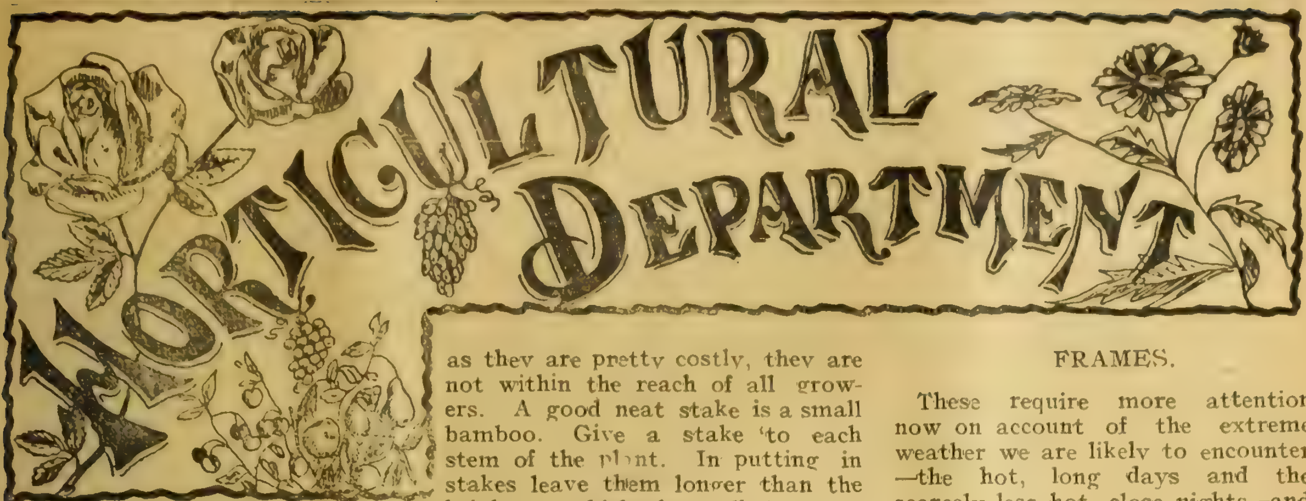
Half a pound of prunes, three of four leaves of sheet gelatine, a gill of water, two ounces of sugar, and cream. Boil the prunes in an enamelled saucepan with sufficient cold water to cover them. Let them come to the boil, and then cook for two or three minutes longer. Drain them, remove the stones, crack these, and blanch the kernels. Dissolve the gelatine in a gill of water, and boil it with the sugar for a minute or so; add the prunes and kernels to it. Pour into a damp mould to set. Serve with whipped cream.

—Boiled Fowl.—

Truss the fowl for boiling, and put it, breast downwards, in boiling water with a carrot, onion, and a bunch of herbs. Simmer gently for about three quarters of an hour to an hour. Serve the fowl masked in the following sauce: Melt an ounce of butter, stir in an ounce of flour, and add gradually half a pint of milk. Boil for three minutes; add the white of a hard-boiled egg cut into dice, and some cream. Boil up again, pour this over the fowl, covering it entirely. Rub the yolk of an egg through a sieve over the fowl, and serve with rolled bacon.

How to give Castor Oil.

Children who refuse to take castor oil make no fuss if it is given in this way—Take one cup of milk, one of treacle, half a cup of sugar, half a cup of castor oil, a teaspoonful of carbonate of soda, two of ginger, a little salt, and enough flour to make a stiff paste. Roll out, cut into shapes, and bake in a quick oven. One or two are as good as a dose of oil.



The Open Garden.

—Short Reminders for January.—

Plant seed of pansy, stock, primula, cineraria, cyclamen. Wait for a cool, cloudy day, and then plant out seedlings ready in the boxes for all you are worth. Water them as soon as planted and a little mulch.

Take cuttings of daphne and other evergreen shrubs, verbenas, pelargoniums, and carnations.

Keep roses clear of withered bloom. Don't be afraid when cutting flowers off your rose trees to cut a good long stalk with each—a useful summer pruning. Look to the watering, hoeing, manuring, staking, and tying of dahlia plants, which are just beginning to make their jump forward.

Find room for at least one Mina lobata—that grand annual creeper.

Dig up and store in a dry and cool place late bulbs whose foliage has withered.

Keep paths and beds free from rubbish, dry leaves, and weeds. These not only make the garden look untidy, but are a harbour for slugs and snails.

Use the liquid manure can amongst those young and vigorous seedlings which are just beginning to present their flower buds.

Remove old flowers from zonale pelargoniums, and keep the soil between them well stirred up with the hoe.

Chrysanthemums.—Many of the plants will have reached a fair height, and will now require staking. Stakes made of a good stout fencing-wire can be used, but iron stakes are the best, but as they are pretty costly, they are not within the reach of all growers. A good neat stake is a small bamboo. Give a stake to each stem of the plant. In putting in stakes leave them longer than the height to which the stalk is calculated to grow, as a piece can be cut off readily, but not so readily added if required. Some growers do not stake the plants so early, but doing so has the advantage in assisting to train the leaders straighter, than if left to a later period.

Collect seed of sweet pea, freesia, hunnemannia, ranunculus, antirrhinum, delphinium, carnation, and others as it becomes ripe. Only lect from flowers of good size, correct form and bright colours.

Look out for caterpillars on asters and other seedlings. When you find the centre leaf of a young aster adhering to the one below it, you may be certain that a friend is awaiting your hand clasp, and delay not in giving it to him.

Mulch and water your roses to induce a fresh crop of bloom.

That old English favourite, the hollyhock, is well worth growing, especially if you take the trouble to raise some good double ones. The seed is cheap, the culture easy, and the result good. They are most effective and telling when planted in bold groups in the back lines of a bed.

Keep on adding to the compost heap all vegetable refuse from the garden except hard wood, which should be burnt first. A careful gardener is careful of everything that is likely to add to the productiveness of his little plot, and will have a collection of manures, as well as a collection of roses. The soot from the chimney sweeping, the fowls' droppings, the cleanings from the pigeon-house, the compost heap, the leaf mould pit, should all be ready at hand for use when wanted.

FRAMES.

These require more attention now on account of the extreme weather we are likely to encounter—the hot, long days and the scarcely less hot, close nights—and one's forgetfulness with regard to them is likely to be visited on one's head by the destruction of the young stuff which is to beautify our glasshouses and our open garden in the near future. A great number of the young seedlings should be now ready to prick off either singly into small pots or several into small boxes or pans filled with a nice rich loose soil, well drained.

Amongst the foremost of these is the cineraria. Keep them growing from the very moment they are above the ground. They must on no account receive a check, or else both their foliage and the quality of the bloom will assuredly suffer. Keep them well watered and well lighted, but do not let the direct rays of the sun fall upon them.

Seedling cyclamen must not be allowed to rest, for you want them to flower as soon as possible to find out their quality and if they are worthy of further cultivation. Pansies that were sown early must be pricked out into boxes or prepared beds in a shady situation, to be ready for transplanting into the border later on. Five or six inches between the plants is sufficient space for this.

Make further sowings of cineraria, primulas, cyclamen, pansies, phlox, stock, polyanthus, carnations, antirrhinums, asters, foxgloves, columbines, and calliopsis.

Cuttings of various kinds of perennials may be put in. Fuchsias, coleus, petunias, and (if ready) show and regal pelargoniums. The shading and watering of these must not be neglected.

It is time that all amaranthus plants were placed out in the borders. A great variety of these can now be obtained, and during autumn will make a splendid show. They are tall growing, and should not be placed too near the path.

Petunias for pot culture are best propagated from cuttings made of the young shoots 3in. long, for one is never sure that a seedling will be worthy of such culture.

Keep the refuse heap turned over to produce potting soil. One of the scarcest soils, and one most sought after, is leaf mould. You cannot depend on buying it; you must make your own; and, therefore, all vegetable refuse should be carefully collected and placed in a small pit to rot. The rotting process is helped by the periodical turning over of the whole.

THE SHADEHOUSE.

One of the most effective class of plants for shadehouse decoration are the basket plants. These require constant attention to their watering, because the air having free access all round them the rate of evaporation is larger than in other pot plants. The best way of giving them water is to dip the basket into a bucket or tub of rain water.

During January we may expect hot weather, and everything in the shadehouse must be regularly watered and sprayed overhead twice, and probably sometimes three, times a day. Ferns and such plants must not be allowed to get dry, and many plants will do well if occasionally given a dose of liquid manure.

One of the cleanest and most easily mixed is sulphate of ammonia, diluting a teaspoonful in a gallon of water. In giving liquid manure remember that two applications of weak manure is more likely to be beneficial than one dose of strong.

Such fine-rooted plants as azaleas, heaths, rhododendrons require to be plunged in sand, or their roots are liable to injury from heat.

Hydrangeas, especially if they are of any size, will want an abundance of water and a little liquid manure.

A number of plants may be removed to the shadehouse after they have done service in the greenhouse, and will be much benefited by the rest in a cooler situation. All plants in the shadehouse must be kept religiously free from dead and decaying leaves, as these only serve as a harbor for various pests—caterpillars, slugs, spiders, etc.—and at the same time destroy the effectiveness and brightness of the plant itself. However careful we are, pests are bound to make their appearance, but by careful attention and unremitting care they may be kept within limits, if not exterminated.

With regard to pot plants, it is most important to know how and when a plant should be watered. Much harm is often done by giving water indiscriminately to all in the house without any regard as to whether they require it or no.

Established plants require more moisture than newly potted ones.

THE GREENHOUSE.

The blaze of colour made in this house a few weeks ago with the pelargoniums, cinerarias, azaleas, rhododendrons, camellias, and a number of others is now practically over, and the plants on the benches require rearranging, and a good display made with foliage plants intermixed with those grown for their flowers alone. And for this purpose some of the plants whose usual place is the stove-house may be brought in, and will do in it for a month or two. Amongst these I may mention caladiums, ferns, anthuricums, gloxinias, early achimenes, gesneras, tydaeas, begonias, dracaenas, impatiens, and a selection of others.

The plants removed to the shadehouse to make room in the greenhouse should by no means be neglected, but must be kept vigorous and healthy for next season. Many of the flowers blooming in the greenhouse are impatient of water on their flowers, and the dust from their foliage must be removed by syringing carefully. It is essential that the air in the house be kept at the proper point of humidity, a point most important in the growing and propagation of ferns. Keep the staging and floor regularly watered.

The shading must be well attended to. Flowers in bloom must not be allowed to receive a check from any cause whatever. Some require a little liquid manure, as was advised above, for the best blooms are borne by plants in the full vigor of healthy growth.

The coleus is a grand foliage plant for making a display in the houses at this time of the year. But how seldom we see them well grown. Like the zonale pelargonium, they are generally allowed to grow without the tiniest attempt being made to train and shape the plant. And yet this is easily done—only it cannot be done in one day, nor two, but requires attention for weeks in the nipping out of the growing point of the leading branches when they have attained a sufficient length, say three inches. Nor should the plant be allowed to remain in the same position on the bench, but should be turned round a little every day, and by this means it grows more uniformly.

Don't allow them to flower, except one or two from which you intend collecting seed, and raising your own plants—an operation which can be recommended as being a most interesting one, and one also which the novice need have no qualms in attacking.

Good care pays. Gardeners too often overlook this.

Garden Notes.

— Double Flowers. —

Double flowers are of three kinds. First, the "full flower," in which the usual number of petals is increased by the transformation of the pistils and stamens into extra petals. Second, the "multiplicate flower" in which the petals are increased by the conversion of part of the stamens and the calyx; and, third, the "proliferous flower," which has other and smaller flowers growing from it, as in that variety of daisy called the "Hen and Chickens." When it is desired to produce seed most likely to give double flowers three conditions are to be observed—1. The plant must have sufficient moisture, but a trifle less than it delights in. 2. The soil should be prepared by digging in a quantity of decomposing organic matter; and 3. The position should be one in which the plant can receive any amount of sunlight.

— Insects in the Greenhouse. —

These generally increase abundantly unless means are adopted for their suppression. Fortnightly fumigation will prevent insect-breeding and render recourse to any drastic measures unnecessary. Though this will kill immature thrips, red spider and green fly in all stages, the older insects and the dreaded mealy bug and scale will not be destroyed thereby, unless doses strong enough to injure the plants are given. These tough-skinned gentry must be got rid of, therefore, by sponging the plants with warm, soft soapy water or a weak solution of Gishurst Compound. As the under-surface of the leaves are the part most favoured by the pests, these should have special attention. After fumigating it is always advisable to give the plants a good syringing, and admit air as soon as possible to reinvigorate the plants after some hours of a somewhat poisoned atmosphere.

— Garden Engine. —

In an old book on gardening a primitive and yet highly scientific method was employed for watering small seeds. An earthenware pot, with perforated bottom and a very narrow opening was dipped into a cistern or pool; when full the hole at the top was stopped with the thumb. This prevented the egress of the water until the spot was reached at which it was intended to be used, when, the thumb being withdrawn, the water descended like rain.

— House Plants and Humidity. —

Many failures in house plants are due to lack of humidity, says Canadian Horticulture. The active root hairs of a plant are really aquatic and must always be in contact with an adequate supply of water. The stems and leaves are aerial, but their behavior and form are largely determined by the water in the air, that is humidity. The water supply is used by the root hairs, while the water loss is the result of evaporation from the surface of the leaves. As humidity exerts direct control on the amount evaporated, the water loss is great when the air is dry.

— Plant Roses Now! —

A Sydney paper some time ago suggested the unusual idea of the summer planting of roses, as follows:—"Although very many people have an idea that roses are only plantable during the winter months, there are a few of the knowing ones who are not adverse even to putting stock out now. We would do it ourselves, and never give the work a thought or bother ourselves in the least about risk or loss; and the roses would live and do well. Indeed, in weather like the present, especially if just a little care is taken over the shading of the plants during the first week after their move, the shift can be made more satisfactorily than in the middle of winter, when so much rose planting is done. Of course, it is not looked upon as quite the right time to move roses; but, right or wrong, there need be no worry or loss if you will but see that the plants are cut very hard back and the planting is done carefully. And just now, while the flowers are very beautiful, is the time that most folk are so anxious to purchase new stock. Well, you have our assurance that rose planting is safe." If any of the houses will supply plants, take the opportunity and see what can be done." This of course is in a more humid climate than ours, and at an earlier date than the present. Still it is wonderful what plants will survive even in January on the Adelaide plains.

— Decorating the Dinner Table. —

No hard-and-fast rules can be laid down as to methods of decorating tables. So much depends upon the likes and dislikes of those whom one has to please, the size of table to be decorated, and the material at command. At the same time, there are certain points which must always be carefully considered. Glaring contrasts of colour should be avoided. Some colours which look very well by daylight are failures under artificial light; for instance, flowers of a yellow shade look much paler under gas or electric light. Bright shades of pink, crimson, or red always look well. Light blue or mauve do not light up well, but flowers of a purple shade are very effective. Generally, flowers that harmonise with each other give the great satisfaction. Another important point is to use nothing on the table that will prevent the guests from seeing each other quite easily. Only perfectly fresh flowers should be used, and none that are very powerfully scented. On large tables plants up to the height of 15 nches may be used with very good effect.

— The Dwarf Trees of Japan. —

Certain guilds of Japanese florists, by secrets, the full import of wh ch is known only to themselves, take the baby seedlings of trees, which Nature intended should be giants of the forest, and so manipulate the train them that each develops only as a tree in miniature, but living, growing, and healthy, and with root, branches, and leaves all in perfect harmony with its minute size. Centuries may pass over the head of the little tree, and yet it remains only a few inches in height, while, instead of being a vast mass of wood and tissue, and of enormous we ght, as it would be in the usual course of things, it remains growing in a flower pot, and can be carried by a child.

— Greenhouse Baskets. —

Gloxinias in baskets are very pretty, and if the following method is employed the extra trouble will be amply repaid. Start the tubers in a compost of leaf mould, loam and sand, in a temperature of 55 deg. As soon as they have made a fair growth plant them in the baskets. The baskets must be first lined with moss, and then filled with a compost of loam, leaf mould and sand. Next choose five plants of about equal growth. Put one at the top of the basket, the other four at equal distances round the sides of the basket. The wires will have to be cut or pressed aside to allow the tuber to be got through the moss and into the soil. If plenty of shade, air, and water, with a watering with well diluted cow manure occasionally, be given them, a very pretty basket will soon be made. Achimenes, especially the small scarlet one called Dazzle, make very pretty hanging baskets. They are easily grown, and if given the same treatment as Gloxinias, and introducing the small bulbs round the sides of the basket so that the whole basket will be well clothed with foliage and flowers, they will amply repay all trouble expended on them.—Exchange.

— Aspidistras. —

Plants needing repotting should be turned out of their present pots very carefplly and divided into several portions where an increased number is desirable. The old soil should be shaken from them, and they should be replaced in clean (inside and outside), well-crocked pots. A mixture of loam, leaf mould, and the well-rotted material from a year-old hot-bed, together with some silver sand, makes a capital compost. If no increase in the number of plants be desirable, the repotting should merely be to a larger sized pot. Large specimens of over fifty leaves and in the healthiest condition are easily growable. Of course these plants are long enduring, and do their best under starvation rations, but a well-nourished, well-grown plant, with long healthy leaves is, I think, what we should aim at.

— Hollyhocks. —

It is easy enough to raise single varieties from seed and a certain percentage of doubles can also be obtained by the same means. Sometimes, however, one comes across a really fine sort which is worth propagating. By cutting a piece of stem up into small portions, each containing an eye or bud, and setting them in shallow boxes filled with fine soil, one can raise a batch of young plants. The boxes should be stood in a cold frame and kept shaded from hot sunshine. When rooted the cuttings should be potted on. It is a pity that this grand flower is so subject to rust, but spraying will usually do much good in keeping them clear.

— Mulching. —

Mulching consists of covering the surface of the ground about the roots of trees, plants and crops with some non-absorbent material, the object being to conserve the moisture in the ground, and in some cases to provide the objects treated with nourishment. When judiciously carried out, mulching is highly benefic al to plant life, but at the same time it can be both overdone and misapplied. In the summer, when the heat from the sun is very great, the moisture in the ground evaporates very rapidly, and unless water is applied in large quantities at frequent intervals, vegetation suffers and growth is checked, small quantities of water given during these periods being practically useless, as the liquid is absorbed by the parched soil before it reaches the roots of the plants.

— Old Time Gardens. —

An old time gardener writes :— Old times were the times of long ago when grand-parents of the present day were young, and before. We had beautiful flowers in those days, fifty or sixty years ago, and we loved them for their beauty and individuality. Something was done in the way of carpet bedding and massing for color effect, but we loved variety in our gardens ; and the lawns not being so much in evidence in the foreground as since the introduction of the lawn-mower, we had our flowers in front of the house on each side of the walk, with an overflow supply in the vegetable garden and the back yard. When even ng shadows gathered around us or when dew-drops sparkled in the morning sunlight, we had fragrance of flowers such as we seldom enjoy in these days. We would not do without our lawns, and are ready to concede that it is not in good taste to cut them up with many flower beds, but there has been a time in later years when we missed the old time favorites, because there seemed to be no place for them.—Exchange.

— Bouquets. —

The beauty of bouquets 20 years ago was often valued by the number of varieties of flowers grouped together, and it required good judgment and taste to arrange the various colors in harmony. Then as now there were some odd expressions of fashion and taste in floral arrangement. At a later date the fashionable bouquet was round or pyramidal in form, with a surfacing of flowers as smooth as a football—each flower having been stemmed with a bit of broom straw and all sustained with a supporting of moss around a central handle. Still later in fashionable arrangements bouquets and plants were often dressed out and overloaded with ribbons and are still, though not to the same extent.

— Flower Lovers. —

The Japanese are essentially nature lovers, and the use of flowers, plants, and trees is so interwoven with their many social and religious interests that stronger influences than beauty pure and simple are apparent in their plant and flower demands. Practically every household, from the simplest up, will have, throughout the entire year, at least a single jar of flowers, or branches, simply and usually most artistically arranged. In the cities and towns this universal use makes quite a business for the plantsman, but the demand is not for roses, carnations, etc., being largely for picturesque, lichen-covered branches of pines, or equally picturesque branches of plum, peach, and cherry, which, placed in water, will expand into the dainty beauty that the Japanese types of these trees are capable of producing. As the season advances, the many lovely garden plants suitable for cut flowers all find favour, but these are the more dainty and decorative forms; the camelia, wistaria, paeony, iris, and chrysanthemum, of the latter not the largest and most double varieties obtainable, but those of a looser form, with an airy grace, such as with a deft hand can be so beautifully arranged. The funeral of a popular personage marks a harvest day at the Japanese florist shop, as great quantities of seasonable flowers are used in making up enormous tree-like bouquets, often so large that four men are required to carry them; and hundreds of such bouquets are not infrequently seen at a single funeral.

— Destroying Worms. —

Those who wish to rid the soil of worms either before planting or after the grass is established may do so by means of water strongly impregnated with newly-burned stone lime. Fill a tank with water, holding about 35 to 40 gallons, add about a peck of fresh lime to that quantity of water, and stir briskly, then allow the lime to settle. The clear fluid may then be used freely from an ordinary water can. The worms will then come up from their burrows in hundreds, and it will do the grass a great deal of good. The worms may then be swept up and destroyed in salt water.

— Striking Rose Cuttings in

The number of subjects that can be rooted from cuttings in water is much larger than is generally supposed. Amongst them are Roses, although they are seldom increased in this way. As a novelty it has its interesting features. The mode of striking cuttings is in wide necked bottles, or glass jars of soft water, a plan as simple as it is practicable, inasmuch as cuttings taken off will root in this way in from 5 to 6 weeks, after which they should be potted carefully in light sandy soil, and placed in a cold frame until established, when they will be ready for planted where wanted. The cuttings should be cut clean below an eye or joint, and none of the bark bruised. It is a help to make one or two other cuts between the lower eyes, but low enough to be under water. The only attention they require is the filling up of the bottle with water as it evaporates.

— Garden Beauty. —

One of the chief things when considering the decorative beauty of the garden is to secure well massed colour, and where it can be achieved at some height from the ground so much greater is the effect from the decorative point of view. Few subjects combine these qualities as do well grown flowering shrubs and climbers, whether evergreen, or deciduous. There is another reason too, why we should be at pains to grow this class of plant. It is the beautiful massed effect we can secure at the minimum of ground space, a matter of the utmost importance when considering small gardens. And again, we have to remember that among them are certain varieties that produce flowers of large size, a matter of importance in garden effect.

— Home Made Labels. —

Labels may be bought very cheaply now-a-days, but the handy man can make his own (says an exchange). The lids of boxes for packing chocolate and other kinds of sweets are just the right thickness for labels, and generally they are planed on one side, or they may be smoothed with a sharp knife. If the plane be used the whole lid should be smoothed at once, and the wood sawn to the size required afterwards. A small quantity of white lead paint must be applied to the smooth surface, and the name written with a pencil before it is quite dry.

— Berberis Japonica. —

This is one of the finest of the Barberries, and is well worth growing either for its large evergreen leaves or yellow flowers. It is found in both China and Japan, and forms an open clump of stiff, upright branches, 5 feet or 6 feet high, terminated with heads of handsome deep green, leathery leaves, made up of seven or nine leaflets, which are large, rounded at the base, and terminated at the apex with a strong spine, several other spines being found on the margins. The stems when broken through are quite yellow in colour. The flowers are yellow, and borne in large, terminal panicles, and are followed by dark purple or black fruits. For grouping on the outskirts of a shrubbery it is an excellent plant, but as it is very impatient of root injury, it should be placed in a permanent position when quite young, and not disturbed afterwards. If, however, it is found necessary to transplant an established specimen care should be taken to secure a good ball of soil about the roots.

— Mice Eating Shrub Stems. —

The following is recommended as a cure for a sometimes annoying trouble. Get a few pounds of dry clay, pound it fine, put it into an old pail, and mix with it as much kerosene as it will well absorb. Also add, dissolved in half a gallon of boiling water, 1lb. of soft soap, then put that into the pail. Still further add an ounce or so of red lead. Mix these ingredients into a paste, then with it coat the stems, using a large painting brush. Keep the solution well stirred while using it. In all cases where the stems are barked all round, no artificial coating can replace loss of bark. Those it may be wise to cut down below the barked injury.

The Suburban Gardener and his Employer.

There are two points worth considering in connection with this important individual. First, the capable jobbing gardener is a rare individual. Second, the suburban resident who knows how to appreciate a good man is almost equally rare.

These two facts operate one on the other. The incompetent gardener lowers the appreciation and confidence of the prospective employer, and the latter by refusing to pay fair wages to the good man, disgusts him and turns him into a new sphere of work. There are some good employers and some good gardeners, and these get on well together.

There is need for a wider appreciation of the work of the gardener. What is the use of denouncing him as a tree butcher, as an ignoramus, as not knowing a verbena from a weed, or a thistle from a petunia, if you begrudge paying more than 8/ a day or less can you expect a man at labourers' wages to be a thoughtful man; to read, and study, and keep himself up to the times?

Gardening ought to be recognised as a first-class trade and worth tradesman's wages; but as long as the work available is confined to precarious jobs of digging up the garden and tidying the paths once a year that is hopeless of gratification.

In each of the Australian cities there are numerous suburbbn homes which might be beautified by moderate expenditure if they were in charge of capable men, and we would like to see a large development of the custom followed by a few people, whose gardens are admired, of employing a man regularly for half a day or a day a week, or two days a week regu-work. How few men there are larly. The trouble is that the gardener has notions, and the owner of the garden has notions, and as he pays the piper he should be able to call the time; but the gardeners knows, or thinks he knows better. Usually in each case the less they know the more notions they have, and both suffer.

It seems a pity that the use of garden tools is not taught somewhere and somehow to boys, and, for the matter of that, to girls too, so far as light work is concerned. It is the exception to find people who can handle a spade, a rake, or a hoe deftly, and do neat workf How few men there are who can dig a plot of ground and keep the sides straight and the surface level! How few, indeed, can make a garden bed neat and tidy even with the use of the rake!

Somebody once said if he had been a fiddler he would have endeavored to be a good fiddler, and it is worth anyone's while to make the best of the position in which he is placed. It is good to see a man strive to do his work well and take a pride in it, as that shows he is fitting himself for a better position. And it is true now—as it always was — that everyone finds his level. Writer was looking at a lot of boys at work in a school garden, and noticed one boy who handled his spade in that ambidexterous fashion not now common, as if he had had years of experience. As a worker he was splendid, but his order of brain did not fit him for a Senior Wrangler. We are, some of us, apt to look down upon a working man, but the position of the latter requires skill of a high order.

In Australia those who look down on a working man as such are, comparatively few, but there are many who fail to appreciate the importance of good work in various directions. Two things are required :—

The gardener must make himself up to date, and study principles instead of working on obsolete rule of thumb methods.

The owners of gardens must learn to appreciate the knowledge of such men, and raise the dignity and pay of the gardener to a level of a first class tradesman.

Re-Potting Orchids.

From The Garden.

In selecting plants for repotting some consideration must be given to their condition with respect to flowering. Plants that are showing their flower scapes or that will flower within a short time should not be disturbed until after the flowers are over. It is more desirable to run the risk of injury to some of the roots, than to disturb a plant for repotting just as it is about to produce its flowers. The double strain of being repotted and then hav,ng to flower would cause, in most cases, unsatisfactory blooms and undue shrivelling of the pseudo-bulbs, which would be deterimental to the future well-being of the plants. Practically all the autumn and winter flowering Cattleyas and Laelias are now more or less root active, and the sooner they are attended to the better. The whole of this class of plants does not require annual repotting, so that if the compost is in good condition below the surface the removal of decaying material and moss on the surface will be all that is necessary. One cannot be too careful in the removal of any dead or decaying matter at the present season, for with the more or less resting conditions to which the plants have been subjectjected the surface moss will generally die, and if this is not cleared away, now that the more liberal waterings are given, the decay quickly spreads to the remaining compost, rendering it altogether unsuitable for the plants.

The potting compost we use for the whole of the class of plants consists of about equal portions of good fibrous peat, chopped sphagnum moss and oak or beech leaves (dried and rubbed through a half-inch sieve), with sufficient finely broken crocks and coarse sand to render the whole porous. The pots used should be clean, and just sufficiently large to contain the plants comfortably. Nothing looks more unsightly or is so deterimental to the well being of the plants as overpotting. One large crock should be placed over the hole at the bottom of the pot, and it may then be filled to one-half its depth with chopped bracken fern roots. See that the roots have been thoroughly dried, and are free from all sappy matter, or there is a possibility of fungus growth, which may spread and affect the remaining compost contained in the pots. The plant from which all the old compost and decaying matter has been removed may now be placed in position, and when the potting is completed it should have it leading growth on a level with the rim of the pot and slightly above the surface of the compost. The compost should be made moderately firm about the base of the plant. Finish with a layer of living chopped sphagnum moss.

Roof Gardening.

Our Australian climate and conditions generally do not give much opportunity for indulging in many of the forms of gardening that are practised in other lands, such as roof, wall, rock, window and water gardening. The following article from "The Garden," is, however, interesting, describing as it does a type of gardening practically unknown with us.

Upon more than one occasion I have been asked to give lists of plants suitable for roof gardening and treatment. In each of these instances the roof in question has been somewhat of an eyesore, and being within view of some of the windows of the dwelling, it was desired, by means of vegetable life, to shut it out from view. Curiously enough, too, a near neighbour of mine, having an ugly sheet-iron roof in his garden and much exposed to view, enquired a year or more ago as to the possibility of growing a few plants in boxes thereon to hide the bad effect of the roof, and the plants I then suggested he obtained and duly planted. In a large degree this attempt has been successful, and it might have been wholly so had a different method been adopted in the first instance. The original idea was that of planting in boxes, and these were not only too shallow in themselves, but raised on ledges or bearers so that they were subjected to continuous currents of air beneath, which, drying and parching the soil beyond expectations, modified what might otherwise have proved to be a complete success. Moreover, the boxes warped considerably under the influence of strong sun-heat, so much so that after a year's experience the original method has been considerably modified, and great success is now expected.

In the above instance I was only responsible for naming the most suitable plants, and my suggestions for covering the roof with soil could not be carried out in their entirety because the strength of the roof was a matter of doubt. The experience gained, however, was sufficient to prove unmistakably that quite a variety of plants could be grown in the way suggested; and in certain instances, and where the roof of an outhouse is open to view from a higher level, it is not merely a good but an interesting way of dealing with a difficult problem.

Just what plants may be introduced and be grown with success will depend upon a variety of circumstances, such as sun, shade, or partial shade, and not a little, of course, on the character and strength of the roof. Strength of rafter is naturally an important matter, and with this ensured, the best class of roof is that composed of the ordinary red guttered tiles seen in many country places or those ever-enduring stone-tiled roofs so frequent on farmhouse, church or other buildings in Midland and other districts. This same style of roof often enough affords a good object-lesson for those interested in roof gardening, and the accumulation of moss and other vegetation on the northern side, and the usual absence of such things on the southern side, indicate where the work of establishing such plants could be most easily carried out. The sharply angled stone-tiled roofs over a lych-gate are often suggestive enough to the planter, and more than once when looking at the moss-covered roofs have I longed for a handful of Wallflower, Poppy, or Snapdragon seeds to start a colony of these things in such positions, and later, possibly, also to create wonder or give rise to speculation as to how such things came there. Indeed, I am not going to deny having done such things, and I look with interest on the now colonised subjects which, if dwarfer than usual, are certainly not without attraction. Where a roof is being constructed with some idea of subsequent planting it can be made of a sufficient strength; but where it is of long standing its strength must be first ascertained. If a choice can be made, the nearly flat roof would receive the greatest number of votes for many reasons which will be clear to all. Next in importance is the provision of a body of suitable soil, which may vary from 2 inches to 4 inches in thickness, and if composed of rather clayey loam w th finely pulverised old mortar freely interspersed, the mixture will be found to suit many plants. With such an assured depth of soil resting on a cool tiled bottom, many plants will be quite at home, and nothing more will be required.

Violas and Pansies.

In the modern races of Violas there is little or no difference between a Viola and a Pansy. At one time the Violas had oblong flowers—that is, blooms that were longer than wide. They also had a very long spur at the back of the lower petal. New varieties have been raised until these distinctions have been more or less completely obliterated. In many of the modern varieties, therefore, there is no difference between them. Some of the varieties, however, especially those that were in cultivation ten or twelve years ago, still retain many characters of the Viola. What you have got to look for chiefly now is a distinctly perennial habit, and the capability of throwing up suckers or young shoots from the base of the plants. This is the desideratum and the true defining line of a Viola at the present day. On the other hand, Pansies may produce more robust stems, but fewer of them. All good strains of Pansies should have circular flowers, but, of course, a very large number of so-called Violas have now circular flowers.—Exchange.

The Beauty of Wall Gardening.

Many are the unsightly and featureless places that might be made beautiful by wall gardening, and more quickly than in any other way; for the wall plants having their roots always cool seem to grow away quickly at once, and yet to be longer lived than their own brother plants in the more level garden. Indeed, wall gardening is not only extremely interesting and soon rewarding, but it seems to quicken the inventive faculty; for if one has once tasted its pleasures and mastered some of the simpler ways of adapting it for use, others are sure to present themselves, and a whole new region of discursive delights offers itself for the mental exporation of the horticulturally inventive. One after another, pleasant schemes come to mind, soon to be fashioned, with careful design and such manual skill as may have been acquired, into such simple things of beauty and delight as this first flower-walled and then Vine-shaded pleasant pathway. Besides the wall gardening that may be designed and reared, there is also that which is waiting to be done in walls that are already in being. Sometimes there is an old wall from whose joints the surface mortar has crumbled and fallen.

But so good a chance is not for every garden, for often the wall that one would wish to make the home ol many a lovely plant is of the plainest brick or stone, and the mortar joints are fairly sound. Still the ardent wall gardener is not to be daunted, for, armed with a hammer and a bricklayer's cold chisel, he knocks out joints and corners of bricks (when a builder is not looking on) exactly where he wishes to have his ranges of plants. A well-built wall, seasoned and solidified by some years' standing, will bear a good deal of such knocking about. In chiselling out the holes the only thing that had better be avoided is making much of a cavity just under an upright joint; nor is it ever needful, for even if one wishes to have a longish range of any one plant the plants will close up, though planted in the first place a little way apart, while there is nothing against widening any upright joint or making it gape funnelwise either upward or down.

Just after the seeds ripen they are put in mixed with a little loamy earth, and if the cleft or opening is an upright one, unwilling to retain the mixture, a little stone is wedged in at the bottom or even cemented in. For a plant of rather large growth, a whole coping brick can be knocked off the top, and probably quite a nice rooting place be made with the downward digging chisel, to be filled up with suitable soil.

By some such means, and always thinking and trying and combining ideas, the plainest wall can in a couple of years be so pleasantly transformed that it is turned into a thing of flowery beauty. There is no wall with exposure so hot or so cold that has not a plant waiting for just the conditions that it has to offer, and there will be no well-directed attempt to convert mural ugliness into beauty whose result will not be an encouragement to go and do still better.

The Virtues of Digging.

One of the chief items in the garden routine is digging. I have heard it stated that digging brings into play more muscles than any other form of exercise. I haven:t attempted to count the number myself, but if any untried amateur wants to cultivate a choice back ache, arm ache, leg ache, and various other aches, let him have a spell at digging a piece of hard ground. Mind you, the man who is dismayed because of sundry aches will never make a good gardener. The trials of digging, however, are not by any means serious, and the digger will certainly feel benefited by taking on his own digging instead of paying a jobber to do it.

Plain digging is not a slow nor elaborate process. For all holding soils the fork is much the best tool, especially if the ground is moist. There are many types of forks, but I myself prefer the three-pronged implement. Great unwieldy tools are not the best, as they lend themselves to skimping. To dig properly, one must have a straight-pronged tool or nearly so, and the prongs should be long and capable of tickling the soil 12 inches below the surface. Open out a trench before digging, and keep to it as the job proceeds.

One must have room to move. I strongly advise diggers to change hands at intervals. Some men can only work with their right hand on the handle, and pressing with their left foot, but a great deal more comfort is obtained if the hands and feet are changed. I generally work to the right with my right hand and left foot, and return with the left hand and right foot. Such a system relieves the tedium of digging to a very large extent. I have done a great deal of digging in my time, and am prone to think that many people do not know what really good digging is.

How to Repair Hollow Trees.

This is a subject worth more attention from the owners or those who have the care of trees. It is a matter for the small garden with a few trees as well as for where the trees may be counted by hundreds. The causes or origin of wounds or decay in trees is varied. Branches broken off by wind usually leave a stump, or it may splinter off a piece of the larger limb to which it was attached. In both cases decay will most inevitably follow, unless means are adopted to check it. Snags or stumps should be sawn off close to the remaining branch or to the trunk. After sawing, the rough surface caused by the teeth of the saw should be gone over and pared with a sharp knife, to provide a better surface for the tar. All wounds made on trees, whether through accident or the removal of branches in the training, pruning, or balancing of a tree, should be coated with ordinary coal tar.

The life of grand specimens is sometimes considerably shortened by disease, which, if checked or even cured, would have considerably prolonged their existence. Before filling up a hole or cavity in a tree, the hollow must be thoroughly cleaned out. Damp, rotten wood attacked by fungus, or soft, crumbling wood must be first cleaned out, removing it with a chisel or small axe till only dry, hard wood remains. One or two dressings of carbolic acid solution (a quarter of a pound of carbolic acid and one gallon of methylated spirits) should then be applied to destroy, if possible, all traces of disease. In a day or two a coating of tar should be applied and allowed to dry. The nature and extent of the hollow will decide the method of filling it. Small holes may be filled with a mixture of cement and sand, or, if round and a fair depth, a hard wood peg coated with tar may be driven in and cut off flush with the trunk. Bricks and mortar, together with concrete, are the best materials for filling up large hollows. It is sometimes necessary to build up a face with bricks, and fill in behind with concrete as the work proceeds. One tree with which we had to deal was hollow on one side, from the ground to a height of 21 feet. In this tree eighty-four courses of bricks were built up—some three hundred bricks in all—with concrete behind and a facing of cement over the bricks. Another tree took nearly a ton of cement, but in this case the shell of the tree held it together without the aid of many bricks. Before attempting the work of filling up large holes, make sure that the tree is not dangerously weakened through decay. With a little practice the varying colours of the wood can be obtained by lampblack, soot, or a little dry cement being sprinkled on when wet. The markings of the trunk can also be imitated by a skilled workman. It is necessary to watch the wounds and "stopping" occasionally, tarring over the former every two or three years till quite healed over.—Horticulture.

Gathering and Picking for Exhibition.

It is best, if possible, to gather the flowers quite early on the morning of the exhibition—the earlier the better, in fact; but where the exhibitor resides at a considerable distance, they should be gathered the previous, so that they can be despatched in good time. Cut the blooms with long stems and place in water at once, keeping them in a cool, dark room till they are packed. It requires some experience to select the most suitable flowers; good form and and colour are the primary points, size coming next; any blooms with the slightest blemish should be rejected. Flowers which open quickly, such as many of the "thin" Roses, should be cut in the bud stage, fuller-petalled Roses when half open; Sweet Peas are best gathered when the two lower flowers on the stem are open; Carnations when the flowers are almost fully extended. It is advisable in all cases to cut a few extra flowers, to be held in reserve for replacing any which are not in proper condition for staging.

For packing, shallow boxes, should be employed, as the flowers will travel much better if packed in single layers; the boxes should be just long enough to comfortably accommodate the flowers and should be lined with some soft non-absorbent material; wood-wool is the best material to use, but fresh moss will also answer the purpose; over this place a layer of white tissue paper and then lay the flowers in position, packing them as closely as possible; cover with another layer of tissue paper and fill in if necessary with a little more packing material till, when the lid is placed in position, the contents of the box are quite firm and unable to shift. Where the exhibitor does not accompany his blooms, as far as possible, flowers should be packed as they are to be exhibited, either singly or in bunches, and the name of the variety should be securely attached to each. A card showing the section and class for which the exhibit is intended should also be enclosed. When an exhibitor is competing in several classes, each exhibit should be separately packed in light wooden boxes, these being afterwards placed in a sout case.—Exchange.

Asparagus Sprengeri.

Though not as well known as the beautiful A. plumosus, the above is both a handsome and useful plant. In its early stages it often forms a bushy low-growing plant, and may be usefully employed in the above ways. After a time, however, it commences to throw up very long stems of a slender character and may then be staked or tied to pillars or wires in the manner of a climber. On the other hand the plant may be grown in a basket or deep seed pan, and suspended as a basket plant. It looks splendidly so treated, especially when the stems are 5 or 6ft. long. The so-called leaves are broader and more feathery than those of the better known A. plumosus.

It is not fastidious in the matter of soil, and when it requires a larger pot or basket a compost should be made up, consisting of two parts of good fibrous loam and one part of leaf mould and sand.

Large plants flower freely and are then very pretty when laden with numerous clusters of small white flowers, and again look handsome when covered with ripe berries.

Mr. Henpeck: "Is your beef tender to-day?" Butcher: "Yes, sir; it's as tender as a woman's heart." Mr. Henpeck: "Then I'll take a pound of sausages."

The Culture of Ferns.

Those who delight in growing Ferns, whether for exhibition or otherwise, usually make for that exhibit, writes "The Gardening World." Sometimes we look on in wonder when we see Maidenhair Ferns in 18in. pots, with fronds from 18 to 24 inches long, and say to ourselves, "How on earth do they grow such plants?" and do home with the firm intention of at least having a try. To those who have that intention, the following hints may be of interest :—

In spring, just before the young fronds make their appearance, select the plants you wish to grow on. Next cut away all the old fronds in readiness for potting.

Compost can be made up of six parts good yellow turfy loam, two parts peat, and one part coarse silver sand.

Th s should be well mixed, and in a nice friable condition, neither too wet nor too dry. When potting, procure a clean pot, at least two sizes larger than that which the plant has lately occupied. The inside of the pot should then be smeared with a thin layer of moist cow manure. This can be done with the back of an ordinary garden trowel. I as a rule use my hand. Then place a large crock over the drainage hole, next some broken charcoal, then a piece of rough compost, and over all a sprinkling of soot. The amount of drainage should depend on the size of the pot used. On no account must the soil be rammed hard with the potting stick; moderately firm is better for the purpose, leaving sufficient space between the soil and the rim of the pot to allow for watering.

With regard to watering, the plants should be examined in the growing season at least once a day, twice is better. Never let the soil become sodden or too dry. Water should never be given overhead, but just above the rim of the pot; avoid giving cold tap water. A good supply of water should always be kept in the house in which the plants are growing, and that, preferably, rain water. Shade the plants before the sun gains power, syringe in the morning when the young fronds are opening, and, when the first fronds are about a month old, cease syringing and give weak soot water about once a week. The plants mav be raised from the staging by placing two pices of wood at either side of the drainage hole, beneath the pot. Brown or withered fronds should be cut away as they appear. Never dry the plants off, but give water when required. Potting may be practised about the same time every year, till they attain the standard for exhibiting. I worked my plants on from 48's, and with the above culture they are now in 18in. pots, with fronds 2ft. long.

Potting Lilies.

The primary operation is, of course, to put ample drainage in the bottom of the pot, placing either fibre, leaves, or the rougher portions of the compost over the crocks to keep the soil from washing down. A little of the potting compost should be placed on this and the bulb placed in position so that when the pot is filled the top of the bulb will be at least 1 in. below the surface of the soil.

Two methods are pursued, namely, to pot the bulbs singly or three together in pots of a suitable size. When a larger number are employed large pots may be used at the beginning, and the initial preparations performed as above. Then soil is filled around and over the top of the bulbs making it rather firm. These big pots are left partly filled at the time of potting, but they are afterwards filled up or top-dressed, when a rather richer potting compost may be used.

Some lilies make roots from the underside of the bulb and also base of the flower stem immediately above the bulbs. This is the object of having the bulbs entirely covered with soil. The roots from the base of the stems are necessary for the support of stem leaves and flowers. Only some species of Lily produce these roots from the flower stem. It will also be noted that this is also the reason for afterwards filling up large pots with soil so that the stem roots may be covered and have ample material from which to obtain support. Some Lilies even produce small bulbs in the same region as these stem roots.

A suitable compost consists of equal portions of fibrous loam and peat with plenty of sand to keep it open. A little well decayed and finely broken cow manure may be used in the compost for top-dressing purposes, but no manure whatever should come in contact with the bulbs. When the plants are in full growth weak l quid manure may of course be employed. It is easy, however, to overdo bulbs by overfeeding them.

The Beauty and Value of Annuals.

Only an annual! Again and again the expression is used, and it makes us doubt whether the debt of gratitude we owe to this fine class of flowering plants is recognised as it should be. The miracle of birth and rapid growth, the glory of form and colour, the mystery of fruition wrapped up in the small brown seed, these are all discounted for many a one by an undefined sense of rebellion against the short tenure of their life. To grow them, we say, is hardly worth whole. Perhaps, if we go to the root of the matter, the secret of our discontent is an unworthy one. It may be indolence, a grudging of trouble which must recur. Or it may have been failure and then a lack of perseverance in trying aga n to conquer a difficulty. But how much colour and fragrance should we not miss if we had only the slower growing plants to rely upon. And not colour and sweetness only, but what marvellous diversity of form in flower and leaf and outline. A garden solely of annuals, though it is seldom met with, would be no mean thing to look at and possess.

Our attention is much directed nowadays to the beauty and artistic effect of colour schemes in garden arrangements. This can be done, of course, to a certain extent by permanent planting. But there is no such thing, so to speak, as permanence in Nature. Beauty is for ever waxing—but it wanes. Our colour schemes would be fleeting indeed if we could not supplement and renew them with the rich harmonies of quick-growing yearlings. For amongst the many triumphs of horticulture may be counted the fixing of strains of colour of annual plants, which enables the grower to depend with certainty upon getting the exact tone he wishes to have from a named packet of seed.—Exchange.

Economical Flower Vases.

At a time when flowers are wanted to decorate the house for any special occasion, it often happens that suitable cases or stands are scarce, some have been broken, while others are too light to hold flowers with heavy heads. A means by which very cheap and at the same time pretty flower holders may be made (is suggested by an exchange) by anyone who possesses a saw and bradawl.

Take a rod of bamboo and cut it into strips about two feet six inches long, one inch below the joint at the other. Then about two inches from each joint make a slanting cut about half-way through the bamboo, and another cut below in the opposite direction; they should not meet, a space of half an inch being allowed between the two. The top is now cut slanting, and a hole made with the bradawl to pass a piece of twisted picture wire through or coloured string; this allows the flower holder to be hung in any corner of a room. Sprays of flowers should then be placed in the holes of each section, the more the flowers spread out and are mixed with green leaves the better being the effect. Fill the sections with water, the solid joints making each section complete.

For the second the short ends of the bamboo are very handy. Take two or four pieces about five inches in length, and for the centre a piece eight inches long, binding these together with wire twice round the centre piece of bamboo, and twisting the wire on itself for six inches and on to the short end, which is all that will be required to make the flower stand complete.

A variety of table ornaments can be made in this way that will be found very useful for decorative purposes, the chief advantage being that these bamboo flower-holders are not easily broken, and are easily stored away when not required.

Indian Rubber Plant.

This well known ornamental plant with smooth shining green leaves answers admirably for decorative purposes in dwelling rooms. A compost suited to the requirements of the Indiarubber Plant is composed of four parts loam, one part peat and one part sand. Shade from the sun is necessary with moderate supplies of water. The foliage should be frequently syringed and sponged and the plants repotted before they become potbound. In course of time Indiarubber Plants lose or shed their lower leaves, becoming leggy, unsightly and useless for decorative purposes, this being caused more often than not by growth receiving a check of some kind, as for instance through want of water, over-watering, exposure draughts, exposure to varying temperature and want of repotting. To bring such plants into better shape and reduce their height stem-rooting must be resorted to. This operation, as will be gathered from the term, is to induce roots to be emitted from the stem at any desired point.

First obtain a three or four inch flower pot and saw it into two pieces, enlarging the drainage hole at the same time. At the desired point in the stem of the plant cut a slit or tongue in an upward direction, about half the thickness of the stem, and to keep it open place a small stone in the slit. Secure the split pot round the stem at the point where it has been cut, tie firmly together and fill with good sandy soil; also support the pot with stakes to which it must be firmly tied.

The Influence of Sea on Scent.

The great European flower farms for perfumery lie in the valley of Var, a great triangular space of 115,000 acres, with Grasse at its apex and Nice and Cannes at each corner of its base on the Mediterranean. Here Orange flowers, Roses, Violets, and others flowers are not so much sold in the bunch as weighed by the ton, and their fragrances are sent all over the world. Nor can we forget, writes "The Garden," the aromatic herbs and bushes that clothe the little capes that jut out into the great sea which washes the shores of Greece, Italy, Sicily, and Corsica. Napoleon said he should know his native land with his eyes shut from the scent of a little white Cistus (C. monspeliensis), that scents the air after rain with its resinous odour. Corsica is covered with it. And there are the spice islands of Java, Ceylon, Borneo and the Windwards, all aromatic with spices, Clove, Cinnamon and Nutmeg. Douglas Sladen, in his delightful book, "In Sicily," says the island is "one herbarium. In every old wall on every uncultivated patch grows some medicinal herb." It is powdered with sweet wild flowers and fragrant trees and shrubs. Another traveller in the islands of the Greek Archipelago describes how at a distance they look bare and arid, yet have a scattered growth of lowly sweet-smelling bush and herb, so that as you move among them ever plant seems full of sweet sap or aromatic gum, and as you tread the perfumed carpet the whole air is scented. Here, too, are dusky groves of incense-bearing Cypress and Myrtle, of Oleander and Sweet Bay. We can hardly doubt that it is the islands of the world that are most richly dowered with scent. Herbs are certainly more pungent and aromatic by the sea than inland. Vegetables, we think, and many authorities agree with us, gain in flavour from being grown near the coast. Some, of course, like Asparagus and Sea Kale are natives of the shore, so no wonder they enjoy being dressed with seaweed, a treat we can often give them.

A Garden in a Barrel.

Few people are so hard up for space that they have to confine their flower-growing to a barrel, still barrel gardening can be made quite a feature for verandah decoration. It is a very easy system of having a succession of plants at their best for this purpose. Select a suitable sound barrel, bore drainage holes in the bottom, also holes round the circumference, through which the plants will grow. Then commence filling with good rich soil, leaving a core of rubble in the centre, as each tier of holes is come to plant a seedling, spreading the roots out well and, of course, passing any growth which has been made through the hole. Carnations, fuschias, ivy-leaved pelargoniums, begonias, nasturtiums, and quite a lot of other annuals can be treated thus or a variety may be used.

Vegetable Garden

Notes for January.

Work for the month on the Adelaide plains and similar districts will consist of attention to the growing crops of summer vegetables—melons, cucumbers, tomatoes, French beans, sweet corn, and in keeping the beds well cultivated by stirring the surface frequently and keeping a mulch with manure to prevent drying out.

Where any plots are vacant they should be turned over roughly so as to get the greatest benefit from any chance showers which may fall. It is not too late to sow late beds of cucumbers and melons. With careful looking after, a picking of beans may be had seven weeks from sowing; cucumbers may be cut within ten weeks.

Seeds of cabbage, celery, broccoli, and onions may be sown now for early crops; they will need careful looking after during the hot weather, but it is only by doing that or by buying seedlings when the first autumn rains come that early crops can be secured. A shaded seed-box, which can be well protected from the heat of the sun is a great help in bringing the seedlings on, but care must be taken that they do not run up weak and spindly. Silver beet may still be sown, and would give nice cuttings of "spinach" in a very little while.

Towards the end of the month preparations for putting in beds of early peas, carrots, and parsnips should be made. Select a cool sheltered position, have the soil in good condition—that is, deeply dug and well manured. Mulch with short stable manure, and be very careful that the surface does not become baked.

Water, hoe, and mulch, and again water, hoe, and mulch is the secret of success with summer vegetables.

Manuring of Potatoes.

Analysis show that the potato consists of 79.75 per cent. of water, 9.99 per cent. of ash, of which 0.21 per cent. is nitrogen, 0.07 per cent. phosphoric acid, and 0.29 per cent. of potash.

We thus see that nitrogen and potash are the manures the potatoes most urgently require. Where the crop is planted in soil abounding in organic matter or humus, the class of soil always chosen for potatoes in the first instance, there will be little need for an artificial application of nitrogen, especially where the potato grows during that part of the season when the nitrification of this humus is most active.

Where, however, the crop is grown in the spring months a liberal application of immediately available nitrogen will repay handsomely. Any fertiliser mixture for the potato must be rich in potash, the percentage of phosphoric acid can be modified.

Massey, in his "Crop Growing and Crop Feeding," recommends potatoes to be grown in rotation, in which the crop preceding these is leguminous, and to which the artificial manures should be added, so nitrogen need not be purchased.

Where the potato crop is to be artificially manured, a mixture of 4 parts of sulphate of potash (52 per cent. at least of pure potash), and 16 parts of supherphosphate, 4 cwt. of this mixture to the acre should be put in the furrow under the potatoes as it will be nearest to the roots of the plant which do not spread far.

It is to be specially noticed that the quality of the potato is influenced by the potash used. Sulphate of potash gives a better quality than muriate, although the latter gives a little more crop, but the chlorides seem to make the potato more clammy.

A good mixture for manuring potatoes is as follows:—5½ per cent. nitrogen, 7 2-5 per cent. phosphoric acid, and 10 per cent. potash.

How often do we hear potato-growers complain that although the tops look magnificent, the tubers are few in number and small in size.

Now it is the top that makes the potato, and it is natural to expect where the vegetation is abundant the growth under the soil should also be so.

What is the reason of the poor crop? We know the potato contains carbonaceous matter, such as starch, that the carbon is absorbed by the leaves from the air, and the first compound is a form of sugar, part of which the plant uses in living, the other part is changed into starch, which it stores up for future use in the potato. Now the plant cannot change this sugar into reserve material unless abundant supplies of potash, besides phosphoric acid are present. The effect of nitrogen is to form a heavy growth, especially of the green parts of the plant.

The soil that gives big tops and few potatoes is deficient in potash, and where this is noticed, do not give the soil any more nitrogen manures, but a mixture of potash and phosphoric acid, with the former predominating. From experiments carried out at the New York Agricultural Station, it was found that an application of 500 lb. of fertiliser gave an increase of 34 bushels of large potatoes to the acre over the unmanured, and 1,000 pounds gave double this increase. The mixture used was 4 per cent. nitrogen, 8 per cent. phosphoric acid, and 10 per cent. potash in the form of muriate.

The same quantities of nitrogen, phosphoric acid, and potash as applied in 500 lbs. of such a fertiliser can also be applied in a mixture made up of:—

— Per Acre. —

100 lbs. sulphate of ammonia.

2 cwts. superphosphate.

¾ cwt. muriate of potash.

Soil-Sickness and Partial Sterilisation.

The recent endeavours to deal with cases of soil-sickness by means of partial sterilization have arisen from the discovery, some few years ago, that this treatment increases bacterial activity in the soil mainly through the reduction of the number of larger competing organisms. The change thus brought about increases the production of plant nutrientsl and hence influences favourably the growth of cultivated crops.

During the last year or two, attention has been given to the matter of partial soil sterilization mainly from the pathological aspect. The healthy or unhealthy nature of the soil, and not merely its supply of plant nutrients, has been the central object of investigation.

It has been established in the United States, the Transvaal, as well as in England, that the so-called sick soils can, in many instances, be rendered healthy by subjecting them to a temperature of 100 degrees F. to 200 degrees F. or by means of the application of antiseptics. Valuable information on the subject, contained in a paper by Russel and Petherbridge, of Rothamstead, deals mainly with the application of antiseptics in practical horticulture. Sick soils to tomatos, cucumbers, vines, ferns, peas and tobacco received special investigation.

It might be pointed out at once that by a tomato-sick soil is meant a soil that induces in tomato plants grown in it, a pathological or diseased condition of so serious a nature that their cultivation ceases to be profitable. It is of the greatest importance to bear in mind that it is not the crop that causes sickness of the soil, but the soil that causes sickness of crop. There are some virgin soils, for instance, in which vines cannot be grown without artificial treatment. That treatment is partial sterilization. In garden or nursery work, heating of the soil is not likely to be so convenient as the application of antiseptics; for glass house or pot work, however, the heating method can be employed with commercial success. Of the common antiseptics, carbolic acid, calcium sulphide and formaldehyde have given good results—even better than those results obtained previously by using toluol. The selection of an antiseptic is controlled by several factors for example, efficiency, original cost and expense of transport, and has to be settled by considering the conditions of each particular case. But the fact remains that their use cures the sickness, kills the disease organisms in the soil, and incidentally increases the supply of plant food. What the different sicknesses really are is not at present definitely known: it may be that toxic or poisonous substances (to the particular crop affected) occur in the soil as the excretions of certain fungi and bacteria. Sometimes the sickness can be, in part, attributed to the presence of " damping off" fungi like the widely spread Pythium and Rhizoctonia. Future investigations will in all probability reveal the exact causes in every case.

In concluding these considerations, it may be remarked that the possibility of the local application of partial sterilization to certain West India soils seems to be suggestive, and the subject will also bear consideration in connection with specific root diseases. A remedy for these may lie in the partial sterilization of the soil. —Agricultural News.

The Potato.

The potato is not a hardy plant. The native of tropical or subtropical countries, like Chili or Mexico, cannot be expected to resist the rigours of frost unless its constitution is changed to enable it to accommodate itself to its new environment. This must be the work of applied science. Further, it is very liable to disease—the "potato-murrain" was a scourge, and still, under new names, devastates fields before growth is matured. Australian growers, like the rest of the potato-raisers of the world, suffer from both these troubles. One well-known man has tried to come to their rescue. This is Luther Burbank, whose name is associated with some decided successes in hybridizing flowers and fruits. He turned his attention to the tuber, and a few years ago produced a specimen which promised to meet requirements, and was tested in Ireland. Burbank's work has been much misunderstood. He is neither a wizard nor a charlatan. He is a private gentleman, who loves plants, and tries to improve them by scientific methods of selection. For years he worked on the potato. Wild and tame species were collected from different countries, and from these he obtained many crosses and combinations in his search for a better stock. He has been trying to breed varieties suitable for every climate and all soils, as well as to produce a vegetable even more palatable than that which is now put on the table. The matter of the moment alike to grower and consumer is whether crossing and selection will produce a variety which will be free from so many of the vicissitudes of the tuber's life. Therefore any experiments made in this direction deserve the closest observation in this country, which should never have to import its vegetables.—Sydney Morning Herald.

— Mulching. —

It is during the drought and heat that mulchings are beneficial and are the means of saving considerable watering. Half decayed manure is no doubt the best material for mulching purposes, but grass cuttings, refuse, road scrapings, all being of a non-absorbent character, are suitable, but in addition to conserving the moisture in the ground, manure also provides a considerable amount of nourishment for the plants and trees round which it is placed as waterings wash out its beneficial qualities and carry them down to the roots, and in cases where extra nourishment is likely to be of assistance in producing better crops it is the wisest plan to employ manure for the purpose in question. The surface of the ground about the plants and trees to be treated should first be well stirred, and if the ground is dry it should be well soaked with water.

Potato Tubers Not Decaying.

Non-decay in seed potatoes is said to be due to the fact that they are over-ripe, or, in other words, to the absence of sap in sufficient quantity to produce that wet decay which characterises all planted tubers that do decay. A correspondent to the "Garden," writes:—We seem to have in the flesh of these sapless or over-matured Potatoes very much that description of flesh which is found in Columbian or Canadian Apples. These, if bruised, never present the form of wet rot seen in British

Apples, ours being less highly matured, but moister. In Cheshire I very rarely saw planted tubers come out whole when growing them on stiff soil. On our drier Surrey sand the phenomenon is common. Last spring I planted, for instance, sets of equal size, and equally cared for, of Sutton's Discovery from Surrey sand and from Cheshire. In the former case every tuber came out as planted. In the latter not one did so, all being decayed. The tuber crop also lifted was doubled. I have not found in sprouting tubers from diverse soils or climates any difference so far as strength of primary sprouts was concerned. The after-growth has, however, been very different. Not only are we at present, according to evidence, driven to hold that mature or unripened tubers give better crops than do those fully ripe, but also, that being more moist or sappy, and therefore having more of soluble food in them on which the young plants can feed, they thoroughly decay, and in the process of decay become equivalent to manure. Curl, so called, is evidently due to the same cause. It is apparently never seen southwards in stocks freshly imported from Scotland or Ireland, but does present itself if seed tubers from these stocks be saved and planted the following year. Anyone can make a trial of immature tubers if they will lift some plants still green.

Bracken Shoots.

Of course most people are aware that the common nettles make an excellent soup and vegetable. The Japanese have lately introduced us to another excellent vegetable that likewise requires no cultivation. Few people can afford or have room for an Asparagus bed in their gardens. But everyone now may produce quite as savoury a dish by gathering the young Bracken shoots and cooking them like Asparagus. Boiled in the same way and served up with melted butter sauce, it is difficult to know the difference between the two vegetables. Two or three nights ago I had some cooked and marked on the menu as "Asparagus." Everyone was congratulating themselves on having such an early dish of Asparagus, and were much amused when they heard what they had really been eating. It is a cheap and inexpensive dish that both rich and poor may equally enjoy.—"The Gardening World."

The Relative Value of Manures.

While travelling in Wales, writes a correspondent in "The Garden," last summer, I happened to meet an old countryman, over whose garden I was shown. In the course of conversation with him I enquired as to what manure he used to obtain such splendid results. His answer was: "Why, horse manure! I don't believe in your cow and pig manures." I, naturally, enquired why, and this was his logical answer: "A pig is fed to make good meat, a cow to make meat and also milk, but a horse simply feeds to live. Therefore in my thinking horse manure is the best, owing to the former two animals extracting more goodness from their food than does a horse." I give you the above, of course, for what it is worth, and it would be interesting to hear what your readers think. From what I saw of the produce it was excellent in every respect. He also showed me ten first and eleven second prizes gained in 1911, and I have heard since that he took nearly the same number this year. In commenting on the above the Editor says, "he publishes the foregoing letter as indicative of an opinion that is certainly original. We do not think, however, that it is quite as logical as our correspondent thinks. On heavy soil horse manure would be the best, but on that of a sandy character we would prefer cow or pig manure."

Fruit Garden

Picking and Packing.

Fruit that is intended for shipping or keeping should not be allowed to suffer the slightest bruising. Therefore, never shape fruit off the tree, and even when picking never toss them into the basket or case, but handle as gently as you would an egg. When harvesting the crop ins st on your pickers wearing cotton gloves. They only cost a few pence, but the amount of fruit that is ultimately saved by preventing the d?leterious moisture on the hands coming into contact with the fruit will run into many pounds.

Each shipper has a pet theory of his own in packing fruit for export, and the "best method" has yet to be proved. However, in whatever manner the fruit is packed the fundamental principles of fruit packing are:

1. That the fruit is packed together tightly enough to prevent shaking and consequent bruising. However, do not pack too tightly, and induce rotting that way.

2. There should be a free circulation of air around the fruit, as nothing tends more quickly to induce rot than a close atmosphere.

3. All fruit, before being packed, should be wiped with a soft dry cloth to remove any moisture.

4. Handle tenderly, and wear cotton gloves.

— Storing Fruit. —

The principal requisites of a good store-room are, before anything else, the means to keep an even temperature. In no instance should the room be moist, and again not too dry. No more light than is absolutely necessary for working in should be admitted : in fact, the windows should be provided with shutters, so that when not working with the fruit, light can be entirely excludedf Therefore whatever room you intend utilising as a store-room see that it possesses the above qualifications.

If you intend to go in for fruit export, or keeping for local market as a business, it s wiser to construct a special store-room for this purpose. Do noe build a wooden place, unless you can have it thoroughly plastered and free from cracks and crevices—in fact, in every respect similar to an unpapered dwelling room. It is preferabl?, therefore, to bu ld a brick or stone structure, and finish it off with doors and windows which can be closed for lumigationf These should also be fitted with perforated zinc or gauze screens when open for ventilat on. All ventilation vents should also be so guarded.

The fruit should be stored on trays, and placed so that each fruit barely touches its neighbour, and with a free circulation of air all round. This is the ideal condition. However, I am afraid but a few of my readers would be able to go to the expense of erecting enough store rooms of this description to meet the requirements of their orchard. The nearer you can get to the above conditions the better it will be for your fruit.

Fruit should be periodically examined, and any that show the slightest signs of decay should be removed. Others that have a tendency to "sweat" should be wiped with a soft dry cloth. Also, when handling fruit wear cotton gloves.

The Codlin Moth.

The use af arseoical poisons has come to be the sole method for the control of the codlin moth. By their use the insects are killed before instead of aft?r the danger is done and the loss can be reduced to the neighbourhood of one per cent. and sometimes the destruction seems to be complete. At first it was ehought that the poison could not affect an insect like this that bores deep into the fruit. When experiments proved that the poisons did protect the crop the general belief changed to the idea that they got the poison in the process of burrowing through the skin. The fact noted above that they do not swallow the tissue removed in this process suggests that the subsequent surface feeding is the fatal operation.

The fact was early observed that in some regions the worm enters the fruit ch efly at the blossom end, giving rise to the erroneous idea that the eggs were laid at that point. It is a very general belief that poison must be deposited within the cup to prevent the entrance of the worms, and in most varieties of apples this can only be done during the fortnight following the dropping of the petals. In the district valley it was observed that the great majority enter the fruit elsewhere and in another county only a third of the worms entered at this place. Furthermore, it was notice that spraying was completely effective in the first case when applied long after the calyx is closed and in the second good results followed when only two or three per cent. of the cups showed an appreciable amount ol the spray. In both of these cases the decrease of those entering the blossom end was practically as great as of those entering on the side.

It will thus be seen that we do not know enough of the facts to explain the reasons for the e—ciency of the poison.—Extract from Cirrular 101, University of California.

Regular Bearing.

Regulating the amount of fruit borne in one year involves the profit of two years, because a tree cannot produce an excessive amount of good fruit and perfect fruit buds for the following year. It may generally make buds which will bloom, but not always that. If it does make the bloom, it is no guarantee that the bloom will be strong and effective for bearing. Consequently, pruning for reasonable amount of bearing should always be borne in view, and should be practised at the close of the year of non-bearing with particular diligence, if the alternate year bearing is to be broken up.

While there are many who neglect to follow any system of pruning there are others, again, who, with the very best intentions, carry this important operation to excess by continuing to prune too heavily for, at any rate, a few years, certain kinds of trees after they have reached the age when they should begin to carry fruit. In making up our minds to follow any system, we should never lose sight of the commercial side of the business; and any system which encourages excessive growth rather than fruit-buds and spurs, and prevents the tree from fruiting, should be avoided. The system to follow is that which will aid the tree in producing annually the greatest quantity of highly-coloured marketable fruit, and which, at the same time, involves the least training and pruning during either summer or winter, rather than one which entails much labour after once the tree has attained the bearing age.

The growing and pruning of trees is no longer a hobby with most of our fruit growers, but a commercial undertaking, and the grower should not go to the expense of doing more pruning during summer or winter than is absolutely essential for the purpose of properly spacing the limbs, and preserving a reasonable amount of bearing wood.—Queensland Agricultural Journal.

Promoting Germination of Seed.

The New York Cornell Station Bulletin 312 calls attention to the fact that a certain percentage of seeds, though possessing vitality, delay or fail to germinate owing to "hardness," but that early germination could be effected by the aid of sulphuric acid. It is advisable, first to make a germination test to ascertain whether the percentage of germination of seeds, apparently alive, is low.

In the case of a small quantity of seed, it could be placed in a tube or other small glass vessel and a quantity of concentrated sulphuric acid, equal to about 5 or 6 times the quantity of seed, is poured over the seed. Stir the mixture thoroughly with a rod until all are completely coated with the acid. After standing for 15 to 45 minutes (according to percentage of hard seed) wash with water until the seed is entirely free of acid.

For large quantities a stone jar of 2 or 3 gallons capacity may be employed, and a wooden stick used for stirring.

The presence of iron in copper sulphate may be determined readily by dissolving a small amount in water and adding ammonia, the solution being constantly stirred till a deep blue liquid is formed. Any quantity of brown flecks floating in this blue liquid indicates the presence of so much iron that the copper sulphate should be subjected to a proper analysis before use.

Increasing the Durability of Fence Posts

The Journal of the Board of Agriculture for January 1913 contains the following from Bulletin No. 163 of the Maryland Agricultural Experiment Station :—Fence posts were treated with preservatives in various ways in 1888 and examined after twenty years. It is concluded from experiments with posts of cedar and chestnut wood that applying a preservative with brush is not very effective; that creosote is more efficient than either coal-tar or crude petroleum; that filling in stones round the post does not increase its durability. Charring the part of the post to be placed underground was found beneficial only in the case of green posts—charring, it is stated, acting by hastening seasoning and possibly sterilizing the wood.

Experiments were commenced at the station in 1909 in co-operation with the United States Forest Service. None of the posts treated with creosote, tar, or crude petroleum show any perceptible decay after two years' use; while a large number of the untreated posts of the same kind of wood, and of the same size and shape as those that were treated, have decayed to such an extent as to make them unserviceable after two years' use.

What Irrigation Does.

It reclaims arid wastes.

It makes a prosperous country.

It causes the dessert to blossom.

It insures full crops each season.

It makes poultry raising inexpensive and particularly profitable.

It multiplies the productive capacity of the soil.

It destroys insects and worms and produces perfect fruits.

It creates wealth from water, sunshine, and soil.

It makes the farmer independent of rainfalls.

It yields surprisingly large returns to investors.

It makes possible the production of choicest fruits.

It gives arid lands great advantage over rainfall areas.

It will increase threefold the value of lands without rainfall.—"Poultry and Farm."

Fruit Bottling

Amongst the best papers on this subject is one which was written by Mr. Wm. Jacques, Canning Expert to the New Zealand Department of Agriculture.

The condition in which the fruit should be for bottling depends upon the use for which it is intended. If it is to be treated for for dessert purposes it should be mature but not soft; if for pie-fruits or for stewing it should be quite on the hard side. Over ripe or damaged fruit should be converted into jam or made into pulp for making jam when the fruit-packing season is over. Specked and bruised fruit should not be used unless the bruised parts and the surrounding flesh can be cut away. In selecting the fruits, while it is quite true that any variety can be used, for pie-fruits the cooking varieties give by far the better result; while for dessert fruits, if it is desired to turn out a fine and satisfactory article, there are certain varieties that are so far superior to others that it will be much more satisfactory to select these rather than expend time and money in treating varieties that do not give entirely satisfactory results. At the same time, if a quantity of fruit is available for preserving, there is no reason whatever why it should not be put up for personal or local supply; but if it is proposed to turn the business to commercial account it is most desirable to obtain fruit which is orthodox as to colour, flavour, and appearance, and suitable for the purpose.

— Apricots. —

These should be selected as they develop flavour and sweetness at an early stage of ripening, as well as of a good colour. The fruit should not be too large, but of fair size, evenly graded and clean.

— Pears. —

The fruit should not be too large but of good size, evenly graded, and clean.

— Peaches. —

Any good-flavoured, firm-fleshed, fruit will bottle, but deep-yellow or pure white give the best result. Clingstone fruit has the better flesh, but it is somewhat troublesome to prepare unless a pitting-spoon is available to remove the stone; while freestone fruit may be used, provided that the pit is not too large and the pit-pod is free from fibre, light in colour, and easily cut away, otherwise the fibre may separate from the fruit and cause the syrup to become cloudy or coloured, and otherwise spoil the general appearance of the package. The fruit should not be too large, but medium in size, and well graded. Late peaches are better than the early varieties.

— Quinces. —

Quinces may be bottled. There is little demand commercially, which I attribute to a want of appreciation of a very wholesome, useful, and delicious pie-fruit. Any variety may be used, but choose the best available.

— Apples. —

The most valuable and obliging of all fruits if properly treated. Apples are sometimes thought too common to preserve in bottles; this may be true from a commercial point of view, but not in the domestic sense, because with care the bottle and cover may be used each season, and the apples are kept for winter use at the expense of only the ring. It is not desirable to put up apples for dessert purposes. Sweet dessert apples do not bottle so well as cooking apples; and, while almost any variety may be used, be careful to choose, if possible, a hard, sour cooking sort, with firm white flesh and a small core.

— To Prepare the Fruit. —

Never pack two varieties of the same sort of fruit in the same bottle (red currants and raspberries excepted), and always thoroughly sterilise the bottles, covers, and rings before using. Spread the fruit out on a table or bench, which should be fitted with a ledge to prevent the fruit from rolling off. The table should be covered with cocoanut matting to make a soft surface, as it is essential not to bruise the fruit. Pick out all speckled, bruised, and damaged fruit, and grade the sound fruits into two or three sizes. If the fruit is wet or dirty, it should be washed in salt and water, taken out, and drained. Then proceed as follows:—

— Apricots. —

As apricots are packed with their skins on, any speckled fruit will spoil the appearance for dessert, therefore reject all imperfect fruit for this purpose. With a clean, sharp knife cut evenly 'round the stone, commencing at the stalk end, then take the fruit in both hands, and with a firm but decided twist, without bruising, divide the fruit into two halves, and with a small spoon, sharpened at the edges, or, for preference, a pitting-spoon, cut out the stone cleanly; remove the stalk and any loose pieces resulting from an uneven cut, and pack immediately into bottles which have been previously sterilised, placing the pieces, skin uppermost, slightly overlapping one another. If carefully packed, the bottles will hold more fruit and have an attractive appearance when finished. Be careful not to press the fruit down, or it will be buised. Fill the bottle quite full, place your hand over the top, and strike the bottom of the bottle on a wooden table to shake the fruit down, and fill up with fruit till the bottle will hold no more. Then fill up with syrup to the top—a dense syrup for dessert fruits and a light syrup for pie-fruits. Pie-fruits are treated in the same way.

— Pears. —

Pears should have their skin removed before they are packed. Pick them over carefully, removing all bruised and damaged fruit. Grade them for size. Pare the fruit lengthwise, with a sharp knife with a thin blade; so as not to bruise the fruit, or, if a large quantity is to be prepared, have ready a wire basket or string net, place the pears in this, and dip them for about three or four minutes into a boiling solution of caustic soda and water—6 oz. of caustic soda to each gallon of water;

take them out and immediately immerse them in a tub of clean cold water, being careful not to bruise them. The skin may then be easily removed. But I recommend peeling by hand as most satisfactory.

If the bottles are not ready, the pears should be put into a brine dense enough to just float a potato. This will prevent the fruit from oxidising, which it is likely to do if exposed to the air. It is not necessary to wash the fruit after brining, but allow it to drain. The small quantity of brine will not affect the flavour.

When the bottles are ready, cut the pears in halves for dessert and quarters for pie-fruit, remove the core with a pitting-spoon, a sharpened spoon, or wire-cutter ; also remove the stalk and all loose pieces, and pack carefully into the bottles, outer side uppermost, filling with syrup of medium density for dessert pears, and light density for pie-fruit (see "Syrup"). The bottled pears must be turned about

before preserving, to enable the air to escape from the cavity caused by cutting away the core.

— Peaches. —

Grade peaches for size and variety, rejecting damaged fruit.

The fruit should be pared by hand. Some prefer to remove the peel first, while others prefer to remove the pit and halve the fruit, peeling each half separately. The latter process gives the better result, and is employed in the best canneries in California and Europe. Much depends upon the fruit to be handled ; both ways should be tried. Remember that much handling after the skin is removed will materially damage the appearance of the fruit.

To remove the pit, procure a pitting-spoon made for the purpose ; insert this close to the pit at the stalk end and cut it away cleanly from the flesh all round, keeping the spoon close to the stone. It is then quite easy to cut round the stone and divide the fruit into halves.

The fruit is packed flat side downwards, partly overlapping (as recommended for apricots), and the bottles filled up with syrup—heavy for dessert and light for pie-fruit.

Freestone peaches are pared first, cut round the stone, halved, and the pit removed ; the fibre in the pit-pod should be cut away so as to leave a clean-cut surface of fruit. All loose pieces are removed, and the fruit packed into bottles, as above.

When a very large quantity is to be prepared, the skins may be removed, by scalding in solution for about two minutes and plunging into cold, clean water as described in preparing pears, but I do not recommend this method. It is not employed even in factories, as it is very liable to spoil both the flavour and the appearance of the fruit.

Pie-fruits are sometimes packed whole, but this is not recommended, as the bottles do not hold enough when packed in this way.

— Plums. —

Only the best varieties of plums should be bottled. I do not consider the Japanese varieties or inferior-grown plums worth even the small amount of labour and expense. The Japanese plums do not develop flavour and quality until they are quite ripe. Then they are good enough to eat ; but their condition renders them unsuitable for bottling, with a few exceptions.

Pick out all damaged, speckled, and over or under ripe fruit; grade for size, wipe carefully if wet or soiled, pack straight into the sterilised bottles, and fill with light syrup for dessert fruit and very light syrup for pie-fruit. If the stones are free from flesh, it is advisable to prick the fruit to the pit-pod to allow the air to escape during the process of preserving.

— Quinces. —

Pick out badly bruised fruit ; pare and core the fruit, and cut into evenly-sized wedges or thin slices ; pack in sterilised bottles, and cover with a very light syrup. Quinces are usually packed for pie-fruit or stewing.

— Apples. —

These must be carefully selected if it is intended to produce a really good result. The varieties must not be mixed, or the appearance will be spoiled. Pare and core the fruit. This is best done with a machine. Then cut the apples into quarters, according to the size of the apples—large into five, six, or more, medium into four or five, and small apples into four ; or, better still, grade the apples, and cut them of each grade into an even number of wedges. Place the apple-pieces immediately into brine to prevent discoloration, allow a few minutes for the fruit to drain, and transfer into sterilised bottles, covering immediately with light syrup. It is desirable to have the apples as white in flesh as possible, and care should be taken to remove all bruises and blemishes.

— The Syrup. —

For the convenience of estimating the density of syrup we take the weight of a gallon of water at 10 lbs. : thus, 1 lb. of sugar to 1 gallon of water, or 10 lbs. of sugar to 10 gallons, which equals 100 lbs. of water, gives us a syrup of 10 per cent. density ; 2 lbs. to the gallon gives 20 per cent. density, and so on. The syrups mentioned herein may be set forth as follows :—

Extra heavy, 6lbs. to the gallon, or 60 per cent. density.

Heavy, 4 lbs. ditto, 40 per cent. density.

Medium, 3 lbs. ditto., 30 per cent. density.

Light, 2 lbs. ditto., 20 per cent. density.

Very light, 1 lb. ditto., 10 per cent. density.

The value of sugars and the weight of water vary somewhat; it is therefore advisable to use a small instrument, costing about 3/6, called a saccharometer, for the purpose of testing the density of syrup, for while some may prefer highly sweetened syrups, others may condemn these as sickly; and as the strength of the syrup does not materially matter, the preserver should exercise his (or her) discretion, and use a saccharometer as a guide and to ensure a regular strength in each batch, of fruit.

Take rather more water than may be required—this will be a matter of judgment, the quantity varying according to the space between the fruit; bring it to the boil, and stir in the required quantity of sugar, and simmer steadily for about seven minutes, stirring occasionally, and removing any scum that may arise to the surface. The longer syrup is worked in this way the denser it will become. Care must be taken not to let it scorch or burn, or the colour and flavour as well as the "texture" will be spoiled. When finished, strain through a piece of muslin into wooden or earthenware vessels, and allow the syrup to cool before filling it into the bottles.

The syrup must be used the same day that it is prepared. If any is left over to the next day it must be again sterilised before it is filled into the bottles; it may be added to the fresh batch of syrup with the sugar.

For canning fruits for commercial purposes very heavy syrups are used for the high-grade fruit. These are obtainable by evaporation, and sometimes a small spoonful of sugar is also added in the tin. A very small quantity of the finest glucose is also sometimes used, but these methods are not necessary in household preserving.

Sometimes honey is used with the syrup in preserving strawberries, raspberries, and other choice dessert fruits. This is a very good practice. The bee-hives are placed among the fruits for which the honey is intended to be used, in order to obtain an additional flavour. I have tasted fruits treated this way, but considered them too rich and sweet to allow me to eat enough of them. Certainly they were very luscious, but for ordinary purposes I consider a good syrup properly made is sufficient.

(To be Continued).

Dynamite in the Orchard.

Some Victorian land owners have found the use of exposives a cheap and effective method of clearing the land in preparation for planting. At a demonstration given for the information of the writer, Mr. Geo. Knox exploded four plugs of dynamite underneath a 12-in. dry stump, with the result that the latter was blown clean out of the ground and thrown a distance of about 15 yards. Six plugs were placed under a much larger stump and although the explosion was not sufficient to remove it bodily, it was completely loosened, and might easily have been pushed over with a jack. Eight plugs, costing with cap and fuse, about 9d., would have lifted it right out. Such a stump could not be hand grubbed for less than 2/. The process is a very simple one; a 2in. auger with a long shank is used for making the hole, which is driven as far underneath the tree as possible; all the sticks of dynamite or gelignite save one are broken into pieces and pressed into the hole by means of a wooden rod; the last stick, fitted with cap and fuse, is then inserted and tamped in with a few inches of soil on the top. The fuse is timed to burn at the rate of 2 feet per minute, so that a 3ft. hole gives the operator one minute and a half to get away. Very little soil is blown out of the hole, but the ground is so completely pulverised that the wooden rod can be thrust into a depth of 3 or 4 ft. below the bottom of the excavation, and for a considerable distance all around. There is no bank of earth to throw back, as there is after hand grubbing, and the hole is easily and quickly filled in. The saving in time is considerable, as a big stump can be blown out "while you wait," with very little more labour than a small one. To show the value of dynamite for subsoiling, Mr. Knox exploded a single plug in a 3ft. auger hole, with the result that the soil was loosened up within a radius of 5 or 6 feet, and the rod was easily thrust in to a depth of 3 or 4 feet. This by no means indicated the limits of the effect of the explosion, the ground being doubtless shattered much further than could be probed with a blunt stick. It appeared as though a cartridge at every 10 or 12 feet would break up the whole of the subsoil more effectively than any other method, and leave the ground in excellent trim for planting. Where subsoiling was not necessary a couple of cartridges exploded at every spot where a tree was to be planted would be a splendid preparation. In removing stumps judgment is required to put a sufficient explosive into the hole without using enough to produce an unnecessary disturbance. It is not the sort of work to give a stupid person to do, but with due care there need be no accident. One of the settlers has an excellent electrical apparatus for exploding a number of charges at one time without the use of fuse. This outfit cost £15, but where a lot of work is to be done it saves time, besides reducing the risks.—Leader.

Citrus Cultivation in Victoria.

The suitability of the soil is a most important feature in connection with the successful cultivation of the Citrus family. Perfect drainage is an absolute essential. Careful consideration is, therefore, necessary in the selection of a soil for the successful growth of Citrus trees. Generally speaking, a suitable soil for Citrus culture should be a deep loamy soil, overlying a porous subsoil, which in turn overlies a gravelly wash. Red soils, as far as my experience goes, do not make any difference in the deeper red colour of the rind.

Tests of the subsoil of any area to be planted should always be made before planting, so as thoroughly to understand its character, quality, regularity, and freedom from any hardpan or impervious layers of cement. Its porosity can be determined by digging a hole 4 feet square and 2 feet deep, under absolutely dry conditions in the summer months, January or February. The hole should then be filled to the surface level with water, and in two days this water should have thoroughly drained away naturally, if it does not do this, the soil requires under-drainage.

— Situation. —

The aspect of the orchard should be well considered. Citrus require a sheltered and warm situation. The generally flat surfaces of the suitable areas do not lend themselves to much choice, but advantage should always be taken of any eminence. The orchard should be given, as near as possible, a northerly and an easterly aspect, and should be protected from the south and west. The climatic conditions of the north and east are congenial. The cold winds of the south and the west are very severe on young trees, as well as the young growths of old trees. On the plains of the north frosts are rarely severe enough to do any serious damage. Any fall of temperature below 29 degrees Fah. may injure the lemon, but the orange will stand more severe conditions of frost.

In the midlands and the south, although every advantage is taken of soil and situation, the orange produces a fruit of thick rough rind, with much rag, and poor quality. The lemon does much better, and can be grown, practically, all over the State under congenial soil conditions—Doncaster and some parts of Gippsland being especially favourable. The suitable irrigable areas of the north successfully produce all classes of Citrus fruits.

Under irrigation, and on Closer Settlement blocks, mixed culture is the general practice. Blocks are as a rule small, and the holder has to produce many varieties of produce-lucerne, fodder crops, vegetables and fruit. Wherever practicable, suitable areas should be given over wholly to the production of special crops. There should be Citrus areas, deciduous areas, vine areas, distinct from lucerne areas, and mixed fodder crops. This would modify to a large extent, the danger of over-irrigation, and under seepage, so injurious to Citrus trees, caused by the laying out of closer settlement blocks on wrong lines. Under intense culture, Citrus trees should be planted on the highest portion of the land. The highest portion is usually the sandiest and best drained, and along the highest points the irrigation channels are brought to command the block.

Citrus trees require more frequent irrigation than deciduous fruit trees or vines and, economically, the planting of the highest land with Citrus follows as a natural deduction. Lucerne requires more water than fruit trees and if planted on the high ground, and the fruit trees planted adjacent to and below the lucerne, underseepage is likely to occur with great damage to the orchard block. The older irrigators of this State will have recognised these conditions long ago.

To shelter the orchard from the south and west it is advisable to aid the situation by suitable wind breaks. Sugar Gums and Pepper trees planted, alternately, at a distance of 20 feet apart will make a suitable breakwind as far as shelter is concerned. The Sugar Gum grows high, and the Pepper tree has foliage right to the ground. These trees should never be planted nearer the orchard than 50 feet. Tagasaste (Tree Lucerne) is most suitable, and can be planted half a chain away from the orchard. It is a quick grower, long lived, makes a dense hedges, and can be trimmed, nor is it a robber of the soil. These trees should be planted in the early spring (August) at a distance of 8 feet apart. Olives can also be used as a breakwind. They do not grow rapidly, but form a valuable adjunct to the orchard, and should be planted 30 feet apart, half a chain away from the orchard. Varieties suitable—Black Italian, Blanquet, Bouquettier, Verdale, Lucca, Manzanillo, Hardy's Seedling No. 1. Cork Oaks (Quercus Suber) could also be used, planted 30 feet apart, and half a chain away from the orchard. They are evergreen, and should eventually be of commercial value for the cork they produce.—S. A. Cook, Orchard Supervisor, Victorian Journal of Agriculture.

Lime-Sulphur Wash as a Summer Spray.

At the present time there is no topic of such general interest in connection with the summer spraying of fruit-trees as that of the use of the lime-sulphur preparations for controlling fungous diseases. Bordeaux mixture has for years been recognised as the only effective means by which the many fungous diseases could be combated. However, there was always the fear and chance of injury, not only to the foliage, but also to the fruit. This injury was more particularly noticeable in the case of tender varieties of apples, and in the cooler districts, where the rainfall was frequent and fogs are likely to be met with at the time the application of spray was made. It has been proved beyond doubt that rain following soon after the application of Bordeaux mixture is more than likely to induce russetting of the fruit. In the case of peach-trees sprayed when in foliage with Bordeaux for fungous diseases, it has been found to seriously shothole the leaves.

As is well known, most of our fungous diseases are of greater severity when the weather is moist and muggy, and in low-lying damp situations. This fact, therefore, places the injurious factor beyond our control when using Bordeaux mixture on the stone and pome fruits. The spores of the fungus germinate and infection takes place only in the presence of moisture. Where the fungous disease has got a good hold it will no doubt continue, regardless of any spray that might be applied the day after the rain. This, of course, is a most important point to be remembered, as some growers are inclined to wait until after the rain is over, so that the spray will not be washed off. By doing this, the purpose of the application of spray will be defeated.

We have, therefore, been in want of a fungicide that could be applied when it is most needed without causing any injury. So far, our investigations seem to indicate strongly that some form of lime-sulphur preparation will, in the near future satisfy this demand. No spraying compound was ever put to so severe a test, and none so strongly condemned, not so much because of its being inefficient as because of its disagreeable features, viz., its odour and its caustic nature. As a winter dressing for deciduous fruit trees its good qualities are well known, but it is for the summer spraying that we have been so anxious to secure a reliable wash. At Bathurst, Capertee, and Penrose, the commercial concentrated lime-sulphur solution has been used largely for controlling the "Black Spot" of the apple, and, from my observations of the result, I feel confident that this spray has come to stay.

Another feature of great value is the fact that the lime-sulphur can be applied mixed with arsenate of lead, and with excellent results. The concentrated lime-sulphur solution in paste form can be now purchased, ready made up, it being only necessary to dilute the m xture with water. The advantage of this, of course, is that the grower has not to buy the ingredients, nor prepare them by cooking. The fact of being able to secure the spray chemically prepared in this way, perhaps means the securing of better results from its use, as it is generally known that lime-sulphur is liable to be cooked differently when each vat is prepared. — W. J. Allen, "Agricultural Gazette," New South Wales.

Bee Stings.

If you see a bee (or feel it) alight on you and sting, don t move, but just grip what you have hold of and watch, wait and suffer. You will see some funny antics (on the part of the bee) in her desire to free herself, which she will accomplish about eight times out of ten if you don't molest her in any way, something after the way in which they free themselves after stinging each other, only it will take much longer on account of having much tougher material to work on. Of course, I am speaking of bees in their normal state, not those that have been stirred up to the pitch when they are just longing to throw away their lives on account of an unnatural state of things bebrought about, such as dropping a frame of bees, overturning their homes, or stirring them up with your foot, etc.

In regard to bees stinging animals, the latter, on being stung, will invariably start to play up, thereby angering the bees into doing their best (or worst) by leaving their stings behind, and then trying to do the trick over again.

One remarkable thing in letting a bee extricate itself from your arm or whatever part it has got hold of, is that the pain is most severe at first, keeps on diminishing until it has freed itself, when a slight rub will let you breathe normally again, and you will hardly know that you have been stung.—Gleanings in Bee Culture.

The Preparation of Honey for Market.

From Leaflet No. 141, Board of Agriculture, London.

The bee and honey classes of the shows now held during each season, both in London and the country, have taught the consumer what to require in a first-class honey. Comb-honey (in section cases) should be translucent, showing the clear bright colour of the contained honey, evenly and delicately worked out to the sides and bottom of the section, and with a scrupulously clean surface. The finest liquid extracted honey should be bright and clear, of a light straw colour, and delicate in flavour and aroma. Granulated white in colour, and of good flavour. There are many grades of medium and dark-coloured honeys below this first-class standard, but the latter is what the bee-keeper must strive to attain, in order to command a ready sale for his produce.

— Preparation for Comb-Honey in Sections. —

In regard to comb-honey, the preparation commences with the fitting of the wax foundation in the section boxes. To ensure a well worked out section this shou,d be cut so as just to clear the sides of the box and hang to within one-sixteenth of an inch of the bottom, thus allowing for slight stretching of the foundation caused by the heat of the bees clustering on its surface. The fitted boxes must next be placed in the section rack, with separators between the rows, reaching to within three-eights of an inch of the top and bottom, and wedged up perfectly square and tight; this is important, for the bees will place propolis over every crack or small space, causing disfigurement and extra work in cleaning; also sections "out of square" are much more liable to breakage when packed for travelling, owing to the unavoidable spaces between them. The rack must be placed perfectly level on a hive containing a strong colony of bees; it will then be filled with good, straight, and even combs.

— Removing Filled Racks. —

Removing filled racks from the hives should be done with as little disturbance to the bees as possible; the best method is to (1) place a "super-clearer" on a stool or box by the side of the hive, raise up the bottom edge of the rack and insert a small wedge; (2) puff a little smoke between the rack and tops of the frames, remove the rack steadily with a screwing motion, and put it down gently on the "super-clearer"; (3) place a cloth, on which a few drops of carbolic acid have been sprinkled, over the top of the frames; (4) in about ten seconds remove the cloth, and it will be found that the bees have been driven down, leaving the tops clear; (5) then immediately take up the rack with the "super-clearer" and place them on the frames. If this operation is carried out in the afternoon, by next morning every bee will have found its way down to the body of the hive through the bee-escape in the centre of the "super-clearer," and the rack can be removed with comfort to the bee-keeper and without disturbance to the apiary.

The full racks should be carried into a bee-proof room, the wedges and back-board removed, and the centre section of the exposed row taken out. It should not be lifted straight out, as the result would probably be a damaged section, but if tilted backward on its bottom edge, it will loosen and come away easily, as also will the two side ones. The sections should be sorted as they are taken out, placing all well-filled clear ones in the first grade; those not well-worked to bottom and sides, and therefore not fit for travelling, will make a second grade; and any only partially filled must be given back to the bees to finish, unless the "honey-flow" has ceased, in which case they must be emptied by the extractor. All propolis must be carefully scraped from the edges of the sections, which, if not already sold, should be stored in a dry, warm cupboard, and protected from dust by tying them in packages of four or six in clean paper; care must be taken not to place anything having a strong odour near the honeycomb, or it will spoil the flavour of the honey.

— Packing Sections. —

If the sections are sold to wholesale dealers for re-sale to traders, no preparation is needed. To pack them so as to travel safely, not more than from four to six dozen, preferably the smaller quantity, should be put into one package.

Packing may usefully be done as follows:—(1) Procure a strong wooden box, bore two holes in each end, about one-third down, and knot firmly into them rope handles, by which the box can be safely and easily lifted; (2) in the bottom of the box put a bed of coarse hay, and on this place, quite close together, a layer of the wrapped-up packages of sections, leaving at least two inches between the sides of box and the sections: this space must be filled with hay, tightly pressed in, and, to prevent possible damage to the comb, the ends of the packages may be protected by pieces of straw-board or thin wood; (3) continue with layers of packages filling in round the sides as before until within two inches of the top; (4) then fill up tightly with hay, and screw on the lid. Packages should be plainly labelled : "Comb-honey, With Care." Retailers of honey-comb prefer to have the sections sent to them glazed, the comb being thus preserved from injury by careless handling, and, what is still more important, kept free from the dusty impurities unavoidably present in shops.

— Glazing the Sections. —

For glazing sections, glass cut to the correct size may be purchased of any dealer in bee appliances, together with the strips of paper lace edging, which, when pasted round the angle formed by the glass and wood, serve to fix the glass on. In country towns the local glazier will gladly cut up waste glass to the small size, viz., 4 3-16 in. by 4 3-16 in. required, while neatly printed bands of coloured paper, 19 in. by 3 in., can be used instead of the lace edging. These bands cost about 7s. per 1,000. They are more easily pasted on than the paper lace edging, and make much firmer and neater work, while they also give an opportun.ty of placing the names of the apiary and retailer on each section. Neat cardboard cases, plain or glazed on one or both sides, and glazed tin boxes, are provided by appliance dealers for those who have but a small number of sections to deal with. Where, however, larger quantities are handled, the printed band holding on the two squares of glass will be found the best and most economical.

— "Extracting" Honey." —

"Extracted" or "run" honey has been greatly improved in quality by the modern method of obtaining it ; and the use of the centrifugal extractor compels the abandonment of the skep system of bee-keeping, with its waste of bee life, waste of combs, and taint of sulphur. This method also necessitates the adoption of the frames apart from the brood-nest and to be removed at will by the bee-keeper.

Honey improves in flavour and density while ripening in the hive, therefore the super-frames should not be removed until they are well sealed over. The full sealed frames of comb having been carried into the store-room, they should be sorted by holding them up to the light, and all those containing dark or second quality honey may thus be separated from the better ones. Fermentation is the great enemy of extracted honey, but it can only affect badly ripened honey or honey exposed to moisture and warmth; if therefore it should be unnecessary to extract unripe honey, it should be returned to the bees for re-storing and ripening.

Extraction is done by means of a machine consisting of a tinned-iron can, within which is a vertical spindle carrying a pair of cages to hold the frames of honey-comb and made to revolve rapidly by means of a simple hand-gear. Before placing the frames of comb in the cages they must be uncapped. To do this quickly and without waste special uncapping knives are used ; they should be heated in a tin of water kept hot over a small spirit or oil lamp. The full frame, held by one lug in the left hand, the other lug resting on a large dish and with the top edge overhanging, has its capping removed with the sharp, hot knife by a gentle, slightly sawing, downward cut, passing just beneath the surface and removing as little as possible of the honey. If held with sufficient overhang the detached sheet of capping will fall clear of the frame. A pair of frames having been uncapped they are placed in the cages of the extractor and made to revolve rapidly with their bottom bars leading ; the centrifugal force throws out the honey, and when one side has been emptied the frames are reversed and the other side treated in the same manner.

— Packing Extracted Honey. —

After uncapping and extracting the contents of the best combs, the honey should be strained through a bag made of cheesecloth in order to remove all loose particles of wax. Tin cans, with strainer and honey tap, made to contain 56 lbs. or 112 lbs., can be obtained, in which, if the honey is allowed to stand for twenty-four hours after strainer it, it will be freed from air bubbles, and can then be drawn into whatever bottle, jar, or tin will best suit the local market. Best honey is usually put into 1lb. or ½lb. glass jars, with metal screw lids having a cork wad inside the lid. To prevent any leakage the cork wad should be dipped in melted wax and placed on the jar while still warm, the lid being screwed down upon it. A neat label will set off the honey jar and make it more attractive. The darker honey is more suitable for marketing in its granulated state ; when extracted and strained it should be run into 14lb. or 28lb. tins, the contents of these being stirred gently, now and again, while granulating ; the stirring tends to produce a more even and finer grained honey. It may also be run into wide-mouthed glass or earthenware jars, covered down with parchment paper, and stored in a cool, dry place. Dark and coarse-flavoured varieties may be sold for manufacturing and confectionery purposes, or for that now almost forgotten procees, the making of mead.

Birdlime may be made by boiling down linseed oil. If boiled oil is used, the concentration takes less time than with unboiled. Treat the oil as you would glue. Put it into a tin. Place the tin in a saucepan of boiling water over the fire, and let it boil slowly till thickened.

The Farm

The Intelligence of Nature.

It is egotism which makes man imagine himself to be the only animal endowed with the capacity of thinking. Horses think and reason, so do dogs, so, without doubt, do monkeys, pigs, elephants, and many other animals. The plain truth is that there is a world of intelligence all through Nature, through the animal world as well as through the plant world. It is an intelligence proceeding from the creative force which created the world. Some of us have some knowledge of the laws of heredity discovered by Mendel, the old monk who worked out the laws of heredity in variations of characters in plants. He did it by cross-breeding peas, and found that there was the most extraordinary and uniform sequence of results. Within recent years others have done a great deal of research work along the course of Mendel's laws. They find them true and accurate, as nearly as anything in Nature is accurate. From crossing distinct races of plants, it is known about what variation to expect and what the proportion of the various types of divergence will be. That is to say, when you cross red peas with white, you get speckled peas, and when you plant the speckled peas, you get a certain number of pure red and a certain number of speckled peas, and one can predict with a comparative degree of certainty what these numbers will be. Well, the same law is found to hold good through practically all the vegetable world, and since Mendel's time it has been discovered that it holds good also in the animal world. Plants and animals are very different organisms. No one can truly say that an animal inherits any trait from a plant, or the plant anything from an animal, and yet they are governed by the same laws. They are divided into sexes; fertilization is performed in a similar manner, and the laws of heredity are similar.

— A Subtle Intelligence. —

One is disposed to incline more and more to the belief that the world is a living thing permeated with a subtle intelligence which runs through every animate thing. The grass leaps up under the spring sunlight, sends its creeping stems this way and that, spying out the land, planting outposts and seeking by intrigue and entrancements to conquer. The flowers spring up and put their souls in their faces, so that it seems as though it were not altogether material, and for the purpose of propagation that this excess of gaiety and beauty is put forward. The trees have their individuality, their likes and dislikes, their rules of procedure, their calendars which tell them when to leaf, when to bloom, and when to put on their gorgeous colours in the autumn. Throughout the winter they stand, their vital forces withdrawn to their protecting bodies, their buds swathed in scales, and sometimes woolly coats, asleep, grimly facing the winter gales, ready at the right moment to blaze forth with green to a world reborn. The water lilies float their blooms on the surface of the water, and afterwards draw their seed pods down to the mud below. Birds come to us across thousands of miles of forest, plain, and sea. They build, guard their nests and young, and sing. Do they sing only because they need to sing for purposes of procreation? Did you ever hear the robin singing in the tree top after a storm, or the thrush or the blackbird singing as though their hearts would burst with the joy of life, singing a message to all to be of good cheer? Can we suppose that all this song means only that the bird is calling to its mate? Is it not rather a token of the pervading intelligence, the optimism and the serene faith of Nature that our own spirits reach out to grasp? Man with all his powers has not all the intelligence.

— Roots. —

The path taken by roots in the earth seems a very singular phenomenon of Nature, for the earth is not open and easy to penetrate except in sandy soil. On the contrary, it is hard, and roots will creep this way, and that, to find a crevice through which they may go. Plant observers say that the method of the roots in finding a path through the soil is very simple, that the root tips are hardened and sharp, and that they have a constant motion, swinging from side to side as they advance. Thus they find each crevice and push through it. So far, so good; but how do we explain the fact that the general course of roots is often in a more or less direct line? Take the roots of a tree for example; they often run almost directly from the trunk far out in all directions. There is some crossing to be sure, but there is a general directness which is wonderful, when we consider that they move down in the dark, that in their beginning they were very slender little fibres, and that they had to make numerous little bends to right and left, up and down, in order to pass the pebbles, hard earth, and obstructions. English ivies and most vines grow away from the light. That is easily enough explained. They must have a sense of light almost akin to our sense of sight. Plants also appear to have a sense of time and season which it is hard to explain.

— Animal Life. —

Animal life is a wonderful calendar of times and seasons. A careful observer states that wolves' puppies are born within a few days of the same date year after year. Deer have their fawns at nearly the same time each year. Domestic animals, however, have nearly lost this sense, and their young are born at almost any time. It is not so with wild animals, and even camels and horses, running wild, nearly always produce their offspring in the spring. Animals do not have articulate speech, but they have means of communicating with one another, which is nearly as effective as speech. Mares warn their foals of dangers, and cows teach their calves to lie quietly hidden in the grass and to remain there whilst going to and from water for a drink. Cows have a certain definite mode of call, which tells one to another that the time for moving in to the water is at hand, and when one begins to call out others join in, and soon the whole string of cattle can be seen making their way in single file to water. Cows also have a marvellous instinct for weather. They can foretell snow and storm and seek shelter. All these data are evidence of the marvellous, untaught intelligence of Nature. Intelligence in animals is commonly called instinct, which is the inherited memory, the faculty of knowing things without being taught. We poor human beings do not have this faculty largely developed. Animals have instinct and a sense, which is latent in us, of knowing accurately where they are and the direction in which they wish to go. Knowing where they wish to go they choose usually the easiest way to reach that point. In rough weather a cow's instinct leads it to seek shelter with sure instinct, much surer than that of a horse. In rough weather horses make uphill; cows do exactly the opposite.—"Elder's Review."

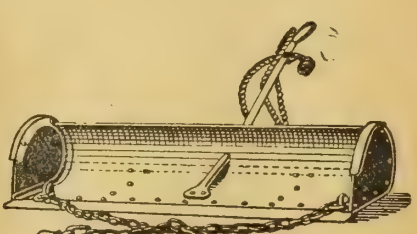
What is Casein?

— Its Production, Uses, and Value. —

In a few words, casein is a by-product, being manufactured from the sweet skim-milk after the fat has been extracted by the separator. The procedure briefly explained is as follows:—The skim milk as it leaves the separator is run into a vat holding from 500 to 1,000 gallons, and it is then heated to 130 degrees Fahrenheit, when it is precipitated with culture made from lactic acid. When coagulation has taken place—as in cheese making—the whey is drawn off, and the residue is the curd from the skim milk, technically known as casein. The agents used for precipitation can either be rennet, acetic acid, lactic acid, or, according to latest American methods, diluted sulphuric acid.

The casein after being pressed and dried in a properly constructed drying-room, is put into 100lb. bags and exported to Germany and France, where factories for the further manipulation of the raw product have been in existence for several years. In the United States and Argentine Republic there is scarcely a creamery to-day making butter which does not also make casein as a by-product from the skim-milk, for the simple reason that it has been found profitable to sell the milk to the factory receiving a higher price for the butter fat and utilizing the whey for calves' food.

The same reason prompts the Danish farmer to sell his milk outright to the factory, receiving in the first instance more for his butter fat, and afterwards sharing in the profits realized from the sale of casein. The whey, after being subjected to the heat necessary for coagulation for casein is practically pasteurized, added to which it still contains the milk sugar, the best and most suitable foodstuff for young calves. This fact the



American and Danish farmer found out long ago, and therefore, as a substitute for the fats and solids removed from the milk during separation and manufacture of casein—3lb. of corn meal or middlings are added to every 100lbs. of whey prior to feeding it to the calves, and this addition to the pasteurized whey is stated to make a food far more suitable for the rearing of calves than feeding them as at present on very often partially soured skim-milk, containing all the casein, which is the most indigestible matter.

— The Uses of Casein. —

Now let us briefly examine to what uses this casein is put, and why the demand is likely to increase. From casein, made with the rennet process are manufactured combs, buttons, penholders, knife-handles, cigar-holders, pearls, knitting needles, paper knives, immitation silk, and as it is not inflammable it is especially useful as insulation in electricity. Casein made with the acid process is the most commonly used, and from it is made glue, and oil for painting called casein paint. It is also largely used in the manufacture of the finest writing paper, also for sizing for textile fabrics, for art leather and insulation. We may add that the general use of casein for manufacturing purposes has increased 100 per cent. during the last five years.

— Value of the New Industry to the Dominion. —

It is stated upon good authority that prices for casein on the Continental markets range from £40 to £45 per ton, and on that basis would return to shareholders of a butter factory an additional 2d. or 2¼d. per lb. of butter fat, after deducting expenses incurred in the making of casein, and as the Dominion export of butter per annum exceeds an average of 15,000 tons, the extra payment of, say, 2d. per lb. fat would mean the distribution of an additional £280,000 per annum amongst the dairy farmers.

From facts already ascertained the making of butter as a by-product from whey has nearly paid the whole working expenses of some of our New Zealand cheese factories, then why should not our butter factories pay their working expenses from a by-product, which in their case would be casein?—New Zealand Farmer.

Selecting a Herd.

The claim so frequently made that it is impossible to maintain in breeding the general average of a selected herd cannot be accepted as a safe standard, even if it has so often proved true, and the steps to be taken to prove it false are those which the breeder of the future must follow, whether or not they run in the established lines of breeding.

That the highway of progress does not run in the ruts of habit is one of the truisms to be accepted, and its conclusions heeded.

Purity of blood does not, of itself, insure positive reproductive powers; therefore, to build up a herd, to establish fixed characteristics, along given lines, and insure greater control in breeding, the study, not only of blood lines, but of individuals, must receive sharper attention.

The purchase of fresh-blood males or females, solely upon pedigree, or family, is neither safe nor sound practice; yet it is the common rule with the majority. Important as these are, they need to be supplanted by individual inspection. Colour or body, switch or tongue, never insured reproductive-power to any male, yet in so many cases the purchaser, knowing the breeder to keep only pure-bred stock, asks only for a bull calf of squirrel-grey or fawn colour, hearty, rugged, and healthy, out of a known producer.

Accepting all that will be claimed by the extremist for purity of blood and for the mingling of blood lines possessing greatest value, there still remains the fact that success must rest largely upon individual characteristics, and the virile energy and extreme masculinity in the heads of the herds must accompany all that inheritance can insure.

The head is emphasized for the reason that back of the shoulders we look for and insist upon the distinct dairy type, the open spinal column, wide ribs, long and well-sprung, good body, long quarter, with absence of fat, the long, slim tail, that strength, yet at the same time flexibility of skin which speaks for quality, the flat bone of high-grade and well-set rudimentaries, with promise of udder development.

These we insist upon; but do we demand the stamp of virile energy in head and neck, the evidence of massive masculinity, that strong, ruggedhead, with horns well set, abundant room for brain development; a good, clean face of length and strength, with broad, strong muzzle and lips, and large, nervy nostrils? Do we require an eye that stands out full and large, and that at the first glance impresses with its first sure sign of intelligence, will-power, and quality; and ear well set, not large enough to be coarse, neither so small as to indicate temper; a jowl broad, strong, and spreading, yet cleanly cut at the throttle; and a neck of such strength and upward curve that it completes the picture and satisfies the purchaser and breeder?

Against this head, set the mild, fine, short face, with small mouth, thin lips, a bright eye, and a pleasant ear, and you have the cow face on the bull's shouldess. Success in breeding with such a male is a practical impossibility; yet we find sucn cases in altogether too many show-rings and tie-ups. They came from great cows—they could not well come from others and carry this stamp of refinement—but for the purpose of which they are created, as heads of herds, kept with an eye single to increase production, generation after generation, they must be failures, because of unmistakable lack of ability to stamp positive virtues upon their offspring.

Shoeing the Farm Horse.

Where farm horses are not required to do much work on metalled roads it is a common practice with some owners to save expense and let them go unshod, but it is doubtful whether this course saves much money in the long run. It is all very well to say that on the land the feet got but very little wear. That may be so, but moist soil has a decidedly softening effect on the horn, so that the hoofs, if unprotected by shoes, break and wear away very quickly, in spite of the softness of the ground, and in the result unshod horses would go tender on the feet, and eventually be lamed.

Farmers should be specially particular to see that their young draught horses, which are destined later on to be sold for town work, are shod with the greatest care in order that the shape of the feet may be fully preserved. Carless shoeing may easily impair their soundness. Buyers of draught horses for town purposes always lay great stress on sound, well-cared.for feet.

All important consideration in shoeing farm horses is that the horses must not be made too big in the heel. The importance of this point quite commonly is not appreciated, but nevertheless there are substantial grounds for insisting upon it, the reason being as follows :—If the shoes overlap much at the heels, as they very often do, the horse is obliged to use extra force in extricating its feet from soft or holding soil, because the protruding ends of the shoes causes them to be more strongly retained therein. This involves considerable extra effort on its part, which must tire it to an unnecessary degree, while it also interferes with the action and curtails the stride. It is, therefore, highly desirable that the ends of the shoes should not overlap the heels to any appreciable extent; on the contrary, they need to be kept as near as practicable flush with the latter.

Now, as regards the question of calkins. While views may differ as to whether it is an advantage or not to have cart-horses doing draught work in town shod with shoes provided with calkins, there can be no question about it that these appendages are entirely superfluous, and confer not the least benefit in the case of farm horses. What valid argument can be advanced in support of them? None. On the other hand, there are two strong objections to be urged against them. One is that they are bad for the foot, because they alter the natural slope, and also by raising the heels, prevent the frog from taking its natural bearing on the ground. The absence of frog-pressure, which is thus entailed, causes the frog pad to shrink, and the consequence of this is that the heels contract. Another deteriment which calkins involve is that they tilt the fetlock and pastern joint forward in an abnormal manner, which cannot fail to subject the joints and tendons to increased strain and wear. For these various reasons calkins are certainly best avoided on farm-horse shoes.—New Zealand Farmer.

An Important Point for Dairymen.

Sufficient attention is not given by dairymen to the "cleaning" of their cows after calving, and the retention of portions of the placenta, or after-birth, is a frequent cause of sterility and abortion in these animals. Naturally, the "after-birth" comes away cleanly of its own accord. Occasionally it is retained for over twelve hours, and in these latter cases it is necessary to adopt treatment. Often the administration of a drench containing the following brings about the desired result :—One ounce ammonia carbonate, 12 ozs. sulphate of magnesia (Epsom salts), 2 oz. common table salt, and 1 oz. of powdered ginger. Dissolve these in two pints of warm water or ale and add a cupful of treacle. When thoroughly mixed, the drench is given by the mouth with usual care. If the "after-birth" remains intact after the drench has operated, it is necessary to render assistance by passing the hand and arm, lubricated with carbolized vaseline, into the womb, and exercising gradual traction. If the whole of the membranes have not been completely removed, and the discharge becomes foetid in character, the womb should be irrigated in a manner similar to that practised in case of contagious abortion. To do this all that is required is about one and a half yards of rubber tubing, 1in. in diameter, and fairly stout; a glass funnel (bottle with bottom knocked out will answer), and a supply of corrosive sublimate in tabloid form. The funnel is attached to one end of the tubing, and the other end, after being lubricated, is gently passed by means of the hand into the mouth of the womb. The corrosive sublimate is dissolved in water in the proportion of one part to 3,000 parts, and then poured into the funnel, which is held higher than the animal, so that the fluid passes into the womb. When the womb has been irrigated with a sufficient quantity, usually about a quart, the animal ejects the fluid, and frequently portions of the retained membranes will come away at the same time. The treatment should be repeated daily until the discharge assumes its natural appearance or ceases. The buttocks and tail should also be washed down with the corrosive sublimate solution, which is a reliable germicide.—"Agricultural Gazette, N.S.W."

An applicant for the post of mistress in a country school was being questioned by those in authority.

"And what is your position with regard to the whipping of children?" one member asked.

"My usual position," she replied, "is on a chair, with the child across my knees, face downwards."

Horse Breeding

By W. H. Potts, Principal of Hawkesbury College.

Continued from Last Issue.

— Causes of Sterility. —

Shy breeders among mares occasionally create some concern. It is claimed, with some evidence to support the contention, that the higher the breed in the scale of purity, the more irregularly does the animal produce its young, and that mares leading a natural life are more certain foal-getters than those fed and housed under artificial conditions. Darwin points out that "any sort of change in the habits of life of an animal, provided it be great enough, tends in some way to affect the power of reproduction." In countries where housing and stall feeding are practised this may, to a certain extent, obtain in horse-breeding, but in Australia, owing to constant and abundant sunlight even temperatures, excellent natural pasturage, and open spaces, we have advantages that induce sexual fertility, and lessen the percentage of barren mares. This is not necessarily a constant factor, however, for the droughts by wh ch we occasionally are visited, with their attendant deficiency of succulent feed, bring about a shortage of foals.

It is also claimed that irregular breeding in mares runs in certain lines of blood. Marshall states :—

It is well known that the fertility of animals which are much inbred is often reduced, but it is by no means invariably the case. Thoroughbred horses are often inbred, and it is interesting to note that in one of the earlier reports of the Royal Commission on Horse Breeding in England, it is shown that no less than 60 per cent. of the thoroughbred mares in the country fail to have foals each year.

This relatively large amount of sterility is probably due to a variety of causes, and not entirely owing to the results of inbreeding.

It is pointed out by Ewart, that mares abort most freely from the sixth to ninth week after conception, but it is most difficult to ascertain how many cases of failure to foal are due to this trouble.

In animals which, as a general rule, breed freely in a state of domestication or under confinement, it is probable that nutrition plays the ch'ef part (though by no means the sole part) in regulating the capacity to produce offspring. That an insufficient or marked abnormal diet must affect sexual power is almost self evident. An excessive diet, tending towards producing a fatty condition, is likewise prejudicial to the proper discharge of the reproductive functions. As example of the way in which over-feeding results in a condition of sterility, the barren Shire mares which, in recent years, have been a striking feature at agricultural shows in England may be quoted.

Definite figures are not available to show to what extent mares are sterile, especially during droughts, but those made available by the Horse Breeding Commission in England may be quoted to illustrate the position. This commission controlled the expenditure of £40,000 per annum for the King's Premiums in the breeding of light horses. During the six years, 1900 to 1905 inclusive, 9,230 mares were mated with the King's Premium stallions, and during that time the highest percentage of foals was 59, which was reached in 1903 and in 1905. The lowest percentage of foals was in 1900, when it fell as low as 52 per cent.

It has to be remembered, however, that the failure to produce a high percentage may be due to defects in the sires. In round numbers, in the six years under review, there were close upon 5,000 foals by Premium stallions, or a a fraction over 54 per cent. In the year 1905, we find the percentage of foals ranging from 33 per cent., credited to the sire "Sunborne," to 88 per cent. credited to the sire "Battlement." Twelve of the twenty-e ght Premium Stallions left from 65 to 88 per cent. of foals. In the service season of 1911, fifty King's Premium stallions served 3,245 mares, an average of 65 mares per stallion. Of the 3,245 service fees paid, eighty were in respect of trials; and out of the 3,165 mares actually covered no information could be obtained of the results of the service of 245. The particulars of foaling for the remaining 2,920 mares show that 1,567 foals were dropped, giving an average percentage of foaling of 53.66.

From this series of figures, we may summarise the results as "one foal to two mares served." In Australia, it is considered a fair average of 60 per cent. of foals are dropped amongst draughts.

Some information may be derived from the records kept at the Hawkesbury Agricultural College, showing the services and foal results each year. It may be mentioned that the mares were mated each year with sires selected from those available in the district :—

Date.	Mares Served.	Result.
1905	21	12 foals.
1906	25	16 ,,
1907	24	17 ,,
1908	22	13 ,,
1909	23	11 ,,
1910	24	12 ,,
1911	23	14 ,,

It will be seen that in seven years the percentage of foals was 58.6.

To the mare is attributed the power of impressing her foal with vigour to the internal organisation, such as the functions of digestion, breeding, endurance, disposition, and constitution. In the case of a draught mare, ability to throw a good foal depends largely upon breeding, management, feeding and soundness.

— Oestrum in Mares. —

The stinting season for Australia ranges from September to December, the aim being to arrange for foaling when frosts are over, climatic conditions favourable, and succulent grazing abundant and suitable.

According to Fleming, the mare will copulate with greater certainty of success on the ninth day after parturition (foaling), than at any other time. Mares failing to conceive on the ninth day usually come well in season on the twenty-first day after foaling. Complete service has been efficient on the forty-second day, and as late as the sixtieth day, after foaling. The pro-oestrum, or progressive stage, is recognised by horse-breeders as coming on heat, or coming in season. The climax to this is termed oestrous, oestrum, or horsing. This is the period at which conception is most certain. The external signs indicating this series of conditions, and marking the first period of the power in the filly, or mare, to procreate, are undue restlessness and excitement; the udder becomes congested and swollen where there is no foal at foot. Occasionally in the case of a foal suckling, the character of the milk is changed and the foal suffers from scours, or diarrhoea. There is slight swelling, congestion, and reddening of the external organs of the uterus, the vagina and vulva, in which are frequently noted spasmodic movements. There is more or less oozing from the genitals of a mucous or glutinous secretion, or reddish coloured discharge, characterised by a peculiar odour, which attracts the sire. The mare frequently gives vent to peculiar cries and whinnies, gets excited, occasionally gets out of hand, and in the hands of inexperienced attendants becomes dangerous. Often she refuses to eat, and exhibits vagaries of an hysterical nature.

These symptoms last, in varying degrees of intensity, from five to seven days.

The cessation of these symptoms (horsing) and failure of their recurrence are usually accepted as a sign of conception. If the mare refuses the stallion for a month, and her general condition becomes normal she is probably pregnant, but in very exceptional cases a pregnant mare has been known to accept service a second, and even a third time. The mare, after conception, becomes unusually docile and gentle. She is inclined to become fat, and shows an indisposition to do active work.

Occasionally a mare will fail to exhibit any definite symptoms of sexual heat, and to finally settle the possibility of its existence the best thing to do is to take her into the presence of a stallion, and he will soon ascertain.

A mare may be too fat, or in too high condition, to conceive, but, on the other hand, under-fed animals fail to get in foal. Others again, living under unusual conditions, such as drought, fail to breed. In odd instances a mare be found to take an unaccountable dislike to a stallion, and to refuse to be stinted. This has been overcome by a change of sires.

— The Mare in Foal. —

As the period of gestation varies in individuals, and sometimes in the same mare in successive periods, no one can state with reasonable preciseness when foaling will take place.

The approximate period is usually stated at 11 months, or 330 days; but this is by no means constant, and it may be most safely stated that it will vary from 322 to 346 days. In extreme cases foaling has been delayed until 400 days have elapsed, and first pregnancies often last a year. Where parturition is delayed it is often accepted as an indication of a male foal.

A farmer who, in his anxiety to give intelligent care to the mare that he believes is in foal, wishes to register the earliest symptoms of pregnancy, should on the cessation of oestrum or heat, note any enlargement of the abdomen three or four months after, although this is not always noticeable, particularly with fillies. A slight falling beneath the loins and hollowness of the back may be present, or the udder may be observed to change shape, becoming rounded, firm, and free from wrinkles, and the teats more prominent. These changes in the udder come and go during the period of gestation. A steady increase in weight daily after the fourth or fifth month is a sound indication, as well as the swollen and reddish state of the vagina-mucous membrane. After the seventh or eight month the movements of the foal may be detected by the hand or first being pressed firmly against the abdominal wall in front of the left stifle. An examination after the mare has had a drink, or during feeding, will find the foal moving in the womb.

Treatment during the period of gestation must be directed on commonsense lines. A draught mare may be given steady work up to within a few days of foaling—in fact, she is all the better for it—but a walking pace should not be exceeded, and any strain or strenuous effort should be avoided, especially as the period of foaling approaches. Shaft work is generally associated with the possibilities of accident or over-exertion, and should be discarded. If a mare is a noted sweater, then over-exertion should be avoided, seeing its continuance may interfere with milk secretion.

A liberal supply of sweet food of good quality is needed during the whole period of gestation, and should be steadily increased towards the end of the period, for the foal is daily increasing its demands for nourishment—a fact that has to be remembered when feeding. Furthermore, increasing activity is noted in the udder, where milk is being secreted for the foal, and a class of food likely to stimulate milk production is required at this stage, especially lucerne.

The bowel discharges require to be watched, and constipation corrected by bran mashes and green food.

The main diet has to be arranged in order to meet the demands of mother and foal.

Good chaff and a little grain, and other foods rich in those elements which form flesh and bone, may be required to supplement grazing. Lucerne is always a useful adjunct to any ration, not only because it affords protein for flesh formation, but also because it stimulates the flow of milk.

Towards the latter portion of the period of pregnancy, the muscles of the hind quarters fall away from the buttock, and a shrinkage of the hind quarters and flanks becomes evident.

Care should be exercised to avoid any class of work entailing excessive fatigue or sudden movements, also jerky exertion.

It may safely be laid down as a rule to work draught mares to within a fortnight of their expected time of foaling.

In this country, where the climate is so propitious, and sunlight with its healthy influences so much in evidence, mares are allowed to foal in clean, well-grassed paddocks, in which are shelter, shade, and a good water supply. Precaution should be taken to see that the mare is not disturbed, and she is best alone, for the presence of other horses often creates undue apprehension.

The ordinary symptoms of approaching parturition are familiar to most breeders. The abdomen becomes more pendulous, the udder enlarged, the teats thickened and extended, and the muscles of the croup less prominent, while the lips of the vagina enlarge and appear slightly parted. Often there is a viscid discharge. The waxy substance found on the opening to each teat drops off about twenty-four hours before foaling, and milk may flow from each teat on the application of pressure. At times the teats do not fill until after foaling.

When the times approaches for foaling the mare becomes excited and uneasy. Lying down, elevating the tail, and straining, are all marked symptoms of pains. These become more frequent until the climax is reached.

Natural parturition is rapidly accomplished. A mare may be seen grazing comfortably, and on revisiting her half an hour later she may again be found complacently grazing, but this time with her foal at foot.

It is well to give the mare at least one bran mash daily for two or three days, the aim being to avoid giving her any class of dry food likely to cause constipation. The after-birth, which as a rule is naturally ejected in from three to eight hours after giving birth to the foal, should be buried or burnt.

The Teeth of Sheep.

In common with all other ruminants, sheep have eight incisors in the lower jaw, unopposed by any in the upper, a callous pad being substituted. Between the incisors and the molars, or grinding teeth, there is a space about an inch and a half. There are 24 molars, six on each side of each jaw; their crowns are marked with two double crescents, the convexity of which is turned inwards in the upper and outwards in the lower jaw. The lamb, when newly dropped, is devoid of incisor teeth, although the two central teeth are occasionally above the gum, even at this early period. When one month old the first set of incisor teeth are complete. The two front teeth of the under jaw drop out at the end of the first year. Six months later the two next to these are lost, and so on until the fifth year. The permanency of these incisor teeth is from this onward more dependent upon the nature of the feed and country upon which the animal is depasturing than upon other conditions.

Accurate knowledge on useful subjects is the best equipment for any man.

Simple Rules for Guidance of Dairymen.

— Cream Supply to Factory. —

Cool the cream immediately after separating.

Never run hot cream into cold, previously-separated cream.

It is better to keep each lot separate, and only to mix when sending to the factory.

Windows and doors of the dairy should be fly-proof.

Keep cream covered with fly-proof covers; metal preferred.

Cream should be sent to the factory, or collected, at least three times a week; daily collection in summer is essential to obtain best results.

When cream is left at the roadside for collection, efficient protection from the heat of the sun must be provided.

All conveyances used for the carting of cream should be provided with covers.

A separate cover (put on wet) is desirable for each can; this cools the cream by the evaporation of moisture from the cover.

The separator is mostly responsible for the variations in the cream test, not the factory manager.

Instal a Babcock tester for the purpose of culling your herd and testing your own cream.

— Butter Making. —

Keep nothing but milk and milk products in the dairy.

For best results, the dairy must be amply ventilated, fly-proof, and well removed from sheds.

Do not run the skim-milk from the separator into a stationary vessel inside or outside the dairy. Remove the skim milk and the vessel containing it from the dairy immediately after separating. This is important.

— Cool the Cream Promptly. —

Well-glazed crocks are preferable to metal for small amounts of cream.

Never mix hot and cold cream.

Stir cream frequently, and keep covered with gauze or butter-muslin only. All cream for churning must be mixed at least 12 hours before churning.

Winter.—Warming the cream quickens the ripening.

Summer.—Cooling cream retards ripening.

Scald and cream the churn before using.

When cream is thick, a sufficient quantity of pure cold water should first be put in to thin the cream down to proper churning consistency.

Butter worker, pats, butter prints, and all wooden articles should be scrubbed with hot water and salt before using.

Churning. — Strain the cream into the churn.

When cream thickens just before breaking, open the churn and flush the lid, beaters, etc., with cold water, allowing this to mix with the cream. Stop the churn finally when the butter is in very small granules.

Drain thoroughly.—This is as important as washing.

Washing the Butter.—Add just sufficient water to float the butter. Let the churn revolve very slowly for about ½ minute, then drain. Repeat this operation once or twice if necessary. Gather the butter, and work out the superfluous moisture; and salt at the rate of ½ or ¾ oz. to the pound of butter, according to taste.

Use a salt-sieve, the best dairy salt, and keep protected from dust.

Work the butter just sufficiently to mix in the salt; then allow the butter to remain a few hours, or until the following day, in a cool place. Finish working the butter, and print as desired.

— Potted Butter. —

Crocks are superior to boxes for potting butter. These should be sterilised by heat and cooled before use. Use no more salt than for fresh butter. Add a little preservative.

The salt should be made very hot in an oven (to drive off all moisture), cooled, and used as for fresh butter. Use a wooden rammer to consolidate the butter in the crock; then put on a layer of the dried salt an inch thick, and hermetically seal the crock.

Cow Stable. —

All operations should be based on the necessity of preventing the access of bacteria (germs) to the milk.

Dust and dirt are chiefly responsible for the introduction of undesirable germs into milk.

Sprinkle the stable floor with water before the cows are brought in. Cows should be cleaned by brushing before entering shed. The flanks and udder should be wiped with a damp cloth just before milking.

Wash your hands in clean water before commencing to milk each cow.

Never wet the hands with milk. If you have a difficulty in milking, moisten the hands with clean water, or use a very little pure vaseline.

Wear clean overalls or apron.

Use small-top, or covered pails.

Reject the "fore-milk," or first few drops from each teat, when commencing to milk by hand or machine.

Remove the milk from stable and strain immediately.

Separate as quickly as possible after milking; cold milk means loss of butter fat. If necessary bring back to 80 degrees F. by placing vessel with milk in another containing hot water, and keeping well stirred.

Never allow pails or cans to remain in or near cow stables.

After milking remove all litter and clean up stable thoroughly.

Never give dry or dusty feed to cows during milking.

Never feed roots or ensilage in the milking shed. Strong-flavoured foods should always be given immediately after milking.

Salt should always be accessible.

Rusty can or tinware produce a tallowy butter.

Do not allow cows to drink stagnant water.

The milking shed must be limewashed twice in every year.

— Cleaning Dairy Utensils. —

Clean Promptly.—If it is impossible to clean a vessel soon after use, it should be kept filled with, or immersed in, water.

All dairy utensils must first be rinsed with cold or lukewarm water (not hot); then clean every part with a brush, using hot water and soda.

The separator parts must be thoroughly cleaned on each occasion immediately after use.

Avoid using soap. Avoid using cloths.

A ½ per cent. solution of soda is one of the best germicides known when used hot. This means—

Washing soda, 8 ounces;

Hot Water, 10 gallons;

or 2½ to 3 ounces of soda to a bucket of water. When clean, rinse thoroughly, then scald by dipping into boiling water. Tinware should not be dried with a cloth, but simply placed (inverted) on a rack while hot, and in a pure atmosphere.

— Wooden Articles. —

Churn, butter-worker, pats, etc., after use should immediately be well rinsed with cold water, then cleaned the same as tinware.

Keep the lids off all cans, churns, etc.

If the churn is likely to remain idle for some time, keep it filled with lime-water. All milk vessels and wooden articles which have not been used for some time should be immersed in lime-water for a day or so.

Lime-water is made by adding a few pounds (two or three) of quick-lime to a barrel of water.

All dairy utensils should be periodically placed in the sun, but wooden articles should be removed before the heat is sufficient to crack or warp them.

Milking machines require special attention, more especially the rubber tubes. Carry out the maker's instructions to the letter.

Distinctive Qualities in Cows.

Every breed of cows has its distinctive qualities. The Jersey is a wonderfully economic consumer and close manufacturer of food into milk solids; so is the Guernsey. Both yield milk rich in butter-fat, and both are highly profitable, providing they are good cows and you do your part. The Ayrshire is a very hardy, robust breed, and another highly economic consumer of feed. As a basis for crossing with pure-bred Guernsey or Jersey sires, there is no foundation that is finer than the Ayrshire grade cow. Some great yielding herds have been produced in this way. There seems to be a natural "nick" between the Ayrshire grade female and the pure-bred Guernsey or Jersey male, whereby heifers are produced that show great capacity for profitable dairy work.—"Hoard's Dairyman."

Scientific Milking.

Professor J. L. Hills, of the Vermont (New York) Experiment Station, writing to an American exchange, says:—"It is well known that the average milker gets less milk than he who does a thorough job, that incomplete milking means not only direct, but indirect loss, not only an immediate lessening of the fat yield, but tends toward drying the cow. A Danish scientist has recently developed a special system of udder manipulation, a sort of massage of the mammary gland, as it were, which it is claimed augments the flow. The Hegelund method, as it is called, involves three manipulations, each thrice repeated or until more milk is obtained. First, the pressure of the quarter on each side against each other thrice repeated, followed by removal of the milk; second, the pressure of the glands together on each side, the forequarter being first manipulated and then the hind-quarters followed by removal of the milk; and, third, the forequarters were pressed between hand and body, the hands holding the teats loosely, then the hind-quarters followed by milking. Trials of the scheme made at the Wisconsin and New York stations offered a daily average increase per cow of a pound of milk and two ounces of butter. The after-milk was very rich in fat, testing above 10 per cent. This, after milking, does not exceed five minutes' time, often only two or three minutes. The two ounces of butter may be held at a low estimate to be worth one penny. This would be a fair pay for five minutes' work—one shilling an hour, and the skim-milk thrown in. Not only is more milk and butter made, but the secretion is stimulated and the lactation period prolonged. It may be remarked, however, that the differences in milk and butter yields between this method and careful stripping are not great. This Danish method emphasizes more perhaps than has hitherto been done, the actual and potential losses due to incomplete milking.

Vealers for Export.

A new industry is being established in New Zealand. It is the export to Vancouver of vealers, a great demand for which exists in many parts of Canada. The calves are carefully dressed in their skins, and when they reach their destination they are skinned and prepared for market. It is said that the flavour and quality of the veal is not impaired in any way by allowing the hides to remain on the carcass till it is removed preparatory to offering the flesh for sale. The hide is, of course, a marketable commodity.

Eleven out of every 12 pigs used as food in England are imported.

A large number of farmers have not yet waked up to the idea that they need any information. Others think they know all about their cows, while in reality their knowledge is a very coarse guess.

Man's Influence.

In growing horses, as in growing other kinds of live stock, the most potent factor is the man. Some men should grow draught horses only. Some men should grow only trotters. The many should raise the former, as they are so much more easily grown. The few should grow the latter. The men who can grow good trotting horses of really superior merit are few and far between, while those who can also develop them are fewer still. Some men should not grow any kind of horses, as they will not make a success of it. They will not make a success of it because they do not understand it, or for both reasons. No one should engage in growing horses who does not take kindly to the work. And no one should engage in growing any particular kind of horses, or any class of the same unless his tastes run in that line. However, if one understands his business and grows that class of horses in which he is most interested, there is but little doubt that he will succeed in the work.—Orange Judd Farmer.

Some South African Figures.

— Exports in 1908 and 1912. —

	£ 1908.	£ 1912.
Wool	2,768,000	4,781,000
Feathers	1,738,000	2,610,000
Mohair	710,000	967,000
Hides & Skins	771,000	1,685,000
Coal	766,000	1,173,000
Tin	114,000	246,000
Maize	207,000	443,000
Bark	135,000	283,000
Whale Oil	9,000	151,000
Total	7,218,000	12,339,000

That is an increase of 71 per cent.

Since 1904 cattle have increased by 65 per cent; horses by 60 per cent.; donkeys by 137 per cent.; ostriches by 106 per cent.; sheep by 87 per cent.; goats by 20 per cent.; pigs by 59 per cent.; poultry by 66 per cent. That is an average of 75 per cent. all through.

— Area Under Cultivation. —

The total area under cultivation in the Union is now more than three million morgen or, say, six million acres; and there are—

36,000 acres under vines, 77,000 acres under orchards, 22,000 acres under vegetables.

Sheep-Raising Throughout the World.

The following countries raise over ten million ship:—

1.	Argentine	67,211,754
2.	United States	52,262,000
3.	New South Wales	45,560,969
4.	Great Britain	26,494,992
5.	Uruguay	26,286,296
6.	New Zealand	23,996,126
7.	British India	23,246,636
8.	Queensland	20,740,981
9	France	17,110,760
10.	Spain	15,725,882
11.	Victoria	12,882,663
12.	Cape of Good Hope	11,796,790
13.	Italy	11,162,926

The World's Cattle.

The ten leading cattle-owning countries:—

1.	British India	121,611,599
2.	United States	57,959,000
3.	Russia	37,/43,075
4.	Argentine	29,116,625
5.	Germany	20,630,544
6.	France	14,532,030
7.	Austria	9,159,981
8.	Uruguay	8,192,602
9.	Hungary	7,318,281
10.	Great Britain	7,114,264

—Queensland Agricultural Journal.

Care of Horses.

The feeding and watering of horses should always be done at the same hours every day. This regularity soon establishes regular habits in the horses, which give increased ability for work and general comfort. It is always desirable to feed early enough in the morning to allow plenty of time for eating, because the food is more thoroughly chewed and much more easily digested. Not less than one hour should be allowed at noon. That time not required for actual eating will be spent in quiet rest, which restores muscular strength, and allows digestion to get a good start before field work begins again. The total quantity of feed required in the twenty-four hours varies widely with individual horses and their surrounding conditions. The division of the total quantity of feed into three parts that will be easiest to digest, allow the greatest comfort while at work, and not diminish strength, will be found best and most economical.

Every practical man knows how stains, bits of straw, and the like, adhering to wool, spoil its appearance, and, worse still, lower its price. The wise flock-master will, therefore, see that his wool is put into the bale free from these blemishes.

Ayrshire Cattle.

— History. —

This breed of cattle was originally found in the district of Cunninghame in Ayrshire, Scotland, and while confined to that part of the country they were known as Cunninghame cattle. Later on Dunlop of Dunlop imported cattle from the north of England and carried on the improvement of these Cunninghame cattle by crossing with his imported stock. For a time after this they were known as Dunlop cattle but as they got spread over the south-western counties of Scotland the term "Ayrshire" was applied to them, and they still retain that name. Not much is known of the early history of the breed, but its improvement started from about 1750. As far as can be gathered from the records of the breed previous to that, the Ayrshire was an inferior diminutive animal of a black and white colour. Owing to the severe climatic conditions of its home the Ayrshire was naturally one of the hardiest of animals, a characteristic which it still maintains to this day.

It is a well-known fact that the established breeds of Britain have been perfected by crossing, and the Ayrshire also falls into line in this respect.

In 1750 the Earl of Marchmont purchased from the Bishop of Durham several cows and a bull of the Teeswater or some other English breed of a light brown colour spotted with white. These His Lordship kept for some time at his seat in Berwickshire. Bruce Campbell, his factor in Ayrshire, carried some of the breed into that country. From there their progeny spread throughout the country. These cattle were of the Shorthorn type, but subsequently crossing with breeds of Holland took place. Probably from the red and white cattle of Holland, the colouring of the Ayrshire of to-day is inherited. It is also possible that crossing with the West Highland cattle and the wild white cattle of Scotland also took place. Some of the characters of the modern Ayrshire, such as shape of horn, colour, and conformation, seem to indicate that such crossing did take place.

No names of improvers of Ayrshire cattle are outstanding. The improvement seems to have been pretty generally carried on in the districts where the Ayrshires were found. The first real systematic effort at improvement came about through the introduction of a scale of points by the Ayrshire Agricultural Association in 1853, and it may be considered to have been established as a pure-breed by that date. The next important step in the advancement of the Ayrshire was effected through the formation of the Ayrshire Cattle Herd-book Society of Great Britain and Ireland in 1877, aod the following year the first volume of the herd-book was published. This herd-book has been published annually since that date, and contains the pedigrees of all animals registered, together with a few photographs of champion prize winners at the leading shows of Great Britain.

— Distribution. —

At the present time the distribution of the Ayrshire is world wide. They followed Scotch settlement throughout all parts of the British Empire. In Australia, New Zealand, and Canada large numbers are to be found, while in the United States of America, South Africa, Russia, Japan, Norway, and Sweden, and Denmark they are found in small numbers. The introduction of the Ayrshire to America dates back as far as 1822. At the same time the Scotch settlers started to emigrate to Canada, and the breed has since made steady progress in that country. Several Canadian Ayrshire cattle societies are now in existence. In recent years quite a trade has sprung up between Sweden and Scotland, the Ayrshires being well suited to the severe climatic conditions of that country.

It is worthy of remark that Ayrshires are found in largest numbers in the countries which are large exporters of dairy products.

— Characteristics of Ayrshires. —

The Ayrshire is essentially a dairy cow, having been bred up and improved chiefly for milk production. While the Ayrshire was being improved as a milk producer it was recognized that the constitution must be maintained, with the result that to-day it is claimed for the Ayrshire that it is one of the hardiest, the most stylish, and graceful of all beasts. Generally of a brown and white colour, with head erect, and the most perfect formation of udder, the Ayrshire cannot fail to take the eye of any stockbreeder. As regards colour, this varies in different herds to some extent, but in individual herds is pretty uniform. Breeders in Canada favour those which are mostly white; those in Japan and Sweden those which are more of a brown colour; so that to-day we have individual farmers in Scotland catering for the special requirements of each country.

The Ayrshire possesses a neat head of medium size, carrying well set up and stylish horns. The neck is fine, long, and clean-cut, well set on to head and shoulders. The body of the Ayrshire is capacious, possessing the typical wedge formation looked for in most dairy breeds. The ribs are long and well sprung, extending well downwards and backwards. The back is straight and the "plates" broad and level. The hindquarters are light as compared with other dairy breeds, and do not partake of fleshiness. The udder is the point that calls for special comment in this breed. It is not of a pendent character as in most other breeds. It is extremely broad, filling out the flanks on either side, extending well forward and level with the belly line of the animal. The sole is level, carrying good teats neatly placed and well in below the udder. Passing backwards the hindquarters of the udder are carried well up behind. Altogether the udder is superior in formation to that of any other dairy breed. Professor Plumb, of America, says :—" A row of Ayrshire cows in a show-ring alongside other dairy breeds is conspicuous for the uniform and superior type of udder."

The points of the bull differ from those of the cow only in masculine characters, which, according to the general rule, ought to be distinctly defined, although at one time a feminine tendency in the appearance of the bull was thought to indicate that he belonged to a good milking strain. The scrotum should be white and the rudimentary teats large and wide apart. His weight at maturity should be from 1,200 lbs. to 1,500 lbs.

— Milk Records. —

On the cheese-making farms in the southern countries of Scotland, Ayrshire, Wigtownshire, Kirkcudbrightshire, and Dumfriesshire, Ayrshire is exclusively used. It is the general custom in these countries to have the cows calving in the spring, in February and March. By the beginning of April they can be turned out to graze during the day and require very little stall feeding, while about six weeks after this date it is customary to let the cows run at the grass both night and day with no additional feeding. Treated in this manner the Ayrshire cows give a good supply of milk for nine months, generally beginning to fall off as the winter approaches and getting dry for about three months before calving. Thus the Ayrshire requires very little stall-feeding to keep in condition during the cold winter months. In addition to being naturally adapted to the poor land of these districts, the Ayrshire gives milk possessing particularly small butter-fat globules especially suitable for the cheese-making industry carried on there.

The milk record campaign in Scotland was started by John Spier in 1902, and this strenuous advocate of the scheme saw his labours rewarded before his death—an irreparable loss to Scotland—in 1910. The Milk Records Society will remain a permanent memorial to his insight and wisdom. It is recognized on all sides that milk records are essential in any dairy herd, and yet it is one of the easiest things to 'over-develop this faculty to the ruin of other good qualities of the cow. This is the point where the show-yard ought to be a pronounced factor in sustaining a type of animal at once healthy and a milk producer.

The milk record scheme in Scotland has made great strides since its inauguration in 1903. In that year there were 1,342 cows being tested, and the numbers have increased to 18,000. At first the testing was under the supervision of the Highland and Agricultural Society, and continued thus till 1907. It was then recognized that some separate body was required to govern the scheme, and the name was changed to the Scottish Milk Record Committee, which now carries out the testing of all the dairy herds belonging to members of the society.

In the Pan-American dairy test in 1901 for five cows of a dairy breed, Ayrshires came second to Holstein Friesians in largest yield of milk and net profits. In 120 days the five Ayrshires yielded 32,998.2 lbs. milk, compared with 39,260.2 lbs. for Holstein Friesians. The best Ayrshire yielded 7,011.5 lbs. of milk of 3.59 per cent. butter fat.

The following record of an Ayrshire cow in Scotland gives a good idea of the breed as a valuable dairy asset :—" She has borne five living calves without going dry. One month before calving she yields 30 lb. of milk, or about half her normal maximum during the first three months of her lactation period. On the "common" pasture in 1905, with no additional feeding, three weeks after calving she gave 30 lbs. of milk at 6 a.m. and 29 lbs. of milk at 6 p.m.; butter-fat by Gerber's test 5.4 per cent. Her weight after milking was 9 cwt. 2 qrs.

But it is not individual records which make a breed famous. Any cow can be fed and forced to yield abnormally large records. When the averages for herds are considered, and the conditions under which these averages are obtained, a true estimate of a breed is arrived at. The following averages have been obtained in the south-western countries of Scotland, where the cows are treated in the manner described in an earlier part of this article, and where the land is comparatively poor. In 1906 the average yield of milk, in eighteen dairies containing 413 cows (including heifers two and three years old), was 875 gallons of milk of 3 per cent. butter-fat in a lactation period ranging, as to individual cows, from about thirty-eight to nearly forty-six weeks. That 3 per cent. butter-fat must not be taken to mean that the average butter-fat was 3 per cent. It simply means that the standard 3 per cent. was chosen and the yields calculated accordingly. The average yield of Ayrshires may be put down at 650 to 700 gallons of milk of from 3.7 to 3.9 per cent. butter fat.—South African Agricultural Journal.

Horse Feeding.

The following, from a French authority, contains much of value to every farmer :—

Three meals are necessary and sufficient, with an interval of four or five hours between, to keep a horse in good condition.

Oats take at least two hours to digest : hay takes three hours, and because it takes so long to digest it should be given when the day's work is over.

The evening meal should be a full meal, the animal being then at rest, and able to digest its food at leisure.

There should be an interval of half an hour between the return of the horse to the stable and his getting his evening feed.

Too much food at a meal, or too long abstinence between meals, followed by voracious feeding, is conducive to colic and indigestion.

Irregularly fed, he is given to showing his impatience by letting his hoofs play about the woodwork of his stall.

Giving "refreshers" at odd times is also bad. Remember that both stomach and bladder should never be loaded in work time, whether light or heavy work is done.

A horse, therefore, should not be ridden or driven immediately after a meal, on the same principle that it ought not to be fed sooner than half an hour after work is over.

Maize Breeding and Seed Selection.

From Dalgety's Review.

It is becoming more and more evident to the practical agriculturist—as it has been for generations back to the pastoralist—that the breeding of the growing commodity with which he has to deal has largely to do with success or failure in his operations. The agricultural laboratories of Cambridge and of Rothamsted in England, as well as those of the United States and Canada and other places, are busy with investigations on the subject, more especially as regards wheat and its maximum production through breeding.

The ordinary farmer discerns no differences in the ears of his grain. It is corn, and only corn. And yet, however homogenous a field of corn may appear, it is in reality a mixture, which varies year to year in the proportions of its different races. This is true of practically all of our cultivated plants. It is equally true of some wild species, and perhaps of all.

If the flower of any particular form of plant be carefully protected from chance pollination by the pollen of some other form, and its seed isolated and grown separately, it will yield plants practically identical with the parent form. That also is the case with the cereals which supply man with food. In connection with wheat, it was first noted about one hundred years ago by a Spanish professor of botany, Mariano Lagasca. He was then on a visit to a friend, Colonel Le Couteur, who had a number of farms in Jersey, some of which were used to grow wheat. Lagasca pointed out to his host that the fields of wheat were not really pure and uniform, as was then the prevailing belief, and he distinguished no fewer than twenty-three varieties all growing together. He suggested that some of the varieties might form a larger part of the harvest than others, and that some were possibly of more economical value than the rest. Le Couteur took the hint and saved the seeds of a single plant of each supposed variety separately. He thus laid the foundations of the method by which different varieties of wheats have been obtained and maintained. As with wheat, so with other plants. If they are carefully isolated and their self-pollination is assured, they will breed true to their own varietal forms. All the supposed cases of the instability of these forms have been due to pollination of these wheats by the pollen from other and adjacent forms.

— Inheritance. —

Fifty-five years later, Gregor Mendel, the Austrian monk, published the results of his investigations on the inheritance of unit-characters in peas. Up to his time and later it was tacitly accepted as an uncriticised belief that species were aggregates of inseparable characters—that is, the whole group of characters which constituted a species were indissolubly bound together and could not be broken up. Each species had to be regarded, if we may take an analogy, as a bundle of sticks, each having a different colour, size, thickness, hardness, and so on. And the bundle could not be distinguished. It was not clearly conceived that one or more of these sticks (specific characters) could be separated out from the bundle and made to replace some alternative stick (corresponding specific character) in another bundle (another species). The importance of this discovery was of the greatest. It enabled man to do consciously and certainly what before he only achieved by haphazard and accidental efforts. For he could now tack them on to the desirable qualities which the miller and baker require.

In connection with these developments of heredity and selection in wheat we may be certain that in reference to another cereal an abridgement of a valuable article published in South Africa, where maize is largely grown, will be of interest. It is by Mr. H. Godfrey Mundy, F.L.S., the well-known botanist.

— Seed Selection. —

He begins by pointing out, with regard to seed selection, that in the case of cereals, the seed of which is grown year by year on the farm, selection is seldom attended to, and when it is it is looked upon as a matter of minor importance. The creation of hybrids is always likely to remain the work of the specialist and the laboratory, but improvement by selection lies within the scope of any grower who will devote a little attention to the subject.

The object of selection is to segregate the offspring of those plants which combine the greatest number of desirable characteristics, and the aim of plant-breeding by selection is to bring about the reproduction of these in such a way that they continue to breed true to type. The advantages are twofold. First, that plants raised from selected seed breed truer to type than those raised from unselected seed, and therefore produce a more uniform crop; and, secondly, that the ideal plant, namely the one which produces the greatest yield per acre combined with high quality, forms the majority of the plants in the field.

— Early Stages. —

In the early stages of maize-breeding in the United States of America it was thought sufficient to pick out the largest, heaviest, and best-looking ears from the maize crib. The idea was that like produces like, and that this was obviously the most certain way to increase the size of the ear and thereby the yield of grain per acre. But if we study the crop in the field it will be noticed that the plant producing the biggest ear may often have other undesirable characteristics which it is unwise to perpetuate, or it may have grown in a particularly favourable situation, as on an ant-heap, or has been influenced by other external conditions, in which case its characteristics will not be transmitted to its offspring. This method, therefore, will frequently be found to fail.

The obvious alternative is to select the seed in the field from plants possessing the desirable characteristics, and the development of which has not been unduly influenced by their surroundings. Here again a difficulty arises, namely, that even when selected in this manner a certain proportion of the seed will fail to breed true to the parent type, and if the seed of all selected ears be mixed and sown in one plot, there is no means of knowing which plants are breeding to type and which are failing to do so. In order to overcome this, and to enable the breeder to eliminate those plants which fail in this respect, the "ear to row" method of planting was introduced.

— American Discussion. —

During recent years there has been much controversy among American authorities on the subject of broad and narrow breeding of maize, it being held by some that the system of selection in a relatively small breeding plot is too conducive to in-breeding and will in a short time lead to deterioration of the strain. It has even been suggested that since the maize plant is by nature adapted to cross pollination, nature should be further assisted by planting seed of mixed origin. On the other hand, many breeders have produced prolific strains of maize originated from one single ear or parent plant, thereby following the principles of excessively narrow breeding.

— Possible Deterioration. —

It has been repeatedly shown that when maize is entirely self-fertilised for a number of years, deterioration, which may even result in sterility, occurs, but on the other hand, though the reproductive organs of the plant are constituted by nature to produce cross fertilisation, there is little doubt that a certain amount of self-fertilisation usually takes place, and this apparently without harmful effects. The "ear to row" method of breeding follows the middle course, and, until stronger arguments can be brought against it, appears to be the most satisfactory means of improving the quality of the seed, while at the same time retaining uniformity, by permitting of cross-fertilisation between nearly related individuals. This is precisely the same process which is followed in the line—breeding of cattle.

— Method. —

Having decided that the "ear to row" method is the one most likely to meet our requirements, we must next consider the points of the ideal maize plant which it is desirable to perpetuate. In addition to the consideration of the best type of ear, the selection, in the first instance, should be largely governed by the appearance and quality of the parent plant. It must be remembered that as the plant is, so to a great extent will be the ear, and as in the case of animals, if we desire to produce large healthy offspring, we choose as parents well developed sire and dam, so with vegetables corresponding desirable qualities should be somewhat as follows. The stalk should be strong and robust, thick at the base and tapering gradually. It should carry a well developed system of primary and secondary roots (adventitious rootlets from the lower node of the stem), and, needless to say, should produce at least one large well-filled cob. Many plants, particularly on a rich soil, show a tendency to produce suckers which is an undesirable feature, in that this secondary growth seldom bears a cob, or should it do so, the grain is of an inferior quality. The removal of suckers entails much hand labour, while if they are left and fail to set seed, the vigour of the plant which should go to developing the main cob or cobs, is expended in useless vegetative growth. Absence of suckers is, therefore, a desirable point. The ear should be produced about four feet from the ground or rather below the middle point of the stem. The object of this is that a uniform height of cobbing facilities harvesting and militates against the danger of the plant becoming top heavy. It would appear that the two last points are influenced to a greater or less degree by the fertility of the soil, but they are also to some extent hereditary characteristics.

— Leaves. —

The leaves are the food factories of the plant, and a good leaf growth is therefore essential. Individual plants vary greatly in this respect, and it is usually noticeable that the stem with the best leaf growth also carries the largest cobs. The leaves should be healthy in colour, broad, and well developed. The shank or stalk of the ear should be short and strong and should not as a rule, exceed three to five inches in length. The mature ear should be well covered by the sheath or husks. If the sheath is short and leaves the tip of the ear exposed, the grain when in a milky state, is liable to be injured by insects or to become mouldy and rotten from rain.

The question of how many ears a plant should produce is more difficult to settle. In Mr. Mundy's opinion one good ear per plant is preferable to two moderate or inferior ears, while three or four ears are undesirable. This is a point which breeders should decide for themselves, and in which personal experience is the surest guide.

— Selection in the Field. —

Selection in the field should begin as soon as the cobs are well formed, and before the leaf growth has commenced to deteriorate, and the desirable plants marked off. About 25 per cent. more than will be actually required should be marked, since some plants are likely to prove undesirable as development proceeds. The marked plants are now left until the whole crop is ripe and are then harvested separately, the whole stalk being cut with the ear attached. These stalks should be carried to the homestead and stored in a safe place until time permits of further handling. Since the breeding plot should contain from 50 to 75 "ear to row" plantings, at least 125 to 175 plants should be marked down in the initial selection, and in order to facilitate harvesting the first selection be made from a comparatively small field; five or ten acres in extent will usually supply the requisite parent plants.

(To be Continued).

Keeping Farm Accounts.

In the face of the fact that many farmers have been, and still are conducting their business successfully, perhaps, without keeping accurate farm accounts, there is some justification for the question: Why keep farm accounts at all? Conditions have changed materially within the past decade. More knowledge and skill are now required to farm successfully than were required of our forefathers. There are good reasons for keeping accurate farm records and accounts, inasmuch as they increase one's knowledge of his business, they reveal and help to stop many leaks, they show one exactly where he stands financially, and by determining the cost of production they help to fix the selling price. A careful analysis of the business of farming involves records and accounts with each separate farm enterprise, as well as with the whole farm. This means a record of the labour as well as the cash expended on each enterprise, and means the opening of several accounts. These records may be still further supplemented by breeding and feeding records if thought desirable.

Farm bookkeeping is, perhaps, somewhat different from ordinary bookkeeping, as everyone who has tried it knows. Maybe the farmer does not believe in any set methods. He may find it too complex to keep his record in the same complete form as a commercial man in the city, and more often than otherwise the farmer will come to the conclusion that he should develop his own system according to his needs and his inclinations. But there are a few essentials, which experience will teach him to observe, namely, a clear understanding of 'what is wanted, simplicity of form, and a minimum of details, a method which is easily workable, and in which regular entries are summaries.—Sydney Morning Herald.

Wood Seasoning by Electricity.

The latest use for electririty is —wood seasoning! The process, which is said to have given very striking results in France, remarks the Advocate of India, is a very simple one and it should have very satisfactory results in increasing the supply of marketable timber and thus in postponing the much discussed "famine" in that commodity—a famine which has induced such high prices as to seriously affect home building trade. Certainly the new method of seasoning is a great economiser of time. A water-tight tank of suitable size is the most expensive article. The timber is piled on a large lead plate at the bottom, until the tank is full, when a second lead plate is placed on top of the pile and connected to the negative pole of a dynamo, the bottom plate being connected to the positive pole. The space around the timber is then filled with a solution containing 5 per cent. of resin, 10 per cent. of borax, and a trace of carbonate of soda. On turning on the current it passes from plate to plate through the wood, driving out the sap, and the resin and borax takes its place in the cells and interstices. This process being completed, the timber is taken out and dried, when it is ready for use.—The Indian Agriculturist.

Stings.

Stings of wasps and bees are occasionally the cause of serious accidents occurring, as if in work the horse which has been stung is apt to bolt in his torture and cause disaster. A similar result may succeed a sting if he is loose in a paddock, but in either case he must, of course, be brought under control before anything in the nature of a remedy can be applied. As in the case of human beings, ammonia is an admirable palliative of the effects of a sting, and even the application of ordinary soda mixed with just enough water to make it moist may be found effective, whilst in some cases witch hazel will provide relief. It sometimes happens, however, that a horse has the misfortune to be stung in the mouth or tongue, and then treatment becomes difficult, as ammonia cannot be given, and therefore the best remedy to administer is the soda. Some people believe strongly in the juice of raw onions as a cure for stings, and this may be experimented with advantageously; but a sting in the mouth requires expert treatment, and therefore professional aid should be procured, as there is always a chance of serious swelling arising, which might end by choking the horse, whilst if the offending bee happens to get swallowed the gravest results may follow.—Exchange.

Poultry Notes

Summer Troubles.

Care and attention do much to minimise those much-dreaded diseases, chicken pox and roup. Shelter is of great importance, as no doubt all animals and birds find having to stand about in the hot sun very trying indeed.

It is one of the drawbacks to hatching late in the season that the chicks do not seem to have developed sufficient stamina to withstand this trying weather.

Chicken-pox is first noticed by small sores appearing upon the heads of the chickens; if not attended to at once these sores grow and spread all over the comb, head, and face, and when broken they exude an almost colourless matter. This disease is highly infectious, therefore the sick birds should at once be isolated and the sores dressed with permanganate of potash. The best method of applying this is to put a small quantity of the crystals into a piece of cloth, tie this firmly on to the end of a small stick, moisten slightly with a little water, and touch the sores with this. The ailing chicks and any contact birds should be given a little flowers of sulphur in soft food and be liberally fed with greenstuff.

— Roup. —

There are two kinds of roup. The most common is catarrhal. This is extremely contagious and is commonly caused by the birds being overcrowded into ill-ventilated houses. The first symptom is a water discharge from the nostrils, which gradually becomes thicker and developes an offensive odour. Sometimes one side of the face becomes badly swollen and a frothy moisture appears at the eye; at a later stage the eye completely closes and a solid cheesy matter forms, which must be squeezed and washed out.

— Diphtheric Roup. —

In young chicks this is often mistaken for gapes, as the outward symptoms are perhaps to the novice somewhat similar. In both cases the bird gapes or gasps as if for breath. The cause of this in diphtheretic roup is a growth of cheesy matter which accumulates in the throat and windpipe, and unless attended to immediately causes suffocation.

— Treatment. —

The cheesy matter should be cut out with a knife or piece of stick, a little flowers of sulphur put in a teaspoon and blown sharply down the bird's throat.

In both catarrhal and diphtheric roup all contact birds and sick ones should be given sulphate of copper (bluestone) to drink. Dissolve ½ oz. of sulphate of copper in 8 oz. of water and add a teaspoonful of this to every half-pint of drinking water. Care should be taken that the drinking vessels are earthenware or of good enamelled ware, as the sulphate of copper corrodes iron and tin.

— Moulting. —

This is the best time of year to weed out any surplus stock that is to be disposed of. The hens will have practically stopped laying previous to going into the moult, and it is more economical to sell now while the birds are in good condition than to bring them through the moult, which naturally reduces their condition, and then to feed them up again and sell them.

To hasten on the moult, birds should be fed very sparingly, that is to say on a little grain only, kept warm, and should be given a few doses of Epsom salts. When the birds are fairly into the moult, which will be seen by the number of feathers lying about the runs, the feeding should become more liberal and a dose of flowers of sulphur given twice a week in their soft food—a teaspoonful to every twelve birds.—South African Agricultural Journal.

Liver Troubles.

Liver trouble in the poultry yard is very common and there are thousands of chickens hatched every year which have inherited the disease from the parent birds; and more thousands in which it is due to improper feeding. In the early stages of live trouble the first symptom is that the chicks have ruffled plumage, a very distressed appearance, and their food remains in the crop, and the droppings are thin, yellow, and sometimes green, and the chick very rarely has much appetite, but stands moping about with wings drooping.

Chicks with liver trouble should be fed almost entirely on oatmeal porridge and milk, or fine oatmeal that has been made crumbly by adding milk to it. They should have abundance of green food which should be chopped up very fine, and should be given at least once a day—about noon is the best time; but do not give any grain, however small, until there are some signs of improvement. In serious cases four or five drops of the best salad oil should be given, and which will be found very effectual in soothing the bowels. Never on any account give chicks spice or condiment in the food, for these only irritate the bowels, and in the case of liver trouble simply add fuel to the fire.

Folks who never do any more than they are paid for, never get paid for any more than they do.

Don't exaggerate in describing your stock; some people know its true value and every one interest- will soon find out.

How about putting down a few eggs for next autumn use. More eggs are laid in the first week of October than in any other single week during the year. If you have not any to spare from your own pens, get a few dozen infertile eggs from a breeder who sells guaranteed goods and put them down in Burford's Magic. You, or your wife, rather, will be glad of them by April.

Nothing New Under the Sun.

"Hardshell," in the Journal, has recently published some interesting information on "the mal-treatment of duck eggs as a solution of the dead-in-shell" forwarded by readers. It occurred to us that we had once read of the same theory and looking the matter up we found the following corroberative but unrehearsed experiment in our January 1906 issue, in the following paragraph, which appears to support the theory recently advanced. It reads :—

— An Interesting Experiment. —

Many great discoveries have been the result of accident. Did not Columbus do something with an egg? However, this is another story. Coming to more modern times, Mr. F. W. Marshall reports an incident which is unique in our experience. The facts are these. Twenty-seven eggs were placed in an incubator, and matters progressed favorably for fourteen days, then one of those little accidents happened which try the poultryman's temper and reduce his hatching percentage. For, in opening the drawer, it came out just a little too far, with the result that of the 27 eggs 7 were converted into cold omelette on the floor, leaving 20 of which 17 were more or less cracked, bruised, dented, and otherwise knocked about. Most people would have considered that put an end to their hatch, but with a laudable desire to extend his knowledge by experiment, Mr. Marshall replaced the cripples and the three sound eggs, and awaited developments, and it is in these developments that the extraordinary part of the story comes in. For of the 17 eggs, none of which were in a condition which is usually considered essential to hatching, 16 produced live, healthy ducklings, whilst of the three which might reasonably be supposed to do so, only one hatched, the other two being dead in shell. This ended chapter one. Chapter 2 began when Mr. Marshall set out to improve on the above fortunate accident. He had another half dozen duck eggs under process of incubation, and with a knife scratched a thin line away at the base of the air cell to a greater or less degree in each egg, and then made four cuts at right angles to the first one. Six ducklings from six eggs was the result. Another experiment Mr. Marshall has conducted during the season has been the immersion of eggs in warm water, approximately 103 deg. Fah., for periods of from five to ten minutes from the 14th to 22nd day of incubation. This has resulted in some surprising hatches, and has quite converted him from the "plenty of air, but no moisture" theory.

The Hen-Oil Idea.

Like the poor, the old hen-oil theory is always with us in one form or another; this time it has made its re-appearance in one of America's leading poultry journals. A correspondent points out that every has noticed the high polish that eggs attain under the hen, and that we all know that a hen's feathers are very oily. "Doesn't it seem possible that this oil from the feathers is rubbed on to the eggs for a purpose or purposes? Wouldn't the oil fill to a certain extent the pores of the shell, and so prevent undue evaporation, and wouldn't a fat of any kind applied to a limey substance have a tendency to cause the lime to disintegrate? Wouldn't this fatty carbon explain the higher percentage of carbon dioxide under the hen, and wouldn't the chick find an easier road out of the shell rotted by the oil?"

This is a question for the scientific investigator of problems of this character. The question has been asked a great many times—not always in just the same form—but never answered. The oil which the eggs take from the hen, probably comes principally from contact with the skin, not from the feathers. This oily deposit on the eggs is an inevitable result of the contact between the egg-shell and the oily skin of the fowl, but it would not be reasonable to assume that the skin was supplied with oil because the oil was necessary in incubation, unless it could be shown that the skin contained more oil when a hen was broody than at other times. In order that feathers and skin may properly perform their regular functions, they must contain oil. An absence or insufficiency of oil is detrimental to the feathers, injuring their texture, and, perhaps, causing irregularities in feather reproduction. It also injures the skin, making fowls extremely susceptible to diseases of the skin, and, no doubt, increasing somewhat susceptibility to some other diseases. The oiling of the eggs in natural incubation appears to be merely incidental, and from the degree of success attained in artificial incubation without oiling eggs, it seems most reasonable to conclude that the influence of oiling is very slight. This, however, though the most reasonable view of the case as presented, is a superficial view. It is simply the most rational view to take, until it has been shown that the other view contains more elements of probability.

The Langshan.

One is perhaps apt in speaking of poultry keeping and the doings of the White Leghorn, Black Orpington, and Silver Wyandotte, to forget that there are others. There are some good birds amongst these others, possibly just as good and just as profitable as the leading three. They have not had their chance or the luck has not been with them, that is all. Their "best hens" have been out of town when wanted. To take three from the general purpose brigade, what about Langshan, White Wyandotte, and White Orpington. To us it appears that there are not many flies on that trio. The Langshan is one of the most interesting breeds we have. Many years ago we remember them in England as big bulky birds, hens weighing up to 9 lbs., layers of large dark shelled eggs, and they sat like the Federal Parliament for half the year. However, they did most of it in the summer, so that though the total number of eggs for the year was not great, the November to March contribution was very profitable. Then came the Black Orpington, which killed the Langshan, not, we believe, because it was better, but because it was newer and Cook knew how to advertise. Then there was the Langshan split "Old English," "Croad" and "Exhibition" Langshan, and that was the beginning, the middle, and the end of trouble. However, that is ancient history. The Langshan, as a competition fowl, begins with the "Chinese" Langshan, practically the old "Croad" importation to England. It will be remembered that a pen bred the first season from a direct importation put up a big record, 246 per hen and 166 the second year. The interesting point is, whence did they get their laying? That surely was "natural" laying, there had been no time for selection on this side, and as far as we know, experts, trap nests, and laying competitions are unknown blessings in the land of the Heathen Chinee. Also where has some of this "natural" laying gone to. Looking up Mr. Dunnicliff's Hawkesbury figures we find that 150 first year hens averaged for the ten years 169 eggs, seventy-two second year hens 141 eggs, and six third year hens 123. On first year laying with a nett value of 10/9 it is fourth on the list against White Leghorns 11/11. On second year laying its nett value is 21/- against 20/9. At the end of the third year it is 30/7 as against 30/2. In autumn-winter laying we gather from the same source they are a long way ahead with an average of 63 against the White Leghorns' 42. On the table side they probably read better than they actually are as a breed. It is the one weak spot in their record. The best hens Mr. Dunnicliff writes, "are of medium size—4½ to 5 lb.—fairly close in feather, fine in bone and with no inclination to either reachiness or legginess," that is a good useful bird. It is quite big enough for trade use, though small for what the home table poultry grower likes for his own table. If that was the average bird it could give the Leghorn some points on table values, but Mr. Dunnicliff mentions that there is a tendency to bring down these weights to 3 lbs. and less. In that case, of course, the average "Chinese" Langshan is no better and no worse than the average farm reared White Leghorn. It is a pity because there is certainly room for a bird of the type Mr. Dunnicliff considers the best of those which appeared at the competitions. On weight of eggs it is quite safe as the average runs about 26 ozs. to the dozen, one of the best on the list.

Odd Jobs.

There are some things necessary for the successful management of poultry, which, not coming in the usual daily routine, like feeding and watering, are apt to be neglected. The old maxim, "Never put off until to-morrow what you can do to-day," may be taken literally in the case of poultry keeping, for the putting off of really necessary work from day to day is likely to result in much loss and disappointment.

An item of first importance amongst the minor details of the poultry man's work is the thorough cleaning at regular periods of the drinking dishes and feeding troughs. Many of the infectious diseases prevalent among poultry are encouraged, and in many cases spread, by neglecting the simple precaution of washing out the vessels used for these purposes. Drinking dishes, which should be made either of earthenware or else of enamelled or galvanised metal, ought to be washed not less frequently than once a week by a thorough application of soap and hot water, and afterwards rinsed with fresh water in which some permanganate of potash has been dissolved. In order to prevent the birds scratching any filth into the water, the dishes should be raised a few inches from the ground, a couple of bricks laid of their edges making a good stand, provided the dishes are of such a character as to prevent the birds upsetting them easily.

The grit-boxes should also have their turn in the water, and the old grit taken away, swilled clean, and then dried before being returned to the box, as poultry do not relish having to pick wet grit. Whilst on the subject of washing, mention may be made of the advisability of occasionally dressing the feet of the birds. By washing the feet and shanks in soapy water, and then giving them a rub with a mixture composed of one part kerosene to two parts sweet oil, much of the trouble with scaly legs can be avoided, besides giving the birds more comfort and a greatly-improved appearance.

For the coating of the exteriors of coops and poultry houses, and, indeed, for all woodwork, there is nothing to beat creosote for cheapness and ease of application. This is an extract of tar, possessing most of the latter's useful properties and without its most objectionable feature, namely, that of forming a close attachment for everything coming in contact with it.

Creosote is less costly than paint, which is in itself a consideration where much of this work is necessary. When used on new wood it gives almost a mahogany stain. It should be applied in a hot state, to enable it to thoroughly soak into the wood. It is also one of the very best materials for the destruction or prevention of vermin. If the perches and nest boxes, and, indeed, all fittings, are dressed with creosote about every three months, red mites and other kindred evils will be almost a minus quantity. It should be worked well into all cracks, crevices, and knotholes, and when the coops to be treated are built on the sectional system, they should be taken to pieces in order that the creosote may be worked well into the quarterings. Chicken coops with fixed bottoms should have a second application of creosote as soon as the first has dried into the wood, and all loose bottoms and fronts should be well cleaned and coated on both sides. If the coops are then whitewashed, and afterwards kept in decent condition as regards cleanliness, there will be little fear of a disaster through the medium of insect pests.

Food Affecting Flavour of Eggs.

An experiment was conducted by the North Carolina Experiment Station (U.S.A.) to determine the effects of food fed to the hen upon the flavour of her egg, and the results are worth recalling, since they throw a light upon the subject. Cut wild onions—bulbs and tops—were given in mash to the hens. At the beginning of the trial half an ounce per head was fed daily to the hens of different breeds, but no noticeable flavour of onions could be detected until the fifteenth day, when a slight "onion" flavour was perceptible. Then the amount of onions fed was doubled for four days and afterwards discontinued. The eggs laid during these four days savoured so strongly of onions that they could not be eaten, but the flavour became less noticeable day by day after the feeding onions had been stopped until a week had elapsed, when no foreign flavour was noticeable. It would seem, therefore, that flavour can be readily imparted to eggs by feeling, but that different foods which are not so strongly flavoured as onions might probably be fed without imparting any distinct flavour to the eggs.

"Does my playing the piano annoy you, papa?" asked the daughter. "Oh, no, daughter; go right on," replied the parent. "It prevents me hearing a lot of your mother's conversation!"

The Hamburg Fowl.

In these days when Wyandottes, Rocks, and Orpington, are so much the rage, the old standard breeds are apt to be lost sight of in a desire to combine in the one fowl a good egg and meat producer. It is a well known fact among breeders that this cannot be attained, that the one quality has to be sacrificed to gain the other. Knowing this to be a fact, the writer, says a recent "A.P.J." desiring a breed that was the greatest egg producer and at the same time a handsome and hardy fowl, selected the Black Hamburg as the one combining these qualities, and were they better known would be bred in greater numbers, as they are a veritable egg machine, and as for beauty, no black fowl in the Standard can surpass them. The Hamburg breed was introduced into England from Holland, or North Germany, and eventually took the name of the noted sea. port, Hamburg, although at that time and for many years after their introduction into Great Britain, they were known as the "Dutch Every Day Layers." In all probability, up to the poultry show era in England, none of the varieties now so designated, bore the name Hamburg, and previous to that time, the Blacks had been known as Black Pheasants, being finally named Black Hamburgs. They are beautiful, symmetrical and stylish in carriage. They have been much improved in the beauty and uniformity of plumage since the era of poultry exhibits, but not in productiveness, as that is hardly possible, for they have long maintained the reputation of being "every day layers." Birds of the Hamburg family are of only medium size, but their deficiency in size is more than made up for by ther fecundity. Both sexes exhibit such glossy and elegantly marked plumage that they are looked upon as special favorites wherever shown or cultivated, and when well bred, are truly ornamental, possessing fancy points that render tnem pleasing to those who desire to keep a fowl that will furnish plenty of eggs and also be a gratification to the eye. For table use, though small, they are very good. Their flesh is tender, with little offal, having a large proportion of the dressed weight in flesh, due to the delicate structure of the skeleton, and is fine in quality. Among black fowls there is no richer color than that possessed by the Hamburg, the elegant beetle green in neck, back, wing bows and tail coverts on both male and female, is not quite equalled in any other black fowl, and it is characteristic of this fowl that they invariably breed true to color and shape. When one considers the good qualities which this variety possesses, it is surprising that so few entries have been made at the poultry exhibits. It is the hope of the writer that this article may have the effect of creating a greater interest in this splendid variety of the Hamburg family, that at our future shows a greater number of exhibits may be found, and the Black Hamburg will again resume its proper place among the important breeds of poultry.

Caponise the late hatched cockerels (says an exchange) and those that show decided faults. It means progression, and prevents the free distribution of your good blood at killing prices.

Methods of Fattening.

It should first be understood that unless a fowl is a suitable subject for fattening, improvement of its flesh qualities is not possible. A fowl intended for this purpose should be healthy, quiet in temperament, and, if a male, not more than four to five months old. A cockerel of a greater age than this will not prove as satisfactory as one which has been caponised.

There are, generally speaking, four methods of cramming — by trough, machine, hand, and funnel —none of which are practiced in South Australia. The first of these is the one most employed on English and American poultry plants. Of the last two little need be said beyond the fact that both demand an amount of hand labour far too excessive in most circumstances. Expert fattening by hand, it is said, achieves a greater finish and measure of success than all other methods. The operator, holding the fowl between his knees, takes a pellet of food from a pile previously rolled up. Dipping it in milk, he rapidly insets it into the fowl's mouth. With gentle pressure of finger and thumb around the gullet the food is then quickly passed into the crop. From twelve to fifteen of these pellets, according to individual requirements, are fed to one fowl, which is then returned to the quiet of the pen, and the next bird operated upon.

Fattening by trough is perhaps on all counts the best method. The birds penned in narrow cages accommodating three to five, are fed twice or thrice a day. The food, mixed to the consistency of thick porridge, is placed in long troughs, which are removed directly the fowls show signs of having eaten all they care to. Curtains of sacking or sail cloth are then drawn across the cages, and the fowls left in peaceful darkness until the next meal time. Liquid is not usually given, as sufficient is consumed with the food.

The cramming machine is the process in nearly all cases adopted by those dealing with very large numbers of fowls. In the hands of an expert operator the cramming machine cannot be said to entail more than slight temporary discomfort upon the bird, but the process is viewed with disfavour by many.

The food, which is mixed with great care to the consistency of thick cream, is poured into the cramming machine, and the operator, holding the fowl under one arm, extends its neck and inserts the rubber nozzle of the machine into the beak and down the gullet. With a firm but gentle pressure of the foot upon the treadle sufficient of the food is pumped into the crop, the fingers of the disengaged hand gauging the quantity.

The operation, though a simple and quick one, needs care, dexterity, and a keen judgment, or the crop of the fowl may be either insufficiently filled or gorged to bursting point. It is imperative also that the operator be careful to release the treadle of the machine with a sharp jerk before withdrawing the nozzle from the fowl's gullet. Neglect of this precaution may cause a quantity of food to be pumped into the fowl's windpipe, when suffocation almost immediately ensues.

Mr. Masseren, a Victorian breeder, gave a demonstration of machine cramming some years ago at the Royal Show and had at the same time some of the finest table poultry on view which we have ever seen. They were Faverolle cockerels, 7½lb. at 4½ months. The machine, however, has never caught on here. One was, we remember, purchased for Roseworthy some time ago, but whether for use or ornament we do not know.

Egg-Eating Hens.

The most common causes of egg-eating amongst hens are absence or want of a sufficient supply of lime, grit, and shell-forming material, giving the birds broken egg shells to eat, improper and insufficient nesting accommodation, which, of course, causes the birds to lay elsewhere—probably on the floor, where the eggs get pecked at and broken—want of occupation and amusement to pass away their time, the accidental breaking of an egg in the nest, and laying soft eggs about the yard or run.

The vice in question is contagious, that is, one bird will quickly imitate another, and once a hen has tasted the contents of an egg she will continually be on the sharp look out for others, and in time become a confirmed egg-eater, the habit being far more easily acquired than cured. Immediately a poultry-keeper is aware that there are egg-eaters amongst his birds he should endeavour to discover the culprits, the best way of doing this being to place an egg on the ground shortly after feeding the fowls, and watch results. Birds that are not addicted to the habit will either take no notice or merely roll it over, but the offending bird or birds will quickly have a hole through the shell and be tasting the contents.

The quickest and safest way of dealing with egg-eating hens that are of little value is to kill them, although other remedies may, of course, be tried.

A favourite remedy for curing egg-eating hens is to take an ordinary egg, blow out the contents, and fill the shell with a strong mixture of mustard and cayenne. Place the egg where the offending birds are likely to see it, and when the contents are tasted the effect upon the delinquents will be so startling that two or three doses are frequently sufficient to bring about a lasting cure. Cutting or filing a piece off the point of the upper and lower beak of offending birds prevents them breaking the shells of the eggs; and placing a few china eggs in the nests for the egg-eaters to peck at will sometimes effect a cure, as the birds get tired of pecking the hard surface with no satisfactory result. In yards where the vice is very prevalent nests with false bottoms will be an effective remedy, but the best "cure" is prevention of all inducement to acquire the habit.

General Purpose Club.

It is interesting to know that a scheme based on the suggestions originally made by Messrs. Laurie and Manuel has now been brought into definite shape and the matter so far advanced that the whole 25 pens required have been entered or guaranteed. It is understood that further entries for this section at the next competition, can only be accepted from club members. If necessary we are told that about five more entries can be provided for. The drafting of the rules and conditions of entry has occasioned very considerable work and careful thought on the part of the committee of the club, for which they are to be highly commended as are Messrs. Gibson, Smith, Manuel, and the sec., Mr. A. J. Todd, for bringing about the present very satisfactory position.

Egg-Bound Hens.

There are many causes for egg-binding. Abnormal size of eggs, general debility on part of hen, diminutive stature, as in bantams, and so on. Whatever may be the cause, its danger to life exists. The one great object is to get the egg away unbroken. Plenty of olive oil shou,d be poured into the cloaca, and the finger should be inserted, with a view to bring the shell, without cutting or injuring the bird. In the case of a shell-less egg, it is advisable to prick the skin with a needle; its bulk will at once subside. The bird, feeling relief, will make an effort, and the tough membrane can be seized and drawn out, the cloaca afterwards being well cleansed with a diluted disinfectant. Egg-bound hens are generally discovered by their muffled-up appearance. It is best to place the bird in hot water and keep her there from ten to fifteen minutes, till the muscles get soften and she has rested a while from all effort. Insert the finger behind the egg, and with the other hand the cloaca is opened as widely as possible, backward, over the protruding egg; then a backward push from the finger of the other hand will generally start things, and, once started, the bird will herself help matters, and nine times out of ten the egg will be laid in the hand or water. Rinse the cloaca with a little diluted disinfectant, which will help to allay any inflammation that may arise. Place the bird on a warm nest for a few hours, by which time it will be recovered.—Exchange.

The Indian Game Fowl.

An English breeder of this handsome fowl writes :—"One of the greatest points in breeding these fowls to remember is never to breed from any that are at all high on the leg. The natural tendency is always to go up, never to come down. But let it not be taken by this I mean that one should kill off young birds showing length of thigh. That will diminish as age and weight come on, so long as the shortness of shank is there.

The most important thing in the Indian Game breed is type. All birds must be short in leg and back and very broad in front. A bird is not an Indian Game if he is high on the leg and long-backed. You must have type above all things.

They do not require anything like the trouble that the light breeds do in the way of shelter from the sun and rain, nor are they the nuisance of the birds of the Mediterranean type with their big combs, which are always collapsing and falling over. Provided you start with healthy stock, they are hardy and very easy to rear and one of the finest table fowls.

Points Worth Studying.

There are personal traits of character which underlie success in any business, and these must naturally be possessed or else acquired, before we can look for the best results from a man's labours in poultry keeping. The poultry-keeper must have application, patience, persistence and in every way be a hustler. Be on the look out for every new idea in your business.

Keep strict accounts and records and study them. Do not begin too expensively. Remember that every shilling you put into the business is an interest-bearing factor and must be accounted for out of your profits.

Expensive or fancy buildings are not a necessity, but convenience of labour and proper conditions are. Make your plant cost as little as possible, but do not sacrifice convenience or proper conditions under any circumstances ; above all, look after the details, for no department on the farm needs so close attention to the many little details, or will suffer so quickly for the lack of attention as poultry keeping.

Careful attention to these littles, a love for the work, and a never failing will to succeed under any and every condition will bring you success. Never depend on luck and never expect success till you have earned it.

Geese.

Whilst there are nine breeds of domesticated geese, there are only two bred to any extent. The two varieties are the Toulouse and the Embden. The former is a grey and white bird, the grey predominating, and is of a huge, massive appearance. It is the largest domesticated goose there is, and, like all large animals and birds, is somewhat slow in growth, whereas its rival, the Embden, is a smaller bird, more rapid in development. The Embden is pure white in colour, which makes it a greater favourite with some people, as rather more can be obtained for the feathers. The eggs produced by the Embden are rather larger than those of the Toulouse, and are usually laid somewhat earlier in the season. As far as number is concerned, however, the Toulouse has the advantage, generally laying from thirty-five to forty-five in a season. The Embden is a very persistent sitter and an excellent mother, whereas the Toulouse cannot be depended upon, frequently becoming restive and forsaking the nest. The quality of the Toulouse is not everything that can be desired, but this would be naturally expected, as large size and fine quality do not often go together. The Embden, on the other hand, is of exceptionally fine quality, being full and rich in flavour, and of a fine texture.

In reality geese are grazing birds, and when given access to a good pasture are well able to support themselves. In fact they will thrive better entirely upon green stuff than upon either meals or grains. Unless one has an abundance of room, geese should not be tried, as it is almost useless keeping them in confinement. It is always wise to realise one's limitations as well as one's opportunities.

In England many goose-farmers are in the habit of growing green crops merely for the geese, one of the best being oats. When the crop is about 10in. above the ground the geese are turned therein, and will thrive excellently upon the succulent green food. In Norfolk, where so many geese are raised, it is customary to feed off turnips, etc, by geese, in the same manner as sheep ; the birds eat the roots as close to the ground, and—what is equally as important—they manure the land just as well as sheep.

Whilst a pond or stream is by no means necessary to the geese, it is advantageous to allow them access to water in which they can swim, but, it is not necessary to ensure fertile eggs, and the germs are equally as strong with or without. It should be remembered that geese do not attain maturity till they are two years old, and the gander should not be under this age. A year-old bird should be mated with two-year-old geese, and vice versa. This will have a much better effect upon the goslings, making them hardier and more vigorous, and causing them to ultimately attain a greater size. Only unrelated stock birds should be used, and those only that are in perfect health.

The Value of Epsom Salts.

Whilst magnesium sulphate, or Epsom salts, cannot be claimed to be a panacea for all the diseases that poultry are heir to, it is undoubtedly one of the cheapest and most efficacious remedies, and one which breeders of healthy poultry cannot afford to be without. Almost all ailments are benefited by a dose of Epsom salts, given either in the drinking water or mixed with boiling water in the soft food mornings, whilst in severe cases the best remedy is to dissolve half a teaspoonful—the correct dose for a single bird—in a little hot water, and pour it down the ailing bird's throat. Poultry suffering from liver disease (easily discernible by dark and purple-coloured combs), or over fat, will soon recover to their normal condition by giving a dose of Epsom salts once a day, early in the morning for preference. It seems wonderfully to brighten up all fowls, and improve their blood, as will soon be evident from the colour of their combs.

Customer : "Do you keep a good corn-cure?" Druggist : "Yes, sir. Here is an excellent preparation. One of my customers has been using it for the last fourteen years with very good results."

Home Notes.

Care of the Hair.

The secret of beautiful hair may be expressed, as in the case of a good complexion, in one word. Cleanliness, absolute and systematic, is essential for the girl who wishes her "crowning glory" to receive its full complement of praise. The average girl shampoos her head once a month—in some cases, alas, once a week, and washes her brushes when she considers that they require it.

Beautiful hair is within the reach of everyone.

The hair has two great enemies that combine for its destruction. One is the present-day method of shampooing, the other is dust. Thousands of girls, night after night, gather the dust of the day on their brush, and the next morning brush the dust back on their hair again. In this way it is no difficult matter to keep a brush clean for a week or longer at the expense of the hair, which is gradually becoming not only a dust but a germ trap.

— First Vital Step. —

The first, and the most vitally important step in the cultivation of beautiful hair is to wash the brushes every night. It does not entail much expenditure of time. After brushing the hair at night pour some boiling water in the basin. Add a piece of soda or a teaspoonful of liquid ammonia. Dab the brushes up and down in this for two minutes. Stand them in cold water for five minutes. Shake well and put in a warm place to be dry by the morning. Once a week add a teaspoonful of alum to the rinsing water, which tightens and stiffens the bristles.

Rub the skin of the head with the finger-tips, until the scalp is aglow, for 15 minutes nightly. As the blood is in this way brought to the root of the hair, which draws its nourishment from this source.

The following is recommended:—If possible, use two brushes. Loosen the hair. Gently comb out all tangles, and with the tips of the fingers massage the whole scalp for a few minutes. If the hair be dry, which can be recognised by its harshness when touched and its lack of colour, dip the fingers in some oil of sweet jasmine, and massage as directed; but avoid smearing the oil in the hair itself. If the hair be greasy or sticky, the result of excessive perspiration from a relaxed condition of the scalp, sprinkle the head with lotion of bergamot. You will soon learn to recognise whether your head requires food or tonic. Brush the hair thoroughly, gathering up small strands and allowing the bristles to pass right through them. Do not plait the hair. Night is the time to induce a free circulation of air. Spread the hair out on your pillow when you are in bed. If it be necessary to use curling pins, procure the very softest pattern, and avoid screwing them tightly against the head. Never use hot irons. To those whose hair has a tendency to curl naturally, which has been frustrated by the use of artificial means, the above system will result in time in the curling pins being banished from the dressing table.

— Too Much Shampooing. —

The vexed question of shampooing must be approached with caution. The girl who is asked to wash her hair as seldom as possible, will be horrified, and consider that all the principles of hygiene are being set at naught. And yet hundreds of cases in which the hair is thin, weak, and "coming out in handfuls," may be traced back to the cause of excessive shampooing. It will be found if the brushes are washed every day the hair will not require to be washed more often than once in six weeks.

When washing the hair use, if possible, rain water. If not, the water may be softened by a little borax. Avoid soda and ammonia, the effects of which are too drying. Beat up the white of an egg to a snow. Add a tablespoonful of soap powder. Whisk all together. After rinsing the hair thoroughly, rub the egg mixture into the scalp. Rinse in several lots of warm water, and lastly apply a cold douche. Do not wring the hair. Gently press out the moisture. Dry with hot towels, but do not go near a fire. If it be summer, go out in the garden. The sun is the finest possible hair restorer. When dry, brush the hair for five minutes. Pour three drops of oil of sweet jasmine on the palm of the hand. Dip the brush in this and gently stroke the hair. This will induce a beautiful gloss without appearing too greasy. To make a good soap powder, collect all the scraps of soap. Dry them until they are brittle. Put them in a cloth and crush with a flat iron to a powder. After the hair is dressed, always smooth it with one of the Japanese silk squares.

Don't Grizzle.

"Don't grizzle," used to be the favourite expression of an old-fashioned nurse to any of her young charges who developed the depressing tendency to imagine themselves injured or to pose to their parents and small world as a martyr.

Self-pity is at the root of all this sorrowing and theatrical trouble-mongering. People worry themselves over trifles, brood over fancied slights, injuries and injustices, till their imaginary wrongs make them feel like martyrs driven to the stake.

It is so easy to delude oneself into the belief that the world has used us very ill.

"Look in my face; my name is Might-have-been:
I am also called No More, Too Late, Farewell."

These two lines of Dante Rosetti furnish a complete key to the morbid brooding of a mind over troubles. It makes little difference whether the sorrows have been real or imaginary. A tiny trouble can easily be manufactured by the mind into a very real tragedy. Nearly everybody possesses, to a more or less degree, the capacity to create stories. Some put their woven fancies into serials or three-volume novols. Others make themselves the centre of the plots which every brain, to some extent, amuses itself by imagining.

Men, as a rule, are to busy to devote much time to creating situations in which—as in the game called "Nap"—the rules sometimes demand that one or more of the players shall "go misery."

The silo enables the farmer to preserve food which matures at a rainy time of the year, when drying would be next to impossible.

Home Hints.

— Care of Silverware. —

The housekeepers of fifty years ago considered it a careful housewife's duty to take care of her own silver or to direct its cleaning, if left to a servant. In the busy life of the women of to-day time seems to be too precious to devote to such work, and knowledge is made to take the place of labour in the intelligent household. Instead of scouring, and rubbing, and polishing each piece of silver, the service may be cleaned in a few minutes as effectively as if an hour or two hours were devoted. After each meal the silver should be put in a clean cedar tub or dish-pan kept for the purpose and covered with hot waer, to which a teaspoonful of powdered borax is added, then taken out immediately and laid on a soft linen cloth, and each piece rubbed quickly with a piece of chamois skin. Silver should never be rubbed with flannel or cotton cloth. When not used it will become tarnished if exposed to light and air; therefore, to keep it in good condition, each piece should be carefully wrapped in white tissue paper. Even plated ware will assume a new dignity treated in this manner, and will always look bright and clean.

— To Ease the Feet. —

If you are trodbled with sore corns, do not fail to try the following treatment:—Soak the feet well at night in hot water, in which has been dissolved a few crystals of permanganate of potash. Then dry carefully, especially between the toes, and dust the skin in these parts freely with a mixture of tannic acid and boracic acid. Next morning wash carefully with pure soft soap and cold water, thoroughly dry, and powder with boracic acid. A piece of lemon or a split raisin bound on a hard corn will very often cure it. The first application may produce soreness, but if treatment is persisted in a reasonable length of time a cure will likely be effected. If not, try the following preparation:—Thirty grains of salicylic acid and five grains of Indian hemp; to be dissolved in half an ounce of collodion.

— The "Little Things" in Housekeeping. —

How few women realise the true value of attention to the details of their owkr. A man in business gives to them his careful consideration, but a housekeeper often, from lack of time, perhaps, or physical strength, will neglect what she feels is the trivial part of the machine work.

This is a mistake: better undertake less and do it thoroughly. The people who do great things are those who have given attention to the little ones as well. It is doubtful if a genuine success in life can be achieved without attention to little things, for neglect of them gives the impression of unreliability, a reputation fatal to any kind of achievement. "Want of time is a modern fiction glibly employed by those who rarely put any portion of their sixteen waking hours to any useful purpose.

— Real Ladyhood. —

A lady is a gentlewoman on every occasion and under all circumstances; she does not reserve fine manners for special people and special occasions. Ladyhood is not an outside veneer or polish which may readily be rubbed off by contact or attrition with the world, but is ingrained. Acquired good manners are better than none, but unless there is a solid foundation of gentleness and kindness behind them they are apt to wear badly when subjected to strain. When in unpleasant dilemmas the lady proves it by never forgetting what is due to herself and others under the circumstances; she does not lose her temper and make use of language to be regretted afterwards; she also makes allowance for the transgressor, and causes herself to be respected.

— Hints on Food. —

To enjoy a natural appetite, the following dietetic hints should be taken into consideration:—Discard all condiments and eat food prepared as simply as possible. Masticate the food thoroughly, allowing it to remain in the mouth until the delicate natural flavors of the food are developed. A large variety of foods should not be eaten at one meal. Avoid carefully the use of much fluid, especially cold fluids at meals. Many persons are better for discarding all drinks at meals.

— Coffee Essence. —

Four oz. coffee, one pint water. Place coffee in a muslin bag and pour slowly over it the boiling water. Then bring the coffee to simmering point, but do not let it boil. Strain and put in a clean, dry bottle, cork well, and it will keep for several days. Two tablespoons of this to a breakfast cup of hot milk. Pour another three teacups of boiling water slowly on the grounds, and keep to use instead of water next time essence is to be made. Boil it, and pour on the same way as when using water. In this way a better coffee will be obtained.

— Care of the Feet. —

The best treatment for tired feet is a nightly foot bath in tepid water, to which a handful of bran has been added. Stand in cold water for two minutes afterwards. There should be a frequent change of footwear, and the shoes and stockings should be changed upon coming in from the street. The feet need a great deal of ventilation, and for this reason a change of footwear is very advisable. It is a good practice, if you can, to keep several pairs of shoes ready for wear. It is a little more expensive at first, but it is cheaper in the end. The shoes will last longer.

— The Colour of the Ears. —

With the craze for ear-rings women have suddenly discovered that small and delicately-shaped as their ears may be, one essential element of beauty is missing when these useful features lack colour. A woman with pale ears can be safely set down as one whose heart is hard to reach, while she whose ears are pink along the curled rims and downy lobes, is a creature of sympathetic and responsive temperament. More important still, a well-coloured ear is as becoming as a rosy cheek, and, in consequence, many a scrupulous girl who would scorn to even dust her cheek with powder, thinks it no evil to slightly rouge her ears till they glow with a delicate pink colour.

— Care of the Piano. —

A prim little lady, who is not quite an old maid, has the best kept instrument I know of, says a lady writer, and this is the secret. Whenever she sweeps the parlour she never fails to spread a ready bleached sheet over the top and pin it down around the edge and corner. This is allowed to stay on until things are righted, and every particle of dust removed. When daily fires are kindled they use the parlour as a sitting room.

The sheet is not removed. Her east parlour windows open out over the side walk, and when a dusty spell comes on the sheet is again retained. We all know that the ordinary wool or felt cover is a veritable dust strainer, and that new domestic article is almost airtight as well as dust-proof; hence the protection is plainly understood. The idea of a domestic cover may not sound artistic, yet this one was so gracefully pinned that it was more ornamental than unsightly. It occurs to me that more fastidious girls might make these protective covers of white duck or imitation linen, work coarse figures or borders in coarse stitch, using white thread, or simply finish the edge with cotton or brown linen fringe.

— To Make Bay Rum. —

Infuse 2lb. of fresh bay leaves in 1 gallon of white rum. Let it stand for a month. Stir the leaves occasionally by rocking the jar, which must b? kept tightly corked the whole time. Afterwards strain off and bottle.

— Mouth Wash. —

For the sore mouths from which infants and young children often suffer the following is an excellent remedy :—Soak a little sage in hot water, strain it, and add to half a cup of the liquor a small pinch of powdered alum or borax. Sweeten it with a spoonful of honey, and bathe the mouth frequently with the syrup.

Save all orange and lemon peels and place them in a saucepan filled with sufficient weak syrup to cover them on a very slow fire. Leave it to simmer slowly for some hours, and repeat for two or three evenings (when the kitchen fire is slow) making the syrup stronger each time, till transparent and tender. Place in a tin box and use as required.

Tried Recipes

— Potato Souffle. —

Bake some good large potatoes in their skins. When done scoop out the floury part and rub it through a sieve; weigh it, and to each pound of potatoes add four ounces of sifted sugar, four ounces of butter, a pint of hot milk, and the grated rind of a lemon. Beat till quite smooth; add the yolks of eggs and the whites beaten to a stiff froth. Have ready a cake tin well buttered; tie buttered paper round it outside to come high, and so prevent the souffle from overflowing. Bake in a quick oven for twenty minutes.

— Salmon with Mayonnaise Sauce. —

Lift some salmon out of the tin very gently so that it may not break into small pieces. Drain, sprinkle w th a little pepper, and cover with mayonnaise sauce. For this break the yolk of an egg into a pudding basin, add a pinch of salt, pepper, and dry mustard; pour in drop by drop some good salad oil until the mixture becomes quite thick, then di ute it to the consistency of thick cream with vinegar.

— Custard Tart. —

Line a large plate with pastry, either puff or short crust. Beat up three eggs, strain them to a pint of milk, sweeten and flavour to taste. Bake in a moderate oven for about three-quarters of an hour.

— Fish Cakes. —

A tin of salmon will make nice cakes. Mix it with an equal quantity of mashed potatoes, season with pepper, salt, cayenne, finely-chopped parsley, and moisten with a beaten-up egg. Form into balls of equal size, and flatten these into cakes. Egg and bread-crumb, and fry in deep, hot fat. Garnish with parsley.

— Maud Pudding. —

Cream two ounces ol butter, add quarter of a pound of castor sugar, four eggs, and beat for ten minutes: stir in six ounces of sifted flour, and add a little milk if necessary. Bake in a buttered mould, hollow in the centre. When the pudding is cold turn it out, pour the syrup from a tin of apricots over it, so that it may soak through, and pile the apricots in the centre; cover with whipped cream.

— Fish in Sauce. —

Flake up some cooked white fish, having first freed it from skin and bone. Mix it with white sauce, and a well-beaten egg. Form into cayenne. Put the mixture into a fire-proof dish, sprinkle over with bread-raspings and small pieces of butter, and bake for fifteen minutes.

— Meat Cake. —

Mince any cold beef or beef-steak, and mix it with an equal weight of bread crumbs; add a little very finely-chopped onion and parsley, a little stock, seasoning, anh a well-beaten egg. Form into a cake, and fry in dripping. About an ounce will be sufficient. This may be served with or without brown sauce.

— Victoria Soup. —

Take half a pint of lent ls, a quart of stock, an ounce of butter, a bunch of herbs, fried croutons, a gill of milk, some boiled green peas. Soak the lentils overnight in cold water, put them in a stew-pan with the butter and bunch of herbs, and fry for five minutes over a gentle heat; add the stock, and cook till the lentils are quite soft. Remove the herbs, and pass the soup through a sieve; re-heat, add the milk, seasoning to taste, and a pinch of powdered mint. Put in the fried croutons and peas at the last moment, and serve.

— Lobster on Toast. —

Melt an ounce of butter in a small saucepan, and put two ounces of tinned lobster through a wire sieve; add the yolks of two eggs to the butter, and stirr well over a gentle fire for a minute or two till the eggs have thickened and the mixture is hot, but not boiling: then stir in the lobster and a tablespoonful of cream. Season well with pepper, salt, and cayenoe. Make a large slice of toast, cut it into fingers, cover each finger with a thick layer of the preparation, and put into a hot oven for two or three minutes. Serve at once.

— Collared Tongue. —

Trim the tongue, rub it over with salt, and leave it for twenty-four hours. Wash off the salt, and cover the tongue with brine. This is made by boiling two pounds of salt, an ounce and a half of saltpetre, half a pound of sugar, and six quarts of water for half an hour. It should be skimmed carefully, and when cold it is ready. A much smaller quantity in the same proportion will be sufficient to cover the meat. Turn the tongue every day for a fortnight. Wash it, put it in cold water, and boil gently for about three hours. Skin the tongue while hot. If it is not required hot for a meal roll it round tightly, with the tip of the tongue in the centre, and press it into a round cake tin of suitable size, with a plate and a heavy weight on top. The tongue can be turned out when cold.

— Tasty Breakfast Dish. —

Take a piece of butter about the size of an egg, some cold boiled rice, salt, pepper, a little onion or tomato. Cut up any cold pieces of meat, beef, ham, tongue, or cold sausages into shreds, put into stewpan, and let it become heated, stirring well, and serve very hot.

Tomato Recipes.

Tomatoes form an important element of modern cookery, taking their place as vegetable, salad, soups, purees, and sauces for meats, macaroni, etc.

— Tomato Fritters. —

Cut the tomatoes in thick slices, dry carefully on a towel, and dip in a batter made with 1 egg, ½ cup flour, ¼ teaspoon baking powder, and a pinch of salt. Fry brown in boiling fat. Take up carefully and serve at once.

— Tomato Salad. —

Peel solid ripe tomatoes, cut in thick slices, sprinkle with finely-minced onion, season with salt and pepper, and pour over a dressing made with 2 tablespoons Seppelt's vinegar and 4 tablespoons melted butter. Serve on lettuce leaves.

— Broiled Tomatoes. —

Cut firm, large tomatoes in thick slices, season with salt and pepper, and broil quickly over a clear fire. Serve on rounds of buttered toast with little bits of butter on each slice of tomato.

— Fried Tomatoes. —

Cut 6 tomatoes in large slices, dip in fine breadcrumbs, and fry with 3 very thinly-sliced onions in 2 tablespoons butter. Delicious with steak.

— Tomatoes with Salmon. —

Cut a slice from the blossom end of the tomatoes and scoop out the pulp carefully. Fill with nicely-seasoned canned salmon, moistened with a little melted butter. Cover with the slice again, and bake for half an hour. Serve hot.

— Tomato Jam. —

Select sound, firm tomatoes. Throw them into boiling water for a minute or two and then remove their skins. Put them into a preserving kettle, and let cook slowly until they are quite soft, then rub them through a sieve with a wooden spoon. Next weigh the pulp, and to each pound allow 1 lb. of loaf sugar and the grated rind and juice of two lemons. Put all these ingredients back into the preserving kettle, and boil quickly until the jam looks clear. Put in dry jars, and when cold cover.

— Tomato Figs. —

Scald and skin small-sized tomatoes. To every 8lb. add 3 lbs. brown sugar. Cook slowly without adding any water until the sugar penetrates, and the fruit looks clear. Take out, spread on dishes, and dry in the sun, sprinkling on a little syrup while drying. Pack in jars with layers of powdered sugar between, and cover tightly. These will keep any length of time, and are an excellent substitute for figs.

— Stewed Tomatoes. —

Select tomatoes carefully, use only good, solid, fleshy ones, scald by dipping for a minute or two in boiling water to loosen skin, and divide the tomatoes if very large. Put them in a porcelain lined kettle, and add enough onion juice or chopped onion to taste. Use one small onion to two gallons of tomatoes, and a half teaspoon of celery seed, eight or ten peppercorns and a tablespoon of salt. Boil until the tomatoes are as thick as are usually served on the table, then pour them into clean jars, put on the rings and cover loosely. Set the jars in the boiler, and fill to two thirds height of jars with water about the temperature of the jars of tomatoes, warm if they are warm, cold if they are not. Bring to a boil and boil ten minutes. Remove at once from boiler and tighten covers.

— Tomato Puree for Soups and Sauces. —

Cut up sound tomatoes and boil in an enamel or porcelain kettle till thoroughly soft. Strain and wash through a colandar, then through a fine sieve. Return to the kettle and add for two gallons of tomatoes the following :—1 tablespoon salt, 12 peppercorns, ½ teaspoon celery seed, 1 small onion chopped, 2 bay leaves, 6 cloves, 6 allspice, 1 bunch parsley. Cook slowly until tomatoes are thick, then turn into jars and finish as in preceding recipe. To use these tomatoes :—For soup, add an equal quantity of soup stock, butter and flour to thicken, and a few drops, if one likes it, of kitchen bouquet. For tomato bisque add a salt spoon of soda to the tomato heated, then an equal quantity of hot milk, thickened with butter and flour and serve immediately. For a sauce for chops, cutlets, fish, etc., merely heat tomatoes and thicken with browned flour and butter. A little left over gravy or soup may also be added with advantage.

— Tomatoes Whole for Salad. —

Carefully select tomatoes of globular shape which will just slip through the mouth of the jar. Scald and skin them as directed for stewed tomatoes, take out the stem and core and slip the tomatoes gently into jar. The day before stew a small quantity of tomatoes until soft and then set the kettle aside to cool and settle. Then following morning carefully pour off all the clear liquid floating on the top, strain it through a jelly bag, and boil it for a few minutes with onion, bay leaves, celery seed, pepper corns and parsley, then cool it and use it to fill the jars of whole tomatoes. The jars are covered with rubbers adjusted and placed in the boiler with cold water. Bring to a boil and boil ten to twelve minutes only. Remove immediately from the boiler. When wanted to serve, drain off the juice, thicken with gelatine and use it to imbed the tomatoes either single or together.

"Hallo ! Chumley, where did you get that black eye ?" "Oh ! Only a lover's quarrel." "A lover's quarrel ! You don't mean to say your girl did that to you ?" "Oh, no ! It was her old lover, I mean."

HORTICULTURAL DEPARTMENT

Reminders for February.

Sow pansy and stock seed.

Pot on variegated leaf begonias.

Strike dahpne and azalea cuttings.

Layer any carnations that are available.

Lift any daffodils that remain in the ground.

Prick out seedling gloxinias, petunias, and cyclamen.

Root cuttings of the verbenas that you wish to keep.

Take out all the old sweet peas, and get the ground ready for sowing another batch of seed.

Ranunculas seed can be sown now. So can anemone. Either should be sown in rich ground in beds, where the young bulbs can be let remain for flowering during next August.

Crimson King, Queen Alexandra and Beauty of Nice are three of the best stock. Victoria is an excellent white.

Sow new delphinium seed in boxes. Buy seedling plants and pot them up for planting out later.

Heliotrope cuttings taken from the young tops strike readily if placed under glass.

Continue planting bouvardias, and cut back all the plants which have flowered, so as to bring on another good crop of blossom.

Try striking thin young shoots from any young dahlias. Select pieces that are not hollow, cut below a joint, let the two lowest leaves remain, and insert the cuttings in moist sand under glass. Pot up when rooted, to make bulbs in readiness for next season.

Bordeaux mixture is used against any of the carnation fungus troubles.

Keep the flower buds regularly picked from all geranium cuttings, as they weaken the plants if allowed to mature.

The yellow colouring in violet leaves is caused by what is known as Mosaic disease. The trouble does not affect the flowering.

With all of the very fine seeds it is advisable to sow thinly so as to give the seedlings a good chance of feeling their feet. Crowding restricts growth.

Salvias are propagated professionally by removing the old plants into a glass-house in the early winter for the purpose of growing the soft-wooded shoots, which are taken and rooted in sand. In this way a big stock can be raised at very little expense.

Some people complain about the premature wilting of their flowers. Much of the trouble comes from cutting flowers after a hot day instead of doing the gathering early in the morning, when the blooms are crisp and fresh. In summer time it is well to immerse or stand everything in water for some hours before packing or using. Anything with a brittle stem should be broken instead of being cut. The break exposes more of the surface, and allows the flower to absorb water quicker than if a simple cross cut is made.

Rhodes grass is a great "standby." Get it once going and no drought will kill it. A little seed should be sown purposely for use as a decorative grass, as the heads go well with roses or other flowers.

A dry lawn that has to be soaked would be better treated to a flooding from the end of the hose, and not sprinkled. Tie the end up in an old bag, and turn the tap on full power. Move the bag from place to place as required. Tying the end up prevents the force of water wearing the surface into holes and it saves water.

A mulch of manure gives lately planted seedlings a great help forward. It acts as a cooler to the surface and provides liquid food every time a watering is done.

Someone asks if sweet pea seed saved from their own plants would be worth holding. Yes. You stand a chance of getting some nice varieties for ordinary garden work. For the best of show stock you must depend on seed saved by expert hands.

When spreading new manure on the surface of a bed for a mulch keep it away from the stems of the plants until the heat has gone out of the material. Even after that don't stack the manure too deep. Anything above three inches is likely to heat.

Procure a package of ranunculus seed and sow it along a border or in a bed of nice rich, friable soil. Ask for the asiaticus variety. This is a poppy-like bloom, with a very wide range of colour, and a habit of flowering that leaves little to be desired. Sow the seed lightly, and cover it with some sand short manure. Bring the young plants on by constant attention. Don't let them lag behind. The better the growth in the early stage the greater display of flowers later on. Sowing seed now will give you blooms in August next. The seedlings transplant very readily. You put them back a bit through the shift. We have moved plants of various sizes without any great injury.

Where a big cluster of rose-buds are being carried on one stem, pinch out the centre one so as to bring all the satelites out together. Pull your flowers in bud and throw them into a tub of water to await the setting up. Five o'clock in the morning is the best time of day to gather roses. Then the flowers are only an hor or two over their beauty sleep.

Gladioli may be lifted just as soon as the flower spikes have dried out. The bulb is hardy full grown, but it is quite big enough for taking up, if you are anxious to use the ground for any other purpose. If not pushed for room let the plants dry right out. Don't break the stem off until they are quite brown. Sow any seed that you have at once. Provide a very rich light bed to get as much size as possible into the seedling bulbs.

Many of the newer lawn mowers are made to cut closer by adjusting the bottom blade against which the cutters revolve. On each end of this piece of steel you will find two screws. Manipulate these to suit your purposes. One brings the blade closer to the cutter, while the other widens the gap.

People who own cows might tether them up, or keep them in a paddock all night, instead of allowing them to wander round the suburb, raiding gardens after dark. It is hard to lose the whole of one's flowers to a cow, or two and a "poddy" calf who usually trample down a lot more than they eat. When you find cows in your grounds—pound them!

American rosegrowers use 2½ tablespoonfuls of Paris green and 2lb. of brown sugar, to about a barrel of water, as preventative spray against thrip on roses. Frequent syringings are given, beginning with the first appearance of the buds and from that right on to the flowering. The Paris green poisons the foliage against the insects.

When men and women garden for love they are not much off the path which leads to real success in life. Not the success which is built of pound, shillings and pence, but that more lasting satisfaction which springs from the inner heart where all the best of the man and womanhood lingers.

Sow any gladioli seed in rich, light soil, and let the young seedlings have all the water and encouragement they need.

Leaf-eating caterpillars are troublesome. Arsenate of lead or Paris green in very weak solution will clear the pests.

Hydrangeas are still holding their lovely blue and pink heads together. Don't let them wilt for the want of a good soaking. The dry weather will end their flowering days quickly, if you are not watchful.

Carnations which have been layered, and those which have recently been planted out, should be looked after and watered regularly, so as to get good flowering wood for the winter blooming season. Keep the ground open, and water frequently.

Poor quality bulbs are not as a rule good flowers. Buy good stock, and plump stock.

Pansies can be kept in flower from June to January, after which they are best taken out.

A mixture made with Calvert's carbolic soft soap is used successfully by English rosarians against mildew in roses.

Gladioli bulbs should not be cut away from the foliage until the leaves are quite dry. Pack in dry sawdust rather than expose the bulbs to the air.

Carnations should not be overfed. As plants for forcing they are not good subjects. A good steady feeding such as can be supplied by old cow manure, but no cramming, in what they require.

Mr. J. H. Pemberton, writing recently to the "Gardeners' Chronicle" on the subject of mildew, says that wherever you find it persistently infecting the plants you can be certain that the root action is defective. There is nothing like good cultivation and strong feeding as a mildew preventative.

It is difficult to get a competent gardener. The man who knows but little loses the plants through ignorance, while here and there a skilful but dishonest gardener makes away with his employer's goods for his own benefit. On more than one occasion the same complaint has been made. Unfortunately there are men in every trade purposely for all they can "make." A gardener without a heart for his plants is a worthless individual at any time. Add dishonesty to his failings and you have someone to avoid.

Auriculas and Primulas.

— The Auricula. —

A very few years ago this flower was very little known in Australia. Folks who knew it were imbued with the idea that the climate was quite unsuitable for it. It is a plant that flourishes in cold climates, certainly; but here one sees some very good specimens. The first essential is suitable soil, and once one has mastered what sort this plant really requires, the rest is fairly easy.

— Suitable Soil. —

If one possesses a woodshed (and the majority of folks do), one can always muster a few buckets of soil where perhap's one's firewood has been deposited. The next requisite is some old dry cow cakes, which can generally be procured. I have many a time obtained a small sack of these for the modest sum of threepence; and just allowed them to lie in a corner near the compost heap. If it is warm weather they will soon dry and be fit for breaking up and mixing with the woody soil. Then from the bottom of the compost heap take some well-rotted leaf manure and a few shovelfuls of clear sand. Mix all well together and let it lie for a few weeks, turning it well over occasionally, and it will soon be found ready for one's auriculas; and not only for them, but this particular soil will be found suitable for primulas, primroses, and diverse other plants. Very good auriculas have been grown from seed. This seed should be planted in soil which has been well prepared. If you are getting a small cocoa box ready for seed, make it slightly richer by putting in extra leaf and cow manure.

— Method of Sowing. —

Auricula seed does not need burying in the old-fashioned method, but rather sprinkling on the surface of the small flat box. Then a little fine sand is sprinkled over it very sparsely. Water most tenderly. Directly the tiny green heads appear, sprinkle a little more fine sand, and when they push their way through that again, sprinkle some fine wood ashes, well broken up and refined, so as not to choke the little seedlings. If the seed is planted now, the little plants should be ready for transferring to open beds by the beginning of August, A great idea is to fill one's flat box with soil and keep the lid well closed on the soil for a few days till it is well warmed. Then sow the seeds, and for at least twenty-four hours keep the flat wooden lid closed, after that propping it open. The soils gets nicely warmed by this method, and the seed germinates all the sooner. Protect them from the wind and inclement weather, for although these plants require exposure and light, still they need to be guarded from extreme heat, wind, or cold. Auriculas are essentially an English plant, and it is just one of those curious things so often found in gardening, that the feeding they like best of all is liquid manure made from sheep dung, but not too strong.

Auriculas have a great tendency to throw out a number of suckers or weak offshoots. These should always be broken very briskly off, so that there is not any brusing to the parent plant. Directly this is done, it is well to apply a little fine charcoal to the place where these suckers have been taken from. Otherwise these will often become like a wound. The charcoal acts as an antiseptic dressing. In watering auriculas, the roots should be well irrigated only. Then, again, a splendid plan is after these plants have been in the pots, say, six or seven months, loosen well the surface soil and shake it well out, and then fill up again with fresh soil from the compost heap. The auricula makes a lovely pot plant.

— Varieties. —

There is one particular variety of the auricula, which bears the name of "Dusty Miller." It is extremely lovely unless the bloom is touched, and then it is spoilt, for the surface of the flower is covered like a butterfly's wing, with a sort of sheen or powder, and the very touch of one's finger on this brings it all off, and so detracts from the beauty of this variety. There are many other sorts. That called the green-edged is pretty, but the silver-edged is rarely beautiful. There is a very pretty one of the old-fashioned lavender shade, with a dark purplish ring around it. When I was a child this bore the very appropriate name of "Granny's brocade," and the Botanical gardens boasted some exquisite plants of this variety.

If one has even a very small clump it is such an easy matter to divide it and propagate some of the side plants. The trouble is, of course, the long, dry summer.

— Primulas. —

There is not much doubt about it, but as a pot plant the primula takes a lot of beating. Everyone seems to have a soft spot for it, for it certainly is a brave, sturdy little plant; its blossoms are so dainty and sweet, and its pretty leaves are a model in themselves. Primulas are so very, very easily grown from seeds, and these are not really expensive. They need just the same sort of soil as the auricula and primrose tribe, and are undoubtedly the hardiest of all these flowers. It is wonderful in Melbourne how one sees these plants growing, and in flower most of the year, but, of course, they are not the same plants. Growers now have conceived the happy notion of sowing month by month, and so ensuring a continuous succession of flowering pot plants of this delicate colouring blossom.—Exchange.

Primroses, &c.

Many of the poets rave about the dainty primrose. The cowslip and oxslip are so very nearly allied to this charming little flower, for they all need exactly the same treatment, for while the primrose grows on a single stem, the others have several blossoms on one stalk. Spenser, one of the poets, must have been very fond of the primrose, for he wrote these fairy lines about it :—

Sweet is the Primrose that peeps
beneath the Thorn ;
She is the rose and glory of the
day,
And mine the Primrose in the
lowly shade.

Shakespeare writes very pensively about it—

With fairest flowers,
I'll sweeten thy sad grave. Thou
shalt not lack
The flower that's like thy face, pale
primrose.

Disraeli made the primrose the flower of the hour in England. After his death some of the dames of the Primrose League inaugurated the great Primrose Day, when thousands of primroses are gathered and purchased and laid on the statue erected to his memory.

Many folks say they can never distinguish a primrose from a cowslip, but there is a tremendous difference in the size of the blossoms alone, apart from the former having a single stalk for each flower. The same treatment, though, in growing may be meted out to these three members of this tribe, viz., primroses, cowslips, and oxslips, and they are all admirable flowers for lasting, once they are plucked. I have often known these blossoms to keep fresh for a fortnight or longer. Shakespeare, in speaking of cowslips in his "Midsummer Night's Dream," describes them as "fairy favours." He says :

I must go and seek some dew-
drops here,
And hang a pearl in every cow-
slip's ear.

Polyanthus.

Many people persist in calling them "coloured primroses." The rich brown and yellow colouring is very like the cowslip and oxslip in form, and has the foliage and fragrance of the primrose, the polyanthus clumps are easily separated and are rapid growers. They are pretty happy and contented in a soil that suits the auricula, but are decidedly hardier than that flower. Keat says of them in his well known poem, "Endymion" :—

Oft have I brought thee flowers, on
their stalks set
Live sweet primroses, but dark
velvet
Edges them round, and they have
golden jets.

Right well must this poet have known his polyanthus, for he describes it so well and truly.

— Polyanthus Primroses. —

If the seed be fresh it is not at all hard to raise. Put an inch of drainage in a 12in. seed pan and fill it up to within half an inch of the rim with leaf mould and sand sifted through a medium-sized sieve. Water with a fine can, and some two hours later, when the pan has drained, sow the seed as evenly and thinly over the surface as possible, and cover lightly with some sifted leaf mould. Water again and cover with a sheet of glass. The pan must not be placed where the direct rays of the sun may shine upon it, but stand it in the shade. It will scarcely want but one or two waterings till the seed germinates, which should be in about a fortnight.

When the seedlings have four leaves prick them off into a box or pot, well drained, and having a soil composed of leaf mould, loam, and sand in it. Here they may be kept until their leaves cover the top of the pot, when they may be repotted off singly into thumb pots or into a nursery bed, and from thence into permanent positions.

In raising plants from seed, even good seed, there is bound to be a certain percentage of worthless blooms, and these being inferior in color or form, should be taken up as soon as their uselessness is determined. The dirty purply colors are anything but beautiful. The following points will help the beginner to determine if his seedlings are good or bad.

"The plant should be healthy; the foliage large and abundant; the stem stout enough to bear the truss well up above the leaves; from the centre of the leaves the stem should rise; the truss should consist of at least five flowers, and the footstalks of each flower be able to support each bloom level with the rest. Each flower, or pip, should be round and flat, neither inclined to cup or reflex. The pips should be divided near the outermost edge into segments; each division, or segment, should be slightly indented or scolloped in the centre. Each flower should have a yellow centre or eye; in the centre of that there should appear a tube containing the anthers, but the pistil should not be there. This yellow centre, including the tube, should be of the same width as the ground, or body, color, which color should be bright, clear, and distinct. Round this body color the margin or lacing should appear of a uniform width surrounding each petal, and continuing down the centre of each to the yellow eye. The color of this facing or margin should be uniform, whether it is sulphur, lemon, or clear yellow."

The Petunia.

The Petunia is one of our best florist flowers, and has many points to recommend it. It is easily cultivated by amateur gardeners, can be had in flower eight or nine months of the year, is good for pot culture, has a nice perfume, and above all, it can be beeded out through our hottest summers, forming a mass of rich colors, which is rarely exceeded by any other flower.

— Hybridising. —

There is no denying this is one of the most important parts in the cultivation of florist flowers, for without the aid of the hybridiser it would have been impossible to see flowers in their present state of perfection. The best time to do this is between nine and one on a warm day, as the flowers have the greatest amount of vigour in them at that time. The flowers should be of nearly the same age; if not, there is a tendency to throw back to the original. The flower that is to be operated upon should have the anthers taken from it before being quite open, so as to prevent self-fertilisation. Some judgment is required in the selection of the plants, for very often a weak-constituted plant products the best flowers (especially in doubles); his aim is then to cross on to a robust-growing kind. In the matter of the colors of flowers, they ought to be clean and distinct; also even shapes should be used. The next thing is to tie a piece of twine round the bottom of the flower, and when the seed vessel has turned brown, the seed is ready for gathering.

A great deal has been done by amateurs, it is to be hoped that they will still continue to take a greater interest in this part of cultivation. Not only do they raise their own seeds, but look forward to getting something superior to the original and, if not successful, there is not the same amount of disappointment as if the plants or seeds were bought elsewhere. Again, it is an inducement to amateurs to love floriculture, which is considered the most healthy of recreations. There is one other point, and that is, never to throw away the smallest seedlings in petunias and a great many other florist flowers, as they invariably turn out the best, but a great many people would disregard this, and choose large plants, thinking they had more for their money.

— Cuttings. —

The best time to strike these is when the wood is fresh and full of vigor. If small side shoots cannot be had a part of the plant should be cut back, and after two or three weeks the breaks will be ready to take off, when they may be put round the sides of pots or pans, in very sandy soil, then cover with some glass, keep close and shaded from bright sunshine, and in about a fortnight to three weeks they will have rooted. Pot into two and a half inch pots, and treat as seedlings. Cuttings of flowering branches or old wood should never be used, as these will never make good plants. Seedlings are preferable to cuttings, as they are generally more robust than plants raised in this way. In perpetuating named or good kinds cuttings ought to be taken often during summer months, have young plants in stock.

— Diseases and Insect Pests. —

Of all the florist flowers the petunia is the least attacked by disease, and this ought to be considered another point in favor of its more general cultivation. It sometimes happens that an old plant gets attacked by a rust or fungus if kept too wet. If we had nothing more than this to contend with there would be little cause of complaint, but the slug, the snail, and, worse than these, the sparrow, have the greatest liking for the petunia. One remedy for the slug is to get some lime, and airslack it before using; put some into a small flour bag, and shake over the ground, about 8 in the evening; if a few particles of dust get on the slug it will kill it. The surest way is to hand pick this and the snail for a few nights. In regard to the sparrow nuisance, it is a difficult matter to find a remedy. It is only while the plants are young that anything is to be feared from these pests.

Manures.

— Manures. —

What manure are you going to use? Is your soil heavy? If so, then the sandy gutter sweepings will be a splendid thing to dig in. These scrapings, beside the sand, contain a considerable amount of horse manure, so that they do good in two ways. A word of caution is needed with regard to these same sweepings. If the roadway from which they are taken is traversed by an asphalted tramway track there is almost certain to be a certain percentage of tar in them, which entirely precludes them for garden use. A little tar goes a long way, especially in a flower garden.

— Cow Manure. —

Can you get cow or pig manure? If you can, then do so by all means. Both are splendid fertilisers for a flower garden, there being little heat in either of them, there is no fear of harm being done when they are being dug into the soil between growing plants. No manure—let it be cow or pig, horse or sheep or fowl—should be dug into the soil in a fresh state. It is better to stack it in some protected place and only use it after it has been in the heap some months. Many gardeners have their manure arranged in three heaps. The fresh manure is placed in one; this, after a month, is turned on to heap No. 2, where it is allowed to lie two or more months, and is then turned on to No. 3—the heap from which it is used.

— Sheep Manure. —

Sheep manure, which is particularly rich in nitrogen, is rather difficult to procure, and consequently expensive, but should you have a chance of getting a load do so at once, especially if you are a carnation grower. This manure is one of the very best for the dianthus tribe, and at this season face of the beds to the depth of an inch and lightly forking it in.

— Fowl Droppings. —

Fowl droppings are a very valuable and rich manure, but owing to its heat must be used with caution, especially amongst young and things. Its value is considerably increased by being dried in the sun, after which it is best stored in large boxes and kept in a dry place. Nowadays, most everyone keeps a few fowls, and by careful collecting and storing of their manure an appreciable increase in the profit accruing from them may be made. This is not sufficiently recognised by poultry-keepers.

— Stable Manure. —

Stable manure should be kept long enough in the heap to enable all straw to become rotted, unless the soil be of a heavy clayey sort, when it would be benefited by digging it in quite fresh. A layer 3 in. thick spread over the surface and turned under would not be too much in such ground.

Among chemical or artificial manures suitable for the flower garden may be mentioned (a) Sulphate of ammonia; (b) Superphosphate; (c) Basic slag or Thomas phosphate; (d) Bone dust; (e) Sulphate of Potash.

The first of these—sulphate of ammonia—is a powerful nitrogenous manure, and can be applied to the beds during early autumn or spring at the rate of 1 lb. of the manure to 20 square yards. Before sowing it break up all lumps small enough to pass through a ⅛-in. mesh sieve. Sow thinly and evenly, carefully avoiding letting any fall upon the foliage of plants, as they are likely to be burnt by it.

A little of this manure sprinkled between two rows of cabbages or cauliflowers and hoed in makes them jump forward as nothing else will, the difference being noticeable in a week.

— Sulphate of Ammonia. —

makes a splendid liquid manure for cinerarias, pelargoniums, etc. A tablespoonful in a gallon of water is quite strong enough. It is better to err on the side of giving it too weak than that of giving it too strong.

— Liquid Manure. —

In giving liquid manure of any kind, there are two rules that must always be kept in mind:—1, only give it to healthy, growing plants; 2, water first with clear water.

— Superphosphate. —

may be applied at the same time as the sulphate of ammonia, the two being thoroughly mixed and sown together. Four pounds of superphosphate and 1 lb. of sulphate of ammonia on 20 square yards of surface is a safe quantity to use. This fertiliser is a splendid one for rose beds. Basic slag or Thomas phosphate will be of small value unless broken and ground very small.

— Basic Slag. —

Basic slag must not be spread at the same time as sulphate of ammonia, or the goodness of the latter will escape in a gaseous state.

When preparing new gardens, digging holes for trees, shrubs, or roses, renovating borders, a sprinkling of basic slag on the lower spit does good.

— Bone Dust. —

This is one of the safest of artificial manures and one of the best. It contains phosphoric acid and nitrogen.

— Sulphate of Potash. —

This is one of the neglected manures. It brightens the colours of flowers and is also very valuable in the vegetable garden.

How to Grow Cinerarias.

There is something quite intensely human about this gay blossom, but one can can hardly describe what it it is, for it is so elusive. With all its beauty there is a great amount of hardness about it, and there is not anything of the softness there is even about an aster, but, with many folks it is a very great favourite, for as a house-plant or for decorative purposes it takes a lot of beating.

— Grown from Seed. —

It is undoubtedly true that the ordinary, every-day amateur or pot plant grower would infinitely prefer to go to the nursery gardener and invest a few shillings in four or five pots of cineraries than buy a packet of seeds and rear them themselves, and yet think of the numbers one can get from a packet of seeds and the varieties one can obtain. One may pay a couple of shillings for a plant of very beautiful showy blossoms of this tribe of flowers, but, in say three weeks, the blossoms are non est and we have not anything to show for our money, for, of all flowers, they seem to be the most fleeting. Cinerarias are decidedly "fa..." and need a very congenial home if one wishes to make a success of them. In the first place, a flat box such as a Coleman's mustard box, is one of the best of all receptacles for sowing them in, or the flat earthenware seed pans. These flat boxes need plenty of holes drilled underneath for drainage and a nice thick layer of charcoal is the first requisite to put in, and then a soil of well-sifted sand and old wood-house stuff. Sprinkle the seed carefully over the top of this and then scatter or allow to drift through the fingers very gently a little sand. Some folks believe in a little fowl manure being added. I do not, but a great fad of mine is this, and experts may smile at the idea. After putting the seeds in as I have mentioned, I water them once a day very gently through an old can then on the fourth day I water with the weakest liquid manure imaginable through the same receptacle. It is always well to keep one's seed-box or pan covered with a square of glass till the wee plants appear. Many folks say cineraria seed germinates and shows within a week, but I look for it in about twelve or fourteen days at least. The seed pans should never be allowed to be where they can feel the full force of the sun, but should remain in the warm though shady corner of the verandah. That sounds paradoxical, but it is often very easy to find a comparatively warm but sheltered spot in one's garden or verandah.

— Seedlings. —

It is just as well not to rush the seedlings from their birthplace; let them have at least three little leaves on before moving them, and then they need the gentlest, most careful handling and the leaves should be of a fair size. Many people say that cinerarias do well in the open garden, but I have never had an opportunity of judging personally, the few times I have ever planted them out my bete noir in garden pests (cats) have made a careful study of what I have been doing, and although the plants have, as I thought, been well protected, the next morning has seen ruin of the greatest. My experience is that cats do much more harm to our young seedlings than aphis or any other plant pest.

These plants have two most pronounced foes and they are the little soft downy aphis and frost. After all, either of these is easy enough to circumvent with a little thought and care.

— A Useful Pot Plant. —

In July, when the brightest flowers are fairly scarce, it is wonderful to see the bright, joyous-looking plants of cinerarias. They seem so brave and happy-looking, and to me, who have an absurd idea of regarding flowers as having a human side, they seem to say, "You may have a sort of Dr. Fell-like feeling about me, but even you must admit I'm brave and show my courage in putting out my best blossoms when most of my fellow-sisters are asleep." For this is exactly what these flowers, with their royal purple-like hues do, and very grateful we often are to them if we especially want some bright, gay-looking pot plants in the winter time. I read recently in an American novel this sentence, "The rich fragrance of the cineraria blooms, which formed the chief decoration, as almost too overpowering." Honestly, I can say I have never come in contact with a scented specimen of this flower, but have known the Melbourne florists to spray cineraria blooms before selling them, thinking, no doubt, that this mode of treatment enhanced their value.

Many folks say a cineraria never blooms so well as when pot-bound, but I contend they may flower earlier, if such is the case, but the blooms will be more fleeting and less lasting than if the flowers just before setting for bud are transferred most carefully and tenderly to a slightly more spacious home. A fair-sized plants needs (on an average) a pot nine inches in diameter. If a very large pot plant is needed, it is often a good idea to put at least four plants of one variety in a large thirteen to fourteen inch pot, and this will really make a magnificent-looking plant for one's hall or vestibule, or for a pedestal in one's dining room. A great decoration for one's mantelpiece and fireplace (especially the very up-to-date affairs of this sort) is to have a dozen or fourteen nine-inch pot plants filled with cineraria plants; those on the mantelpiece can be very easily draped with some old Oriental stuff, which so many housewives possess. The effect is awfully good, and generally calls forth the utmost admiration.

— Decorative Flowers. —

For a dinner table of a winter's evening cinerarias are not too great a success, for as the lights are turned on, often the purple tints of this flower assume rather a hard look, but tubes of the white flowers, especially if used with dainty, decorative glasses or soft-looking ferns, are very graceful and pretty. There is an undoubted marguerite suggestion about the cineraria, especially the pure-white ones, and pots of this latter variety are simply perfect, used as a chancel decoration at a wedding.

— Watering. —

When cinerarias are just forming their buds, then is the time to give them liquid manure about twice a week, for it seems to help them greatly. To allow any of these plants to become dry is certain death to them, and yet so many folks, because they are at their zenith in the winter time, think they do not need moisture, and "it really does not matter if they are kept without water for a few days."—Exchange.

Many of the deciduous shrubs and trees will root from cuttings if the pieces are taken before the wood gets too hard.

Seed Sowing and Repotting.

A lot of seed sowing is being done. Much of the work is done in frames, shallow boxes or seed pans. Either plan will do, provided you study the nature of your seed. If it is very fine, after the style of petunia, primula, gloxinia, or begonia, you must do all the work under glass, as it is necessary to afford some shelter to all the softer kind of seedlings. Indeed, any of the seedlings are soft enough for the first few days of their life. They all require careful handling. Too much care cannot be given. Shade and water are two of the essentials. Friable and not over rich soil is another necessity. But let us get a good beginning.

You are about to sow stock seed. Everyone should be doing this during February at the very latest. Buy the best seed you can afford, and sow it on these lines :—Take a third each of sweet loam, leaf mould and sand, and old rotted cow manure. Sieve the lot. Moisten the soil just enough to hold it together when you squeeze a handful. Don't make it wet.

Get a shallow box, one 20 inches long, 12 inches broad, by 4 deep, will do nicely. Leave the bottom boards a little apart, to let any surplus water soak away. Put an inch of old manure in the bottom, and then two inches of soil on top of that. Pat the surface flat with a piece of board, and sprinkle it with a fine rose watering can. Now scatter the seed, or if the seeds are larger, put them out in rows. A very thin covering of the same soil, and then a scattering of very finely sieved manure, after which place a sheet of glass over the box, and keep it out of the full sunlight in a bush house or shelter. With a frame or glass house you work in practically the same way. Be very careful over the seeds for the first week or two. Keep the box moist, and avoid splashing the surface. Water very gently, allowing the box to soak its full out of a tub with two inches of water in the bottom, is the best plan, as you then give the whole soil a watering. Remove the glass as the plants grow, and see that they get enough light and air.

Hardy seeds of the bigger things you can put out in the open, in rows in a soil half manure ; the rest nearly all sand.

When the young plants have their second set of leaves, or one in. high, "prick" them out (transplant) them into other similar boxes, but give them plenty of elbow room. One or two inches apart, according to the size and variety of the seedlings, is sufficient.

In potting off—much the same as "pricking" out. The left hand holds the seedling, and the right finger makes the hole. The little plant is put in firmly, pressed, and then watered. Things that have just undergone this process had better be put into a frame, or glass house, until they show signs of new growth, after which they may be hardened off.

Remember that all seedlings require attention and feeding. Never let them get too dry. You will kill the young plants if you don't look after them. Water often, and give a weak liquid manuring now and again to freshen them up. Avoid drawing the plants up too high. Make them short and stumpy, and whenever you are about to shift a seedling, lift it with a clump of the earth round its roots. Let the roots fall into a hole big enough to take them without crowding. So much for the seed-sowing.

In re-potting a plant let the stalk come between the second and third finger of your left hand. You hold the ball and plant as well in this way. Tap the rim of the pot, and the plant will come out root and all.

See that the roots are well through the ball of soil. If they are not it is too early to make the shift. You should always remember to clean all pots first. Dirty ones give trouble. Put a piece of crock over the hole, some cinders over that, and then a little manure to complete the drainage material. No water should be allowed to remain in the pots. Don't jump from a small size to a large one. Go a step, or size at a time. Much better this than run from a 4 to an 8 inch all at once.

When the ball and plant are out of one pot, set about getting them into another. Set the drainage stuff, place some earth over that, and then see how the plant will sit on the soil. If it is too high take some of the compost out again. Take the old drainage stuff from among the roots before making the shift.

Fill the earth in,, and see that sufficient room is left between the top of the soil and the rim of the pot to allow you water the plant. It does not matter whether you are potting seedlings, ferns, or palms, room must be left for the water.

The ramming of the soil is done with a piece of batten. To leave air spaces and holes is bad. Press the earth solid. If it is of the right texture no harm will come to the plant. All this work can very well be done on a rainy or a hot day. Potting work is usually done under cover.

Fuchsias, coleus, cinerarias, and many other such things are often grown in pots, and to know just how to handle them is to make a success where otherwise you might fail. One thought, in closing : Don't keep any plant so long in the one pot as to force it to fill the whole area with a mass of rootsf And when you shift anything that carries a ball of roots, comb the sides of the ball lightly to break some of the mass before re-potting.

Palms like a fairly heavy soil with no leaf mould. Two-thirds loam and the rest sand and old manure will do.

Cochineal is obtained from a parasitic insect known as coccus cacti, which infests one of the ordinary prickly pears that flourish on the Mediterranean coast.

"If you get a new idea, don't build a barbed-wire fence around it and label it as yours. By giving your best thoughts freely, others will come to you so freely that you will soon never think of fencing them in. Thoughts refuse to climb barbed-wire fences to reach anybody."

On Exhibiting Flowers.

By W. R. Sayers in The Amateur Gardener.

I have been asked to contribute a paper on this subject, and can only give my own views without in any way posing as an oracle. Other persons may differ from me. Let us start on the table and deal with the material upon which the vases are placed. I prefer a dark olive-green cloth or black velveteen. To use bright green, or pink or white is a detriment to the flowers. We want something quiet in colour, and yet capable of giving a good background. Next as to vases or receptacles. These should be neat, plain glass tubes of different sizes as to height. Where a miscellaneous collection is in question, green earthenware vases, with a light brown band round the centre, do for the background, as the blooms in the back row are sometimes unwieldy. I have seen blacking bottles used, but they are ugly. The earthenware vases I speak of can be seen in the florists windows at times. Coloured glass vases, or those with too much ornamentation should be avoided as we are showing flowers, not glassware. If possible the flowers should be staged at home, to get the right effect, taking care to have spare blooms in case of accident. Then again, if the show be at night the room should be darkened and the gas turned on, because what in daylight, for instance, may be termed a beautiful yellow, at night looks white—and many flowers lose their charm of colour under gaslight. A note may be taken of the relative position the flowers are to have so that when staging at the show confusion may be avoided. As soon as picked, the flowers should stand in water until time to go on the show board. Here, again, be careful to avoid heaping the flowers one on the other and landing them in a crushed condition. Good, roomy shirt-boxes, or baskets square in shape, may be packed one on the other, and securely tied together and carried in comfort. Take plenty of time in the show room. Don't fluster, but, on the other hand, don't be finicking, but deal in a bold, natural way with your blooms. This more particularly as regards a miscellaneous collection, which should be arranged with due regard to blending of colours, keeping the background higher than the middle, and the front row lowest of all. It is not necessary at all times to make each set of blooms stand alone and clear of the others, sometimes they intertwine, as it were, with excellent effect. Don't discard so-called common flowers, if they are clean and well grown. Remember it is the condition of the flowers which often counts. Again, avoid overdoing some of the vases. If you have a good Stock, for instance, don't cut it level with the ground and show the whole plant. This is aptly termed an abuse of strength, and tends to destroy the proper balance of the exhibit. I know some of the judges are led away by size and weight, but if you are a true exhibitor, you will first of all try to deserve first place, and not seek to get it by vulgar showing. I may say here, that for my part I detest the show-tray, I care not what flower is being shown. In these trays we have holes with receptacles all exactly distanced apart. Now, flowers differ in size, and it is convenient to move your glasses so as to space the flowers intelligently.

My remarks have largely applied to miscellaneous blooms. Let us deal with carnations. These should be shown with the calyx clear of the tube, and without that abomination—a paper collar. If the bloom requires this support it is in my opinion inferior. I must join my protest against the dressing of the flowers in vogue nowadays. We see two or three rows of petals with a hole in the centre where the small petals have all been removed. The flower is unnatural—a little dressing is desirable, but surely we won't want to outrage nature! As to roses. I think these would be much improved by exhibiting in vases and not trays, and they look far better with some of their own foliage. I fear to venture upon the domain of ladies' floral work, but I have seen many cases in which a few flowers artistically arranged have won the day against heavy massed work in which expensive flowers, such as orchids, have been used. The same applies to decorated tables. There is that indescribable air of grace about ladies' work well done, which commends itself even to a man. You don't know how they do it, but there it is; and it is the light touch and not the heavy work which appeals to the general public.

Speaking generally, it is difficult to express in writing what one feels as regards proper methods of showing, because one gets an intuitive way of doing things as the result of years of watching other people's methods, picking up wrinkles here and there. The whole thing is very interesting, and it is wonderful what an improvement has been made of late years. We seldom see miscellaneous blooms, for instance, plastered down on a show-tray. Much more taste is now exhibited.

Perhaps I may conclude these imperfect remarks by dealing with one's personal feelings in exhibition. I think, after years of showing, one experiences every feeling possible. There is the keen sense of battle in going against a tough competitor, the disgust at being passed by, when you pretty well know you are first, and the humiliation of being placed first when you don't deserve it. Then, again, a run of luck may make you careless, and behold you get a well.merited thrashing. Or, you may be constantly defeated, and, undismayed, you take leaves out of your conqueror's book, and finally turn the tables on him; but through all, unless you are of a narrow and uncharitable disposition, you peg along, sometimes winning, sometimes defeated, but laying up a pleasant store of memories and enlarging your sympathies by association with those whose lives have inevitably been softened and refined by the quiet, unseen influence of the flowers.

About Carnations.

Mulch any one-year-old perpetual carnations which have finished their first flowering with a good layer of old manure, and water the plants sufficiently to keep them nicely moist. A second growth will not be long putting in appearance. Cut away all the old flower stems. These are of no use now.

You sow your carnation seed this month at the latest. Stock that you have saved from your own plants will germinate like sorrel, and grow quite as readily. Perpetual and the spring blooming varieties go in together. The "springers" will bloom in the first year if seed is sown at once. Hustle the plants on. Make them gallop. As soon as they are big enough to handle "prick" them out about two inches apart in a bed by themselves. A little later on lift them into their flowering place. From the time of the last shift never let them have a minute's idleness. Use plenty of old mortar rubbish, wood ashes, leaf mould, and coarse sand when making up a box or bed for raising seedling carnations. The one great necessity with this stock is a soil which gets the water through quickly.

Many people have an idea that carnations are only to be grown in light soil. This is wrong. A heavy loam that is not allowed to get too dry does almost as well for the average run of flower. The lighter medium will give you slightly bigger blossoms, but that matter does not concern the man or woman growing carnations for pleasure.

If bent on striking some cuttings try the following plan:—Get two pots, one a six-inch, and the other a four. Plug the hole in the four either with wood or cement. Place the smaller pot inside the larger one. Fill the space between the two with moist sand. Fix the cuttings in this. Half a dozen in a pot will about use all the room. Now fill the centre pot with water. See that this is not allowed to run dry. Treated in this manner the carnations will root very quickly. It is the even supply of moisture which quickens the root action. A bush-house or a shady corner is the best place to hold the pots.

Editorial Notices.

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Sunflowers.

To observers of the early spring flowers the predominance of soft colours, especially in white, blue and pink shades is plainly evident. During summer we enjoy being regaled with a lavish abundance of strong tints, fully exhausting the entire floral color scale. As a distinct feature of the passing summer and early fall aspect we notice a great volume of yellow passing before our eyes—the golden waves of the rudebeckia, solidago, helenium, and helianthus varieties, gently swaying in a light breeze; hues vieing with the coloring golden fruit of field and orchard, their intensity lending a certain element of visionary warmth to the cooler atmosphere of the season. It is the rich golden tone of nature, intensified in radiance in our garden.

Being of tall growth they require less tieing up when given protection from violent winds and heavy rain storms. High woods or buildings, back, in the direction where the most storms come from, are safeguards. In agreeable contrast with a solid background the effect is infinitely superior to a plain outline against the sky. In such positions the golden wave of color gains in volume and brilliancy in the clear sunlight of the early fall days. We watch the interesting spectacle of myriads of singular flowers following with their faces the moving sun, until, at night, their heads bend in an angle that the petals may protect the centre.

Perennial sunflowers can be most freely propagated by divisions of the rambling roots. The chief trouble is to keep them within bounds.

Oil from Sunflower Seed.

A report of the Imperial Institute contains the following note on Sunflower seed: "A sample of of this seed was received from the Sudan. The kernels yielded 47.9 per cent. of oil, equivalent to about 22 per cent. expressed, on the whole seed. The oil was bright yellow and somewhat viscous, and would be suitable for edible purposes after refining. The residual cake would be suitable for use as a feeding stuff. So far Sunflower seed has not been largely worked in the United Kingdom as an oil seed, but experiments in its utilisation have been made recently in Hull." With us of course the Sunflower is grown only for its beauty.

Dahlias.

Although the Dahlia has good-sized, fleshy tubers, as a rule, few plants show signs of distress sooner in dry weather. The blooms suffer in proportion, some of them not fully developing when the roots of the plants are very dry — dry enough to cause the leaves to become flabby when the sun shines on them. Water must be given in sufficient quantity to maintain the soil in a moist state as deep as the roots go. Twice every week apply manure-water in a weak state, and the general appearance of the plants will be most satisfactory. On the young shoots that bear buds the resultant flowers will be very neat and refined, and the supply of bloom will be maintained well into the autumn.

The Panther Lily.

Lilium pardalinum, the Panther Lily, is a particularly us?ful tall-growing Lily. A native of North America, the usual height is from 5 feet to 7 feet. Both leaves and flowers are arranged in whorls on the tall stems, giving the plants a distinct and stately character. Each stem terminates in a loase inflorescence of twelve to twenty blooms, rich orange in colour and freely spotted. It is what may be termed a good-natured Lily, for the bulbs appear to thrive equally well in peat or moderately light loam. L. pardalinum has large, rhizomatous bulbs, which increase rapidly. These should be planted 5 inches to 6 inches deep, as this is a stem-rooting species. One of the best positions for this Lily is in beds, where the stems will be screened from the hot sun.

The Lotus Lily.

The beautiful rose coloured blooms of the Lotus lilies, which have grown so magnificently at the Botanic Gardens, are of a singular construction. Herodotus compared the receptacle of the flower to a wasp's nest. The leaves are covered with a fine microscopic down, which, by retaining a film of air over the upper surface, prevents it from being wetted when water is poured on it, the water rolling off in drops; this has a very pretty appearance, the drops of water looking like drops of molten silver. The lotus plant was worshipped by the ancient Egyptians, and in India, China, and Japan is still employed in religious invocations and ceremonies.

The Arum or Nile Lily.

There are often spare corners in a garden which, for various reasons, generally present a bare, untidy appearance. These may be made to look really beautiful, especially if near water, by planting the ordinary Arum Lily. This, owing to its extreme hardiness, will not only grow but thrive luxuriantly in places where most other bedding plants will fail to grow altogether. A well grown clump of the Arum or Nile lily in blooming season presents a splendidly bold effect. The ground needs to be dug deeply a couple of times before planting, and a barrowful or two of sifted compost heap product mixed with it at the same time. Plant pieces of the roots in this 2 feet apart, firming the soil round each with the gentle pressure of the foot, and afterwards giving a watering. They will scarcely need any more attention, except the keeping down of weeds by an occasional hoeing round them. They multiply rapidly, and in twelve months will completely cover the space planted. Places which are too damp for almost any other things are especially suited to the Arum. The yellow variety also is very hardy and does well outside, although it does not spread so rapidly. It forms a pretty contrast to the white.

A Good Annual for Cutting.

When sowing hardy annuals, the Sweet Sultan should not be forgotten. The flowers remain fresh in water for a long period, and are therefore valuable as cut flowers, being very effective either in vases alone, or mixed with Fern, light Grasses, or with Gypsophila. The seeds should be sown where the plants are to flower, and the best results are obtained from plants that are well thinned. There are several beautiful varieties. The Bride (white), The Bridegroom (heliotrope), The Bridesmaid (yellow) and splendens (rich wine red) are some of the most distinct, although a mass of mixed shades is very attractive.

Prince's Feather.

The botanical name (Amarantus hypochondriacus) of the above plant may prove troublesome to those who have not yet made its acquaintance, but the popular name, Prince's Feather, has been well known for many years. The plant grows 2ft. to 3ft. in height according to the richness of the soil gnd the space which the cultivator gives it. When grown vigorously it keeps branching and producing many flower spikes of a rich carmine-red or crimson and is very effective. Those who cannot afford so much space can still have a clump or patch of it of more moderate dimensions by planting rather more closely. The plants do not last so long in beauty if they are too crowded. The bright effect is due to the coloured bracts and calyx rather than to petals which most people regard as the flower proper. These coloured portions are also of a dry nature, comparable to Everlastings, and that explains their durability.

The Flag Iris.

The Flag Iris will grow in any ordinary soil that is moderately well dug, and seems to thrive in any position, although it prefers one that is not too fully exposed to the sun and a soil that is deep. The Flag Iris develops into large clumps if left undisturbed for a few years, and makes a finer show in the border. It has one great advantage over many other plants, that when its flowers are over it still presents a clean and wholesome appearance. Its leaves do not become ragged or unsightly, and, in fact, when the old flowering stems are removed it still remains an ornamental plant. It would almost be worth planting if its flowers were valueless, for its clean, attractive grey-green sword-shaped leaves act as a foil to the brilliantly-coloured blossoms of many flowering plants and add to, rather than detract from, the appearance of the border as a whole.

Cypsophylla Paniculata.

When one considers the d fferent effect a few sprays of Gypsophila known as the Siberian gauze plant, give to a bunch of cut bloom out of the garden, it really proves itself to be absolutely essential to every garden, more especially when flowers are required for decorative purposes and for bouquets, etc. The blooms being of a compact, rigid nature, help immensely in the formation of the bunch by keeping the blooms in their places as arranged. It will thrive in almost any soil, but does best in a deep dryish soil. I say deep because in transplanting it from the two year old seedling beds I very rarely get the entire root up, as being similar in shape to the horseradish, it nearly always breaks off, even if two or three feet deep; but this does not materially effect the future growth of the plant.—Exchange.

The Most Permanent Colour.—Yellow is far the most permanent of any colour in flowers. It is the only one not affected by sulphurous acid fumes.

Fern Tassels.

One of the more peculiar characteristics of the great Ferm family is that so many of its members have developed a faculty of producing tassels at the tips of their Ironds and side divisions. This faculty appears to be entirely confined to Ferns with one doubtful exception in Asparagus plumosus which have leaves of an extremely Fern-like character, and in one variety these terminate in fasciated bunches similar to Fern tassels. Fern tassels, however, cannot be regarded as forms of fasciation as they originate in a different way. Thus if we compare the Cockscomb Celosias with a tasselled Fern frond we can see that the fasciation begins really at the base, the stalk being really a number of associated stalks, which, as each expands by growing, eventually form a huge mass, the stalk of the tasselled Fern on the other hand will be perfectly simple and normal until the base of the tassel is reached when it branches into many and eventually as a rule forms as many independent strands, these rarely adhering together as in the Cockscomb, the only exceptions occurring in the Hart's-tongue or other undivided species.

— Origin. —

It does not appear justifiable to attribute cresting to reversion to earlier forms especially as, although a large number of fossil Ferns have been found in coal and other formation, no tasselled example has been discovered. The tasselling varies very much in degree ranging from a mere forking of the frond tip or side divisions to dense bunches of filaments or long pendulous tassels of many strands, these dividing again and again or remaining single according to the variety. It originates as we have said in a multiplication of the midribs, and as a rule a frond bearing a heavy tassel at its tip will have its side divisions tasselled in proportion.

— Method of Growth. —

The divisions of a Fern frond are indeed generally smaller replicas of the frond itself and any decided character is reproduced an a smaller ecale; thus in some thorough bred tasselled fronds we find the tasselling to extend even to the smaller sub-divisions to the fourth degree. The curiods part about such extreme varieties is this. Fern fronds are entirely developed by growth at their points. The frond begins as a tiny knob with a rolled-in point, this rises on a sustaining stalk and develops into a rolled up ball, inside which growth proceeds by extension ot more and more growing tips which eventually uncoil and flatten out to form the frond which normally has its tips finished off with a point. In these extremely tasselled forms, therefore, we must conceive that at a given stage all the growing tips multiply themselves with the result that when the uncoiling occurs we see each division emerge with a little tassel complete,y formed, this eventually assuming full size by mere expansion.

— Variation. —

Nature, however, delights in varying her methods, and in some cases we see tasselled Fern fronds uncoil which merely woolly looking tius which subsequently divide and re-divide, continuing this process right through the growing season or even in evergreen Ferns, into the ;next, great bunches of thready tassels be ng thus created. Some forms of Pteris serrulata, the common tasselled Pern, act in this way, and the size of the tassels depends entirely upon vigour of growth. It is a remarkable fact that despite the great extra drain which the formation of heavy tassels must impose upon a Fern, the production of spores is rarely, if ever, reduced. In many cases indeed it is increased, the tassels themselves being provided with spore heaps.

— Fertility. —

Plumose or extra feathery Ferns on the other hand are invariably less fertile in proportion to sheir leafiness. The multiplication of the midribs which leads to the formation of terminal tassels sometimes commences below the leafy partion of the fronds, thus multiplying the fronds themselves, each branch bearing a frond, and this as a rule branches and branches again. This carried to an extreme does away entirely with the frond proper, and may so alter the aspect of a species as to render it difficult to determine it. Thus, for instance, we have a Hart's-tongue, which resembles exactly a ball of fine moss, and a lady Fern, which in a plant of same size, extremely resembles the Hart's-tongue, though in their normal forms nothing could be more dissimilar. In neither case is there a trace of the normal flat frond. Between these extremes and a simple forking of the frond tip there are all grades of division, and since these vary on other lines, some forming flat-fan like tassels, some dense bunchy ones, others long pendulous ones, and so on, while other abnormal characters are allied with these to diversify them in other ways, we need not wonder that distinct tasselled forms are numbered by the hundred. — "The Gardening World."

Roses.

It will be readily understood that if a plant is called upon to give a succession of blooms over a lengthy period it must be lovingly tended and liberally treated. Deep cultivation of the soil is one of the first and most important requirements. If the roots cannot find a cool and moist run during the drought and heat of summer they cannot sustain the strain of continuous flowering, therefore dig deeply and incorporate plenty of rich farmyard manure with the bottom spit. A little artificial in the shape of quarter-inch bones or bone-meal is also a great help.

Another important point to be observed is to remove all spent biooms as speedily as possible, and in cutting them to take a fair length of the flowering stem, but at the same time taking care not to cut low enough to start the basal buds into growth. These lower buds are those from which the shoots for next year will emanate, and it is most desirable to have the early-formed and well-ripened wood to prune back to than that grown later in the year, hence the need for exercising judgment and care in cutting the blooms. Constant stirring of the surface of the Rose bed is also an immense aid to healthy and vigorous growth. It not only aerates the soil, but prevents evaporation, and thus conserves the moisture, a most desirable thing, especially in a hot, dry summer. It is also advisable to give a liberal top-dressing of well-decayed farmyard manure. This may be lightly forked in, taking care not to disturb the roots when so doing. When time cannot be spared for almost daily hoeing between the plants, the manure may remain on the surface all the summer, making an effectual mulch and supplying nourishment to the roots after each shower of rain. This may be supplemented with applications of liquid animal or artificial manure Soot water is also most beneficial, heightening the colour of both foliage and flower, or sulphate of ammonia at the rate of half an ounce per gallon of water acts as a capital stimulant. These applications should only be made when the soil is thoroughly moist, and not oftener than once a fortnight.

Imitation v. Real Flowers.

Our horticultural friends across the Atlantic (soys "Horticulture") are somewhat worked up about the increasing popularity of florists to sell them. In this country the problem is by no means a new one, and the increasing skill shown in the production of these imitation flowers should not be underestimated. It must be admitted, however, as we have before remarked, that the artificial flower has its place, and an unqualified denunciation of it by the grower of fresh goods would hardly serve any good purpose. The sinning which we all can consistently condemn is its use as a substitute for the real thing where the latter can and should properly be used. Fresh flowers in a ladies' hat are as impracticable as a bridal bouquet in cloth imitation would be abominable. Last winter it was quite a common thing to see on Broadway silk cattleyas worn as corsage adornment, but everybody could see they were imitations, and on freezing days when fresh flowers could not be worn we must admit there was some commonsense in the practice. "The eternal fitness of things" is a good standard to have in mind. Any florist who would encourage the use of artificial flowers as substitutes for the genuine when the latter would be practicable and fit is a proper subject for censure, but there are plenty of uses for the former and the more nearly perfect they are made the better we enjoy seeing them. Let us be careful not to stand up so straight that we tumble over backwards.

Sugar baskets are one of the best possible material for the sides and ends of a bush house. They let all the air through that is necessary, and make a very effective windbreak. To straighten the baskets lay them on the ground and pour boiling water over them. Put a length of timber and some stones from end to end until the baskets dry.

Anemones and Ranunculus.

The St. Brigid Anemone is a most charming variety; the large, semi-double flowers are freely produced, nestling among beautiful fern-like foliage, and the colours are greatly varied, some flowers being intense scarlet, others purple and pure white, and delicate shades of other colours. The French Ranunculuses (Asiaticus superbissimus) are free-flowering, give many colours, and are very fine indeed. The double Persian, and the double Turban in scarlet, white and yellow, are all worth growing, and deserve very good treatment. Having determined the positions for the plants, either rows or clumps, put in the roots as follows:—If in rows, make these 15 in. apart in the lightest soil of the garden, and put in the roots with the claws downwards (in the case of the Anemones especially) 6 in. apart, and bury them 2 in. deep. If the roots are to be grown in clumps, place from five to a dozen 9 in. apart each way in the clump, and cover them the same depth as those in the rows. Label the clumps and rows at once to prevent injury to the roots before growth appears.

Why are Some Flowers Altogether Barren?

At the outset, a distinction must be made between flowers which are sterile when insects are ecluded, and those which are incapable of fertilization with their own pollen, or self-sterile, as Darwin terms them. In the former case sterility is merely due to the fact that the pollen is prevented from reaching the stigma, or that the pollen and the stigma mature at different times. In the latter class there are a number of plants that aresterile even where insects are given every opportunity of fertilizing them. This is the case of five species of Pasiflora, several species of Verbascum, and a large number of Brazilian Orchids. In the last instance it was found that the pollen was often actually poisonous to the plant. But the examination is not yet complete, as the fact of self-sterility cannot be proved except by protecting the plant from insects, and then fertilizing it by pollen of other plants and by its own pollen. It is, however, ascertained that the phenomenon is found at random throughout the whole vegetable kingdom. The causes of it are due to environment. Plants self-sterile in Brazil become fertile plants in England; plants sterile in spring become fertile later in the season. Darwin concluded from this that some degree of differentiation in the productive system is necessary for the full fertility of plants. Self-sterility must be regarded, then, as an incidental result, dependent on the conditions to which plants have been subjected, such as excess of heat, manure, moisture, and the like.—"Florist."

Vegetable Garden

Notes for February.

Beans just now are one of our staple vegetables. They may be sown for the next month or so, and as often as required. Being hardy, as well as very prolific, no difficulty is experienced in getting satisfactory crops. Select well tilled land, enrich it with plenty of animal manure to keep the soil open, and add a little fertiliser. In a long series of experiments at Rothamstead, in England, it has been amply demonstrated that potash manures promote the growth of beans.

No manure will do for the crop what good common sense cultivation does. You can manure freely and then fail. But you never will fail if you manure and hoe together. Far better a light manuring and frequent stirrings of the soil and all the watering necessary, than a strong dose of fertiliser and the rest shunted on Providence. Sometimes you get a "leg-in" by leaving your battlings to chance: most times you fail.

Then sow your beans, no matter what variety, in the best soil possible, in shallow trenches, two rows of seed to each trench, seeds eight inches apart, and cover the seed with an inch of friable soil. Prevent the surface baking by scattering some old manure. Water freely. Use only the dwarf varieties. The pole, or runners, are rather too late, unless for tropical climates. Avoid sowing too many at one time. Rather do one good row to-morrow, and another a fortnight hence, than put out a hundred feet row now and do no more. Pick the beans before the seeds get too prominent, and while they snap. Stringy things are useless in the kitchen.

Beets, both red and silver, can be sown this month, the red for root growth, and the other for the leaves. The red are sown in drills in rich ground, and thinned out sufficiently to allow each root to swell as large as the palm of your hand. To do this you must give the plants "elbow room," and manure as well. Scatter the seeds in rows anything from 18 to 30 inches apart. Ample waterings are necessary. Keep the soil well broken between the rows, and in selecting the seedlings save the sturdier plants. Beets can be saved through the winter by being carefully dug, stacked and first covered with a straw thatch, then with a coating of earth to keep out the air. Break off the leaves not closer than three inches from the root.

The silver beet is grown for leaf and not for root. It is perennial and can be kept leaf-producing for months. Well-manured soil, loamy in texture is the best for this beet. Still, good results can be had in light sandy soils. Sow the seed carefully in drills, cover it lightly, thin out the plants and keep them always moving. Fourteen inches between each plant will do.

Broccoli, like the cauliflower, is grown for the flower or head. Unfortunately the flower is not produced as quickly as the ordinary cauliflower, and for this reason the vegetable is no favaurite here. There is no sense in wasting time and land over things which are not as good nor as easily grown as some of our staple products. Broccoli is really a cold country vegetable.

Brussels Sprouts belong to the cabbage tribe, and are grown for the sake of the sprouts which are produced along the main stem. Treat the seed as you would cabbage, and transplant the seedlings when as high as your longest finger, giving each 20 inches clear room. Quite six months are required to mature a crop of the slow-growing sprouts. Good, rich, well-drained soil suits this class of vegetable. Over-manuring goes against the production of the sprouts. In windy places the stems may be earthed up a little to give them better support. The cabbage head should not be cut off until the crop is ready for gathering. A sharp knife should always be used to make a clean cut when gathering the sprouts. Tearing them off with a part of the stem adhering spoils the chance of a second crop.

On the subject of how to obtain monstrous Carrots such as seen on the exhibition table, a successful grower writes:—The ground should be deeply trenched, working in plenty of soot as the work proceeds. When ready to sow rake the surface down level. Afterwards stretch a line across the ground 18 inches apart, then, with a crowbar against the line, holes should be made 12 inches apart and 2 feet deep and 4 inches across at the top. These must be filled up with a mixture of three parts sifted loam, two parts leaf soil, and a half part of wood ashes and dry powdered fowl manure. Make the soil moderately firm, and sow a few seeds on the top of each, to be ultimately thinned out to one. Keep them well watered during dry weather, and fine soil should be placed around the collar of each as the season advances to prevent the crown from becoming green. They will, when pulled, be found to be splendid shape, of gaod colour, and free from side growth and strongy roots.

As a rule Horse-radish is grown at all is relegated to some out ol the way corner of the garden and no attention paid to it. It is far more wholesome than sauces or relishes, and possesses valuable medicinal qualities which might be taken advantage of by neuralgic and rheumatic persons, and therefore deserves wide and more rational culture.

Cabbage may be grown all the year round. We have varieties for all seasons, and good ones at that. For present plantings use Succession or Drumhead. These transplant easily and do well. In seedsowings take some later sort, or one of the good Savoys that carry a nice crinkly leaf, as these are better doers in the winter season.

All the tribe are gross feeders, and like rich, deep, moist soil. When properly fed they grow wonderfully fast and repay one for all attention. A cool, moist climate is really one of the ideal conditions for cabbage culture. Moisture you must have, as droughty conditions are certain failure. Cabbages head best in a good stiff loam.

Sow the seed in a small bed of light soil and do not allow the seedlings to over-crowd. Reduce their number as soon as you can handle them, as there is no gain in growing more weedy plants than can be used.

Plant out in rows, allowing space according to the requirements of the varieties in cultivation. Drumheads should have fully thirty inches between the plants, while Sugarloaf and the smaller kinds can do with eighteen inches. The vigor and growth of cabbages can be improved by frequent stirrings of the soil between the rows. Water is very necessary during dry weather. In home gardens where cabbages are grown in rows, be careful to leave the last two rows of leaves on the stem when you take the head. New breaks come away almost immediately, and the old plants get a furnishing of nice succulent little heads that can be put to a good use. This recommendation only stands good where the ground is not required for immediate use.

Radish seed may be sown lightly in well-manured beds in any open situation. Rake the surface level, water it, sow the seed evenly, cover with a half-inch coat of light soil, and then top with new manure, and keep the whole fairly moist. This is the Chinaman's way of doing, and it generally pays. Quick growth is what the radish requires. There should be no lagging. Start clean and keep the seedling plants growing hard. Thin out liberally.

The utilization of diseased potatoes as pig feed is by no means a good plan. The parasitic mode of life of the micro-organisms, which have spoilt the tubers considerably reduces the value of the tubers, and operates injuriously upon the digestive organs of the animals to which they are fed. Small quantities do little or no injury. It is the persistent use of the diseased potato which does the harm.

Sow carrot seed on light land, and cover some with fresh manure. Take the seed and mix it with a little dry sand before sowing. Rub the lot through your hand, so as to get it to scatter more evenly.

Pumpkins, melons, marrows, and cucumbers will stand much mulching, and a lot of watering now that the weather is so hot. A little mulch to keep the ground cool will be such a help. It is a pity to make even the vegetable friends suffer unnecessarily.

Sow early cauliflower seed at once. January is the time to do something towards laying the foundation for your winter vegetables. Most of us think of sowing this seed when we see the young plants displayed for sale. It is then getting rather late. Purchase seed this week and get the stock in somewhere, either in the open ground or in a shallow box that can be lifted about to suit the day. For preference we like a small bed near a tap. Water is then handy enough not to be forgotten. All the quick growing seedlings require a lot of attention. Fairly rich soil covered with a light dressing of manure will do for the seed sowing.

To exterminate the leaf-eating insects which are just now so troublesame among pumpkins and the like, use arsenate of lead for making a spray with which to poison the foliage.

The slightest shower sets the snail in motion. He dearly loves the rain. And yet we usually speak of the shell-back as a sluggard. Were this true no rain drops would not awaken him. He would slumber through the "thunder shower," much as his pursuers do through the golden hours of the early morning.

Globe Artichokes.

Not many people care for this vegetable. Still it is a good one when properly grown. If not treated to very heavy dressings of manure and copious supplies of water, then it had better be kept out of the garden altogether, for very little satisfaction will be got out of it. It does best on rather stiff soil into which all the rotten manure you can afford has been trenched. It will also appreciate a heavy mulching with similar stuff. Treatment such as this will give you very fine toothsome "heads," and these if cut sufficiently early—that is when closely arranged and very compact—will be delicious when cooked.

Lettuces.

It is important to grow lettuces quickly. In addition to stable manure dug in before planting out they will be much benefited by top dressing. Guano is considered specially good and may be applied at the rate of 2 lb. per sod as soon as the young plants begin to make growth. A fortnight the same quantity of nitrate of soda can be given. See that neither manure touch the plants.

Humus and Air.

The presence of any large quantities of decaying organic matter (humus) adds enormously to the water-holding capacity of the soil. One ton of humus will absorb two tons of water, and give it up freely to growing crops. Not only that, but the shrinking of the particles of decaying organic matter and the consequent loosening of the soil grains keeps the soil open and porous.

Furthermore, humus of good quality is exceedingly rich in both nitrogen and mineral plant food. The maintenance of fertility must always be said to consist in keeping the soil supplied with humus. The first step in renovating worn-out soils, is to give them an abundant supply of humus of good quality. The best source of humus is stable manure, containing both the liquid and the solid excrement, especially when the stock are fed on rich nitrogenous foods. Even a poor quality of barnyard manure, which has had much of the plant life bleached out of it, has considerable value because of the humus it makes.

Another cheap and valuable source of humus, but one which

Readers! Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.

must be used understandingly, is crops grown to turn under as manure. The legumes are especially valuable for this purpose, because of the nitrogen they contain. .. .

A proper circulation of air in the soil is just as important as any other factor of plant growth. Nearly half of the volume of ordinary soils is occupied by air spaces. These air spaces wind in and out between the soil particles, just as they do in a pile of larger stones.

If the layer of water on the surface of the soil grains becomes so thick as to stop the air passages here and there, the soil is then too wet for most crops, and needs drainage. Plants have no special breathing organs, the oxygen required in their breathing finding entrance all over the surface of the plant. Plants roots must therefore be supplied with air, and hence the soil must be porous enough to permit of free circulation of air. A good supply of humus, draining, and proper tillage, will accomplish this result in clayey soils. Sandy soils need little or no draining, as they are usually too porous. They want humus to help them retain water.

Another reason why air must circulate freely in the soil is that large quantities of oxygen are required to insure proper decay of organic matter to supply plant food.—" American Homes and Gardens."

Fruit or Vegetable.

The tomato is usually defined as a fruit botanically, but popularly known and used as a vegetable. I find myself (says a writer in Wisconsin Horticulture) in the position of the old Scotchman who was having rather a hard time to hold his own in an argument. " Well," he said. " I am open to conviction, but I would like to see the man that is able to convince me." So I would like to see the man that is able to convince me that the Tomato is a vegetable. To quote another of my illustrious countrymen, an old Scotch minister was lecturing his flock about the wall round his garden. He said, " It does na matter whether it is a brick wall, a stone wall or a wooden wall ; it is a wall a' the same." So I say that it does not matter whether the tomato is used as a fruit or a vegetable, it is a a fruit all the same.

Fruit Garden

Fruit Notes.

Bag any bunches of grapes that you wish to keep from the birds. Paper bags will do. Pin them at the stem, and cut a hole in the end, so as to allow the fruit to throw off any surplus moisture.

The folly of leaving fruit trees unpruned can be seen at this time of the year, when the long, whip-like stems are bearing down under the load of ripening plums, apples, or peaches. No good shirking the pruning. For the sake of the tree and for the fruit, the limbs must be cut back every year. Neglecting the work means spoiling your stock.

Fruit trees which have made very little new growth owing to the drain upon their recourses, occasioned by the ripening of the crop, will take a thorough soaking now, and be all the better for it. The taking away of the fruit will in itself be sufficient to give the trees a new start. The watering makes the movement all the better. Trees are no different from roses. Those you favour with attention will repay more than the cost of the labour. All through the flower and fruit world it is a matter of dealing out with the left hand to gather in with the right. Those who give little, either in labour or manure, have nothing much to gather after a dry time ; but the company who know what is required of them, always have something for home use and a little for giving away.

Sparrows have troubled us pretty much of late by their attacks on the ripening fruit. Much of the damage that we have been in the habit of debiting against the starling is really done by the cheeky and useless sparrow, a bird against which it will soon be time to begin a systematic crusade. Experiments have proven that this winged pest is a serious menace to the orchardist and the farmer. Grain and fruits are more to his liking than insect pests.

Remove the bandages from the apples, pears, and quince trees every ten days at least, and inspect them thoroughly for codlin moth grubs. Where no catch is recorded tie the bagging round again ; wrappers which hold any insects should be boiled. There is only one way of ridding ourselves of orchard pests, and that is by laying ourselves out to catch and kill every noxious moth and grub that can be trapped or poisoned.

Should you ever become possessed of an acre lot where there is some native timber standing, think hard before you destroy the trees. The first mistake a man can make is to clear his holding of the timber. Trees are easier to cut down than to grow. It is all very well to say, " I'll plant good varieties in place of the eucalyptus cut out." But how long will the new things be in making the shelter and shade which the natives are able to give ? Twenty years at least. Not much when you say it quick ! Still it is very nearly half a life-time. Ready-made, hardy gum trees are much better than nine-tenths of the stock people plant to-day. Give a gum half the attention which the exotic tree gets and it will surprise you. Say what you like, there is nothing in the world of timber trees to compare with our own wild stocks.

The citrange is the name of a comparatively new American fruit which was originated by the U.S.A. Department of Agriculture. The fruits produced to date are said to be small, and slightly bitter, and very juicy, carrying a much larger proportion of juice than the best lemons grown. For a drink they are equal to lemons, and make a first-quality marmalade. The addition of a little sugar makes the fruit quite palatable. The citrange is said to be able to stand much more cold than any other member of the citrus family.

The enormous energy and power of a growing plant is one of the many questions which are apt to puzzle men and women who do their garden work with their eyes and ears wide open. Take the bracken fronds which we frequently see forcing their way through ground that can only be broken with a pick or a mattock. How is it that this brittle thing works its way to the surface ? There must surely be a greater power within the brittle stems than is apparent to human eyes. As an illustration of the lifting power of plant life, a portion of a solid asphalt path was lifted in one place to a height of six inches by several small fungi which had reached their fruiting age.

Plant Growth.

When a seed is placed in a suitable environment as regards warmth and moisture it absorbs the latter, swells, and softens; the starchy matter stored up for the nutrition of the young plant becomes soluble, and the radicle or future root descends into the soil, whilst the plumule ascends to form the stem of the plant. It is at once clear that the formation of a good seed-bed allows the penetration of the young roots into the soil, and the depth of planting the seed should be such that the first young leaf-shoot will be above ground before the store of food provided in the first place in the seed is exhausted. In the case of plants which only live one year there is a marked activity of growth of the root and leaves, which collect, and with the aid of sunlight prepare material for the growth of the plant. The leaves are the centres of activity where the materials from the roots meet the carbon from the atmosphere, and the various materials required for the nourishment of the plant are manufactured. The next step in the case of annuals is the formation of the flower, which is followed by seed, after which the plant dies.

The composition of a plant, as above-mentioned, varies at different periods of its existence. In the early stages the nitrates and mineral matters taken in by the water absorbed through the root hairs are in excess, but as growth proceeds the percentage of carbonaceous materials derived through the leaves steadily increases. When the crop is in full bloom it ceases to take in any more nitrogen and potash, although the absorption of phosphoric acid continues a little longer, but the assimilation of carbon through the medium of the small openings or stomata of the leaves will continue as long as the plant remains in a green condition. When the process of forming seed commences the whole of the energies of the plant appear to be concentrated in the direction of transporting the materials (starch, albuminoids, &c.) from the root, stem, and leaf, and depositing same as seed. When the life history of the plant has been uninterrupted, and what is known as a good season prevails, this migration of material from the vegetative portions of the plant will be very complete, and the straw of a cereal crop at harvesting will be found to be very completely depleted of foodstuff. Should, however, the crop fail to reach maturity, or in seasons of deficient sunshine and poor seed-formation, the material assimilated and manufactured during the growth of the crop remains in the straw. It is thus quite obvious that cutting the crop before the seeds have been completely formed is the most certain means of getting a straw of high-feeding quality.

In dealing with plants which live longer than one year a different order of things prevails. The same marked activity of growth of the vegetative organs (roots and leaves) is observed, but at the end of summer, instead of the formation of seed, the matter collected during growth is stored up in the roots, tubers, or stem. The next season the plant throws up a flowering stem, and the foodstuff thus accumulated is then used for the production of seed. This is the cycle as regards biennial plants, such as mangels, &c.

Again a difference is met with in the case of trees and shrubs which last for years, and which do not form fleshy receptacles. Here we have a trunk of more or less thickness and stout roots in active growth for a greater part of the year. Between the bark and the wood is a layer of cells called the cambium layer, which is constantly dividing to form fresh wood and bark, and running at right angles to the pith of the tree are also channels of cells called the medulary rays. It is in these regions that material is placed to supply the necessary activity to perennial plants when active growth is taking place.

It will now be of interest to show briefly what materials are first employed to serve as nutritive matter for plant growth, and by what agency such combinations are brought about. By growing plants in sand free from any organic matter it has been demonstrated that large quantities of carbon and nitrogen are obtained, which, together with the elements of water and the mineral salts imbibed with the water, constitute the organic material of plants. Now, where did the carbon come from? As the sand did not contain any humus it is quite clear that the source of supply must have been the atmosphere. In the air there are about three parts of carbon dioxide in 10,000. This, though only a very minute quantity, suffices, as the leaves as compared with their weight offer an enormous absorbing surface, and are being constantly agitated by the wind, which brings a large quantity of carbon dioxide into contact with the plant. Now, providing the plant is in a normal condition, that is, the leaf cells are filled with water, and are constantly being supplied with moisture from the roots to replace that lost by transpiration, the orange and yellow rays from the sunlight acting on the green colouring matter in the cells will cause the carbon dioxide absorbed in the water of the plant cell to decompose, the oxygen being liberated whilst the carbon is retained. The carbon unites with the elements of water in the cell, and we have the simplest primary compound known as formic aldehyde. By a simple process of condensation this material would be changed into one of the sugars. As will be seen from the above, light is absolutely essential to the assimilation of carbon by the leaf cells, and this fact is clearly borne out by the rapid uprush of cereals in northern countries, the long period of light allowing uninterrupted growth to take place.

Starch is one of the earliest products of assimilation, and is very abundant in leaves exposed to sunlight, but at the end of the day it disappears, being changed into some form of sugar by the action of an unorganised ferment, or erzyme. By this means the starch is conveyed by the sap to distant parts of the plant where growth is actively going on, or else it is reconverted into starch and deposited, as in the case of the potato, in the tuber.

Whilst it is comparatively easy to explain the formation of carbohydrates in plants, the manner in which the albuminoids, vegetable acide, and fatty matter are produced is not so clear.

According to Warrington, the mode in which albuminoids are formed is possibly that the nitrates taken up by the roots are converted into ammonia, the ammonia into amides, and the amides finally into albuminoids. These changes were clearly shown by the investigations of Wood at Cambridge, when searching for an explanation of the changes in the composition of mangolds during storage. When pulled up in the early autumn the roots were found to be full of nitrates—the form in which nitrogen is first taken up by the roots of plants. A few months later it was found on analysis that these nitrates had been largely changed into amides, and there was also an increase in the albuminoids and peptones.

A house without a garden is like a photo frame without a picture to set it off.

Planting.

Deep planting is not advocated, the general practice being that the depth of planting in the nursery should be followed. If holes are dug, they should be shallow, the bottom being merely loosened to allow a comfortable friable bed for the tree roots. A good practice is to dig the whole strip along which the trees are to be planted, merely removing sufficient soil when afterwards planting. Another satisfactory custom is to plough furrows 20 feet apart, and to plant the trees in the furrows, filling in the soil over the roots and trampling well down. Before planting, the roots of the young tree should be well trimmed, shaped to an even form, and cleanly cut. As a result of their removal from the nursery beds, the roots are generally more or less damaged; and numbers of the fibrous roots, becoming dry, shrivel and die. These all require a clean trimming. Then it is often desirable to remove some of the roots so as to balance the root system. The trimming of the roots gives the young tree a clean root system, and it is enabled to establish itself with young vigorous roots.

After planting, the top should be well cut back, so as to leave three or four arms, with three or four buds on each. Where it is not possible to have this number of arms or limbs it is frequently atvisable to cut back to one stem, allowing the buds to break out strongly and frame the tree after planting. In some localities, the custom of not cutting back the trees the firts year is favoured. Local experience has not resulted in favour of this practice, as it is found to be inadvisable to unduly strain the young tree by leaving a heavy top to be supported by the weak-growing root system.

It is unwise to plant a large number of varieties in a commercial orchard, but due consideration should be given to planting varieties that have a favourable influence on each other for cross-fertilisation purposes.

A number of good commercial fruits have been found to be either wholly or partially self-sterile, requiring other varieties near them to enable them to set their fruit. For this purpose it is necessary that the bloom periods should be somewhat coincident.

Root Growth.

Root growth no doubt varies according to circumstances in as great a degree as top growth, which, as one is the result of the other, is of course perfectly natural. An interesting illustration of the extent of root development was reported from the Bathurst orchard. It appears that shafts were sunk to ascertain the character of the formation of the ground on which the trees are planted At a depth of from 12 feet to 14 feet the granite rock was met. At 11 feet deep the soil was fairly moist and the roots of the apple trees at that depth showed strong development. The trees have been in the ground 15 years. Beyond giving the roots of young trees a lead, there does not seem to be any necessity for subsoiling. In any case subsoiling to, say, a depth of 12 inches would be of little use to a depth of 11 feet. In stiff clay it may be advisable to lead the roots by subsoiling to discourage a root development too close as a help to roots growing to the surface.—Exchange.

Fruit Bottling

(Continued).

— The Principle of Preserving. —

Several things have to be carefully remembered to enable the preserver to arrive at a successful result. First, the fresh fruit no sooner arrives at a state of perfection than it begins to decay. Then, the more quickly the fruit ripens the more rapid the decay. Thus fresh fruit necessarily contains the germs of decomposition more or less emphasised according to the condition of the fruit. The principle of preserving is to arrest this decomposition by sterilisation, not of the fruit alone, but of the whole contents of the bottle, by driving out and absorbing all the air and gases, and preventing any air returning. Thus a vacuum is formed within the bottle or receptacle, and a corresponding atmospheric pressure on the outside, principally upon the cover, this being the part which offers the least resistance. It is not essential to destroy the micro-organisms in the fruit, for if this were done scientifically the fruit itself would be effectually reduced to a mass of pulp by the lengthy and highly heated process; but in a properly procured vacuum (which Nature abhors) the germs become dormant and sterilised, and in the absence of air cannot continue the natural process of decay. The fruit, therefore remains in its natural condition of freshness as long as the vacuum is effectively maintained, or until the bottle is opened and the vacuum of course, destroyed. when, in the natural evolution of things, the germ-activity will go on again as from the time when it was arrested by the process of preserving, but at a slightly increased rate resulting from the unnatural check to which it has been subjected.

— Sterilising the Bottles, Etc. —

The bottles and covers should be well washed, and thoroughly dried in an oven until they are quite hot. This will effectually sterilise them. It is also desirable to fill the fruit into the bottles as soon after as possible.

Sometimes it is desired to sterilise a large jar when putting up jam or pickles in large quantities. This may be done by procuring a sulphur taper and attaching this to a wire; allow it to burn in the jar (which should be quite dry) for a few seconds. This will have the desired effect, and this method may also be ueed for sterilising barrels, which must, of course, be previously cleansed and dried. This sterilising must be done just before use, and will not injure the flavour of the goods.

— The Process of Preserving Fruit in Glass Bottles. —

Having described the principles of preserving, I will now proceed to describe the process by which a proper vacuum may be secured and maintained in bottled fruits. I am aware that a vacuum chamber is sometimes used for certain preserves and confectionery, but this is not satisfactory in preserving fruits. The method in general use, and which supersedes all others for fruits, is the application of heat, which may be either live steam or hot water. Live steam has many disadvantages, and is not suitable for household use, nor is it now employed in preserving fruit commercially. Water is by far the best method, and is the only means now employed in preserving fruits in bottles. Water can be brought to a higher temperature by the addition of certain chemicals, but this need not be discussed here, as I do not find it necessary to employ water at boiling-point or over. It will be well, however, to offer a word of warning against the use of sea water. A case came under my notice where, fresh water being scarce, sea water was used for the preserving bath, and, although the preserver had been usually successful in the past, he was surprised on this occasion to find his fruit over-preserved; in consequence of the sea water, which, being of greater density, reached a higher temperature than he intended.

The utensil to be employed may be the ordinary domestic boiler (or copper), or a suitable preserving bath may be made at small cost, having a tray made to fit the inside closely, and deep enough to allow the water to completely cover the tops of the bottles to a depth of one or two inches. The tray should be made of strap iron and galvanised, light in weight consistent with strength, and fitted with rope handles (not metal) to enable the operator to lift the tray containing the bottles bodily out of the bath. Several baths of this description can be employed if necessary, or a larger bath to hold two, three, or four trays can be employed according to the quantity of fruit to be preserved. If the copper is to be employed as a preserving bath, as is usually the case, I strongly recommend the use of a galvanised wire basket, made to fit the inside of the boiler. This will enable the preserver to submerge all the bottles of fruit in one operat on, and, what is more important, to lift them all out at one time, and so avoid the trouble and annoyance wh ch generally occurs with that last bottle that "declines to come out", when a wire basket is not used.

The cost of the few appliances which I urge all fruit-preservers to provide themselves with is so trifling, and, seeing that they will pay for themselves the first year in the improved quality and extra quantity of finished bottles, that they can be used for other purposes when not employed for fruit preserving, and if taken care of will last for many years, the outlay can only be considered in the light of a good investment.

Those that are necessary and important are :—

(1) A suitable tray or basket.

(2) A bath-thermometer.

(3) A pitting-spoon.

In addition to the above, it is well to be provided with a sieve, a wooden tub, a wooden or enamelled bucket (large size), a saccharometer for testing syrup, and a paring knife. A large stew-pan and a wooden spoon are also sometimes required.

— The Process. —

Put sufficient water to completely cover the bottles in the copper or bath (which for brevity will be hereinafter referred to as the "bath"); and set the fire going. Tie a piece of string to the loop of the thermometer, and suspend it in the water so that it may be easily read. While the water is heating see that the covers of the bottles are fitted correctly and quite loosely on the bottles, but not so loosely as to be liable to fall off in the bath; also see that the rings fit correctly and are sufficiently soft and not perished by age. It is false economy to use old or previously used rings; if they are round in shape they must not have a twist in them. Pack the bottles then closely into the basket (or tray); it is not necessary to pack hay or straw between them, as they will not be likely to dance about and strike one another in the temperatures we are about to use, as they would when water is brought to boiling point (212 deg. Fahr.) or over.

The bottles of fruit being now prepared and packed in the basket, watch the thermometer until the water reaches a temperature of 130 deg. Fahr., not more, and not less except in cold weather, which rarely prevails when fruit is to be preserved. Then take the basket and place it with the bottles into the bath, and bottles being entirely submerged one or two inches below the surface of the water. It may be imagined, the covers being loose, that either the syrup will get out and mix with the water or the water will get into the bottle and mix with the syrup; but neither will happen, as when the bottles are submerged in cold water (which I do not recommend, although it is an old-fashioned method sometimes employed). It may also be imagined that the bottles will break, but this is not at all probable if they are properly annealed as they should be. Also, it is often thought that the indiarubber rings may not withstand the heat if fitted into the bottles and subjected to the necessary heat in preserving. These are suitably carbonised for the purpose, and no fear need be entertained on this account.

Now, watch the temperature of the water continue to rise until it reaches 160 deg. Fahr., and at this point it is necessary to note the time carefully, and to count from this the number of minutes usually required for the preserving process. The action of the fire must be looked at and regulated, so that when the required heat is obtained it can be kept steady at this, instead of getting much too hot or not hot enough. This may be done by regulating the quantity of fuel and by opening or closing the door or damper as may be necessary.

As previously stated, no hard-and-fast times and temperatures can be laid down; but the following table is as near as can be, if the fruit is of correct variety and condition, as recommended :—

Immerse the bottles at 130 deg. Fahr.

Count the time from 160 deg. Fahr., and preserve :—

Apricots at 180 to 185 deg. for 13 to 15 minutes.

Pears at 190 to 195 for 15 to 20 minutes.

Peachs at 190 to 195 for 15 to 20 minutes.

Plums at 185 to 190 for 15 to 17 minutes.

Raspberries at 175 to 180 for 15 minutes.

Strawberries at 175 to 180 for 15 minutes.

Gooseberries at 180 to 185 for 13 minutes.

Cherries at 195 to 200 for 15 to 17 minutes.

Quinces at 195 to 200 for 15 minutes.

Apples at 185 to 190 for 12 to 15 minutes.

Currants at 180 to 185 for 10 to 10 to 15 minutes.

— An Important Point. —

As a practical guide the foregoing table will be found reliable, but it will be necessary in some cases to regulate the period and temperature according to the variety and cond tion of the fruit. For instance, there are many excellent apples which at 180 deg. will become pulp in eight or nine minutes; it is obvious that these are not suitable varieties for preserving. On the other hand, there are others which will require cooking for twenty to twenty-five minutes before they will be sufficiently cooked. Then, again, a variety grown rapidly in a warm climate will not require so much heat, but a longer time in preserving than the same variety grown more slowly under less forcing conditions. Therefore I recommend an experiment to be made with two or three bottles, so that the time and temperature suitable to the particular variety or condition of apple or other fruit to be preserved may be precisely determined. The many details which it is necessary to bring to the preserver's notice may appear very complicated, but there should not be the least discouragement on this account, for a very little practical experience will make all things quite plain and prove many times more instructive than volumes of theory. At the same time, the rule that the softer the condition of the fruit the less the heat and the longer the process will be a safe guide to success.

— Cooling. —

Having preserved the fruit according to instructions, lift the basket from the bath, and with some pieces of sacking made to fit the hands, take each bottle while hot and screw down the cover without any delay. Stand the bottles on a wooden floor or a piece of board (not on stone, cement, or damp earth), and cover them with a piece of sacking or cloth to protect them from a draught of cold air, which might cause the bottles to crack or break, and leave them thus until the next day. Then examine and test them, and if necessary give the covers a further screw down (except when Mason jars or jars in which the rubber is likely to be disturbed are used). Clean the bottles, label them, wrap each in paper, which again label outside, and store in a cool place in an upright position. The paper wrapper prevents the action of light deteriorating the colour of the fruits.

The fruit when cooled and finished should be quite firm in the bottles, the syrup clear and of a creamy texture. If the fruit appears extra firm before it cools this need not cause much concern, because the heat of the syrup will continue to act in cooking the fruit still more after it is removed from the preserving bath. Before the bottle is finally cleaned and wrapped it will be advisable, if possible, to test each bottle. Where the tin cover is loose a sharp tap with a nail or knife. handle will give a crisp ringing sound, evidence of the vacuum upon the bottle; but should the sound be dull and hollow it will be evidence that the air has not been properly exhausted, in which case there will be no vacuum, and it will be necessary to thoroughly inquire into the cause, rectifying the trouble, and to again preserve the bottle or to use the fruit at once, or pulp it or convert it into jam. In preserving perform precisely the same process as in the bath, but for two-thirds of the time only, as in all probability the fruit may become pulpy, certainly too soft, but at the same time quite usable.

Another method of preserving fruits is to subject them to the process of taking. This is an improvement on the simple method just described, and is usually adopted commercially, as the fruit will be more certain to keep sound for a longer period. A strong steel clip fits down closely to the cork during the process of preserving, and prevents the cork from being blown out of the bottle. The fruit is very lightly cooked and filled into hot bottles; the process of preserving is the same as regards times and temperatures as given in the table above. Then remove the bottles from the bath, and when cold remove the clips, cut the cork flush with the bottle, finish off with wire, and dip in the mixture of resin and beeswax as advised.

Many persons pack pie-fruits in water only. I do not recommend this practice, because the flavour of the fruit is much deteriorated, while the addition of 1 lb. of sugar to the gallon of water will make little difference in the cost, and will fix the flavour in the fruit and produce a distinctly improved package when compared with fruits packed in water only.

Some people use a small quantity of preservative, such as boric acid or salicylic acid, with these fruits, but I do not recommend this; in fact, it is quite unnecessary when fruits are properly preserved and all details are given intelligent attention. Preservatives are extremely useful when properly employed but their use is often abused. The medical officers ought to insist on all preservative compounds bearing full instructions as to their use, and a warning against using too much. There is a difference between the use and abuse of a very useful article.

The bottles of fruit, when finished as advised, may be improved in appearance by the tops being covered with thin tinfoil, neatly folded over and rubbed down smoothly.

When storing these bottles it is sometimes advisable, especially when they are not corked by a machine, to lay them on their sides, so that the corks may be kept moist. These and all other bottled fruits should be wrapped to prevent the light spoiling the colour.

Complete Fertilisers.

By J. C. Brunnich, Queensland Agricultural Journal.

The great advantages gained by using improved methods of cultivation in combination with the application of artificial fertilisers, in order to increase the productiveness of the soil, are getting gradually more recognised. It is quite self-evident that the best profits will result, if small areas are made to produce heavy crops of high quality. This is achieved by "intense cultivation," as practised in other countries; but our farmers, on account of land being comparatively cheap, hardly know what such cultivation means.

Even the richest of soil will gradually become impoverished by continued cropping; the crops not only become lighter and of poorer quality, but also much more liable to get diseases. The plant foods which are removed by the growing crops must again be returned to the soil in one form or another. With judicious application of artificial fertilisers, combined with thorough cultivation and, if possible, with rotation of crops, the fertility of the soil cannot only be maintained, but frequently considerably increased.

No artificial fertiliser will be of any value if it does not supply in adequate proportion all the necessary plant foods required by the crops and wanting in the soil. Excess of one plant food cannot make up for the absence or deficiency of another. In this respect grave mistakes have been frequently made, and no end of money was squandered by applying manures which only supply part of the necessary plant foods and, perhaps, one which was not wanted at all. How often have large amounts of bonemeal been applied without getting any benefits, because Potash or Nitrogen were wanting more than phosphoric acid.

No amount of artificial fertiliser will be of any value to the land is not in good tilth by thorough cultivation, well drained, and the soil contains a sufficient amount of humus and moisture.

Again, it would be a great mistake to apply a large quantity of fertilizers one year and completely neglect to do so the following year.

Situation climatic conditions, class of soil, and many other factors will influence plant growth, and will make certain districts more suitable for a special class of crops than others.

The importance of humus in the soil is frequently quite overlooked by many farmers and fruitgrowers. Unfortunately, a large number of our soils are deficient in the amount of humus they contain, and the customary methods of cultivation and climatic conditions have a tendency to continually lower the amount, and the soils, therefore, lose that light friable state necessary for the successful growth of all crops and for the conservation of moisture.

The amount of humus may be increased by the addition of bulky amounts of vegetable matters, dead leaves, straw, cornstalks, and more particularly of stable manure. But even small amounts of stable manure used in additioin to artificial fertilisers have a very beneficial action, and increase the value of the artificial fertiliser, evidently by increasing the bacterial activity in the soil.

Stable manure is, however, generally very scarce, and the most economic way to supply to the soil the necessary humus is by the practice of growing and ploughing in of green manure crops. As a rule, vigorous growing leguminous crops—like cowpeas, field peas, Mauritius beans, harico beans, velvet beans, etc.—are to be preferred; but excellent results are frequently obtained with rape and mustard. The crop has to be chosen according to locality and season.

In orchards mulching of the fruit trees with green crops, stable manure, dead leaves, etc., is of particular value.

By growing crops in a proper rotation, applying the manures required for each crop, the fertility of soil will be increased and good results obtained.

In the case of many crops which, on account of local conditions, do not allow a rotation of crops—like, for instance, sugar cane—it is always most profitable to give the land, after a few years of cropping, a complete rest. Instead of leaving the land bare of fallow, it is best to grow plants like pigeon peas, wild indigo, and lantana, which cover and protect the soil, and at the same time enrich the soil in humus and make further amounts of mineral plant foods available, so that after a few years of rest it is again completely renovated and fit to grow heavy crops.

— Lime. —

In many of our soils the want of lime is very apparent, and is frequently shown by strong acid reaction of soil and subsoil. Many plants are very susceptible to soil acidity; and application of artificial fertilisers, and more particularly such with an acid reaction, is frequently an absolute waste of money, unless the acidity is corrected by a previous application of lime in one form or another. Only in the case of heavy clayey soils the use of quick lime or air-slaked lime is to be recommended; for lighter soils carbonate of lime, in the form of limestones screenings, and also sulphate of lime or gypsum, are to be preferred, and all have to be applied as a top-dressing. Particularly after ploughing in heavy crops of green manure, many soils develop a high acidity, and may require liming.

As a rule, soils under cultivation for some years will require complete fertilisers in order to obtain good crops and maintain the fertility of the soil. It is of interest to mention that in Hawaii the extremely rich virgin soils, when put under sugar cane, are manured with heavy dressings of artificial fertilisers from the very start, and consequently a heavy yield is obtained and maintained for years.

Still, the fact must not be overlooked that in many cases complete fertilisers are not always necessary and their use not economic. As an instance the meanuring of wheat may be mentioned, which is quite different in Australia than in other countries. Practical experiences, gained in South Australia and Victoria, have shown that even very light dressings of superphosphate give excellent results, frequently even better than an application of complete fertilisers. Unfortunately, this experience is not universal; and already in New South Wales exceptions have been found, and it is quite likely that our wheat-growers will find more complete fertilisers in certain localities better than superphosphate used by itself. All this is a matter of experience, which cannot be gained in a year or two; and experiments in this direction should be encouraged. No farmer should hestitate to do a little experimenting of his own, as it is quite probable that his soil requires a slightly different treatment than his neighbour's land.

The plant foods which are generally supplied by artificial fertilisers are :—

Nitrogen, Potash, and Phosphoric Acid; and, as they may be used in various forms, a few remarks on these points are necessary. It must be also borne in mind that the plants can only absorb, by the aid of the roots, such mineral plant foods which are actually in solution; and, therefore, sufficient moisture must be present in the soil, and the plant foods in the manure should be in a fairly soluble form. It is always best to use artificial fertilisers in the most concentrated form, in order to save freight and handling; and therefore, only such will be used in the manure formulae recommended for the different crops.

Nitrogen is one of the most important and, at the same time, most expensive ingredient of artificial fertilisers.

— Nitrogen. —

Nitrogen promotes and stimulates the growth of leaves and stem, but rather retards, on account of a more luxuriant growth, the development of buds and flowers. The leaves generally show a deep-green colour, and the whole plant becomes more vigorous after application of a nitrogenous manure. In the form of nitrates it is most active and most readily available to plant life, and is generally applied in the form of nitrate of soda, or Chili saltpetre, which contains from 15½ to 16 per cent. of nitrogen. Saltpetre is, however, very soluble and, unless, directly used up by the plant, may be readily leached out and lost in the drainage water. At the present day it is being replaced by the artificial product nitrate of lime, which is just as active and available, but not so easily leached out, and has a much better action on the soil on account of the large amount of lime it contains. Both fertilisers absorb moisture from the air, are not suitable to mix with other fertilisers, and are also bad to handle. They are generally applied as top-dressings in repeated small amounts at the time when the crop is ready to utilise them.

— Nitrolim. —

Nitrolim, or cyanamide, is another artificial product, containing about 18 to 19 per cent. of nitrogen and over 60 per cent. of lime. The nitrogen is not quite so readily available as in nitrate of lime, but it comes very close in its action and has other advantages. It may be readily mixed with other fertilisers, and may be applied some time before planting. When using this fertiliser by itself, it is best to mix it with about twice its weight of fine soil, to apply the mixture in drills or broadcast it, and cover well with soil, by subsequent harrowing or cultivating, a week or two before sowing or planting the crop. When mixing nitrolim, in the preparation of complete fertilisers, with superphosphate, it is advisable to sprinkle from time to time with a little water during the mixing, in order to keep down the heat produced by a chemical interaction, and to add the potassium sulphate last.

In most of the manuring formulae, this nitrogenous manure is used, but it may be replaced if desired by the same amount of ammonium-sulphate, or increased amounts of dried blood.

Dried blood contains from 12 to 13 per cent. of nitrogen in a fairly available form, and many crops seem to benefit particularly by this nitrogenous manure, which, however, is rather scarce and not easily obtainable. Blood may be mixed with other fertilisers, and can be applied some time before planting.

(To be Continued).

Drying Plums and Prunes.

— Gathering the Fruit. —

Fruit for drying must be thoroughly ripe, or almost over-ripe, as the sweeter they are the better they dry.

— Grading the Fruit. —

After gathering the fruit should be graded, so that all may be of an even size and degree of ripeness. There are machines for doing this.

— Dipping. —

To ensure quick drying and make the skins tender the plums are dipped in a hot solution of lye. Procure Greenbank's 98 per cent. potash lye, or, failing that, soda will do. Various workers use different strengths of lye. Some advise 1 lb. lye to 10 gallons of water, and some 2 lb. to 10 gallons. This lye bath is made in a boiler or tank over a fire and kept at the boiling point. A 200 or a 400 gallon tank will make a copper. Cut the tank in halves and mount one on a low flue of brick or stone and the other alongside, but without a flue. Put the lye bath in one and clear water in the other. Erect a post at one side, a few feet away from where the two join, and on it suspend pole by the middle, such as is used for drawing water from shallow wells.

Make a tray of stout wood, with a bottom of $\frac{1}{2}$ in. galvanized wire, and suspend it by stout wires from each corner. Hang this on to one end of the suspended pole, and weight the other end with one or two kerosene tins of stones. The tray is then filled with plums, and is lifted by the pole and dipped into the lye bath for, say, 30 seconds. It is then lifted and allowed to drain for a minute, and is then dipped into the clean water and rinsed. After draining a little the prunes are ready to be spread on the trays. If there are many to do, two dipping-trays are advisable, one to be used while the other is being emptied.

— Trays. —

The usual 3 x 2 tray is made of three pieces of 8-in. spruce, $\frac{1}{4}$-16th in. thick, fastened together with a cleat at each end 2 in. by 1 in. When the trays are stacked one upon the top of another this construction allows of a space of 2 in. between each for a current of air to pass through. The Globe Timber Mills Company will quote for these trays.

— Drying. —

After being spread on the trays they are placed in the sun or in the evaporator to dry. If an evaporator is used, trays with bottoms of $\frac{1}{8}$ or $\frac{1}{4}$ in. woven wire are used. The amount of dried fruit from 100 lb. of fresh will depend on the condition of the fruit, and the method of drying or evaporating, and may vary from 30 lbs. to as high as 45 lb.

— Sweating. —

After the plums are so dry that they will not exude pulp when pressed they are packed into boxes and stacked to equalise the moisture or "sweat," and are then ready for packing for sale. Some, however, after sweating, dip the prunes for a few seconds into a boiling bath of clear water in which is dissolved a little glycerine or sugar. This rinses the fruit, destroys any insects, and gives them a gloss and softness. After this final dip, the fruit should be quickly dried and packed.

Some Phases of Pollination.

—Results with Sacked Blossoms.—

The question of the potency of pollen as a factor in the fertilization of the blossoms of fruits is comparatively new. Some years ago the writer tested the pollen of various varieties of grapes that seemed to show that the viability of the pollen was the chief if not the only factor which determined whether a given variety was self-fertile or self-sterile. This naturally suggested the query as to whether the same conditions did not possibly exist among other of our cultivated fruits. In apples, in particular, as the most important of our fruits, an investigation was started with a view to determining the self-fertilizing capacity of the various varieties. This work has been continued now for about four years in a very desultory way, owing to interruptions caused by the intervention of other work, change of location, etc.

One of the first, and almost indispensable things in an investigation of this kind, is a complete and accurate list of the self-fertile and self-sterile sorts. Unfortunately, there are no such lists which are generally accepted. Many investigators question the accuracy of the results secured by sacking the blossoms of such fruits as apples and pears, basing their skepticism on the fact that many varieties which fail to set fruit in sacks do not fail to give satisfactory crops when planted under conditions where access of pollen from other varieties would be improbable, if not impossible. Several experimenters, to my knowledge, have sacked large numbers of blossoms for several years in succession with such contradictory results that they were never published. Generally the results of such experiments prove altogether too much. Varieties of apples which are recognized to be self-fertile will frequently set no fruit at all under sacks, and will almost invariably set much less than when exposed to the visiting insects; and this is true even when the trees are standing in solid blocks of one variety so that cross pollination of the outside blossoms is very improbable.

—Confusing Results With Apples.—

In some experiments carried on by Lowe and Parrott, and kindly loaned me by Mr. Parrott for this occasion, a small Ben Davis tree was completely covered with muslin. On this tree there were 315 blossoms but only five set fruit. Other trees of the same variety alongside set the usual crop. Yet Ben Davis is known to be a self-fertile variety. Such instances could be duplicated many times from the experience of every horticulturist who has investigated this subject to any extent. On the Geneva Station this year sacks were placed on the blossoms of 60 varieties, from ten to twenty sacks being placed on each tree. Tolman Sweet, which is sometimes classed as a self-sterile sort, set seven fruit in one sack. Oldenburg, which is known to be self-sterile, gave no fruits whatever, although the twigs surrounding the sacks were covered with fruit. The results of other varieties were equally confusing. Such experiments as this are not worth publishing; all that they indicate is that sacking alone will not determine for the apple, as it does for the grape, whether the variety is self-fertile or self-sterile. The question naturally arises why is it that a variety normally self-sterile should fail to give fruit under sacks. It manifestly must be on account of some abnormal condition produced by the presence of the sack. A manilla sack being close and impervious, will naturally shut out more or less of both light and air, but the same is not true of muslin sacks, yet they give the same contradictory results as the paper ones. In Lowe and Parrott's experiments, where they covered small trees or large branches with muslin, windows were made of wire screens for the admission of light and air. In no case did they find that there was any more fruit close to the windows than away from them, and there were no more fruits in the muslin sacks with windows than in those without. So it seems that it can hardly be a question of the lack of light and air. In putting a sack over a cluster or several clusters of blossoms it is very difficult not to have the sides of the sack so close to the blossoms that the natural movement of the sack in wind would cause it to press against certain of the stigmatic surface after the petals have expanded. It seemed a question as to whether this possible injury might prevent fertilization from taking place. Examination of a large number of sacked blossoms, however, failed to show that there was any greater probability of the fruit that set being in the centre and more protected than in the outer portion of the sack. This year four fruits were found, each in different sacks, where the sack had been pulled down on the branch so far that the blossom was bent back upon itself so that the calyx end of the fruit pointed down upon the branch upon which it was borne. Yet fruit had set under these conditions. In numerous other cases fruit had set with the calyx pressing against the sides of the sack, showing that the contiquity of the sack apparently had no deterrent effect on the setting of fruit. There seems to be only one other abnormal condition produced by the sacks, and this is the prevention of insect visits. The use of the sacking method as a means of determining a fruit's capacity for self-fertilization is based on the supposition that it will prevent insects from bringing pollen of other varieties while the pollen of the blossoms enclosed will fall on their own stigmas. So far as I am aware, it has never been proved that this is actually the case. The stigma of the apple is receptive, even before the blossoms open. If blossoms are castrated the day before they normally open and pollinated at the same time, they will usually set fruit. How long the stigmas remain receptive I do not know, but I have never found as good results from the later pollinations as from the earlier ones; apparently showing that the receptive condition is not long continued. When the blossom opens the anthers usually have not burst, and no pollen is available from that blossom. They soon commence bursting from the outside in, that is, those at the periphery dehisce first, and then those toward the centre. Thus it will be seen that the chance of the stigma being past the receptive condition before the closest stamens would have available pollen is very great, and that pollen from other and earlier blossoms would be necessary in order that fertilization should take place.

— The Reason Possibly a Mechanical One. —

A consideration of these facts makes it appear possible that the reason why apple blossoms seldom set fruit under sacks as readily as they do outside, is a mechanical one and due to the pollen not being on the legitimate surface at the proper time. I have been confirmed in this view by the finding in one orchard this year that in every case where fruit had set in the sacks, the apple aphis was present also. These sacks were wired to the twigs, and while it might be possible that an aphis could crawl through the opening, it does not seem possible that it could do so with pollen sticking to its body without the pollen being rubbed off. This coincidence was so marked that it was possible to tell whether there were apples in any particular sack by tearing off the bottom of the sack and looking for the cast skins of the aphis. If these were present, then the fruit could be confidently looked for. In one case there were seven fruits in one sack, the variety being Tolman Sweet, which as is mentioned above, is sometimes listed as being self-sterile. For these reasons, and others which the length of this paper will not permit me to elaborate, I am strongly of the opinion that we will never secure satisfactory results from sacking apples except where they be also hand pollinated with their own pollen. This manifestly is going to add very seriously to the labor of all such investigations.—"American Horticulture."

Revenge is chiefly a function of memory, and with the majority of mankind, forgiveness is but a form of forgetfulness. Be very chary, therefore, of offending those persons who possess good memories.

The Farm

Breeding of Cattle.

One thing ought always to be considered when men start out to buy pure-bred cattle (says a writer in Hoard's Dairyman)—that is, that the knowledge, skill, and character of the breeder are about as important as is the animal they are to buy. There is a wonderful difference between being a real breeder and one who simply mates male and female. The art and philosophy of breeding is a very deep question. One man's cattle show almost always a progressive quality. The are the product of skilful, intelligent mating. Another man gives no thought to the deeper phases of the question. He simply breeds pure-bred cattle together; there is no intelligent adaptation of means to ends. The average capacity of his cattle shows a hit-and-miss result that is very confusing and disappointing. It is right to say that there will be fully enough failures even with the most thoughtful and comprehensive breeders. What must it be with men who bestow but little thought or study upon the deeper physiological problems that are involved, and which will have their way. Take, for instance, this matter of keeping two or more bulls in a breeding herd. The question of a successful "nick" is an all-important one. Yet in almost every herd of cows there will be found a certain number which do not nick well with the head of the herd. An observant breeder will note this. Mate them with another sire, and with the most of them, at least, the result will show a decided improvement in the strength and vigour of the offspring.

The Advantages of Testing Milk.

There are three factors in connection with the management of a dairy herd which help to make up its value for purely dairy purposes. First the quality of the offspring, second the quantity of milk, and third the quality, or richness in fats, of the milk. The first of these is a matter of slow evolution, and can only be worked out to advantage by following the laws of selection, and by breeding in such a way as to steadily improve the herd. Selection is the keystone to improvement by breeding, and it follows, therefore, that we must have a sound basis for selection. Selection may be, and is, often based on the law of correlation, or a study of outward points of the animal. These points, however, do not always follow rigid laws, and are sometimes misleading. Performance is a much surer guide for selection, or, in other words, the quantity and quality of the milk. Instances innumerable have been known of cows which show nearly all the outward signs of being heavy producers of milk rich in fat. The monthly tests have proved her to have the lowest average of any cow in the herd. On one farm there may be one animal on which alone the owner must have lost more than would have paid for the testing of the whole herd for many years. The owner might know that she was not a particularly good milker, but it is almost a certainty that had he been aware that she was so unprofitable she would not have been kept on so long as she has been. Her good looks have saved her, whilst other better milkers with less appearance have evidently been sacrificed. Indifferent milkers should be weeded out when young, say at three or four years old, and not kept until they are ten or twelve years old, as is far too often the case. The work of testing invariably brings to light a large number of quite unprofitable animals. These, like the poor, seem to be always in evidence, and it is only by systematic work of this kind that they can be effectively eliminated.

— The Babcock Test. —

The value of the Babcock test in connection with the work of a herd depends mainly on the frequency with which the animals are tested, the number of milkings from which the sample is taken, and the accuracy with which the test is carried through. Many have claimed that two or three tests, made at intervals of several months, with the weight of milk, will furnish a fairly accurate basis for estimating the fat yield of a cow for one year. Experience tends to prove the contrary to be the case. In several instances variations of more than one per cent. have been detected between the tests of one month and the next, without any apparent cause. Some months the tests for certain cows will be far above the average, and some months much below. If a test happens to be made at such a time, and another is not made for several months, a very incorrect estimate of the capacity of the cow may result. Experience indicates that once a month is as seldom as tests should be made, and that tests made less often than once in two months cannot safely be used in judging of the productive capacity of a cow.

— Another Factor. —

The second important factor in the value of the test is the way in which the sample is taken. Where cows have been tested from day to day unaccountable variations in the percentage of fat have been noticed. This has led to the conclusion that the sample should be take from several milkings. The most convenient way seems to be by taking a small portion of milk from each of several successive milking, and using this mixed or composite sample for the test. A sample taken from six successive milkings in each month seems to give good results. In Scotland a society exists for the purpose of supervising and collecting the results of milk records of dairy herds. These are chronicled in the annual volumes of the Society, and as a result it has been demonstrated that the increased return from one average cow over that of a single poor one will more than pay all the cost of testing the whole herd. It is quite possible that something of a general kind might be attempted in the same direction in this State, so that farmers might be aided in acquiring the knowledge as to which of their cows it pays to keep, and which they might find it profitable to draft from the herd.
—Elder's Review.

Subsoil Water.

All supplies of fresh water are in the first instance derived from the atmospheric condensation of rain (including snow) and dew, which are precipitated on the land surface and serve directly to minister to the needs of plant life. Of the supplies received in this way, a portion soaks into the land; the amount which is capable of being thus absorbed, will depend on the texture of the soil and the underlying subsoil. When this is coarse and open, the capacity of the soil for absorbing water is relatively great. On the other hand, in the case of close-textuted soils, in which the finer particles of the clay order of magnitude predominate, the rate of absorption is naturally slower. In any case, when the rate of precipitation exceeds the absorptive capacity of any soil, the excess of water passes off along recognized channels in the form of surface drainage or storm water, and unless special facilities exist for conservation, becomes lost to the area on which it falls.

The water which is absorbed by the soil, however, tends to accumulate and form an underground reservoir. This accumulated supply may conveniently be termed subsoil water, and serves as a source from which water is drawn by capillarity from below through the layers of soil to supply the needs of growing plants, supplementary to the amount available from actual precipitation.

In general, subsoil water permeates the soil, subsoil and underlying rocks. The quantity present usually increases from the surface downwards to a point varying in depth according to the prevailing conditions, and after that, diminishing as the pressure of the overlying rocks and soil increases. Under certain conditions, it is estimated that the amount of water contained in the first hundred feet from the surface is equal to one-quarter of the total volume of ordinary porous soil, subsoil, rock. In other words, this is an equivalent to a reservoir of water 25 feet in depth, or a supply equal to the total rainfall over average years under the conditions in question.

It will be seen that the aggregate quantity of water thus available is considerable, and it is useful to conceive it as an actual reservoir susceptible of increase and diminution, and differing from an open pond chiefly in unevenness of its upper level, this latter effect being due to obstruction of free movement by the earth within which it lodges.

Water contained in subterranean reservoirs in this way moves under gravity, tending to flow from a higher to a lower levels at rates which depend on the permeability of the material through which it passes. Moreover, it is subject to capillary movement, and thus unlike free water, the upper level of the subsoil water will tend to irregularities of the ground level.

Under the influence of these two forces the upper level of the subsoil water is indefinite; the moisture content of soils increasing gradually downwards until a point is reached at which the surrounding subsoil or rock is saturated-

Wells derive their water supply from subsoil water, as also do by far the greater part of normal brooks and rivers (apart from storm water), and the varying levels of these mark variations in the level of the subsoil water by which they are supplied.

The level of saturation is known as the water-table; it is convenient to distinguish between the level of the saturation which is effective in supplying capillarity, from that (generally somewhat lower level) at which water is delivered freely into wells. The former is termed the 'agricultural water-table,' the latter the 'well-water table.'

The quantity of subsoil water permeating the earth varies to some extent with the texture and structure of the materials, and these factors also influence its movements to a very considerable degree. Through gravels and sands it flows with a freedom approaching that of open streams, whilst through clays and close-textured rocks it may move only at an imperceptible rate. When the underlying rocks consist of permeable limestone however, large cavities and fissures may in course of time become created, as the result of the solvent action of water containing dissolved carbon dioxide, and thus form those subterranean reservoirs and channels commonly termed underground rivers and lakes; which receive drainage of the surrounding rocks, and facilitate generally the movements of subsoil water.

The limit of vertical movement of soil water is, of course, the distance between the surface of the soil and the agricultural water table, but when the latter is removed to considerable depths below the surface, the water available for plant growth in this way becomes increasingly restricted. It may be broadly stated that, under average conditions, capillarity acts freely to a depth of 4 or 5 feet; fairly, to a depth of 10 feet; and slowly, to 30 feet or more.

In certain cases, especially those of very heavy low-lying lands, the water-table may approach very near to, or even rise above, the soil surface. Under these conditions, lands become water-logged, and it is then necessary to lower the level of the water table by drainage, to permit of the lands being utilized.

In districts liable to suffer from drought it is obviously a matter of importance agriculturally to know whether the reserve supply of subsoil water, available ,or eking out the rainfall, approaches the surface to within 10 feet, or comes within 30 feet, or lies so much deeper as to be beyond the reach of capillarity.

Moreover, a proper appreciation of the conditions governing supplies of subsoil water is of importance in relation to attempts to utilize them as industrial and domestic sources of water. In the foregoing article the main principles relating to this question have been outlined.—Agricultural News.

The Age Limit.

As a result of experiments made in Wisconsin, U.S.A., it would appear that a cow reaches her best during the fifth and sixth years of her life; up to that age, if the cow is in normal condition, the production of milk and butter-fat increases. As regards the length of time that a cow will maintain her maximum production, this depends largely upon her constitutional strength and the care with which she is fed and managed. A good average cow, properly managed, should remain at her best productive standard almost unimpaired until after she is ten years old. Generally speaking, a cow may be said to have passed her best after her tenth year, though many excellent records have been made by older individuals.

The Holstein-Friesland Breeders.

The history of the Holstein-Friesland cattle has frequently been told, but it is ever a subject of interest and value to all stock-raisers, and one which does not suffer much by occasional repetition. It is said that the Holstein-Friesland breed of cattle was established by the ancient tribe of people which dwell in the two provinces of the Netherlands, North Holland, and Friesland, 300 years before the commencement of the Christian Era. These people were described by the early Roman historians as peaceable cattle-breeders. This tribe was constantly in danger of attacks from adjoining tribes, and also to probable conquest by the Roman army, hence a treaty was made with the Romans in which the tribe was guaranteed protection and political autonomy on payment of a tribute to the Roman Empire of ox hides and horses. The present breeders in these two provinces are lineal descendents of that ancient people, and their cattle in the main are lineal descendants of those ancient cattle. It is very doubtful if there has been much change either in the character of these breeders, or, of their cattle, in the 2000 odd years during which they have been known in history. There was once a theory that the peculiar characteristics of these cattle were the result of the climate, and the soil of the lowlands, and highlands, but this seems to be rather lame. So far as is known, the introduction of them into other climates and to other soils has not changed these catt.e in the least, although it is a favourite theory of the highland breeders on which they base a hopeful conclusion, that constant resort to their herds must be made by foreign breeders if they hope to maintain the excellence of the breed in their country.

— Good Citizens. —

These breeders are considered to be among the noblest class of people that strangers are brought in contact with, although in their own country they are counted as peasants of third-class community. Intelligent visitors have found them to be physically, morally, and intellectually superior to the so-called first and second classes of those provinces. In dignity of manner these breeders are the equal of any class, and in truthfulness are superior to the commercial class. They very rarely own the farms which they occupy. More often they pay rent ranging up to £4 an acre. All their agricultural affairs are very broadly, mentally, and skilfully organized, the whole province of Friesland, being, in fact, a huge experimental farm. The soil is far less fertile than most people would imagine, and does not bear the luxuriant luscuious pasturage that most people suppose. Over the rough portion of Friesland butter and cheese-making, and veal and beef production, are combined, and carried on by each individual farmer, breeder, and dairyman. All these functions are closely systematized. There is only one building of importance upon one farm. Its wide-spread roof covers everything that requires protection at any season of the year. The manner in which these cattle are housed during the winter is an ob-ect lesson in neatness and sanitation. Put into their stalls in this huge structure late in the autumn, the cattle are never turned out in the open air for a single hour until the grass is well started in the fields in the spring. Usually there are windows which are repeatedly opened in front of each stall, which contains two cows, a washing room, and then the hall intervenes between the rooms and the cow stable. The stable is often visited day and night, and the strictest of sanitary conditions is maintained.

These clean, plain Dutch folk have reduced to a science the economical production of milk, and if anywhere on the face of the globe there exists a race of uniformly good milkers it is to be found among these Dutch. It is very seldom that a traveller will meet with either a poor cow or an old cow. These people are occupying land which is rarely sold for less than £100 per acre, and more frequently £200 an acre, and always producing butter and cheese and placing it on the European market in succe(sful competition with that produced on land of less than half that value.

— Breeding. —

Few bulls are kept, and these but for two or three years at most, when they are sold to the butcher. These bulls are selected with the utmost care, and are invariably the calves of the choicest milkers, all other bull calves, with scarcely an exception, being sold for veal. In like manner the heifer calves are sold as veal, except about 20 per cent., which are carefully selected, and raised on skim milk The age of a cow is usually denoted by the number of her calves, and in no case does one meet with a cow which has had more than six calves, the more general average being four or five. The rule is to breed so that the cow's first calf is dropped before the dam is two years old, the main object gained by this method being that should the heifer fall below the extremely high standard set, she usually goes straight to the butcher before another winter. In these dairy herds there is a threefold metnod of selection—first in the sire, second in the young calf, judged largely by the milking qualities of the dam, and lastly by the greatest of all test—performance at the pail, and not until a cow answers this satisfactorily is she accredited a prominent place in the dairy. The cows, no matter how good, are seldom kept until they become old, worn-out shells, valueless for beef, and not fit to propagate their kind, but are sold for beef whilst they are still able to put on flesh, profitable alike to all concerned.

— Rearing. —

The peculiar method in vogue of rearing the cows and calves at the time of calving has some influence on the market production of the cow. After birth the calf is immediately removed, and the cow rarely ever sees or hears it make a noise. It is removed to some other place, away from the mother and there fed by hand until it learns to drink freely, and the contents of the cow's udder are immediately drawn off by hand. Generally this course of procedure induces the cow to give to her milker the natural maternal affection which otherwise would be devoted to the calf. If the milker be gentle and kind the cow gives down her milk in response to this affection to the full extent of her ability. Some people really think that in no small measure it is the secret of great records of milk production raised in winning affection of the cow.

— Three Types. —

In the Friesland herd book these cattle are described in three forms —milk form, milk and flesh form, and beef form. The largely prevailing form is the dual form, and thus it has been recognized "as a dual-purpose breed." According to the experience and observation of many intelligent breeders it requires this form to ensure the constitution, vitality, and endurance necessary for a continuous and large flow of milk over a long period. The decided milk form is rather an indication of weakness and delicacy, which it is most desirable to avoid. There is no animal which requires such strength and vigour as the cow that can give 16,000 to 20,000 lbs. of milk in a year, and continue on this mark year after year without being worn-out.—Elder's Review.

Lime.

Lime is very extensively used as a fertilizer, but its action is not generally well understood, and serious mistakes often occur from its indiscriminative use. Most soils contain all the elements of the plant-food in varying quant,ties, but, however abundant the presence of most of these essential constituents, if any one of them be absent the soil is perfectly barren, and if present in insufficient quantity the resulting crops are unsatisfactory to the extent of that deficiency. Lime cannot be classed among these deficient substances, for, although it enters into composition of almost all forms of vegetable life, its various compounds are so widely and generously distributed that it would be a very rare circumstance for any sample of ordinary soil to be found on analysis not to contain sufficient lime for the requirement of any cultivated plant. Then, it may be asked, how is lime a fertilizer? Anything is a true fertilizer which causes a plant to make more vigorous growth, and yield a better crop; and lime does this in a twofold manner—namely, chemically and mechanically. First, as to its chemical action. All plant food to be available must be in a soluble condition, otherwise it is like human food under lock and key. All soils contain animal and vegetable matter in varying proportions and in various stages of decomposition. Now, lime in its caustic condition is one of the most powerful agents of decomposition, and where, from defective drainage, or other causes, the land is "sour," and where organic matter does not readily decompose, the application of caustic lime often works wonders, causing these previously inert substances to yield an abundant supply of available plant food. Probably this use of lime and its compounds sometimes reacts with injurious mineral substances, producing useful or harmless compounds—for instance, the action of gypsum or carbonate of soda. The mechanical action of lime on heavy clay lands is an important aid to fertility, causing the soil to become friable, and thereby gi ing free access to air and water. This mechanical action is shared by several of its compounds, such as gypsum, powdered chalk, pulverized shells, etc. The common mistakes in the application of lime as a fertilizer are the following:— When its chemical action is required on sour, boggy land, it should be spread and ploughed-in as soon as possible after being slaked. It is often allowed to lie in heaps for weeks and months, when it absorbs carbonic acid from the atmosphere, and becomes gradually converted into carbonate of lime or chalk. When spread and allowed to remain some time before being ploughed-in the mischief is still greater. Considerable damage sometimes occurs from over-liming. Since caustic lime greatly promotes decomposition there is a danger of bringing too large a proportion of plant-food into available form, resulting in a heavy crop in the ensuing season, and comparative barrenness for several years after. It is a common practice to add lime to night-soil and other animal manures. Caustic lime sets free the ammonia, thus depriving manures of one of its most valuable constituents.

Make a Noise.

A hen is not supposed to have much
Common sense or tact,
Yet every time she lays an egg
She cackles for the fact.

A rooster hasn't got a lot
Of intellect to show,
But, none-the-less, most roosters have
Enough good sense to crow.

The mule, the most despised of beasts,
Has a persistent way
Of letting people know he's around
By his insistent bray.

The busy little bees they buzz,
Bulls bellow and cows moo,
And watchdogs bark and ganders quack,
While doves and pigeons coo.

The peacock spreads his tail and squawks.
Pigs squeal and robins sing,
And even serpents know enough
To hiss before they sting.

But man, the greatest masterpiece
That nature could devise,
Will often stop and hesitate
Before he'll advertise.

—T. P. A. Magazine.

Tending the Young Pigs.

Young litters of pigs may be guarded from the danger of crushing by the mother by having a fender made of a scantling or rail fastened say eight inches from the wall, and the same distance from the floor. The pigs quickly learn the protection afforded by this device when the sow lies down. Some breeders advocate a farrowing pen not large enough for the sow to turn round in, and with walls open eight inches from the floor, so that the pigs may run in and out. A pen of this sort may be made by confining the sow at one end of her regular pen with boards so nailed that she will be unable to turn round.

The condition of the weather will govern the length of time it will be necessary to keep a newly-farrowed sow in close quarters, but she should not be denied access to the air. Pigs should not be allowed out in a cold rain, or where they will receive the shock of cold winds. Where they can do so without danger they should be out in the sun within twenty-four hours after birth, and after that the best practice is to let them run in and out at will. Neither the sow nor very young pigs should be permitted to run in pasture early in the morning if the grass is tall and wet with rain or heavy dew.

For the first weeks of a pig's life the mother's milk is its drink as well as food, and therefore in caring for suckling sows it should be the aim to so feed them that milk of only medium richness will be furnished instead of a limited supply of that which is extremely rich, the latter being less healthful and more liable to cause thumps, scours and unsatisfactory growth. It is only a law of nature that pigs should make more economical gains through the milk of the dam than in any other way, and it is also true that the sow will furnish nourishment for her young at less cost for the raw material than any other animal on the farm. A sow's milk is rich in sold matter, which amounts to 17 to 20 per cent. On a comparative basis of 1,000 pounds live weight a cow giving three gallons of milk per day will give in the milk 1 pound of fat and .77 pound of protein daily, while a sow's milk will yield 1.26 pounds of fat and 1.1 pounds of protein a day on an average. In composition sow's milk in comparison with cow's milk is very high in total fats as well as solids—Leader.

Potatoes.

Plant only good seed of heavy-yielding potatoes. Have your soil well drained. Fertilize as heavily as you think need be, then apply same amount a second time. The extra yield of the crop will more than compensate for this. All but the more soluble parts of the fertilizer will remain for future crops. Break the potato land early and deep. Pack the soil as little as possible. In preparing the surface for planting, cover the seed 4 in. deep. Never plant when the ground is wet. Begin cultivation as soon as planting is completed. Cultivate at least once a week, keeping the surface level as long as possible. Harvest as soon as the tubers will not roughen in handling. Store in a cool, dark place. Sell as soon as the price justifies. Don't try to grow potatoes commercially with primitive methods, else you will become disgusted and quite the business. With these suggestions properly observed, and the closest attention to every detail, is how to make the potato-crop pay.—Exchange.

Selection of Sow for Breeding.

In selecting a brood sow look for an animal broad between the eyes and snout. The ears should be medium in size and fine in texture, and the back strong and well arched. Hoofs should be short, and stand erect, legs fairly long, so that the udder will not drag on the ground. The under line should be long, hips broad, and the body deep. A gentle disposition is important. A nervous, high-strung sow is dear at any price.

The Money-Maker.

She doesn't belong to any breed exclusively, but is found in all breeds. In experimental work it has been found that it is not the breed that determines the value of the cow as a money-maker, nor is it the colour, size, or her score on the scale of points of that breed. For the scale of points of the different dairy breeds is misleading; the cows scoring the highest are not necessarily the best cows. The score of a dairy cow should depend upon her ability to convert raw material into dairy products economically. Great dairy performers of all breeds have similar conformation. The first requisite of a dairy cow is large feeding powers. The more raw material she can make use of—other things being equal—the better the cow. An animal's feeding capacity can be closely ascertained by its conformation, it depending largely upon the size of the middle or barrel. The first and most important point in determining the size of the barrel is depth of body through the middle; then comes the length of the body from shoulder to hook points, and its breadth through the middle. A broad muzzle and strong jaw are also desirable.—"Farm and Home."

Are Farmers Breeding Up or Down as Regards Quality of Milk.

We believe that the natural tendency of affairs leads constantly to the production of poorer milk. This is seen in all breeds. The great desire with all farmers is quantity, to breed and raise the cow that will give the largest amount of milk. As a rule, the cow that yields a large amount of milk does so at the expense of the richness of her milk. That is, the more milk the lower will be the percentage of butter-fat. We have noted this tendency for years. The inevitable outcome of it must be a gradual decline in the per cent. of fat in the milk, unless breeders and farmers guard against it. The laws in most States set the legal standard of milk at 3 per cent. This would seem low enough to satisfy almost anyone, yet there is not a little complaint that even that low standard is too high. Such complaints come very largely from persons who have cows which produce milk of unusually low standard of fat. It is well to know the lay of the land; which way water naturally runs. We believe this tendency to a low percentage of fat is an uneconomic one, so far as the cost of fat production is concerned.—"Hoard's Dairyman."

Pail Feeding.

In pail feeding a danger to be avoided is the sudden and excessive filling of the stomach, which is more likely to occur when the calf, after a long fast, is thoroughly hungry and thirsty. The following is the plan of a very successful rearer of calves. The calf in its box should be fed through a hole cut in the wooden side of the box, just large enough to allow it to put its head through so as to reach the pail outside the box. The fore or finer part of the neck cannot pass through the aperture, so that plunging is stopped. Pail feeding is common in dairy districts, and is found to be a necessity in management directed to the greatest possible increase of the dairy properties of a breed, a herd, or a single cow. It is not uncommon in many districts where grazing steers are raised, and the cows used for the general purposes of those districts, their dairy produce being an important, although not the one principal, return expected of them. The best of all rearing for the calf is, no doubt, by suckling. It thrives better on a smaller quantity of milk drawn in the natural way from the cow, and especially if it runs with the cow and can suck at will, than upon a larger quantity brought to it twice or even three times a day. If, however, the calf is intended for the dairy as the primary object of its rearing, the suckling system, continued for any great length of time, is not desirable, as it fosters the tendency to make flesh and to fatten, rather than the tendency to comparative lightness of flesh and aptitude to produce milk.—"Livestock Journal."

Hiuts on Drainage.

"We talk about the drudgery of dairying (and it is rather a binding business), but it is the poor half of the herd that makes it so. Keep records, weed out those poor cows, pay more individual attention to the rest, feeding them up to their capacity to respond, and feed the rest of the field products to sheep or colts or steers or heifer calves, or even sell them outright. Cull out the unprofitable part of the herd, and don't do it by guesswork. Some people think that they can tell by the look of a pail how much milk there is in it. Any man who has not actually weighed or measured several milkings will be inclined to exaggerate the amount by from 25 to 50 per cent.

Land Drainage.

The cold nature of undrained soils calls for consideration, because undrained soils cannot be satisfactorily worked so early in the spring as those which are drained, for if any attempt is made to cultivate them puddling is the result, and the texture of the soil may be so injured that its restoration to a fit state for the growth of crops may be very difficult. This circumstance, owing to the lateness of the sowing season, causes the harvest to be unduly late, which may be disastrous in districts which from other causes or climatically cold and backward. The fact that water is a bad conductor but a good radiator of heat causes a soil saturated with it to be always more or less cold. Water quickly cools, especially when evaporation is stimulated by wind or other causes. In the first place a film of particles of lower temperature than the underlying body of water forms upon the surface; these particles sink only to be replaced from below by those which are warmer, the process continuing until the mass of the fluid is of uniform temperature, when, if the atmosphere conditions admit of it, a layer of ice is formed. This law of the temperature properties of water may be easily tested in the case of a copper of water, the fire of which has recently been lit, when it will be found, upon plunging the hand and arm into the fluid, that the latter is warmer at the surface than at the bottom, where the heat is being applied. This is just the contrary condition to that considered above, but it is precisely the same thing in principle, showing that water, when heated, expands and becomes lighter, rising to the surface; but when cooled contracts, and if then at the lowest level remains there, but if at the surface sinks. This property of water is sometimes made use of in warming buildings, in which case the water is heated in the basement, and by transference of its particles presently reaches the highest point, where it is cooled, returning again to the basement to repeat the process.

During the season of growth a well-drained soil derives warmth from the rain which falls upon it, as the latter is commonly at a higher temperature. In England the difference between the rain water temperature and that of the soil 2 feet deep has been found upon occasions to be as much as 18 degrees. Professor Wrightson lays stress upon the advantage which a drained soil derives from the alternate contraction and expansion which it undergoes through being wet and dry by turn. He says, "A wet soil is almost always in a sodden or water-logged condition, while a drained soil is repeatedly wet and quickly dry. Accompanying and depending upon this alternation of condition, a drained soil contracts as it dries, and expands when it is once more wetted with rain. Anyone who has observed the cracks that appear in land after a severe drought and which close up again after rain, will understand that in a drained soil there must be an alternate contraction and expansion induced throughout the soil. Not only will there be large cracks formed, but small ones, and the entire soil will be fissured in every direction. As a consequence, the soil becomes pulverised to a considerable depth, and both soil and subsoil are benefited. This pulverising action proceeds slowly, and accounts for the fact that land drainage does not operate fully the first season, but requires several years before its advantages are realised.

Under these favourable conditions the roots of crops go downward more readily into the subsoil, bringing plant food to the surface which would otherwise not be obtainable; the roots serve the purpose of disintegrating the undersoil.

Some of the benefits of drainage may be thus summarised :—

(1) An earlier and more abundant harvest. These results follow from the foregoing considerations, viz., earlier cultivation, increased warmth of the soil, and from the fact that the plant food existing in the soil is rendered more available, and access is provided to larger quantities of it.

(2) A better quality of produce naturally follows the growing of crops on a well-drained soil. As the result of healthier conditions there is a better development of all parts of the plant, which becomes more resistant of rust, mildew, and other fungoid pests.

(3) A greater variety of crops can be grown upon well-drained land. This is distinctly advantageous to the farmer, as it admits of a more extended rotation of crops, whereby there is less drain upon the plant food resources of the soil.

(4) It is easier and much less expensive to cultivate a well-drained soil than one in a contrary condition; moreover, access to the land is less restricted.

(5) Fertilisers are more or less ineffective when applied to undrained land, and are in that case generally quite wasted.

(6) The health of both human beings and livestock is improved where extensive draining operations are carried out—rheumatism, catarrhal affections, and tuberculosis being rendered non-existent or less harmful in their effects.

The Soil our Heritage.

We must cease looking upon our land as an object which has us as transient masters. Instead, the passing years must teach us to love our soil as the European landowner does the few acres that he has inherited from his father, and in which lie all the past traditions of his family. In the soil we must see our great and permanent possession that is to be preserved, built up, and made more fruitful for our children in coming years. If we accept as a national ideal the demand that we live by the labour power of our people, we must quickly become a nation of skilled workers in the city and upon the farm, for crude and unskilled effort will not support us in our present standard of living. It is comparatively a simple thing to farm by machinery on virgin ground; but to carry on extensive agriculture in accordance with scientific principles under a system of crop rotation, using a great equipment of tools, with large stocks of well-bred cattle, growing a great variety of plants and fruits, supplying from year to year the needed fertilizer to the soil, requires special skill and very much technical knowledge. The routine of tradition will no longer suffice. The sciences of chemistry and physics, acquaintance with botany and some of the other elemental laws of plant life, mechanical skill in handling tools and machinery, are the necessary part of the equipment for successful farming. The knowledge that underlies this is of recent development, but is not yet a common possession of the farmers of this country; hence, not knowing himself, the farmer cannot impart training to his son.—"Country Life in Canada."

Why Land Becomes Unproductive.

After a time the lean years come, and the farmer wonders why his land is growing less and less productive. The soil that was once dark in colour, and mellow to the touch, as if instinct with life, has become lighter in colour and lifeless to the touch.

Why this change; and what of the bacteria that were so generously fed in the new-established fields? An answer to these questions may be found in the history of every agricultural country. It is the story of young soils, and later of soils all but dead, and of soils in their decline. It is the story of vegetable matter decaying rapidly at first, and then more and more slowly, until the residues finally become so inert, so resistant to decay, that the bacteria fail to secure enough food, and come upon a period of starvation. For, after all, it is not so much the quantity of humus in the soil, but the quality of it, that regulates the growth and activity of the bacteria.

It is surprising what enormous quantities of plant food are present in many so-called "run-down" or "worn-out" soils. Yet, notwithstanding the abundance plant food, the crops do not grow rapidly enough and do not yield profitable returns. There is not enough fermentation in these soils, the perfect bacterial machinery is lacking, and the acids and other chemical products of fermentation are not abundant enough to provide for a rapid breaking down of the rock particles, and the formation of available phosphoric acid and potash.—New Zealand Farmer.

In driving cows, never hurry them when their udders are full of milk or when they are heavy in calf, as serious injury may result.

Maize Breeding.

SEED SELECTION.

From Dalgety's Review.

The selected ears should be removed from the stalk and husked by hand, and a certain proportion, which at first glance do not conform to the standard, can be discarded. This will probably leave from 100 to 150 ears, from which to make the final selection.. These should be laid out in one or two rows, and the necessary number of ears to form the breeding plot can then be selected. The following has been found to be a very simple method:—A hundred or more cheap paper bags are provided, and the 50 or 75 ears finally selected are placed in a row in descending order, that is, the ear most nearly approaching the ideal is placed first and the poorest last. Each ear is then slipped into a bag and the number of its place in the rank is recorded on the outside. The best ear will thus be No. 1, and the poorest No. 50 or No. 75, as the case may be. The bags containing the ears can now be put on one side, for preference in a tinned-lined case, and, if necessary, can be fumigated with carbon bi-sulphide.

—Compilation of Records.—

As time permits, the ears can be taken out, measured, weighed, and the percentage of grain to total ear recorded. This is obtained by deducting the weight of shelled grain from the total weight of the ear unshelled. Any notes regarding the relative qualities of the ear or grain can also be recorded in a notebook, and after the inferior kernels at the butt and tip have been removed, the selected seed is put back into the bag and reserved for planting time. The character of the notes made will differ with the taste of the breeder, but such points as weight, length, and circumference of ears, size, and depth of grain, number of rows, space between rows, and quality of butt and tip should be recorded, though not absolutely essential to the success of the breeding plot. The careful breeder will also have noted the vegetative characteristics of the parent plant, such as height of plant, quality of leaf growth, number and size of ears, date of the appearance of tassel and silk respectively, and so on.

The pollen of the maize plant is exceedingly light, and in a dry atmosphere may be carried considerable distances by wind. The breeding plot should be at least 400 yards from any other maize, and in order to guard against the danger of volunteers, should be, if possible, on land which has not carried maize the previous season. The soil should be of similar character to that on which the bulk of the crop will be grown, and should receive no special treatment, except such as is meted out to the main crop. The rows in the plot should be of equal length, and may be regulated by the amount of seed available from the several ears. A small portion of seed from each ear should be reserved for filling in blanks and for reference with the grain of its progeny when the latter is reaped. Seed should be dropped singly, and planting by hand, or with a hand dibbler is the most satisfactory method. The grain from each ear is planted in a separate row, and the rows are numbered accordingly.. It is advisable to commence planting the centre of the plot with Nos. 1 and 2; Nos. 3 and 4 coming to right and left respectively, and so forth. By this means, the seed of the best ears is in the middle of the plot, and these plants are less liable to fertilization by stray pollen from unselected seed, or to injury by cattle or vermin. The breeding plot may be situated in the main-crop planting of the same variety, or better still, in the midst of the "increase field," but where possible, its entire segregation is preferable.

In order to guard against self-fertilization and the possible deterioration which may thereby occur, alternate halves of each row are detasselled, that is, the main flower or tassel at the top of the stalk is removed as it appears. Detasselled plants will thus be fertilized by "entire" congeners in the adjacent rows, and seed will only be saved from detasselled plants. With this exception, selection in the breeding plot is proceeded with in exactly the same manner as in the preceding season, and the process, one of continual, improvement is carried on year by year.

—Elimination of Undesirable Plants.—

To be effective, selection in the breeding plot must be rigorous, and during the early stages of growth any plants showing undesirable traits should be cut out entirely. Certain rows will also fail to breed true to type, and these also should be cut out as early as possible, and, if practicable, before the male plant has shed pollen. In the ordinary course of events, several ears will probably be selected from each of a certain number of rows, and the second generation can be numbered 1a, 1b, 1c, 5a, 5b, 5c, and so forth as applies to each. In this way the pedigree of each ear is known, and the remarks pertaining to it can be traced in the stud book.

The remainder of the seed secured from the breeding plot should be superior to that from the main crop of the farm, and if of sufficient quantity can be used for main-crop sowings the following season. Failing this, and particularly in the case of the breeder of pedigree seed, it can be sown in a larger plot, often known as the "increase" field, from which the entire seed for the third season's sowing can be obtained. The usual system of selecting seed ears from the crib indiscriminately entails much time and labour without achieving its object. For the large grower who does not consider he has time for the niceties of records, the breeding plot, together with the increase field as outlined above, affords good possibilities of increasing his profits, and careful annual selection of seed by this means spells certain improvement in yield and quality.

Finally, there should be a word of caution to those growers who, on limited areas, and in too great proximity, are attempting to grow two or more kinds of maize. The effect of cross fertilization may not be apparent in the first generation, but in time it will leave its mark, and the second or third generation, lack of uniformity coupled with deterioration and a splitting up into innumerable types and sub-types will surely make its appearance. There is so much maize of inferior quality being produced that manufacturers are in a position to pick and choose, and it is only the best grades which will command top prices. It remains for the grower to decide whether he will compete for these prices on the market, and at the same time, increase his acre yield, or whether he will be content to accept a smaller price for a medium quality article suitable for conversion into mealie meal or for home feeding to farm stock.

It must be remembered that Mr. Mundy has in his mind chiefly South African conditions, but there is probably much in the above which will apply to those who take an interest in the production of maize in our northern districts. It is for this reason that we bring it before our readers.

Pig Breeding.

The sow should not be bred too young; ten months is a good age, as a rule. The in-pig sow should neither be half-starved nor over-fed. It is a bad plan to put her in a new sty almost at the last moment. She should be made accustomed to the place she is intended to farrow in for a week or two beforehand. A properly fed and consequently healthy sow rarely develops the evil propensity of eating her own pigs. During the earlier period of gestation she should be fed so that she is in fair condition without developing fat, and, while withholding fat-forming and starchy foods, plenty of albuminous food should be given, especially in the case of a young sow, so as to develop growth, roominess, and milking capacity. Immediately after farrowing give the sow a mild dose of castor oil, and follow this by one drachm night and morning of bromide of potash, which should be given in a little warm milk.

Crib-Biting Horses.

There is a great diversity of opinion as to what really is the cause of crib-biting. Some people consider that it is the result of a diseased condition of the stomach. Others attribute it to long abstinence from food, when the animal, feeling a knawing pain on the stomach, arising from want of food, draws in a quantity of air which serves to distend this organ. Yet again there are others who maintain that the horse learns to crib bite from other horses, and there really can be no denying the fact that this habit is remarkably catching; as there are instances on record of one horse contributing the habit to a whole row of others stabled with him. At one time it was supposed that crib-biting was the result of eating too much dry and stimulating food, thus overcharging the system with blood, or to feeding on mouldy hay and musty oats. In fact, so numerous and so varied are the opinions of practical men on this subject that it is difficult to arrive at anything like a just conclusion.

It would not appear as though crib-biting were a disease in its first stages but it is a habit acquired by young horses, and one which is very rarely met with in old horses which have been stabled for any length of time. It is quite possible that some of the trouble is due to the change which takes place when a young horse is first brought up from the paddock, where it has found much to interest itself in, observing what is going on around it, and in ascertaining what other horses are doing, or in feeding for about eighteen hours out of twenty-four. It is very seldom indeed that a young horse can be seen crib-biting when out in the paddock. If anybody ever does come across an instance of a young horse practising on the top panel of a fence he may rest assured that there is an older horse in the same paddock which has contracted the habit and is passing it on to the youngster. Where a young horse can find amusement and interest in its environment it is hardly likely to fall a victim to this unfortunate habit. With regard to the contention that crib-biting is produced from long abstinence from food, the following can be said:—Under natural conditions when out in the open, assuming the season to be a normal one, the horse's stomach always contains a certain quantity of nourishment, and when the animal is stable-fed the feed is given more or less irregularly, consequently the stomach is frequently empty and collapses, the collapse being followed by unpleasant sensations, to overcome which the horse takes to biting the manger. During this act a quantity of air passes into the stomach and distends it, and this, to a certain extent, satisfies the craving appetite by allaying gastric irritation. The confirmed crib-biter generally puts in a good deal of work of this description when it is fed. Hence it seems strange to suppose that the above explanation really has anything whatever to do with promoting the habit.

It would rather appear as though crib-biting were a habit which took place in consequence of a change from a natural to an artificial mode of living. A horse is taken from an open paddock, where for a long time it has had nothing to do but feed, gaze around and amuse itself by an occasional gallop. The feed which it there gathers is of such a character as requires the animal to be almost continuously eating, and when the appetite itself is satisfied, looking at its companions and surrounding objects to amuse itself. As soon as one thing has lost its attraction another presents itself, and thus the animal's time is constantly occupied, and it never becomes bored with existence. On the other hand, the change which comes over its life when placed in a stable, which is virtually a prison, is very marked. In its stable the animal stands for hours upon end; sometimes for days in succession does not leave the stable. The feed which is placed before it during that time is of a dry stimulating nature, and of this a little serves in comparison with what it has been in the habit of picking up in the paddock. In the stable it will probably be feeding for only three hours out of the twenty-four, which, as compared with the time devoted to feeding in the open, is a great contrast. Is it therefore to be wondered at that a horse when placed in a situation so different from that to which it had previously been accustomed should acquire such a habit as crib-biting? When the animal is taken out of the paddock and placed in the stable, having nothing to amuse itself with, the manger in front of it is the most convenient thing to demand its attention. The top of the manger is generally round and smooth and the animal soon begins to lick it. This licking has a certain amount of fascination, in that it occupies the animal's attention, and by the motion of the tongue the glands are excited and give forth an increased quantity of saliva. This habit continues for some time, perhaps a fortnight or three weeks, or even a month or more, as horses vary much in the length of time during which they practise it.

One really good preventative is not to allow the animal to stand in the stable too long, but, once the horse has become a confirmed crib-biter, there is nothing which will keep it in check except what is known as the neck-strap, a broad and stiff band of leather running round the neck and under the throat, and catching the animal very much in the same position as that occupied by what is known as the Adam's apple in man. At one time it was supposed that an effective cure was to be found in cutting off the tip of the tongue. It may have the desired effect, as one can readily understand that when a portion of the tongue is taken off the same power as existed before to draw in the air does not exist after the operation. Seeing, however, that it is a remarkably cruel proceeding, this remedy is hardly likely to appeal to any but the most inhumane. Possibly there are a good many people connected with horses in this country who do not appreciate the fact that no horse which is a crib-biter can be regarded as sound. The reason of this rests in the fact that a horse is a crib-biter seldom or never carries much flesh. Its coat is staring, and generally long; the state of the skin is regulated by the stomach, and if the skin is out of order so is the stomach, and vice versa. Moreover the powers of digestion are generally weakened, and the animal is thus predisposed to various diseases, such as spasmodic and flatulent colic. Every time the horse cribs he draws in a quantity of air into the stomach, an organ made to receive food, and not atmosphere. In addition to this it may be remarked that the stomach of the horse differs from that of a man and other animals. When air or other matter has once entered the stomach the horse has no power to expel it by the mouth again, in consequence of the strong, muscular fibres which are arranged in a valve-like manner at the cardiac orifice. Since the air occupies space, the same as the feed itself, the stomach has two walls, instead of one to contract upon. The walls of it are preternaturally distended, and in process of time must be materially weakened. The horse is likewise subject to colic from the same cause, namely, the air which passes from the stomach into the bowels, and colic is a disease which often proves fatal if not promptly attended to. Notwithstanding what some veterinary surgeons may allege to the contrary, no horse that is a crib-biter will be passed as sound at that great horse mart in London, Tattersall's. If a horse be there offered for sale as sound and the purchaser subsequently finds iut that the animal is a crib-biter he can recover his money.

—"Elder's Review."

Muscle in Horses.

About 40 per cent of the weight of an ordinary horse is muscle. All muscles concerned with locomotion are atached to bones, and when they contract they cause the bones to which they are attached to move The lower parts of a horse's leg are nearly all bones, but the muscles in the body and upper parts of the limbs are attached to various parts of the bony construction by tendons, and can thus produce a motion of the parts located some distance away. A long muscle enables the horse to get over the ground rapidly, and a short muscle is for power. The later, however, is not powerful because it is short, but because in horses constructed on that plan the muscles are thicker, contain more fibres, all of which are pulling together when contracted exert a much greater pulling force than a long, more slender muscle. It is because of this that in buying horses to draw heavy lodes we look for large and heavy muscles, whilst in roadsters we must attach importance to the length of the muscles.—Livestock Journal.

Lime.

Enough experimental work has been done with lime on the land to demonstrate conclusively that lime pays where land is sour or in need of physical improvement. Lands that long have been given to grass, or have become hard and stiff because their humus has been used up and destroyed by continual cultivation, frequently show marvellous results from a moderate use of quick-lime.

Lime shows its power in affecting the soil properties which constitute fertility; in changing soil texture to the extent that sandy soils are improved and heavy clays are made open and crumbly; in releasing potassium and making it available for use of plants. Nitrification is helped, organic matter is decomposed, and the soil is sweetened. Surely a number of good deeds it does and with lasting effect.

Does your soil look sad and sickly? If so, it may need lime. Does your soil fail to produce vigorous growth and good colour in the plants it grows? If so, it probably needs lime. Does your soil show acidity when tested? If so, it truly needs lime.

Get a pennyworth of blue litmus-paper from your chemist. Take from the field a handful of wet earth that looks suspicious, insert your knife-blade, and in the opening put a strip of blue litmus-paper, and press the soil tightly about it. If sour, in a few hours the paper will become reddish in colour, and you may know that lime is needed to correct the acidity, for most of our plants do but poorly in acid soils.

A common method of application that is practicable and inexpensive is to place 10 or 12 bushels on an acre, in heaps of 2 or 3 bushels, covering with soil or old sacks until the lime falls apart and becomes thoroughly slacked. This done, you should spread evenly over the soil, and harrow in.

Too constant use of lime is undesirable. An application once in four or five years is sufficient.

Destroying Trees With Saltpetre.

"I have seen many hundreds of acres of bush—large and scrub—completely destroyed with ordinary commercial saltpetre, but the trees were not cut down, as this entails much labour. A hole is bored in the tree in For large trees, a 1-in. auger is used; for smaller ones, ½ in. size is large a downward direction to the centre. enough. For large trees, 1 oz. to 2 oz. is the quantity used, and for smaller ones ½ oz. to 1 oz. A plug is put in the hole to keep rain from washing it out. The nitrate of potash is carried by the sap to the tips of the branches and to the rootlets. If the tree is a large one, say 2 ft. or more in diameter, very little difference will be noticed in the foliage for two or three months, then the leaves begin to fall, and it assumes a bare, wintry appearance. At the end of about six or eight months you pile a little brushwood round the tree and light it, and there is no further trouble. It will smoulder away to the remote ends of the roots, sometimes 30 ft. from the butt of the tree, leaving masses of valuable ash in all directions; while, if your bungalow is near to the clearing, you will hear a crash, which will sometimes startle you at night time, when the big trees fall, and when fallen they will continue to smoulder until every particle is converted into ash."—"Pastoralists' Review."

Onion Growing.

The crop has the valuable advantage of being one of the few possible to the market gardener that need not be marketed at the moment of attaining maturity. Onions, to be successful, must be grown on clean land. The most suitable soil is a rich, sandy loam, free, friable, and easy to work—a soil that will not cake, and not lying so low as to retain the superabundant moisture after heavy rains. In such case the land should be well drained.

As soon as the land is dry enough after the early rains to be properly worked, and when that work is completed, sowing begins. Getting the land into proper order means—if the land is not virgin soil, or if it has borne crops for many years in succession without manuring— that it should be reduced to a fine tilth, and thoroughly well manured with stable dung, ashes, bonedust, soot, sulphate of iron, and sulphate of potash. A good manure for onions is a light dressing of dung, supplemented by 4 to 6 cwt. of superphosphate,1 cwt. of sulphate of potash (or 4 cwt. of kainit), and 4 cwt. of nitrate of soda. Potash is of vital importance to onions, and should on no account be neglected. It is valuable in improving the keeping quality, and sulphate of iron is a preventive of onion mildew.

Getting the land in good order includes well rolling it, for an indispensable cultural condition for onions is to get the soil well firmed underneath without "panning" it. This condition is often lost sight of. If the soil is carefully worked, reduced to a fine tilth, and the plants are set out in a soil which is loosened to a depth of, perhaps, 8 in., no good results can be expected without rolling. The onion requires a firm bed; otherwise the plant, instead of making a large, well-shaped bulb, will run to "neck," and have more the appearance of a leek than an onion.

The best way to sow onions is to drill them in, although for small areas the seed may be sown in a seed bed, and the young seedlings be planted out. The drills should be from 8 in. to 15 in. apart, which will require from 8 lb. to 10 lb. of seed per acre. The seeds should be dropped at a distance of 2 to 3 in. apart in the drills, and the plants will afterwards be required to be thinned out with the hoe to 6 in. apart in rich land. The drills should be slightly raised, and the roots of the plants be firmly embedded in them. The bulb is not the root, and it should be allowed, so to speak, to squat on the surface, not under it.

As the plant grows, the soil must be kept perfectly clear of weeds; and where the working of the ground has thrown the soil against the bulbs, it must be drawn down so that only the root is in the ground. Where this has not been attended to, the remedy for the resulting want of bulb-formation is to wring the necks of the plants, or, at least, to bend them down with a twist. This will have the effect of inducing the formation of bulbs.

When sowing the seed, it need only be put just under the ground, as it requires but a very slight covering of soil. If sown deep, many seeds fail to germinate, and most of those that do appear will make an abnormal growth of neck, causing much labour in drawing away the soil from the incipient bulbs. There are few seeds so annoyingly deceptive as onion seed, as old seed will lose its germinating power, and imported seeds, unless carefully packed in airtight bottles or soldered tins, will scarcely germinate at all. Therefore, it is well to make sure of getting new seed. After sowing, germination should take place in about a week, and the onion comes to maturity in from 120 to 180 days (spring onions in from 60 to 90 days). They may be known to be ripe by the drying up of the tops. As soon as this happens, pulling should be done quickly, because, if wet should come on, the bulbs may start a fresh root action. This, besides making them harder to pull, will seriously impair their quality. After they are pulled, the onions are left in narrow "windrows" to get well dried and ripened, and may then be removed to a dry barn, subject to a free current of air. Should they show any signs of heating they must be at once turned over, and the bad ones picked out during the process.

The great possibilities of onion-growing may perhaps be realized from the following figures given in "Commercial Gardening"—Vegetable-growing for Market:—

"Assuming the rows to be 1 ft. apart, and the plants, after thinning out, to be 3 in. apart, as a fair distance for market-garden culture, there would be 174,240 to an acre. At an average weight of 8 oz. each, the yield per acre would be nearly 39 tons. At £4 per ton, this would represent £156 per acre for the matured crop, without counting the thinnings—all saleable for salads. If the plants are thinned out to 6 in. instead of 3 in. apart, there would be 87,120 bulbs to an acre. These would yield 19 tons on the 8-oz. basis, and £76 per acre at £4 per ton."

From experiments carried out on the "Times" Experimental Farm in 1910, the following results were obtained from a square chain of land (1-10 of an acre) from seed sown in boxes in February, and transplanted 12 in. by 3 in. in April (174,240 bulbs to the acre):—The varieties of onion were: "Ironhead," 2,640 lb. (—11.7 tons per acre); "Cream Globe," 2,878 lb. (—12.8 tons per acre); Wroxton," 3,960 lb. (—17.6 tons per acre); "Ailsa Craig," 4,950 lb. (—22.1 tons per acre).

— Keeping Onions.—

Onion growers usually find that if, owing to a slow market, onions have to be held over for any length of time, the chief difficulty is their liability to sprout. This must, if possible, be avoided, because, whenever growth is set up in any bulb or seed, that seed deteriorates in proportion to the extent of growth. Anyone who has tried to eat an old seed potato, which has been inadvertently gathered up with a new crop, will be aware of this fact. Onions, when pulled, should not be stored away at once, but should be left on the ground for a few hours to dry. Then they should be put away dry, in the coolest shed or barn available. They require constant looking over to sort out any bad ones, for, as in the case of fruit, such as oranges, apples, pears, &c., a single rotting onion will infect all those in its immediate neighbourhood. It used to be the custom, and probably is to this day the custom in the good, old-fashioned farmhouses in the old country, to hang the onions in strings to the kitchen rafters in company with hams, flitches of bacon, &c. This hanging in strings is a good plan where it is only a question of keeping a few for home consumption, but, in the case of many tons, the labour entailed would not be recompensed by the profit.

In an article on this subject in a French journal, mention is made of an observation of great importance which deserves the attention of farmers and market gardeners. After some experiments made on ten plots manured with chemical fertilizers, the resulting crops of onions were put away in bags and carefully numbered with a view to planting them out in the following spring to obtain seed from them. When the time for planting had arrived, it was found, to the astonishment of all concerned, that, under identical conditions of temperature and light, certain lots had sprouted, and were exhausted by young, premature shoots, whilst the other lots still remained hard and solid, without a trace of a shoot. The collections having been carefully ticketed, it was easy to prove that the produce from plots deprived of sulphate of potash were exhausted by a too-hurried vegetation, whilst that which had received the potash manure was perfectly preserved. Such experiments are well worth repeating, and it would be to the advantage of the agricultural world if those few advanced farmers who make such trials of fertilizers would publish the results of their experience.—"Queensland Journal."

The Dust Problem as Solved in England.

The advent of motor cars has effected a revolution in provincial rural England which can scarcely yet be estimated fully. The dust nuisance, though seemingly a small matter, was rapidly creating a deep-rooted hostiity that was seriously menacing development, and even calling for reactionary legislation.

The problem has been solved in two ways. Firstly, where the traffic is extremely heavy, the roads have been relaid with tarred macadam, but this method is too expensive for general extension both in first cost and upkeep. The other method is watering or spraying. Watering is prohibitive in cost because of the rapid evaporation. Spraying with tar is effective, but very objectionable in hot weather.

But a method is in use to a rapidly-growing extent which combines the advantages of watering with that of tar-spraying at a reasonable cost, and eliminates the disadvantages of tar. It has long been known that calcium chloride attracts the moisture which is present in the driest atmosphere and retains that moisture tenaciously. A few years ago it was discovered that if a road was watered with a solution of calcium chloride the dust became impregnated with the calcium chloride and the whole, instead of drying up, remained damp for from two to three weeks. A modification of the process is to sprinkle the road with calcium chloride as a powder, the result being the same as the most perfect watering, without the expense of watering, except once in three or four weeks. Calcium chloride is a well-known article of commerce used largely in cold stores, and sells for about £5 per ton. The mixture for watering is about 1 to 5 of water, while the powder entails no expense except the cost of sprinkling every few weeks. Calcium chloride is odourless, and harmless to both man and beast.—"Pastoralists' Review."

Overstocking.

The subject of overstocking may be briefly adverted to. Apart from the ill-effects of continuous grazing, and which become much increased when paddocks are overstocked, and apart also from the actual fouling of the herbage by excess of animal discharges, and by "the tramping of many feet," there is the further disadvantage that the good grasses are continuously eaten off as they shoot into growth, and are thus prevented from seeding. In this way the extirpation of much wholesome herbage is hastened. At the same time, useless or actually harmful and noxious plants which are not eaten by stock until the pasture is bare of nutritious grasses are allowed to seed, until eventually the innutritious herbage predominates, the good grasses having been eaten out. A familiar instance is the gradual usurpation of a pasture by Yorkshire fog grass (Holcus lenatus) where this grass has been sown with sweeter grasses; the latter are eaten down continually, while the fog is neglected by stock owing to its harshness, and being a stronger grower it soon takes possession of the pasture. Again, the well-known rib-grass or plantain (Plantago lanceolata) being much relished by sheep, is a useful grass on sheep country; cattle, however, neglect it, and on cattle runs it quickly becomes a nuisance, not only on account of its spread, but because its flat habit of growth entails great waste of ground surface that could otherwise be utilized by more suitable grasses. Even in times of plenty, the folly of overstocking is not less acute, for then the noxious plants are left still more severely alone to propagate and spread their baneful presence over the pasture, occupying ground that would otherwise accommodate herbage of more nutritious character. Truly the factors operating towards deterioration of Australian pasture lands are many, and deserve thoughtful attention and action on the part of all concerned. At the risk of being charged with uttering a libel on the commonsense of Australian farmers, a protest must be here entered against the suicidal and wasteful practice of burning off seeding grass during bountiful seasons, a practice which is carried out by not a few farmers in some highly-favoured districts. They fear bush fires, and instead of mowing the superabundance of seeding grass, and turning it into hay or ensilage, as a standby for a time of scarcity, they thoughtlessly resort to the characteristically improvident method of the "firestick."—By S. S. Cameron, M.R.C.V.S.

White Paint for Outside Fences, Etc.

The following is a good substitute for white lead for the above purposes (writes the Queensland Agricultural Journal):—1 quart of skimmed milk, 3 oz. of fresh lime, 3 oz. of raw linseed oil, 1½ lb. of whiting. Put the lime into a clean bucket, add sufficient of the milk to slake the lime, add the oil a few drops at a time, stirring the mixture with a flat stick until the whole of the oil is incorporated with the mass, then add the remainder of the milk and afterwards the whiting, which must be finely powdered, and sifted over the mixture gradually, or it will go lumpy. One coat of this will do for some purposes, but two coats are required for good work. It should be strained through a hair sieve or coarse calico. The above quantity will be sufficient for 100 square feet, or 11 square yards.

Harness for Horses.

Whatever purpose a horse may be called upon to fill, the harness or gearing used should fit exactly. In ill-fitting harness a horse is bound to suffer in one way or another, and this affects the animal's condition. You should not be content with tackle which only fits fairly well, but see that it fits perfectly. A proper adjustment of the parts has much to do with fit and comfort, but the vital parts, such as the draught collar and the riding sadle, should conform to the anatomy of the particular animal. Upon exactly the same diet and general care one man will keep a horse in good condition, whilst another will have him lose condition, even though the work is exactly the same in each case, the reason being that one man is in sympathy with the horse and the other is not.

Care of Horses' Feet.

There is no doubt (says "The Live Stock Journal") that many horses suffer from foot troubles which would have been preventable if properly treated in the early stages, while some diseases are the direct result of negligence. In the first place, it is of the utmost importance to grow a sound and shapely foot, and with this end in view the feet of colts should be systematically attended to at intervals so that the bars grow strong, with a good width of hoof, which means that contraction, fever, and such like ailments are far less likely to attack such a foot than if it is stilty and narrow. Of course, bad feet are inherited, but much can be done to improve the feet of horses descended from parents with poor hoofs if they are tackled as foals and never neglected. This may seem a formidable task, but it is worth doing, and when a colt is accustomed to be haltered, and to have its feet picked up, two or three minutes at intervals of five or six weeks will suffice to keep ordinary colts' feet in good order. Thrush is a very prevalent complaint with horses, both old and young, a spell of wet weather being one of the causes. This is, or should be, a simple ailment, but neglect turns it into a deep-seated and more lasting one. In fact, its cause is usually put down to "negligence and filth," and there is no doubt that horses which inhabit clean, well-littered stables, and have their feet washed out daily, rarely suffer from the complaint, but cart horses are more subject to attack, as they are more likely to stand in foul stables, and, as a general rule, do not get their feet cleaned out except when shod. It is, therefore, advisable for those who own horses to have their feet picked up and the frogs looked at to see if any foul smell and tenderness exists. With harness horses the presence of thrush is manifest, because it causes tenderness on the road, but cart horses may suffer for some time without being noticed. Simple treatment at the outset is better and more effectual than professional help at a later stage, say, when canker has developed. A pleng of tow soaked in Stockholm tar—warmed for choice—and pushed in the clefts of the frog, is the farrier's remedy, and one which has the advantage of being cheap. There are very few cart-horses which would not benefit by a daily dressing of this tar to their frogs for a week or two before being turned out."

Mending Auger and Olher Tools.

It oftens happens that good augers with the screws broken off are thrown away as useless. This should not be, for with a little work and small cost they can be made as good as new (says the Colorado College of Agriculture).

Take a file of suitable width, and cut a groove the width of the old screw about 3-16th in. deep, a little wider at the bottom than at the top (dovetail form). Then from a piece of steel cut a piece the shape of the screw, with a base that will fit neatly and tightly in the groove, then coat the edges with a tincture as follows:

Equal parts of sulphur and any white lead with about a sixth of borax; mix the three thoroughly. When about to apply the preparation, wet it with strong sulphuric acid. After treating the blank screw with the preparation, press it tightly in the groove, lay away for four or five days, and then you will find it as solid as if welded. The job will not take a half-hour or cost more than 5 cents for material. The same process may be used for mending almost any broken tool without drawing the temper. — "Nor'-West Farmer," Canada.

A New Remedy for Contagious Abortion.

In U.S.A., at the Vermont State Experiment Station during the past year, the Science Department, after exhaustive experiment, have demonstrated that methylene blue is a remedy for contagious abortion (writes the Queensland Agricultural Journal). In their Bulletin No. 174, they give an account of 92 cows that were fed on it. They had all aborted before being tried with this remedy, but only one aborted subsequently. This remedy can be administered either in food or by capsule, and is said to exert a very great antiseptic effect on the blood, thus destroying the abortive germ, and without doing any apparent injury to the cow. Dose: One-third to one-half ounce given night and morning early in the period of pregnancy for seven days. Allow a week to elapse, then dose again for a week; then dose, one week in every month, till the birth of the calf. Cost of dosing a cow is about 3/ per week. The methylene blue should be obtained from wholesale druggists, pure, for about 15/ per lb.

"Patrick," said the priest, "the widow Maloney tells me you have stolen one of her finest pigs. Is that so?" "Yes, yer honor." "What have you done with it?" "Killed it and ate it, yer honor." "Oh, Patrick, when you are brought face to face with the widow and her pig on Judgment Day, what account will you be able to give of yourself when the widow accuses you of the theft?" "Did you say the pig would be there, yer riverance?" "To be sure I did." "Well, then, yer riverance, I'll say, 'Mrs. Maloney, there's your pig!'"

The attention of our readers is drawn to the fact that Income Tax returns are due on or before the 1st February, except those of farmers only, which are due on or before the 1st May. Forms of returns are to be had at all Post Offices. Postages must be prepaid in every instance. Fines and interest are imposed by Act upon assessments of late returns, and no remission can be made of same. Returns must be signed by the taxpayer. No agent or attorney can sign returns for principals resident in this State.

Poultry Notes

Breeds of Turkeys.

— Black Norfolks and White Hollands. —

The Mexican turkey, whilst it cannot be termed black, for there is a considerable amount of brown in the plumage, is decidedly dark in color, and has a constant tendency—as, in fact, have the Bronze—to black feathers, more especially under new conditions. As there was no other species or race with which the early imported turkeys could be crossed, we can but suggest that the tendency already mentioned explains the origin of the Black Turkeys, which are widely distributed over the greater part of Europe. It is more than probable that the earliest importations were dark in plumage; perhaps even selection for that color had been followed in Central America before the discovery of that country; or at an early period the superiority of the black turkey in flesh qualities, as is the case to-day to a large extent, was recognised, leading to choice of specimens of that color for breeding; or the evident predilection of the Spaniards, as seen in their races of fowls. for black-plumaged poultry, may have had an important influence in making turkeys of that hue almost universal throughout European countries.

Mr. E. Brown, of England, gives the following history of the breed:—In the absence of any definite information as to the distribution of black turkeys during the past centuries, facts must be accepted as they now are. Senor Castello says that the black variety is chiefly found in Andalusia and Castile. In Northern France many of the turkeys are black. At one time throughout East Anglia what were called the Black Norfolk were common, and evidently had been bred there for a very long period. Their place has been taken by the American bronze, due to the greater size and vigor of the last-named breed. In other Continental countries than those already named blacks are very general, more especially in Germany, Austria, Hungary, and the Balkan States. These are often called bronze, but personal observations have shown that they are much more nearly allied to the black than to the bronze American. Eastern European turkeys are, as a rule, much smaller in size than those found in western countries and in America, and it would appear that diminution of size has been greater the further the species has travelled from its natural habitat.

It is generally admitted that the black turkey is one of the finest for the table qualities, yielding a large amount of beautifully white, soft flesh, and is very fine in flavor, whilst its lightness of bone is a distinct advantage. These—as, in fact, all—qualities are due in large measure to the conditions under which they are produced. The finest specimens of blacks have been met with on the rich lands of Eastern England and of Normandy, in France, where soil, climate, and natural food are all conducive to quality of flesh. In mid-Europe they are smaller in size and not so good in flavor of flesh, whilst in South and South-Eastern Europe in both directions there is a marked deterioration. Of the blacks, the French are much the hardier, whilst the Norfolks have almost become extinct, and where found are delicate in constitution, probably due to inbreeding and the use of immature birds for stock purposes. The hens are good sitters and mothers and fair layers.

This race is long in body, which is very deep from back to breast, and massive, very full and round in front, with a broad back, which is curved, highest in the centre, but the stern is always lower than the shoulders; the neck is long and curved, carried well back; the head is long and broad, and what is known as carunculated, which means that the head and upper part of the neck is bare of feathers, the skin wrinkled and formed into wart-like elevations. From the base of the upper mandible springs a fleshy protuberance capable of elongation, with a few hairs at the tip, and taking the place of a comb, as seen in the domesticated fowl. The head is blue on top and at back, and face, wattles, and caruncle bright red. The beak is stout and well curved, dark horn in color; eye full and dark hazel; the wattles are full, round, and pouch-like; the wings are very large, long, and powerful, carried low in the male; the tail of the male is very large, and spreads out like a fan; that of the female is long but compact; legs and feet are stout and strong, but not heavy in bone, and, with the toes, are long, in color dark lead or slatey black. Weight for fully-grown specimens: Males, 20 to 22 lbs.; females, 12 to 14 lbs.

— White Holland Turkeys. —

Given black plumaged birds as the basis, it is quite easy to explain the origin of the White Turkey, as there is always a tendency by failure of pigment to white in all black-feathered birds. Many instances can be given of such variations within recent years, but it is unnecessary to deal with them in detail. Tegetmeier says: "It is well known that most birds, wild as well as tame, occasionally produce perfectly white individuals of more delicate constitution than the parents. There can be no doubt that the selection and pairing of such is the way in which the breed of white turkeys has been established and kept up." This writer mentions the frequent production of ticked or speckled specimens in flocks of Whites, and an American breeder, Mr. Leland, says: "As to color I have never seen a White Holland turkey that did now show some black ticking in its plumage during some period of its life," which is a further evidence of the origin.

White Turkeys appear to have been known for a long period of time, as Moubray and other of the earlier writers refer to them, and the author states that they are said to have been originally imported from Holland. The countries where they are found are France, Austria, and Hungary. In the South of France, more especially in Languedoc, Provence, &c., they are almost exclusively kept, and are there regarded as hardy and of fine quality. Mr. Lewis Wright mentions that "the Whites are often mentioned as Austrian Whites—why, we do not know, as they can be traced back in England for over

100 years." Our personal observations in that country, as in Hungary, prove their wide distribution, and the above name may be attributable to some special importation. In America the White Holland, as it is called—probably owing to birds having been taken from the Low Countries to the States—has a limited amount of favor, but in England they are kept chiefly for ornamental or exhibition purposes. The finest display we have ever seen was at Pozsony, Hungary, in September, 1902, when it was learnt that the white plumage explains their popularity; and a later visit to that country (1904) gave further proof that they are largely kept in one or two districts.

In France it is claimed that the Whites are equal to all others for flesh qualities, but in Hungary we obtained the opinion of a large dealer that they do not kill or dress as well as those with dark feathers. The English experience is not at all reliable, as the breed is not kept for market purposes. They are regarded as specially delicate color of plumage, but for the reason here—not, we think, because of the that inbreeding and preparation for exhibition has debilitated the stock. The Hungarian view is that they are equally hardy with the blacks. The hens are fair layers, and good sitters and mothers.

The general characters are as in blacks, excepting the beak, which is flesh-colored with a pink tinge, and the legs and feet, which are pinkish white; the plumage is a glossy white, with the faintest indication of blue, thus proving that they are not mere albinos. The beard, or tuft of feathers on the upper part of the breast, found in turkey cocks, is black. Thus, the effect of contrasts in plumage and head and neck is very pleasing, and there can be no question that this is the most ornamental of the turkey family. Weight: Males, 16 to 26 lbs.; females, 10 to 16 lbs.; but the heavier birds are not common abroad.

Balanced Rations.

The true digestion of the food does not take place in the crop, stomach, gizzard, and intestines only, it takes place all over the body, in the tissues. Suppose the bird to have been fasting. Food is taken into the crop, and the activity of that organ in supplying fluids to soften the food at once starts heat generation. The muscular contractions in forcing the food onward, also makes heat. Heat production increases rapidly as the work of digestion progresses. After the food is mixed with and softened by the secretions of crop and stomach, dissolved, mixed, and reduced to a paste in the gizzard and combined in the intestines with juices from the liver and pancreas, it is taken up by the circulation and carried all over the body to meet the demands of the tissues. The living cells select what they require and make it over to suit their special purposes. In the chemical transformations which takes place the energy contained in the food is further converted into work, tissue repair or building and heat. Unavailable matter waste from the manufacturing or building up and breaking down processes going on in the tissues, is returned to the circulation and carried back to be mixed with refuse in the intestines and is voided as droppings. The maximum of heat production, which began with taking activity of the organs of the body, food into the crop, occurs some six or eight hours after the meal. The muscular activity, building up and breaking down of the tissues, all contribute their share to heat production.

Foods may be balanced according to the object of feeding, whether for breeding stock, laying, or market meat and fat. As a rule, a narrow or medium ration should be fed to layers, for breeders a medium ration with an abundance of green food to supply as nearly as possible food conditions nature provides for the breeding season, while for fattening and for heat production in cold weather, a rather wide ration will serve best. A ration containing proportionately one part of nitrogenous matter to three of non-nitrogeneous matter would be considered a narrow ration would be be spoken of as having a nutritive ration of 1.3. For practical purposes 1.4 is narrow enough. One having a ratio of 1.5 or 1.6 would be a medium ration, and a wide ration, 1.9, or thereabout. Rations which vary widely in the nutritive ratio are giving equally good results in the hands of different poultry keepers. It is undoubtedly wise to roughly balance a ration by off-setting a heavy supply of carbonaceous food with some nitrogenous matter or vice versa. It is not necessary to provide elaborate mashes with a multitude of ingredients. Whatever you do give the birds a variety of good, sound, wholesome food. A chemically balanced ration simply means that there is maintained a certain relative proportion between the nitro and non-nitrogeneous constituents of the food. The precise proportion that is most desirable has never been positively fixed, and different writers have placed the ratio as narrow as 1.3 and as wide as 1.9, each claiming, and without doubt, having good reason for his claim, that the results from his ration were excellent. Recent observers have apparently "split the difference," and the range of the ratio has been presented as 1.4 and 1.6.

The fowl will balance its own ration if it has a chance. Do yours get a chance, or are they confined to cramped quarters, with bare, hard, runs, and obliged to live on whatever you throw out to them? Give them a chance. Supply a variety. If permitted to range and find its own food, the fowl will live chiefly on grains and seeds, an abundance of green food when available, quantities of worms and bugs, some grit and pieces of shell and drink freely of water. The ration will have a wide variation, according to the success of her foraging, and it will be largely such food as nature provides in season. Yet, if the fowl has the range of a good-sized farm, gets a good feed of sound grain before roosting time, and has good sleeping quarters, the results are generally good.

Athletics in the Poultry Yard.

Australian poultry-raisers, despite their enterprise and ingenuity, are behind the Europeans in one feature of the art of breeding. It has never occurred to anyone over here to introduce athletics as an agency for producing the best results. This feature of education is locally supposed to be confined to man. Nowadays every University and school has its gymnasium course as a means of building up the physique of the rising generation. But who ever heard of a boxing gander, a sprinting rooster, a tumbling turkey, or a duck versed in the movements of the American cake-walk? Of course, we have long known about cock-fighting, and how, in years gone by, certain breeds of birds were specially trained for this purpose. The custom, however, whether sport or gain, has long been interdicted as barbarous, and modern sentiment will have none of it. This is not what is meant when the term "athletics" is used in connection with breeding. A scientific principle is involved, the very one so entertainingly unfolded by Darwin in his discourses on the survival of the fittest among animals. In a chapter devoted to pheasants in certain parts of Asia, he tells how, at a certain season of the year, those birds assemble from miles around at a certain place, and there the males fight desperately until exhausted or killed. The survivors or conquerors then marched off with the choice of their "ladies," and in this way the new generation always springs from the strongest, the bravest, and the most fit. Deer, wild cattle, buffalo, and horses in their native state, as well as seals, also fight each other in sight of the females, the victors picking out their choice, while the weaker or unfit are left in the lurch.

It may be of interest to dairymen to learn that the Zulus of South Africa have a method of judging cows peculiar to themselves. They invariably select the best bellower, arguing, doubtless, that the possession of good lung power indicates a strong and healthy cow. Perhaps this test alone would hardly satisfy our experts engaged in judging at any show, but it is not to be despised as one, at least, of the necessary qualifications, since it is desirable that all cows should have a good pair of lungs.

The Belgians, who are, in some respects, an ingenious people, in selecting cockerels for the breeding-pen, set great store on early crowing, reasoning that this indicates vigor, energy, and other strong qualities, which they are apt to transmit to their offspring. For their layers they select hens descended on the male side from birds that have won crowing matches, in which the prize goes to the cock which crows oftenest in half an hour. This is an appreciation of the value of robust health in poultry. Thus we see that the Belgians follow out a system of athletics or physical training, instead of the mere principle of selection and exclusion familiar to most Australian breeders. These Belgians are not only very practical poultry-raisers, but they are equally scientific, and it is actually claimed that they have a breed of fowls, the feet of which have been shortened in order to lessen their power of doing damage by scratching in the gardens. This would seem to be the limit in scientific breeding, but we are told that they have so cultivated a variety which have been denuded of tail-feathers and wings, that they may have a better chance of escaping from the foxes! This is a direction in which, in the light of recent happenings, it would not be impolitic on the part of Australian breeders to turn their attention!

The last two statements, though bordering on the improbable, are really no more marvellous than some of the feats performed by pigeon fanciers. The fantail pigeon was bred up from a freak with one odd feather in its tail, which was added to by selection and persistent breeding to similar freaks, until instead of one, they had many odd feathers, producing an entirely new variety. The pouter came from a pigeon which, as the result of disease or accident, had an abnormally long crop. By getting two of this kind and mating them, the keeping up the process for years, the pigeon with a huge protuberance in front called the pouter was evolved.

Two ganders, when excited to combat by the presence of a female bird, charge one another, intertwine necks and press against each other's breasts with every pound of strength they possess. The combatant that is first exhausted loses the fight, while the victor marches off with his lady-love, with every air of triumph and rapturous cachinnation. There are sure to be good goslings from this pair, possessing vigour to fight off enemies, and survive till the exigencies of the season of Michaelmas demand unconditional surrender to the cooking oven. Whether all this knowledge will eventually result in the establishment of regular gymnastics as an appurtenance of every well-ordered poultry farm remains to be seen. It is, however, to be hoped that the athletic contests will be friendly trials of skill, and not be allowed to degenerate into the old-fashioned fighting for money, for that will at once bring them beneath the regulations of the latest Gaming Act. There can, of course, be no infringement of any clause in the latter instrument by the promotion of crowing matches between roosters, or scratching contests between hens, or even friendly wrestling bouts among the ganders.

The aim should be to ascertain and develop sturdy qualities of strength and endurance in the males, for the purpose of finding out those which are the most apt to transmit vigour and other good qualities to their offspring. It is well known that game chickens, as well as game birds of all kinds possess flesh as well as eggs of superior flavour, and that they are superior as foragers and self-sustainers. Who can doubt that these valuable qualities are due to the athletic training inherited from a long line of fighting ancestors?

The Rearing of Chicks.

Clean quarters, shade, pure fresh water, and judicious feeding are the chief essentials of chick raising. Of course, by this time, the chicks are in most cases all hatched and past the critical period, or first two weeks of their lives. The question now arises, what must be done with them in order to produce hardy and well-matured breeders for next season's pens.

In the first place see that they have clean and airy quarters. There are a great many different styles of brood-coops now in use that are proving satisfactory, but the object should be to have them so constructed as to be always dry, well ventilated, and of ample size for the number of chicks housed in them. By whitewashing the interior of these coops and cleaning them every other day or so the house problem is solved in the easiest manner, for one seldom, if ever, sees lice or vermin where strict cleanliness prevails.

The subject of shade is an important one, and must not be overlooked.

On the largest poultry farms shade is obtained by planting fruit-trees in the yards and runs. This is, perhaps, the best method, but where it is not practicable mammoth sunflowers planted in the same way as maize will answer the purpose as well, if not better. The ripe seed also will be of great benefit to the poultry.

Cool, clean water is undoubtedly more essential to our growing stock than even feed. Still, this is a matter often attended to with the utmost carelessness. The water fountains are allowed to get rusty and slimy, and the water allowed to remain in the hot sun, unchanged for days at a time. Where such conditions exist it is no wonder that we so often hear complaints of the chicks not doing well. Ample-sized earthen or stoneware fountains are about the best for general use, as they are easily kept clean, and they seem to keep the water cooler than tin fountains. By setting them in a shaded place and refilling twice a day during the hot months, no difficulty will be found in having the water supply pure and fresh.

Feed for the chicks during their growing period should consist largely of solid grains, such as cracked or whole wheat, barley, oats, and cracked maize. Care must be taken not to overfeed, and at the same time not to starve them. It will readily be found that chicks prefer a variety in their feed. Animal meal or cut bone may be fed occasionally, especially where bugs and insects are scarce. Green food has come to be recognised as an absolute necessity. An abundant supply may be had by sowing lucerne early in the season. If the chicks have free range and ready access to good sharp gravel no other grit will be needed. Otherwise, however, it will be necessary to provide some of the prepared grit sold on the market.

Culling the Flocks.

Now is the time when this important, but often neglected, operation is best begun. In theory we all know that quality is preferable to quantity, but it is to be feared that the majority of poultry farmers and poultry keepers try to go in for both, and hang on to the quantity to the detriment of the quality. For the farmers culling is a simple operation, and consists merely in getting rid of the unprofitable birds, when he knows them, and of all the young cockerels as soon as they reach a marketable age. In this connection it is just as well to mention that in all cases a bird pays better to sell at four months than to keep six or eight, for prices do not increase in ratio to size. Now that there is demand for better poultry, and more of it, it is probable that some extra feeding before marketing will be often advantageous. For this purpose birds should be kept in small pens, not coops, and fed heavily for three weeks. In recent experiments this method of feeding has been found equally as satisfactory as cooping, and in our climate it is certainly preferable. For this fattening process ground oats and maize meal may enter largely into the composition of the mash, mixed with sour milk. With a mash fed three times a day birds should rapidly put on weight, and the extra cost will be well repaid in the returns.

Let us take next the suburban poultry keeper. For him culling should be a little more serious undertaking, for he has limited room and wants no drones to occupy valuable space, and he will be well advised to begin eating and marketing the young cockerels right away. He should watch narrowly, too, the old stock and send to market the second year hens before they break into moult. If he takes any pride in the appearance of his birds he should weed out all ill-grown pullets and keep only those which are healthy, and, consequently, profitable.

For the fancier culling is, we believe, one of the things which decide his success or otherwise. To cull, cull, cull is good advice. The actual value of the birds is to most fanciers a minor consideration, and now that he has fairly sorted up his season's chickens the more carefully he goes through them and weeds out those which are faulty, the better it will be for the remainder. One of the greatest obstacles to quick and healthy growth is overcrowding, and the space gained by the absence of one bird is often of great advantage to his neighbour. In the fancy world it is the bird at the top which pays. To keep a cockerel for a year and sell at 7/6 is a waste of valuable time. One can certainly put one's space and time to more profitable and pleasant use than that. In some varieties it is difficult to judge the quality of the birds till they are some months old, but there are in all breeds indications which will tell the experienced fancier what the quality of the bird will be.

Les Faverolles.

In a country such as Australia, with its ample space, facility for growing crops, the cultivation of poultry and the table poultry industry are matters of the greatest moment. The cultivation of poultry is one thing, and the poultry industry is another. For it stands to reason that to obtain the custom of our own people, and those who cater for the export trade, the breeding of the more suitable classes is of paramount importance. It is little use rearing birds for the market that are not required either by the home buyer or the exporter. Therefore, the breeder must study what will best suit his customer.

It is universally recognised that the best export market for Australian breeders is that of Great Britain. So long as the birds are of the type and meet their requirements in other ways, the English buyer will give a remunerative price.

The English trade is one that deserves to be catered for. It suits the Australian breeder in so far that the birds bred in October, and even later on in the year, are the ages which are most suitable for that trade.

The essentials of the trade are that the birds sent must be white-legged, white-skinned, plump, and young. To obtain these desiderata is the business of the breeder who desires to succeed in the supply of table poultry for the London market.

There are several breeds of birds that are eminently suitable for the trade referred to. One of these is Les Faverolles, a breed of French origin, but which is acclimatised here, and gives good results. Here it is not very well known, but in France it is very popular, and is recognised as one of the choicest of breeds for the table.

Les Faverolles is a breed that has been obtained by grafting on an original stock some of the best varieties known, and which were most suitable for table requirements. In its family tree is to be found the blood of the Dorking, Houdan, and Crevecoeur; all these help to make the Faverolle a table bird of highest merit. The progeny of this desirable breed are very precocious, and fatten readily. It is quite possible to have twelve-week-old chickens to weigh 3lb. each.

Les Faverolles do especially well when suitably crossed for table purposes. An experiment was made at the College Poultry Farm, Theale, England, in which Les Faverolles and Buff Orpingtons were bred together. It is related that the progeny made the most rapid growth out of 60 birds.

Apart from their excellent flesh-producing quality, Les Faverolle hens are very prolific layers, more especially in the winter time, of medium-sized eggs. They are also capital sitters and mothers.

To Cure the Broody.

The seasonable item that now confronts all farmers is undoubtedly the broody problem; and instead of blindly following most people's methods, i.e., waiting till the birds become broody to effect a cure, we can cure it (to a great extent) by prevention, and when this fails then to adopt heroic methods. Employing the first method we must drop all stimulating and blood-heating rations, such as meat and maize, thereby also effecting a saving in the feed bill, as it doesn't pay to feed much animal food now. Also give a blood cooler pretty often in the shape of salts, and don't forget prenty of green-stuff feed, and as grain, mixture of fat oats and wheat. Try this method and note the result. For those which this treatment fails (there are bound to be a good number) procure a big colony coop, water the floor and put roosts in, let a draught play under the coop, and put a couple of vigorous males in, and I can positively guarantee it will cool the ardour of the hottest member in two days, especially when in sight of laying flock. Later on in the season the broodies may be made to moult early by confinement.—Exchange.

Killing Fowls by Dislocation of the Neck.

To kill fowls by the dislocation of the neck take the bird by the legs in the left hand, catching the extreme ends of the wings in the same hand, to prevent the fowl fluttering; then grip the bird's head between the first and second fingers of the hand, the palm of the hand being uppermost, and press the thumb on top of the head, the back of the fowl being upwards. The legs should be held against the left hip of the operator, and the head laid against the right thigh, near the knee. The fowl should then be quickly and firmly extended, at the same time pressing the thumb and bending the head suddenly backwards, so that the neck will be dislocated just below the junction with the head; death will immediately ensue. Muscular contraction will take place for a few minutes, so it is best not to place the fowl on the ground, as thus it will damage its flesh. Some poulterers, in addition to dislocating the fowl's neck, run a knife through the neck just below the ear, so as to allow the bird to bleed, and to render its flesh whiter. But if the fowl be hung by its feet for a minute or two directly after the vertical column is broken, the blood will drain to the head and neck, and there will be no necessity to use a knife. It is, of course, of great importance that the blood be thoroughly drained from the body, otherwise the flesh will present a reddish appearance, which gives the carcase a common look, and detracts from its value in the market.

Water Supply.

A abundance of pure, fresh drinking water should always be kept before the fowls. The water supply seldom receives as much attention as it should, and many times the hens suffer from this cause, although the trouble is generally attributed to some other trouble. Plenty of water is indispensable to the fowls, and is as necessary to their health and comfort as to that of human beings. The drinking vessels should be scalded out once a week and a few drops of carbolic acid added to the water with which they are scalded, in order to kill disease germs if any are present.

The best of all soils for the rearing of horses is the limestone, which is believed, and with reason, to promote the development of bone and size.

Home Notes.

How to Take Care of Children's Eyes.

People constantly asume that near-sightedness is a mater of comparatively little moment, and is not a disease; but I am convinced, writes a London oculist, as the result of my observations, that fully eighty per cent. of the near-sighted cases are absolutely pathological, and should be treated as such.

"So important is the care of the children's eyes, both for their comfort when they are children and for their well-being when they are grown up, that, after their eyes have been examined, they ought, in my opinion, to be placed in classes according to their vision. Thus, I should not have a near-sighted child taught in the same class-room with a child who is not near-sighted, for the strain on the eyes of the latter in looking at what is written on the blackboard necessitates the use of stronger glasses than are advisable. This question of the blackboard brings me to a practical point, namely, that it be so placed that the light is not directed into the eyes of the pupils; in other words, it should not be placed on a wall directly opposite the windows. Then the colour of the rooms in which children are educated and in which they live constantly is important. It is best that the colour should be light, and red should be elimated both from the paint and from the appointments as much as possible—light buff, grey, or yellow, being among the best, not only for the eyes of children, but also for grown-up people.

"The care of the child's eyes, however, should begin long before it goes to school, and many a mother, who is kindness itself in everything else, sins out of sheer ignorance in respect to the care which she bestows, or rather does not bestow, on the eyes of those for whom she would literally go through fire and water.

"Headaches, for instance, are amongst the most common complaints of childhood, and yet how often are headaches put down to everything but the right cause. As soon as a child complains of a headache, the mother, if she deems it necessary to consult a doctor at all, sends for the ordinary physician, or puts it down to something which has been eaten and has disagreed with the child. Fully seventy per cent. of the cases of headache, however, from childhood up to the age of nineteen or twenty, are due to the eyes, and it is the eyes and not the stomach or any other part of the body which should be treated, if a cure is to be effected. These headaches are caused by straining the eyes, and it is remarkable how soon they go away, never to return, when the proper glasses have been given and have cured the deficiency which has been the cause of the strain.

"It is remarkable how the eyes respond to attention. People who are in the habit of living a great deal in the open air, and using their eyes to see things at a distance, like sailors, for instance, do not suffer to such an extent from near-sightedness; and if a far-sighted child is constantly kept at work and made to pore over the opinions of many authorities on books, it is quite posible, according to the subject, that they will become near-sighted. Still, far-sightedness, if it is greatly in excess of what it ought to be, should be treated by the use of proper glasses just as near sight is, as the muscle of accommodation, which we call the ciliary muscle, is strained to produce a proper focus for looking at near objects.

"It is because of the constant strain of this muscle that going out into the open air is in itself so great a rest for the eyes, for the strain of focussing is taken off the muscle, and it is allowed to rest quietly and easily.

"Children who squint should be taken at once to a specialist, for, by the aid of glasses, this condition, caused by the wrong action of the muscles which move the eyeball, can be cured without having recourse to an operation, which used to be the only way of treating this disease in the past.

"Again, from a variety of causes children's eyes become inflamed, and this inflamation is constantly being treated by parents who are quite ignorant of the results which might occur from their lack of knowledge. If we remember how exceedingly delicate the eye is, and how dependent we are on our eyesight, not only for our comfort but for obtaining our daily bread, it seems terrible to think what chances people take in treating their children's eyes themselves, by such things as bread-and-water poultices, or poultices of tea-leaves and other so-called simple household remedies, instead of calling in someone who is competent to do so through having studied the subject thoroughly. Indeed, there can be little doubt that many people are to-day in asylums for the blind who would never have been deprived of their sight if they had been regularly treated when they were children."

Bracken as a Food.

Last month we quoted a case of successfully substituting bracken shoots for asparagus. An article on the sub- appeared recently in the "American Botanist" in which the bracken is very highly commended as a nutritious article of human diet. The principle points to observe would seem to be to select the tender stems of the bracken from the time they appear above the soil until the frond commences to unroll. Even then only the tender top portions are selected before the tissues become hardened and tough. Practically this applies to Asparagus and the two would appear to have very much in common when cooked.

Certain people complain of a bitterness in taste of these young stems, but the Americans have discovered that the bitterness is confined to the hairs covering the young stem and frond. The frond itself would take too much trouble in preparation and is therefore rejected. After suitable lengths of the young stem have been selected a hard brush is obtained and with that the hairs on the stems are brushed off.

To have a dish of ferns with white sauce the stems are cut into pieces 1in. long and boiled for forty minutes. The water is poured off and a white sauce prepared, and after seasoning with butter, peper and salt, the Ferns are served warm. Fern greens are dealt with in the same way and cooked for forty or fifty minutes. The first water is poured off and boiling water is added, and the cooking continued for ten minutes. These greens are then eaten after seasoning to taste. Fern salad has two eggs added, a piece of butter about half the size of an egg, a teaspoonful of mustard, some pepper and salt, and a teacupful of vinegar.

These are cooked over a fire like a soft custard. To get ferns on toast, the stems are cut up into pieces of equal length, boiled with a fair quantity of salt, and when the ferns are eaten some pieces of bread are cut up, toasted, and then dipped into the liquid in which the ferns are boiled. The latter are placed on the toast and covered with a white sauce or melted butter. They are also eaten with eggs, for which a recipe is given.

It is declared that the fern stems are softer than Asparagus, less woody, and that the flavour suggests almond to many tastes. In food value it is closely similar to cabbage, and in several respects superior to radishes, asparagus, Tomatoes lettuce celery, and cucumbers. We may state that the bracken is a native of Western Oregon, Washington and British Colombia. Under the shade of trees it varies from 3ft. to 8 ft. in height, or even to 14 ft. in hollows where the soil is rich and moist. It is claimed that the bracken reaches its highest development in that part of the world.

Jellied Fruits.

The fruit for jellies must be ripe, but not over-ripe, because then the juice is not so rich. It must be dry when gathered, and ought not be overheated by the sun.

Freshly-gathered fruit is much the best for jellies or for jams. Do not let it lie in bulk for long before using.

A three-cornered flannel bag is best for straining jellies in moderate quantities. It must be strong, and is better for being long, so that the ends may be twisted to press out the juice Never use metal vessels, but employ enamelled ware, or poreclain, or glass for jellies. For each strained pint of juice allow half to three-quarters of a pound of granulated sugar. Boil the juice slowly for fifteen minutes before stirring in the sugar. It is well to heat the sugar before adding the juice. Watch stir, and skim the juice, and never cause it to boil rapidly. Jellies and jams should not be covered until cold. One quarter-inch depth of very finely-pulverised sugar laid on top of jam or jelly will effectually prevent mouldiness occurring afterwards. For currants allow a full pound of sugar to each pint. When the fruit has softened enough by boiling place it in the bag and press out as much juice as can be made to flow. Strain it into an enamelled pan. Return the juice to the kettle, bring it to a boil, stir in the heated dry sugar, and stir until it is all dissolved. By this time the jelly should be ready to pour into the glasses or forms. If directions have been carried out the jelly will coagulate on the side of the ladle as it is taken out.

Apricots, apples, quinces, plums, and peaches should be first peeled, cored, pips or stones removed; then cut in pieces, cover with water, boil gently until well cooled, strain the juice through a jelly-bag, add ½lb. of granulated sugar to each pint of juice, boil until it ropes from the spoon—in about fifteen to twenty minutes.

Strong pressure is needed to express the juice. A net-bag made of strong cork could be used outside the flannel bag, and the ends twisted by means of a stick. A proper jelly or tincture press is better than all.

A small quantity of dissolved wattle gum or of gum Arabic added to jelly or jam will give it great consistency.

Fig jelly is made by washing the figs; place in the kettle just enough water to cover the fruit, boil twenty minutes, strain out the juice; add ½lb. of sugar to each pint of juice; boil about fifteen minutes.

Grapes should be barely ripe. Clean and stem the fruit, cook for a short time, strain off the juice, add 1lb. sugar for each pint of juice; boil again for ten minutes.

Crab apples should be fresh, sound, and just ripe. Place the gallon of fruit in the kettle, add 1 pint of water. Heat slowly till it boils, and continue till it pulps; then pour off the juice gently pressing the pulp back until no more juice can be obtained. Strain the juice twice through fine cloth; add 1lb. of fine crystal sugar for each pint of juice; boil and skim for fifteen minutes, then bottle for use.

What Our Boys and Girls Should Know.

The aim of the modern magazine publisher is to specialise, not to scatter. He does not, if he is wise, try to cover all earth and sea and sky with his contents bill, or to appeal to every class and age. Two magazines that illustrate this point have just arrived. They are "Life" and "Everylady's Journal" for December. The former appeals specially to busy men, and the latter to busy housewives; and together they provide a perfect complement for any home, however large or small. This particular issue of "Life," happens, however, to be specially wide in its appeal; for every member of the household, from the father to the small boy, will be profoundly interested in the moving story of Captain Scott's last, greatest, and, alas! fruitless struggle to reach his base of supplies. The story of the desperate battle, the pictures of the doomed party, taken at the South Pole, and the photos of the grim relics of the lost fight, are things to be engraven on the memory. This is but the keystone of a magnificent arch of reading provided by the editor in the December issue of "Life." "Everylady's Journal" is, as usual, replete with good things. Notable, this month, are the pages devoted to the fashion review and forecast, the admirable Australian stories and articles, the money-making and labour saving devices set forth, and the third of the adventure stories in that world-famous series: "What happened to Mary?" The editor of "Everylady's Journal" has been fortunate in securing the sole Australasian rights of the "What Happened to Mary?" stories, and we shall look with interest for the continuance of the series. In "Everylady's Journal" will procember appears a striking symposium by noted Australians on "What our Boys and Girls should Be Taught," that we commend to thoughtful parents. A shilling spent in buying both "Life" and "Everylady's Journal" will provide the whole family with much good reading.

Tried Recipes

—Baked Tomatoes with Sauce—

Take as many tomatoes as needed; cut a slice from the top and scoop out the centre; chop and season any kind of odds and ends of meat, fill the cups, cover with stale bread crumbs, rolled fine; add bits of butter; bake in a quick oven until tomatoes are tender. Take the tomato scooped from the centres; cook until tender, strain; then add a lump of butter the size of an egg and two tablespoonfuls of cream, in proportion to half a dozen tomatoes; season with pepper and salt and a little sugar; add a generous pinch of soda to tomatoes, let boil up once. Place baked tomatoes on platter, pour sauce around them and serve hot.

—Veal and Ham Pie—

Cut some veal into thin slices, also some ham, allowing about a quarter of a pound of the latter to a pound of the former. Rub the veal over with lemon juice, put it in layers with the ham in a pie-dish. Sprinkle plentifully with finely chopped parsley and some pepper. Cover with short crust and bake for about two hours.

—Potatoes in Butter—

Boil the potatoes in the usual way; then add a lump of butter and some chopped parsley; toss them in this till all the potatoes are buttered and serve.

—Rice Cream—

Simmer four ounces of rice in a pint of milk with an ounce of sugar till it is reduced to a pulp; turn out to cool. Whip half a pint of cream to a stiff froth, and when the rice is cold mix the cream with it. Set on ice or in a very cold place till wanted.

—Vegetable Marrow—

Peel and cut the marrow in slices, parboil, drain, and finish cooking by frying the marrow in butter.

—Macaroni Soup—

Make some stock from bones, the trimmings of veal and ham, and the liquor in which the fowl was boiled, together with plenty of vegetables. Boil the macaroni separately; drain, wash in cold water, and cut into small pieces; put into the tureen, when the strained soup may be poure ' er it.

— Canning Tomatoes. —

Canning tomatoes is a simple process. Have the tomatoes of a uniform ripeness. Pour boiling water over them to remove the skins. When peeled place in a granite kettle and heat slowly without adding any water. A sprinkle of salt may be added. Boil for one half hour and seal hot.

— Whole Tomatoes. —

Select small ripe tomatoes that will go into jars. Peel and drop a few at a time into boiling salt water. Dip out when cooked and place in the jars, then fill up the jars with boiling water. These are nice to use with different kinds of salads or with a salad dressing over the tomatoes.

— Tomato Chili Sauce. —

Take twenty-five large ripe tomatoes, four white onions, three green peppers with the seeds removed. Slice the tomatoes so as to take out as many seeds as possible. Chop the onions and peppers fine and mix the three ingredients together. Heat three cups of Seppelt's vinegar and dissolve in it two cups of white sugar and two small tablespoons of salt. Pour this solution over the mixture and cook slowly one hour. Seal hot.

— Mutton Cutlets. —

Trim some loin or best end of neck chops, and season with pepper and salt; either grill over a very clear fire or fry in a frying-pan with two ounces of butter. Let the butter be hot before the chops are added.

— Rice and Cream. —

Simmer three tablespoonfuls of rice with six lumps of sugar in a pint and a half of milk till the rice is quite soft and has absorbed all the milk. Add a little milk or water if the rice becomes dry. Turn into a wet mould to set. When cold, serve with whipped cream and strawberry jam.

— Calf's Head Soup. —

Bone the calf's head and boil both meat and bones. Cut a few ounces of lean bacon into pieces, put them in a stew-pan with a sliced carrot, turnip and onion, and a bunch of herbs. Fry a light brown over a clear fire. Stir in an ounce of flour. When it is brown add the calf's head stock and bones, and let the whole simmer for three hours, removing the scum as it rises. Strain; cut any of the calf's head left over in small square pieces, add them to the strained soup, together with seasoning if required, and serve.

— Chocolate Pudding. —

Quarter of a pound of chocolate, half a pint of milk, an ounce of sugar, four eggs, six ounces of bread-crumbs, half a tablespoonful of vanilla. Break up the chocolate and dissolve it in the milk over gentle heat. Melt the butter, add the bread-crumbs, and moisten with the milk and chocolate. Stir till the mixture leaves the sides of the saucepan, then let it cool, and stir-in first the yolks and then the whites beaten to a stiff froth. Pour into a buttered mould, and steam for an hour and a half. Serve with chocolate sauce or cream.

— Scalloped Tomatoes. —

Cover the bottom of an earthen dish with ripe tomatoes sliced, then a layer of bread crumbs, then one teaspoonful sugar, one-half teaspoonful of salt and a dash of pepper, then another layer of tomatoes, sprinkled with one-half teaspoonful of cinnamon, and so continue until the dish is filled, letting the topmost layer be of bread crumbs. Pour over the mixture one-half cup of sweet cream, or use one tablespoonful of butter. Bake 25 minutes.

— Crecy Soup. —

Wash and scrape six large carrots, cut them in slices, fry them gently without discolouring in two ounces of butter, together with a large sliced onion; add three pints of stock, season with pepper, salt, and nutmeg. Simmer until the carrots are done, and rub all through a sieve. Reheat, thicken with half an ounce or more of cornflour mixed first with a little cold water. Stir well, put in a teaspoonful of castor sugar, and serve with fried sippets of bread.

— Tomato Croquettes. —

Cook until soft one pint of tomatoes, cut up and peeled, with half a small onion, three peppercorns, three cloves, one level teaspoon celery seed or one stalk celery, one teaspoon salt, one-quarter teaspoon pepper. Press through a sieve and add one tablespoon butter and scant three-quarters cup fine bread or cracker crumbs. Return to fire and stir until thoroughly heated. Add a beaten egg, mix well and remove at once. Put aside until cold enough to form into croquettes. Roll in egg and cracker crumbs and fry in deep fat.

— Eccles Savoury. —

Boil some eggs hard, cut them in quarters, cover with Dutch sauce, to which two tablespoonfuls of grated cheese have been added. Put them in a greased dish, cover with bread-crumbs and grated cheese, and set in the oven for over ten minutes. Serve hot or cold.

— Salmon and Tomatoes. —

Drain and flake one can of salmon. Put a layer of sliced tomatoes into a baking dish. Season with salt and pepper. Put in the salmon, cover with another layer of tomatoes. Add more seasoning, sprinkle thickly with grated bread crumbs, dot with butter and bake.

— Macaroni with Sausage. —

Cook one package of macaroni in water until soft, then drain and cut into small pieces. Put a layer of macaroni in a baking dish, cover with sausage meat, then a second layer of macaroni. Put in a little water or a cupful of tomatoes, and bake one-half hour in the oven.

Poultry

A Man With a Headache.

But many men make the most of their oportunities to pose as martyrs. As p oof, witness the demeanour of a man at home—with a headache. He thinks he is more to be pitied than a syndicate of t ehsaints who have been burned alive at the stake and died slow deaths from cunningly-administer doses of torture.

However, this by the way. Let us return to our women who possess the faculty of making fiction and weaving imaginative stories, but who use this talent only for creating tragic tableaux of themselves as martyred mothers, ill-used and sligted wives or maidens, left al forlorn by a cruel wörld of unappreciative men.

Readers! Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.

A New Plan for Fancy-Workers and Home Dressmakers.

"Everylady's Journal" has tackled the above problem in a most ingenious manner, and at the same time launched a new Australian industry. A staff of expert dressmakers was employed to make a list of every possible garment, from infant's binders, to grandmother's frocks, not forgetting Johnnie's knickers, Mary's bathing suit, father's pyjamas, and Clarence's tennis shirt, that the average Australian family needs.

The result was a list of somewhere round 130 high class and tested patterns. The patterns were then gathered into sixteen carefully selected groups called outfits to enable these perfectly cut patterns to be sold at about half the usual price. For example, all the garments that a baby in short clothes is likely to want were put up as an Infant's Short Clothes Outfit, containing nightdress, feeder, pilcher, drawers, petticoat, bonnet, yoke dress, tunic dress, dress, cloak, sac coat, and a smocked frock. Just the same way each cluster of patterns was wisely grouped into appropriate outfits, thus making a complete range for the whole family.

Each single pattern within these new outfits has its separate envelope, on which is printed full directions for cutting and making, and the sixteen different Outfits sell at the low price of 2/6 each, which comes to about threepence for each pattern. If a woman wishes to buy a single pattern only from any outfit she may do so at the usual price of ninepence.

On this plan the whole series of patterns has been treated. There is the "Small Boy Outfit," the "School Boy Outfit," the "School Girl Outfit," the "Maternity Outfit," the "School Girl Outfit," the and the "Utility Outfit" — most of which are cut in two or three sizes—and so on over a range of 130 patterns grouped into 16 distinct outfits.

That this is a comprehensive scheme is best gathered from the catalogue issued by "Everylady's Journal." This can be obtained either from the local draper, free of cost, or post free by sending a penny stamp to the office of "Everylady's Journal," 376 Swanston Street, Melbourne.

THE LATE WALTER HACKETT.

A Pioneer of the Agricultural and Horticultural Industries.

Few names have been better known to the Agricultural and Horticultural communities of South Australia than that of the late Walter Hackett (of the firm of Messrs. E. & W. Hackett, seedsmen, etc., of Rundle Street, Adelaide), who passed away on the 12th of February, at his residence at Brighton, in his eighty-seventh year.

Walter Hackett was of English yeoman stock, and had three brothers and three sisters, viz., Richard, Elisha, George, and Emma, Matilda, and Isabel. He was the youngest son of Champion Hackett, and was born in the year 1827 at a Sussex farm, "Summersdale," on the road to Lavant, and near the old and typical rural town of Chichester, but for more than sixty years he lived and worked in South Australia.

Sixty years takes us back a long way, practically to the beginning of the Agricultural and Horticultural development of the State, and from this beginning Walter Hackett was one of the pioneers and leaders in its progress. In political and municipal affairs he took little part beyond the ordinary duties and responsibilities of good citizenship: for his interest and activities were centred in the sphere with which, from his earliest arrival in the State, he quickly became identified.

The Victorian goldfields of the early fifties first attracted him to Australia, as they did so many young Englishmen of his class endowed principally with health, strength, and a determination to succeed. The ship by which he arrived, the "Francis Henty," reached Port Melbourne in 1852, and from there he went to Forest Creek diggings, where he remained for several months. Fortune, however, did not choose for him any special mark of favour, and he decided to join his brother in the business which the latter had already established in Rundle Street, near the present premises which the firm have for so many years occupied. The next ten years were busy ones for the brothers, for during that term the firm established itself on that broad basis of integrity and commercial foresight, which secured a leading and permanent position among business houses of the State. Some time afterwards they were joined by their brother, Mr. George Hackett, who continued a partner until his death in England on March 20th, 1895. Following these strenuous years

THE LATE WALTER HACKETT.

he visited England, for the purpose of seeing the great Exhibition of 1862, and also to become thoroughly in touch with the leading English and Continental firms. He returned in the following year, and since then resided first at Marryatville, and for the last thirty years at Brighton. Shortly after his return he accepted the position of honorary secretary of the then infant Horticultural Society, which position he held for over thirty-five years, resigning the office in 1898, in favour of his son (Mr. W. Champion Hackett).

In 1867 he became a Vice-President of the Agricultural and Horticultural Society; and in 1885, when the funds of that society were not as buoyant as they are at present, he came forward as one of the three guarantors of the then considerable financial deficit, for which valuable and opportune service he was, with his fellow guarantors, subsequently presented by the society with a framed photo. of themselves. At the first Rose show for the year 1898, which was held on October 20th, Mr. Hackett was the recipient of a handsome presentation made by the President (Mr. E. J. Cox) of the Horticultural and Floricultural Society. The Register of October 21st contained the following:—"His Excellency the Lieut. Governor and Mrs. Way, attended by Capt. Wallington, arrived at about 2.30, and almost immediately an adjournment was made to the cloakroom, where the President of the Society (Mr. E. J. Cox), on behalf of the committee, presented the secretary (Mr. Walter Hackett) with a handsome writing cabinet, in recognition of services to the society during 35 years in which he had been connected with it. In making the presentation Mr. Cox said that at the conclusion of the last annual meeting the suggestion had been made that it would be a fitting thing to show, in some small way, the appreciation of the members for the services rendered by the secretary. Mr. Hackett's connection with the society had been unique. He had been office-bearer for 35 years; and during most of the time had held the position of hon. secretary. They were extremely grateful for what he had done, not only for the society, but for the whole of the Colony. He trusted that Mr. Hackett would be long spared to continue the work which he had so much at heart. The form which the presentation had taken was the outcome of a suggestion made to the committee by His Excellency the Lieut.-Governor.

Mr. Hackett, in replying, said that he had had no more idea a few minutes before of what they were going to do than he had of going to France. He had been taken completely by surprise, and words failed to express his thanks for the kind things which had been said of him by the President. The cabinet was the best thing he could have wished for, and he would always keep it with a great deal of respect and veneration.

His Excellency said he was glad to express his admiration of Mr. Hackett's character, and his gratitude for the signal service rendered by him to the Horticultural Society. He was not a very old colonist, but he could look back over 46 years, and during the whole of the time he had the pleasure of a personal acquaintance with Mr. Hackett. He paid a high tribute to Mr. Hackett's business character." (The writing cabinet has been very carefully preserved, and is to-day in as good condition as when presented).

In 1909, on his retirement from the membership of the council of the Royal Agricultural society after more than 40 years' service, he was elected a life member. He was appointed one of the South Australian Commissioners for the great Exhibitions in Melbourne and Sydney, and also for the Expositions which were held in London and Paris. Deceased took a prominent part in the South Australian Exhibition of 1867, at which the Duke of Edinburgh was present. Besides having been on the Council of the Royal Agricultural Society, Mr. Hackett was a member of the finance committee of that body, and was responsible for the arrangement of the grain and agricultural exhibits at the shows for many years. In 1863 deceased married Emmeline Curnow, a daughter of Mr. James Curnow, of Cox's Creek (now called Bridgewater), and his wife predeceased him in 1905. Last December Mr. Hackett met with an accident in Stephens' Place whilst crossing the road on his way to lunch at the Exchange Hotel, Hindley Street, where he had been a regular attendant for more than forty years, and this probably hastened his death.

The late Walter Hackett was considered one of the best judges of grain for seed, etc., and his opinion was often sought on these matters. He visited the Mount Barker show as far back as 1867, and was invariably a regular attendant for very many years, as also the Auburn, Mt. Pleasant, Willunga, and Gawler shows.

Many of our readers will feel the poorer for his death, for he was, by those who knew him, regarded as a man of sterling honesty of purpose. Mr. R. H. Crawford, as President of the Agricultural and Horticultural Society, in referring to the loss sustained by the society, summed up Walter Hackett's life and work in the words: "A fine example of faithfulness and integrity." The "Garden and Field" knew him for nearly four decades, and, like many of its readers, remembers with gratitude many instances of helpfulness and encouragement.

The late Walter Hackett has left five sons and one daughter, all of whom reside in South Australia. They are Messrs. W. Champion (who for some years has taken a leading part in the management of the business), E. J., G. S., R. W., Joseph, and Miss Isabel May. He left seven grand-children.

Mr. R. W. Hackett is now on his way to the Old Country for a trip for the benefit of his health.

Editorial Notices.

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Garden Notes.

Mildew is a fungus that grows and thrives on the leaves and stems of the rose, and so quickly does it multiply and spread that if not checked as soon as it appears on a bush the whole of the plant in a week or so will be covered with it. It is very easily recognized, as the leaves attacked assume a curled or crinkled appearance, and appear as if covered with a white powder. Plants grown in an open situation are not so liable to its attacks as those grown in positions sheltered from the wind, and where, therefore, the air does not circulate freely. The remedy is to cover the foliage with a fine shower of flour of sulphur. This is best applied with a sulphur bellows, for if the sulphur is merely dusted over the plants the under side of the leaves, where the mildew is worst, remains untouched.

The principal work in the open garden consists as it always does at this time of the year, in watering and hoeing, especially the latter. The soil of the beds should be in the fine tilth of a seed box, so often should the hoe be applied. It is astonishing how long the moisture will remain in the soil after a good soaking if the surface be hoed a few hours after giving it.

The annual phlox may be planted during any month of the year, and there is no annual so deserving of cultivation.

When transplanting seedling stock put them rather close together, so that the singles may be pulled out as soon as they show, and a gap is not made in the bed. Stocks delight in a good garden loam, a little sandy; feed them with manure water, say half an ounce of guano to a gallon of water as soon as the flower buds appear, and the result will be extra fine flowers on the doubles.

Cuttings of pelargoniums, carnations, and evergreen shrubs should be put in now. The best soil for this purpose is one in which sand forms a conspicuous part. The principal point to be remembered is to take care that the soil is pressed firmly round the base of the cutting. Keep the soil damp, but not wet. If the cuttings are in pots, the pots must be well drained and the slips placed near the edge of the pot.

Old blooms in roses, pentstemons, pelargoniums, sunflowers, antirrhiniums, are apt to spoil the general effect of a garden if not removed, besides, they prevent partly the production of fresh flowers if allowed to seed.

Good loam, decomposed dung, with a good proportion of sharp sand, well incorporated by turning it over three or four times previous to planting, is what is wanted for the hyacinth. Plant this month. Take out a trench 5in. deep and place the bulbs in it 6 or 7in. apart; then turn some fine earth gently on them, and proceed in this way until completed.

The coral plant, by which name Russelia Juncea is often known, grows to the height of from 2 to 3 ft., and bears throughout the summer quantities of bright scarlet flowers. It is an evergreen, and perfectly hardy, and altogether is well worth a place in the garden border. It is a native of Mexico, and revels in the Adelaide climate, if well watered, requiring little other attention. It is easily propagated by layering, and if one of the long stems be pinned down, covered with soil, and kept damp, it will root at nearly every joint, and may be afterwards (in the autumn or spring), cut up into as many plants. It also forms a pretty specimen planted in a pot for table decoration.

The statice is rarely seen — not nearly so often as it deserves to be—in our gardens. There are few plants hardier or more attractive. The flowers, which are everlasting, cover the whole plant for the greater part of the summer months, and if picked just before it is fully out will last a long time. The two usually grown are Statice Dicksonii, which bears a pink flower, and Statice Halfordii, having a blue flower. They attain a height of 18 in., and may be put out from pots now. Propagate them by division of the root or by slips.

A very pretty and effective way of planting that general favorite, the ivy-leaved geranium, is over a mound of stones. A number of large stones are built to a height of 2ft. to form a hollow square. The hollow filled up with some good loam, well pressed down, and then planted with four or five varieties of the geranium. When kept well watered they quickly hide the unsightly stones, and form a charming object when in bloom, which is most of the year, and a pretty green mound at other times.

Many gardens contain specimens of roses, usually hybrid perpetuals, that are comparatively useless, blooming, as a rule, for only a few weeks in the spring. These may be changed into the ever-blooming tea rose by means of budding, a simple and interesting operation, often explained in the "Garden and Field," which all amateurs would do well to practice. They may, of course, expect a few failures at first, but when once the method is mastered there are few things that will give more pleasure to the operator. It is late, but not too late to do it now, in fact, any time, provided the sap is running freely, which can be ascertained by cutting the bark and seeing if the bark separates easily from the wood.

Peonies only do well in cool districts. Prepare a special bed by deep trenching, and incorporate plenty of old cow manure is soil is sandy add some marly clay or loam. Secure only strong crowns, and plant during the winter months. As summer approaches mulch with stable manure, and keep them well watered. To ensure successive blooming the weak side-growths should be cut away so that strength be imparted to the main crowns. They need not be lifted every year.

Where it is desired to save good varieties of petunias the best plan is to strike from cuttings, and protect during the winter, and plant out early in spring. Petunias are best treated as annuals. Sow seed during March or beginning of April. As soon as seedlings are fit to handle prick out into 3-in. pots; then plant out early in September.

Plants want various things to keep them healthy, and one is air, and for this purpose "work" the beds with hoe, and fork until the top is almost as fine as the soil in a seed-box. Weeds, and with them slugs and snails, and other pests, will disappear almost altogether, and at the same time it is one of the most important methods of increasing the fertility of the soil.

Get seed in early and have seedlings ready by the time the first autumn rains arrive. By this means a long stretch of cool, damp, weather is secured for the young plants, and some months of bloom before they are cut off by the hot winds of early spring.

Sweet peas planted on the eastern side of a fence, running north and south, will produce the earliest flowers. For cool localities spring sowing gives the best results.

Seeds planted now will require a covering of some sort to protect the surface from the fierce rays of the sun, and to prevent the too rapid evaporation of moisture.

Take cuttings of all perennials you wish to propagate, such as pelargoniums—regal, show, and zonale — pentstemons, carnations, and various evergreen shrubs.

Save the seed of sunflower, hunnemannia, delphinium, gaillardia, calliopsis, and asters. Select the finest flowers on the plants for this purpose, and mark them with a colored piece of wool. It will be found advisable sometimes to tie the seed-pod or head up in a piece of tissue paper, to prevent its being lost when it falls.

The beds that are to receive bulbs should be prepared at once, Take care that the manure is very old and rotten, and turn the plots over two or three times before planting, to ensure the soil being sufficiently granulated and mellowed.

Bougainvilleas grow and flower more freely when planted facing the north or north-east. They do not require pruning after flowering, only to cut away unsightly growths. Bougainvilleas grow best when planted in a rich, sandy loam, but will grow in any ordinary garden soil where there is good drainage.

Tulips will thrive in any good ordinary garden soil—a cool, loamy soil for preference. To do them well prepare a bed for them. If soil is light and sandy dig in plenty of lumpy old cow manure, and if procurable, some good stiff loam or clay ; mix well by turning with a garden fork. Procure only strong selected bulbs and plant in rows not less than 3 in. under ground. When growth is looking strong and foliage is two or three inches above ground add superphosphate or bonedust, or both mixed, as a top dressing, just a nice sprinkling, and press the soil firmly about the roots. Mulch with stable manure as hot weather approaches. The most important point in tulip culture is to ripen the bulbs slowly, and lift them from the ground directly the foliage has died down ; lay them in trays and place in a cool storeroom, or when quite ripe store in pots or boxes of dry sand. Select a nice sheltered position for the special bed, or provide means for sheltering by flowering time. If ground lies low the bed should be drained. A narrow bed, say six feet (6 ft.) wide, rows running lengthways, is the most convenient.

At this time of the year of course there is no doubt that imported spring flowering bulbs should be planted as soon as received. We remember that Mr. Peter Barr recommended immediate planting at whatever time they were received. A cool shady position should be selected if available or artificial shade be provided during the hot months. If the soil is kept just moist the bulbs will bloom the first year and when once acclimatised they will flower freely in their right season. A local grower told us that he had better results by cutting the flower stems as soon as the bulbs showed the first sign of colour. Bulbs so treated gave particularly fine flowers the next season.

A successful grower of sweet peas, writing to "The Garden," says :—It is, of course, necessary that the soil shall be in perfect mechanical condition, and that there shall be an abundant supply of readily available food, not, for preference, in the form of natural manure near the roots. Place the seeds not less than 3 inches apart on a firm, level base, and cover the dark brown and black seeds with half an inch of mould, but simply press the white and spotted seeds into the surface. When the time arrives for thinning, remove plants as may be necessary to leave the distance 6 inches. This will not conduce to the production of blooms with stems a couple of feet in length ; but that will not matter, as the object of culture is not exhibition blooms, but plenty for home decoration. The popular objection to sowing Sweet Peas with a view to transplantation is that they cease growing entirely for some days when put out ; but this is not the case when proper care is taken in handling the roots and in choosing a time when the soil is in an ideal state for such an important operation, and, needless to say, it must be fertile. It is early to sow yet but quite time to think about preparing the ground.

The question of the space to be allowed from plant to plant is of great importance, for one of the commonest mistakes in Sweat Pea culture is to grow them too closely together. Where they are overcrowded they produce neither quantity nor quality of blossoms, and are never satisfactory. Some exhibitors give 18 inches for each plant, but this is only advisable where everything is specially suitable for their requirements, or where there is plenty of room. A foot apart is a fair distance, and six inches may be looked upon as the absolute minimum. The distances named refer to rows, but where clumps are grown the dangers of over-crowding are just as great.

In its native home the Aristolochia, known as the Pelican flower, must be a beautiful sight. The leaves are large and heart-shaped, the stem climbs to a height of from 15 feet to 20 feet. Some of the larger flowers often measure 15 inches or 16 inches across, and 20 inches to 22 inches in length, with a tail upwards of 3 feet in length. This latter appendant forms a convenient ladder for insects to reach the flower. The inside of the throat is lined with hairs turned downwards, evidently to prevent the escape of insects when once inside. The mouth of the tube is velvety purple, the remainder of the flower being creamy yellow, mottled with purple. It does not last long when fully expanded, and emits a rather obnoxious odour.

Most heavy soils, if dug and allowed to lie rough for a time, are rendered friable and better suited for seed-beds than when newly dug, as, through being lightly forked over and raked, the soil breaks down into fine particles, so that when the seeds are sown the soil does not present much resistance to the delicate roots. Light sandy soils are quite the best and easiest to deal with when forming seed-beds, as they may be dug at any time except when extremely wet. No hard-and-fast rules can be laid down respecting soils, but as far as circumstances will admit it should be got into the best possible tilth for seed-sowing.

Australian florists (says an Exchange) do nothing special at Easter time to make their windows attractive. They should take a leaf out of the book of a Parisian, or of an American florist, and make a mild sensation in the Easter egg line. A pretty conceit is the following:—If you cannot get an egg-frame made, fit up a frame of heavy wire screen. Cut a jagged hole where the chick is supposed to pick its way out. Cover the outside with a layer of sphagnum, and also fill the inside solidly, except where the cut is, and as far back as can be seen. Cover the outside with one kind of cream or white flowers. Three feet in length, completed, is a good size. Finish the interior, as far as it shows, with yellow or pink. The carnation is a capital flower for this work. Some nice workmanship will be necessary to get a good shape. As a setting arrange a group of showy flowers, such as hydrangeas or Easter lilies. Let the foreground be composed of a path of green moss leading from the egg. Among this path a troop of stuffed ducklings, in interesting poses, can be placed, the head of one barely appearing from the inside, one or more in the act of jumping out, and the others making their way along the path in Indian file. Border this path with low pans of bulbous flowers or ferns.

The arbutus, or "strawberry tree," is one of our best evergreens, thoroughly hardy, growing in a variety of soils. They bloom in the winter, and also produce clusters of fruits which are highly ornamental. A. unedo is a native of Ireland, its flowers are creamy white, and its berries are crimson; it fruits more freely, and the berries are more highly coloured, in cold lacalities. A. Canariensis, from the Canary Islands, has whitish-green flowers and showy yellow fruits, a little larger than those of unedo. A. Andrachne is a much scarcer plant than the preceding two species; its flowers and fruits are similar to those of the others, but its stems are devoid of bark, which give it a singular appearance. A. coccinea is another rare species, having rose-coloured flowers.

To preserve lavender flowers cut them with long stems, tie them in small bunches and hang the bunches up in some airy place where they will not be exposed to sunshine which would make them brittle. It is necessary to hang them upside down to keep the stems straight until they dry and stiffen. When perfectly dry they may be used for any purpose you like, and they will retain their perfume for a long time.

Disbudding is often done to retard flowering, in which case stimulants should be given, which causes the plants to make new growth, thus absorbing the energy which would otherwise be spent in the production of flowers. All plants cannot be treated in this manner. For instance, Orchids, Amaryllis, and many others of the same class, if they are disbudded, it is a distinct loss—the plant will not exert itself to replenish our treasure. The prevention of flowering is also done to increase the vigour of a weakly plant, as flowering is very exhaustive of plant life, and many valuable plants are lost by not defering the flowering period until the plant is healthy and strong, and therefore able to give us better flowers.

House plants should not be kept too wet, and if a tablespoonful of ammonia to a pint of water be applied once a week it will keep the plants in a thrifty condition. Plants should be taken to the kitchen sink occasionally and given a thorough spraying. Plants breathe through their leaves, and unless they are kept free from dust, they soon take on a very discouraged appearance. Stirring the soil frequently will prevent its getting soggy and sour.

Cut flowers will last longer if the stems are split up about an inch before putting them in water. Maidenhair fern will last longer if, when it is gathered, the stems are inserted in boiling water and allowed to stand in it until the water is cold before arranging in vases.

Toads are most useful reptiles, and devour thousands of small insects that would otherwise eat up the vegetation. Gardeners well know this when they turn them into the hot-houses. An English gardener gives the following testimony:—"In the autumn of last year a pit wherein I grew Melons was so much infested with ants as to threaten the destruction of the whole crop, which they did first by perforating the skin, and afterwards eating their way into the fruit; and after making several unsuccessful experiments to destroy them, it seemed to me that I had seen the toad feed on them. I accordingly put half-a-dozen toads into the pit, and in the course of a few days hardly a single ant was to be seen.

Soil is inhabited by multitudes of minute forms of vegetable life, known as bacteria or germs. These organisms act upon nitrogen, gradually converting the ammonia of nitrogenous matter into nitrates, and thus making it available as a plant food. This gradual change is known as nitrification. Nitrification is a process of oxidation, or burning, and as such can only take place where the oxygen of free air can combine chemically with with ammonia in the soil. It is obvious, therefore, that to enable the bacteria to do their work soils must be properly aerated. A certain degree of warmth and of moisture is also absolutely necessary. Lastly, the presence of lime, phosphates and potash is needed to provide suitable nourishment for the soil organisms.

The necessity for deep digging as a condition of successful cropping has long been proved; but beyond a general notion of the benefit of working the soil and exposing it to the effects of "weathering," much uncertainty prevails among us as to the actual principles underlying the process. For principles there are, and these of a nature which makes their bearing a matter of first importance to the practical successful man. The fundamental idea, with which science has acquainted us, is that the soil is alive and must be treated accordingly.

Pansies were first improved from the original type in Great Britain, and new varieties were gradually brought out with larger flowers and varied colors. England and Scotland held the honors for good pansies until about 1878, when three French Specialists, Bugnot of St. Brieuc, Cassier and Trimardeau of Paris made immense strides in developing the pansy. Trimardeau created a new race with immense flowers and a very hardy constitution.

One often hears it asked whether it is wise to grow Sweet Peas on the same ground in two or more consecutive seasons. Probably a change of ground is a slight advantage, but where the ground is well tilled and well manured there really seems to be no apparent difference if the same ground gives flowers year after year with no apparent noticeable falling off in quality. On the other hand, if the plants have been diseased, a change should, if possible, be made, otherwise the disease is liable to break out again the next year. Another preventive is to burn all diseased plants. The sticks that have been used should share the same fate.

Bulbs and Their Culture.

Though it cannot be said that bulb growing is a popular form of gardening in South Australia, more interest is taken in the subject than was the case some few years ago. Bulb culture certainly has much to be said in its favour. It is cheap, it is easy, and it is certain, and though our climate is not perhaps all it might be (it is well on to the 110 degrees as we write these words, so we may be excused the foregoing mild expression of disapproval) there is no doubt that it suits most sorts of bulbs. The following paper, read by Mr. T. W. Babbage, at a meeting of one of the suburban floral societies, will be of interest, though it is some years since we first printed it :—

The secret of growing bulbs is sand ; sea sand for preference, but other sand will do, or old street sweepings. Dig your hole or trench, place in your bulbs, cover them with sand, then put the earth on top ; your bulbs must grow ; they can't help it. If I went on talking all night I could not give you any more instruction on the subject. I can only say to you, used sand, sand, sandy, and you must succeed ; to alter an old proverb, "A bulb in the sand is worth two in the earth.

Never cut the leaves of bulbs until they have quite died down ; non-observance of this rule is one of the chief reasons why so many people complain that their bulbs come up each year without flowers. If the tops in dying down do look a bit untidy, tie them up to a stake.

As a proof that bulbs can be grown in the flower beds I have thousands of them planted where the beds are soaked with water nearly all the summer ; yet they do not rot. I attribute this to the use of sand.

—The Hub of the Bulb Universe.—

The great bulb centre is Holland; there they fear no rivals. Visitors are shown all over the bulb grounds, and everything is explained. There are no secrets ; the natural advantages of the place are so great that no other country in the world can approach them. There the flowers, comparatively speaking, are not of much use, although a good many are exported; the bulb itself receives all the attention. Of course, such places as Great Britain, America, France, etc., have their special growers, but in growing bulbs on a large scale Holland stands pre-eminent. A writer, who had visited Holland during the bulb seasons, says :—"These Holland bulb gardens or farms are the first wonder of the floral world. Travelling by rail in the bulb districts, towards the end of April, the whole face of the land is inundated with gorgeous color of every imaginable hue, and the air is laden with a rich perfume from millions of hyacinths, tulips, daffodils, and others, which are then at the height of their prosperity.

Were any one to attempt to depict such a display on canvas it would be generally regarded as a glaring vulgarity ; but, in my opinion, no flower ever appears in that garb. These bulbs are grown without any regard to harmony in their arrangement of color ; the display was so novel and unique that depression from excessive color never occurred. If one field was flooded with a surface of intense scarlet the snow whiteness of the next, or the blue, pink, or yellow of the succeeding ones, quickly diverted attention, and the bulb-covered parts of the country in Holland will always be associated, in my mind, with all that is beautiful. One firm in Holland has 60 acres under bulb cultivation ; wide water-ditches intersect the fields everywhere. The level of the water is only about 1 ft. below the surface of the land, and it is no doubt by this arrangement that the sand in which the bulbs grow is prevented from drying up in summer.

— Treatment. —

The bulbs are allowed to blossom fully, but they are all nipped off before they wither, with the object of increasing the strength of the bulbs. Many hands were employed removing the flowers and emptying them into huge heaps or casting them into the water, the latter process giving a pretty effect, as thousands upon thousands of flowers floating on the surface gave one the impression that the liquid too was competing with the soil in beautifying its surface. A greater waste of flowers could not be witnessed anywhere. Everything in the bulb districts, outside of bulb growing, is of minor importance. strangely enough the public and private gardens contain nothing striking in the way of flowers."

Another writer, giving his impressions, "says it is difficult to give even a faint idea of the beauty of these vast plains of blossoms, each in itself perfection that encompass the quaint old towns. The idea that there must be a sameness monotony in all these vast fields of flowers is a mistaken one. The color varies with every hour of the day. In the morning the flower fields are quite a different story from the same gardens at noon, while towards evening, when the nightingales begin to sing in the historic woods, there comes a softness to the bright tints, a mystery that seems born of the night, due, perhaps, to the mist that rises from the meads that stretch towards the dunes, the mist that augurs well for a fine day on the morrow. Then, again, there are the barges passing, always passing, along the canals, with hulls gaily painted with green, white, or red, and with sails tanned russet-brown. There are the windmills, against the sky, turning round so busily in the breeze; there are the quaint peasant women trudging townwards along the canal bank, with deep baskets hung at their backs, and the busy gardeners in their bright blue dungaree jackets, and sabots as white as chalk can make them. All these mean color and life. No, there is no monotony, it is an ever-moving pageant, instinct with living beauty, and the one way to realise it is to see it."

One can gather from these expressions that the Holland bulb gardens must be one of the floral wonders of the world.

Coming back to the cultivation of the bulb, in this part of the world there seems to be a certain difference of opinion as to the depth bulbs should be planted. Personally, I think in lots of cases the depth is not of much importance, except, of course, where the bulb is small and likely to be buried too deep. Such bulbs as the polyantha narcissus, daffodil, snowflakes, hyacinths, etc., can be planted 6in. down, and they would come up, but less depth will do, and they will thrive equally as well; ixia, freesia, babiana, and the like, can be planted a couple of inches down and thrive. I have had freesias grow up through a heap of manure which was 2 ft. thick. In planting bulbs always put in a stout marker, as when they die down and leave no trace of their whereabouts the gardener is apt to find them with his spade, and bring them up earlier than was anticipated.

— A Charming Succession. —

The first bulb to flower amongst those generally known is the Belladonna lily; then the autumn crocus. There is a white crocus-like flower which comes out about this time of year called zephranthes, and is often mistaken for a white crocus. The spider lily is flowering now, and soon we shall have the paper white and Soliel d'or narcissus and the Roman hyacinth; then follow the daffodils, hyacinths, and all the other bulbs in rotation.

Regarding the removal of bulbs from the ground I do not consider it necessary to remove them, except where they are too thick. I often keep them years without shifting. Some bulbs do not take the move kindly, particularly amaryllis and tube-rose. When bulbs are taken up it is best to dry them a little in the sun and then put away in sand or dust in a cool place until wanted again for planting.

When there are bulbils or small bulbs they should be planted in rich soil, so as to hasten their development. In reference to watering, unless the winter is very dry, I do not water, as rain is the best irrigator, and more natural and impartial in its favors.

I know of no special pests that attack bulbs, except our old friends the slug and snails, but these can be got over by lime dusting. I do not think I have missed anything referring to the cultivation of the bulb. Bulbs are very easy to grow if the directions given above are carried out. In concluding I can only say—"Don't forget the sand."

Birds are our best friends, and the lack of appreciation of them is robbing the country not only of their beauty of song and colour, but the inestimable service they perform in destroying myriads of insects.

Herbaceous Perennials.

The usual way of increasing herbaceous perennials is by division. Of course, this is by far the most expeditious, and one can depend on having good plants the next year; but when we come to compare the quality of the blooms with those of plants raised from cuttings, then we must leave the subject. The reason is obvious. In the case of division we have simply a portion of an old, partially worn-out plant, while from the cutting we have a young plant full of vigour. For filling beds the plants raised from cuttings are far more suitable in every way. The plants grow vigorously and uniformly, both as to height and size of flower-heads, and these are larger than those from divided plants.

Since it may be laid down as an axiom that bad conditions will not produce good plants, the preliminary work should be most carefully attended to. Should the soil in the bed or frame prove to be sour or exhausted, the surface soil must be removed, and fresh substituted. If the level requires raising, sifted coal ashes, raked smooth, will be found to make a satisfactory substratum; as an assistance to drainage, these are excellent. Where it is only necessary to prepare and improve the existing soil, this should be dug over to a depth of at least nine inches. Take out a small trench, removing the soil to the spot where it is intended to finish the work. Place leaf-soil or decaying leaves at the bottom; turn in the next trench, and proceed, filling up the last trench with the soil removed. When the whole has been dug, spread over it three inches in depth of good light soil, finely sifted and well mixed with sharp sand. Then rake over until absolutely level. A final covering of sand should afterwards be given, and the whole made firm by pressing with a piece of board. It may be remarked that boards will also be needed when putting in the cuttings, one to kneel upon and another on which to rest the feet, in order to avoid making hollows in the soil.

For making the cuttings, select firm ripe growths, avoiding such as are sappy or weak. Shorten to a length of three or four inches, and make a straight clean transverse cut immediately below a node, as from this point is produced the layer of living cells, known as cambium—from which the new roots will raise. Let two pairs of leaves remain at the top; remove any flower buds, and all lower leaves and leaf-stipules. Each cutting should show a clean unbruised stem, with nothing to encourage decay or damping off. While making the cuttings, it is advisable to keep them out of strong sunshine, in order to avoid any needless flagging.

— Putting in the Cuttings. —

Have ready a piece of twine as long as the width of the frame, and attach it at either end to a short stick. Insert the stick in the soil, stretching the line rather tightly across the surface of the soil. Now put in the first line of cuttings, 1½ or 2 inches apart, according to their size. A twig of wood cut to the required length will serve for measuring the distances in the first line, and the distance apart of the succeeding rows. Use a small blunt-pointed dibber, and work it round so as to make holes of a fair size; a small hole discourages free rooting, by the caking of the soil induced. As each hole is made, a little of the surface sand will work downwards into it. It will be remembered that the more sandy the rooting medium, the more likely are the cuttings to resist decay and damping off. Press in each cutting carefully against the line of string, as far down as the lowest leaves. The hole made must be only so deep as to allow the base of the cutting to touch the soil; otherwise the cutting will be "hung," a condition not favourable to root formation.

Move the line down to the distance measured, and insert the next row, making the cuttings alternate with those of the previous row.

When a bed or frame is filled, water the cuttings lightly. Put on the sash—which should be prevoously cleaned—and shade with mats for two or three days, to hinder flagging as far as is possible.

— After Treatment. —

Keep close until the roots have formed. When on examination this is found to hape taken place, allow plenty of air if the weather be fine, and water when necessary. Do not allow any damped-off cuttings to remain. Keep the soil weeded and stirred over, and remove any flower buds which may make their appearance. As growth proceeds, pinch out the tips of the plants once or more to secure a bushy habit.

The plants should be allowed to remain undisturbed until removed to their flowering quarters, when they may be carefully lifted, each with as large a ball of soil as possible.

If the instructions are followed out with care, the result should give a fine and healthy stock of plants.—Exchange.

Sweet Peas.

Preparing the ground for Sweet Peas is an important operation, as the success of the entire work may be said to depend upon it. Whether the row or clump system be adopted is wholly a point for individual decision, and though, perhaps, the finest blooms come from plants in clumps, satisfactory results may be achieved either way. Take out a station or trench between 2 feet and 3 feet deep, place in the bottom a layer of cow manure and work back the soil, incorporating with it more good natural manure, with a light dressing of mineral superphosphate and sulphate of potash. Make the whole moderately firm before planting, but immediately after working have it loose and rough.

To sow the seeds, make a trench lay the seeds about two inches apart, and replace the soil. Under ordinary conditions more plants will appear than are really required, and they will have to be thinned out later. Expensive seeds, however, can be sown two or three times as thinly.

Some reader may be undecided whether to grow clumps or rows. Each system has its advocates, but as regards the quality of the flowers yielded, there seems to be very little to choose. It is fairly generally admitted that where a plot of ground is to be devoted to Sweet Peas, rows are the more economical of space. On the other hand, however, most persons of taste will agree that where Sweet Peas are grown in a mixed bed or border, clumps indubitably give a better decorative effect.

If several parallel rows are grown, they should be at least five feet apart. Six or seven feet is none too much where the plants grow very tall.

Complaints are sometimes made that mice eat the seeds before they germinate. Where there is any fear of the depredations of these rodents, it is wise to damp the coats of the seeds before sowing, and sprinkle them with red lead.

The birds, like the poor, are always with us, and if they have an opportunity, they will work havoc with the young seedlings when they appear. How many a time has the seedsman been blamed for the non-germination of the seeds, when, if the truth were known, the seeds germinated well, but the birds removed the young plants directly they appeared. No man who values his plants will leave them unprotected. Many devices may be known to the reader, but one of the cheapest and, at the same time, one of the best, is the liberal use of black cotton streeched tightly along the rows. To ensure safety, three or four lengths of cotton should be stretched on each side of the rows, at heights varying from one to five inches above the level of the ground. If, when the plants outgrow this protection, the birds attack them, more cotton must be added.

Roses from Seed.

The operation is one of the greatest interest, and certainly deserves the attention of some of our rose enthusiasts. The one objection is, that it is slow, it being at the lowest reckoning, at least two years before any visible result is secured.

The seed pods should be gathered when quite ripe, taking care only to collect them from roses of established merit. The removal of the fleshy outside envelope is somewhat tedious, and is best performed by burying the hips in the damp ground for several weeks, when it will be found that the covering has rotted, and the seed may be easily cleaned.

If planted in August or September some of the seed.ings may be showing above ground in three or four weeks, whilst others may not make their appearance for a month, or even two months, later.

The young plants must be kept moving straight ahead from the very beginning. When the seedlings are up give them any amount of sunlight and air; don't keep the soil too damp, but they must not suffer from the slightest suspicion of drought. When they have attained a height of, say, three inches, take them out of the seed pan with a thin pointed trowel, thus securing with each a little ball of soil round the roots. Replant into a prepared bed, one that has been dug deeply, and in which some old manure has been stirred, placing them a foot apart. This bed must be kept in the pink of condition, with frequent hoeings, and the young plants encouraged to do their very best. A small percentage of the seedlings may flower the first season, but these will be found to be almost without exception of very poor quality. The majority will flower during the second season. As soon as the bushes show signs of buds begin giving weak liquid manure once during the week, increasing it to two doses weekly when the buds are about half-grown.

A large number of seedlings will prove to be single, and unless showing a flower of sterling quality should be pulled up at once and added to the manure heap. But anything giving promise of merit should be retained, so that a more extended trial should be given it.

The percentage of really first-class roses will, of course, be exceedingly small, but the thought that one may chance to raise a Maman Cochet or a Mrs. Edward Mawley is enough to make one continue to persevere in this interesting branch of gardening. It would be as well when collecting the seed to keep that taken from each variety separate, so that should anything good be the outcome, the name of one of the parents of the new rose at least will be known.

Bulbs for Pot Culture.

All the bulbous plants must be placed in the dark immediately after planting (Freesias, by the way, are an exception to this very general rule). The pots may be placed in a dark cellar, and covered with several inches of ashes. Many do not realise the significance of this operation. Now, the express purpose of keeping the plants in darkness is to retard top growth until the bulbs have produced a quantity of roots. Exposure to the light encourages top growth at the expense of root growth, or at least before sufficient roots have been formed to sustain it. The pots can be kept in their darkened quarters for about five weeks.

Many bulbs will even grow without soil, that is to say, a substitute may be found for it in fibre, mixed with shells, pebbles, and pieces of charcoal. Jadoo can be bought ready mixed with shells and charcoal—the use of the charcoal, is, of course, to keep the whole sweet and wholesome. In growing bulbs in fibre one of the main secrets of success lies in never allowing the fibre to become dry, as the direct cause of this is to make the roots shrivel and prevent the development of the flowers. The bowls are filled with water once a week and then tilted, pouring off the surplus water, that will ensure the fibre keeping evenly moist through the bowl. After all it is in mere detail such as this that success or failure lies, for the whole cultivation is so wonderfully simple that it is only in details that one can err. It is quite as necessary to place bulbs that are to be grown in fibre in the dark as for those in soil, and to examine them at the end of five weeks, and then, if possible, to leave those in fibre an extra week in the darkness.

How to Plant Daffodils.

Daffodils can accommodate themselves to a'most any good garden soil, but to get the best results a deep, loamy soil with a cool bottom is necessary, says one of our most successful growers. Some of the best daffodils exhibited are grown on rich, chocolate, volcanic soil. Where the soil is of a sandy nature it is a good plan to trench in a heavy dressing of well-rotted cow manure some time before the bulbs are planted.

— Manure. —

The applcation of manure requires great judgment, and the proper quantity to apply can only be determined by actual experience. At one time it was thought that daffodils did not require manure, but this is a mistaken notion. Daffodils are the same as other plants; they like good cultivation.

— How to Plant. —

Where the bulbs are planted in the borders dig a hole about a foot in diameter and the depth of the spade, put in a good handful of bonedust; mix with bottom soil, then put a little more soil on top, then plant your bulbs, and fill in balance of soil. In planting in beds I always take out a trench the length of the bed, 15 in. wide, and a spade deep. I then apply a good dressing of bonedust or well-rotted cow manure to the bottom of the trench, then fork it in lightly. Put back some of the soil removed, plant my bulbs on top of this, and fill in the remainder of the soil level. I continue the same way until the bed is filled up. When bulbs are planted in this way the manure is below the bulbs, and the roots soon find their way down to it; bulbs should not be allowed to come in contact with the manure. In planting the bulbs a good depth is 3 in. from the surface of the soil to the crown of the bulb; for some of the smaller bulbs 2 in. from the surface is sufficient.

Bulbs from Seed.

The ranunculus, anemone, gladiolus, freezia, cyclamen, sparaxis, ixia, belladona lilies may be easily raised from seed.

—The Ranunculus and Anemone.—

Prepare the seed box by placing in it a compost of loam, leaf-mould, and sand. The seed is somewhat difficult to sow thinly, and so should be treated in the fashion sometimes recommended for carrot seed, that is, to mix it with sifted ashes, rubbing the seeds between the hands until they are completely separated. This mixture of ashes and seed should then be evenly served over the surface of the box and covered with sifted stable manure to the thickness of a penny. The best position for the seed-box will be on the north side of a wall or fence, as it is then protected from the heavy rain that usually comes from a southerly direction.

The surface must be kept damp, but not wet, using the very fine rose can. But one of the chief reasons of the general failure amongst amateurs to raise seed of any fineness is that they will water their seed boxes and pans with an ordinary garden watering can, thus often washing the seed right out of the box. A slight shade placed over the box will help.

The seed comes up very freely and may be placed out in a bed, finely prepared, as soon as they are a fair size.

Seed of the ranunculus will flower the first season, the anemone the second.

— Glad olus. —

New and beautiful varieties may be had by this method. If you intend collect in your own seed select a dozen or so of good roots, bearing flowers of good color and form, and as dissimilar in color as possible, and plant in a small bed by themselves. When well watered they seed freely.

Collect it as soon as ripe, and either sow at once or kept it till wanted in an air-tight tin.

Fill a box with good sandy loam; sow the seed thinly and press it with the back of a spade or a piece of wood; give a gentle watering with fine rose can, and cover with sifted manure to no more than the thickness of a shilling. Never let the surface of the box become dry.

The seedlings will probably make leaves eight to ten inches long the first year. When these die off the small bulbs should be taken out of the seed box (running the soil a fine sieve is the best way) and replanted in a finely prepared bed, where they will bloom. In the blooming season harden your heart and discard all roots that are not up to a certain mental standard in form, color, and size.

— The Freezia. —

This popular favorite can be propagated quickly by seed which they bear in large quantities. They may be raised in the bed where they are to remain. Mix with the loam of the bed a quantity of sand, dig finely, and rake all lumps out. Sow the seed thinly and cover lightly with either soil or sifted horse manure. A slight shade placed over the bed during the hottest part of the day will prevent the too rapid evaporation of moisture from the surface of the bed. These bulbs may be left in the same border year after year without detriment.

Watering.

If you have a well established tree suffering for want of water give it all the water it wants, but give it economically by loosening the soil well with a fork as deeply as possible without hurting the roots all round the tree from, say, 2 ft. from the trunk of four-year-old trees to well out, say, 2 ft. beyond the spread of the branches, or even further. Now, with a good hoe, make a series of gutters or a circular trench round the tree outside the spread of the foliage, or even rake out a few inches of soil over the whole area loosened so as to make a bank outside the spread of the foliage. The tree will then stand in a basin with a loose, open bottom. Over this sprinkle a little superphosphate and sulphate of ammonia, and then run in the water until the soil will drink in no more, and return the top soil. This may take anything from 100 to 1,000 gallons, depending on the size of the tree and the condition of the soil.

If you cannot find time for the thorough work indicated, i.e., to loosen the soil all round and under, then dig a trench round the tree just outside the spread of the branches. Dig it with the fork and do not cut the roots, and run the water round in this trench until the root area gets a good soaking.

Hyacinths.

— Their Culture in Glasses. —

In choosing Hyacinth bulbs see that these are healthy-looking, heavy, and firm to touch. A "regulation" type of glass for growing the bulbs in water is supplied. Procure dark-coloured glasses by preference, as these more closely imitate a dark-rooting medium when brought into the light.

Before "setting" the bulbs remove any bulbils from the sides, as these will not flower satisfactorily the first year, but will impoverish the food stores of the parent bulb. Fill the glasses with tepid water—rain water for choice—place in each a little charcoal for keeping sweet, and set the bulbs. The water should just clear them at the base; root formation will thus be encouraged, and rotting-off prevented. Stand in a dry, cool, and quite dark place, free from mice and other pests.

Examine occasionally, and add water if needed, tilting the bulb gently to do so. If a convenient hot-water cistern cupboard is available the bulbs may be mildly forced by placing in this after the third week. It is undesirable to start them in an over-warm temperature.

By the sixth week at latest long sturdy roots should have formed. Remove the glasses to a favourable position in the light, such as a sunny window ledge. The almost undeveloped shoot will now grow rapidly, owing to the light which produces in its tissues the medium of nutrition known as chlorphyll (plant green). Give plenty of air, as the plants will otherwise become lanky, and change the water at discretion, being careful to take the chill off the fresh supply. When the truss appears a daily sprinking of rain-water before the flowers show colour will improve their quality. Turn the glasses gradually to secure equal conditions for all sides. Stake with the appliances sold for the purpose, or with home-made substitutes of copper wire.

The foregoing suggestions are intended for those wishing to grow their Hyacinths in an ordinary dwelling house. Culture in a cool greenhouse differs little from this method, be careful to cover the glasses completely with thick matting, or with inverted flower-pots, having their holes plugged; or the glasses may be covered four inches above, and banked at sides in dry cocoanut fibre. When roots have formed place the Hyacinths near the glass to prevent drawn shoots.

When the flowering season is over remove the dead blooms, allowing the leaves to remain and continue their work of nourishment. Plant out the bulbs in a spare plot of ground, here they will recuperate, and form fresh stock for use in succeeding years.

Superiority of Tin Cans over Pot for Seedling Plants.

An ingenious investigation into the circumstance, observed in Hawaii, that some seedling plants grow better in tin cans than in earthenware pots, is described by the Honolulu Experiment Station.

For the practical propagator the results of the investigation are of very considerable importance, and of a character highly suggestive.

As a working basis it was supposed that the two factors involved were differences in evaporation and stimulation due to tin and solder in the cans. In the course of the experiments it was found that the average evaporation from pots was exactly two and a half times greater than that from the tin cans, though as might be expected, in sunshine, the relative increase was greater for the tins owing to the more rapid penetration of heat. The soil in a pot was found to be more exposed to evaporation than even the greater surface area would indicate. A more interesting result was the discovery that with the ordinary pot 52.3 per cent. of the evaporation takes place through the top, and 47.7 per cent through the side. Further determinations showed that the evaporation from a given area is 3.5 times as fast through a free surface of soil as through the side of the pot.

A continuation of the investigation consisted in the growing of seedling plants in pots of varying porosity, and the height and vigour of the plants increased in regular gradations as the porosity diminished. It was next found desirable to determine the loss of water by transpiration.

This was done by the remarkably simple method of subtracting the loss in the tins and pots without plants, from the loss from the tins and pots with plants.

The results showed that the total loss from two months' old plants in pots was approximately the same as that from two months' old plants in tins, the explanation being, of course, that the greater loss by transpiration from the larger and more vigorous plants in the tins balanced the greater loss by evaporation from the soil in the pots. Leaf measurement showed that transpiration was 1.6 times greater in the case of the plants in tins, and therefore they might obviously be considered as growing more vigorously.

The great advantage of using tin cans rather than porous pots seems to rest in the fact that in tins it is easier to maintain a nearly constant moisture content without a rapid drying of the soil about the growing roots which naturally follow the horizontal water movement towards the side of the pot.

Finally, in regard to the influences of the presence of salts of tin and zinc, plants grown in untreated cans did better than those grown in cans of which the internal surfaces had been waxed. This result, together with the fact established, chemically, that very dilute solutions of tin and zinc salts do have a stimulating influence on plant growth, would appear to be good evidence in support of the conjecture that the presence of these salts in the tin can is a second beneficial factor which is absent in the case of its rival the earthenware pot.—"Agricultural News," Bardados.

The Weather.

From the personal comfort point of view Adelaide has had little to complain of this summer. We have had a few days which have been unpleasant, it is true, but a great number which have been delightful. We are not quite out of the wood yet, in fact the sultry days we sometimes get in March are more trying to many than the dry clear heat when the thermometer skips over the century. They remind us also of how much cause we have for gratitude that our climate is not as it is sometimes called, "tropical," or even "semi-tropical." It is in fact quite the reverse. No one can pretend that the old fashioned "brickfielder" is pleasant, but there seems to be a general idea that it is heafthy. Hot winds drive away and destroy the disease germs which are floating about in the atmosphere. These same hot winds are about as nasty but as beneficial, as a disinfection after the measles.

It is a fact one often hears commented upon that we Australians apparently do not realise our "semi-tropical" environment. If we did, it is reasonable to suppose, they say, that we should adapt ourselves accordingly, and this would exercise an irresistible effect on our mode of living. But, on the contrary, the type of Australian dwelling house, the clothing of the Australian people, and, what is more important still, their food habits, prove without doubt that we, as a people, have never recognised the alleged semi-tropical character of our climate.

As a rule, the peoples of different regions adapt themselves to their surroundings—everyone sees and knows this—the food and habits of the Laplander are as widely diverse as the poles from those of the Hindoo, and it is reasonable to suppose that we have arrived, or at least are arriving, at a knowledge of what suits us best.

What our summer visitors forget is that though our mode of life may seem a little unsuited for a hot spell, such spells only amount to say, one day in ten throughout the year, and it would be certainly absurd to eat, dress, and build for the ten days in order to be just a little less uncomfortable on the one day. For the nine days out of every ten our food, clothing, and houses, leave little room for improvement.

We are still influenced by our Anglo-Saxon origin but not greatly. The first settlers coming from old mother England found the seasons quite reversed—that the middle of the year was the coolest instead of the hottest part — that Christmas-tide came with sunshine aided and abetted by scorching hot winds, too, very often. Notwithstanding these widely different conditions, however, the "Pioneer Fathers" of our young country still maintained to a large extent the same style of dress, the same forms of food, and often the most unsuitable class of dwellings. If they only thought about the matter it would seem very absurd on a day when the temperature ranges from 100 to 105 degrees in the shade to sit down to such a gigantic heating apparatus as hot roast goose and steaming rich plum pudding. But their English forefathers did so amid frost and snow, and so did they whatever the temperature might be.

Traditional tendencies are certainly ineradicable in a generation or two, and hence it is that we are not quite free of like absurdities It's in the blood.

Australia is a very large place with very varied conditions. In the north the conditions are tropical, and the people largely adopt the clothing and conditions suited to the conditions. Not as far as they might do perhaps with benefit; but enough for the present argument. As we progress down the east and west coasts we pass into semi-tropical conditions, but the changeable nature of the climate is the reason for the existing condition of things as far as clothing and buildings are concerned. In Central Australia we have short period of intense heat, separated by periods of cool, pleasant weather. Often when the sun registers 160 degrees Fah. in the sun in the day and the shade temperature is over 100 degrees the thermometer runs down to 60 degrees or even 50 degrees Fah. at night, so great is the radiation.

It is not unusual to hear or experience a temperature of 110 degrees. Even 120 degrees is not unheard of, but such temperatures in the tropics would be more fatal to the population than an unchecked epidemic of smallpox, and yet our people who live under the conditions where such records are made are physically among the most healthy and energetic in the world.

A tropical climate is a moist air climate. Central and Southern Australia are essentially and distinctly dry-air climates, and cannot be considered tropical in any respect, except in the range of the thermometer, and, Irish-like, we would say that this tropical characteristic is not tropical at all, because it is not characteristic of tropical climates to have intense dry heat.

— Quick Changes. —

Another characteristic of tropical climates is long periods of even temperatures. The inhabitants of the tropics know that as it is to-day so will it probably be for weeks or months. The residents of South Australia, Victoria, and much of New South Wales and West Australia live in daily expectation that as it is to-day so will it not be to-morrow. More or less complete changes occur all through the year at intervals of from a few days to a fortnight. In the winter season we have English spring days and slightly frosty nights, followed by short periods of cold, blustering wind and rain. In the summer we have a few days of intense dry heat, culminating in hot blasts, as though the furnace door of mythical Hades had been left accidentally open, and the loose portions of the surface of the dry soil starts on a roving mission, filling and darkening the atmosphere for hundreds of miles with dust and sand. The thermometer runs up to anything from 95 degrees to 112 degrees. Fahr. in the shade at midday or thereabouts; everyone growls and grumbles, but work goes on as it never could in a tropical heat. Then comes one of the great features of this climate. The wind changes, and in a few hours the thermometers drop 30 to 50 degrees. Then people who desired to live in an ice-chest and drink lemon squash at midday put on overcoats in the evening, and next day are comfortable in the ordinary dress of an English man, and the visitor just landed from an ocean boat praises the beautiful, bracing, mild climate.

In North Africa, Turkey in Asia, Greece, and such warm dry climates, the people expect several months of even temperature, and arrange to dress accordingly; but what can we do where it is necessary to dress in the thinnest of white in the morning, but take rugs and wraps if one expects to be away for more than a few hours?

There is undoubtedly much room for improvement in the habits of feeding, drinking, and living in Australia; but the frequent changes, the variations of temperature, and conditions render the problem a very difficult one. In Adelaide the range of the temperature of the air throughout the year is normally between 34 degrees Fahr. in July or August, and 110 Fahr. in summer. It occasionally goes to a few points within freezing. The number of days over 90 degrees averages a little over 40 in the year, of which rather more than 10 are over the 100. The mean temperature is about 62 degrees Fahr. These figures, together with the evidence of the ripening of fruits and the dry atmosphere, show that in spite of the intense heat of some days, the climate is essentially a mild, temperate one, and is not a tropical one at all.

Sub-Irrigation.

The scarcity of water in the suburban area has led many gardeners to try their hands at sub-irrigation. Quite a long while ago a subscriber wrote us as follows on the subject:—

I have tried the sub-irrigation system on a very small scale by inserting three rows of galvanized down piping (2-in.) full length of my flower garden. These pipes are perforated on the under side and have a slight fall, so that gravitation conveys the water to the far end. My pipes are too deep for small seedlings to reap much benefit from them, but immediately over one pipe I have six roses and a lot of other things. These evidently enjoy the treatment and look as if they were growing over a spring.

APPLES FOR EXPORT.

Profitable orchard work really comes under three main headings—(1) the growing of the fruit; (2) the packing of the fruit; (3) the selling of the fruit. To get best results each is as important as the other; for given equal quality a well packed and well sold consignment will return very much more nett profit than one which is indifferently graded and packed and sold without full knowledge of markets. With regard to growing the fruit, the orchardist is largely depending on natural forces, in grading and in packing out the matter is in his own hands, whilst for selling he looks, or should look to his agents. The advantageous selling of fruit in oversea markets is a special business. The man who sells best in the long run is the man who knows most, and this is obviously the man who has agents and correspondents in the world's market. It is impossible for each individual fruitgrower to do this. We must leave it to the man who makes a business of it and who makes a living out of it. It is true, that the total selling charges out of a consignment is increased by the agent's commission, but the nett returns are more than correspondingly greater. What the grower, who sometimes objects to the commission idea, should remember, is that it is not he who really pays it but the consumer. Messrs. Prevost & Co., of Steamship Buildings, Currie Street Adelaide, go in largely for fruit exportation. Their business in this department is based solely on commission lines, there is no possibility of their own and their clients' interests clashing. The higher the price secured the better it is for both parties. In order to facilitate their customers' business as much as possible they undertake the supply of all packing requisites so that all the grower has to do is to write them that he has so many cases of fruit on his trees, everything except the manual labour of picking, packing, and cartage will, if required, be undertaken by this firm. If the grower prefers to buy his cases, paper, etc., elsewhere, Messrs. Prevost will be equally pleased to accept the selling of the fruit in any market desired.

Carnations.

The next two months include what is probably the best time of the whole year for planting carnations under ordinary garden conditions and the earlier the preparation of the bed in which they are to grow is completed the better. We do not mean that the carnation, even of the most highly bred exhibition strains, is fastidious as to soil requirements. It will grow in almost pure sand, and also in heavy clay, but the nearer we get to the happy medium, between these two extremes, the more successful will our carnation growing be. There is just two points which the carnation certainly objects to—stagnant air and sodden ground—the remedy is easy, where it is possible avoid planting near hedges, and if the ground is badly drained, this must be altered. Without making the soil too rich, which does not favor the production of the best flowers, it should be reasonably fertile. If new natural manure only is available, it should be dug into the second spit and will not then damage the young growing roots. If it is cold, and well rotted, it is best incorporated with the soil throughout the bed. A layer two inches deep of this class of material, well and deeply dug in, will be sufficient for ordinary purposes, or a dusting of superphosphate, or perhaps bonedust will be a suitable equivalent. Since the carnation must have lime to do its best, in the rather unusual absence of this ingredient, it should be supplied at the rate of three or four good double handfuls to the square yard, but should not be applied at the same time as the manuring is done. Where the situation is low, and the drainage not very free, it is a good plan to raise the bed somewhat above the general level.

Clairville Nursery.

Except in cold, wet, and exposed situations, which in any case are not suited to orange growing, the autumn planting of citrus is becoming more and more common. The absolute best time during the next two or three months, will depend on the season, whether it is an early or late one. What the planter wants to aim at is, as much warmth in the ground as possible without too much of it in the atmosphere—in any case it should not be so delayed that the ground becomes cold, with the result that the newly-planted trees merely exist. The important point is that root growth shall be active, and the tree well established before winter. In successful fruit growing a good deal depends on the nursery treatment of the trees; this is perhaps especially so in the case of all citrus varieties. A good start means a lot. Fortunately South Australian nurserymen are fully alive to this. Visitors to the extensive nurseries at Hectorville will be impressed with the fine condition of the block of many varieties which Mr. Pike has raised for this season's planting. Whether he is growing a standard variety like the Washington Navel, Siletta, St. Michael, etc., by the thousand, or one of the newer sorts by the hundreds, he puts the same amount of skilled supervision into the work so that buyers either in small or large quantities may be assured that as far as a "Good Start" is concerned, everything possible has been done for them. Intending planters should communicate with Mr. Pike, if they have not already done so, and place their orders at an early date, for large as has been the provision made for the past few years, he has on more than one occasion got very near the "Sold Out" mark, and in some varieties over it. The early bird gets the best worm—or at all events he gets the choice of all the worms—substitute trees for worms and you have the position of the man who is going to plant trees this season. The lesson is obvious.

In the Land of the Setting Sun.

Some Yankee nurseryman, 'tis said,
Claims to have scored a floral coup,
For he successfully has "bred"
A Rose indubitably blue!
Which like the short-lived "green Carnation,"
Will cause, he hopes, a wide sensation!

But we, for our part, cannot be
Approvers of the skill he's shown;
Confound that nurseryman! say we,
Why can't he leave the Rose alone?
Blue Rose, forsooth! Why not Black Lily
Or something even still more silly?

Far in the end this meddling crank,
Resolved his cleverness to show,
May outrage Nature by a prank,
Past which e'en he can't hope to go—
Yes, he may stagger us, the varlet!
With Violets of a vivid scarlet!

—Truth.

To enlist the aid of boys and girls in improving and ornamenting the school or home grounds means to cultivate esprit de corps which makes them more loyal to the school and its interests. The joy coming from helping make things go in the little republic, will lead to future loyalty in the broader citizenship of community, state, and nation.

Vegetable Garden

Mushrooms.

Many people would like to grow mushrooms in their gardens. Many make the attempt—some succeed, others fail—but a great many do not make a trial because they think it is quite necessary to have specially-constructed houses in which to grow them. This is a mistaken idea. If there are cellars or sheds on the premises, Mushrooms can be grown in them when the necessary heating material is procured. Mushrooms may be grown in pure leaves, or in ordinary hot-beds in the open air; but rather more skill is necessary than in growing them in sheds.

— The Needful Essentials. —

Materials that will combine to make a hot-bed which will be sweet and produce a medium lasting heat. Moisture of atmosphere as well as heat, consistent moisture of the bed without excessive watering of the latter being necessary. A darkened interior of structure, exclusion of all cold draughts, and regulation of ventilation.

— The Material for the Beds. —

This is best when procured fresh from the stables; and newly-gathered tree leaves from heaps where fermentation has not set in. The horse manure, and the short, strawy litter with it, must be gathered fresh every morning and spread out thinly in an open shed to partially dry, and be turned over every morning to allow the rank gases to escape. When sufficient has been gathered to form a bed, we will say one measuring 8 feet long, 4 feet wide and 14 inches deep, the whole must be thrown up into a heap and left so for one day and a night. A strong heat will be induced, but, before the material burns, the heap must be spread out again, when much rank steam will escape, and the manure will be thus sweetened and made ready for use in the building of the Mushroom-bed. This manipulation of the manure is absolutely necessary if Mushrooms are to be grown successfully. When neglected, the spawn perishes and all labour is in vain.

— Building the Bed. —

On the space selected shake out a thin layer of the manure and some leaves—one-third of leaves to two-thirds of manure—and tread all down firmly. Build up the bed in layers in this way, firming each layer as put down. The firmer the bed, the longer will the heat in it last and the more even will it be. Insert a thermometer; the heat may rise to more than 100 degrees. If so, wait until it drops to 85 degrees; then insert the spawn.

— Another Method. —

Another authority writes:—There are many different methods used for building mushroom houses. In my opinion, the ideal house is the house that is built beneath the surface of the ground, or partly so. Dig out six feet deep, ten feet wide, build concrete walls one foot above the level of the ground. Place an equal span roof on these walls. This will give you two beds on each side four feet wide with a two foot centre walk, leaving an aperture in the roof two feet square for the purpose of conveniently handling the manure. I do not believe that mushrooms can be grown successfully in any hole or place. Mushrooms need a suitable and comfortable place to grow in, and where the conditions are right and the beds are made right, there is no reason why you should not have a good crop of mushrooms.

— A Fair Crop. —

A fair crop of mushrooms is three-quarters of a pound to one square foot. I have seen places where the beds have been made in the corner of a large cellar, the bed being well made and spawned with good spawn. The result of these conditions is that you will get a few mushrooms from the strongest mycelium threads, but the fact that the large body of cold air floating through the cellar will naturally fall on your bed, preventing the weaker mycelium threads to head or knob, therefore will spread itself flat over the surface of the bed, indicating fungus.

— Preparing the Bed. —

Preparing the manure for the beds is done in a number of different ways. The reason for this, as a rule, is the quantity of manure you can collect at one time. It takes me ten days to get enough manure for a bed thirty feet long, four feet wide and one foot deep. I spread this manure rather thinly in an open shed until I have enough, and then turn it all inta a pile about eighteen inches deep and keep it turned every dat for twelve days, always having the pile eighteen inches deep. I use three wheelbarrow loads of good soil to every load of manure and by mixing the soil with the manure every day it obtains an even temperature.

— Spawning. —

I find sawdust, baled shavings, and short straw, that has been used for bedding the horses, not objectionable when used in small quantities, as these commodities have a tendency of retaining the urine and ammonia. The depth of the mushroom bed varies among different growers, but I believe beds twelve inches deep cover all requirements. In making up the beds, they should be made firm by treading the manure until the required depth has been attained. The temperature should run up to 110 degrees or 120 degrees, and when it cools down and returns to 90 degrees it is safe to spawn. It is good practice to lay the spawn bricks on the bed three or four days before the bed is ready for spawning, the reason for this being that it starts the mycelium into action, and also softens your bricks of spawn and saves a good deal of waste when cutting them into small pieces. I cut a brick of spawn into twelve pieces and insert these in the manure one inch below the surface and ten inches apart. The bed should be covered with soil one and one-half inches thick about a week after the bed is spawned; this gives the mycelium a chance to get into action. Before the bed is cased over, the soil should [illegible] down even all over the surface of the bed with the back of the shovel. Cover the bed over with a thin layer of clean straw until the mushrooms appear, and then remove it. By using good spawn, mushrooms will appear in four weeks under proper conditions, and in six weeks you will be gathering your first mushrooms.

The temperature of the house should be kept around 58 degrees. Ventilation is an important point. A small circulation of fresh air is necessary. The watering of the bed, when necessary, should be done thoroughly with warm rain water at 80 degrees. Watering too often will cause black spot and fogging-off of the pin-head mushrooms. Be careful to avoid over watering.

— Feeding. —

The question of feeding mushrooms with manure water does not always appeal to the average grower, but from experience I find it to be a great help, especially on heavy cropped beds. I use half sheep manure and half horse manure soaked together for several days, and then drained off, adding 100 per cent. clear water, and put into the whole amount one pound of saltpetre. Do not water the bed when it is moist; wait until it shows signs of dryness. Do not allow the manure water to touch the mushrooms, as it discolors them.

— Insect Pests. —

Woodlice, without doubt, are the most troublesome pests to deal with. They must be trapped by placing sliced Potatoes about their haunts, or old pieces of wood under which they shelter. Slugs are likewise troublesome, and may be kept at bay by means of soot and lime or trapped on Lettuce leaves.

All gardeners who have grown horse radish know how difficult it is to get rid of, and some persons object to have it in their gardens at all, because of its vitality and difficulty to uproot. We read that a large building in England, which cost £15,000 to build, and were opened less than two years ago, is built on ground formerly used as a market garden. The horse radish roots were not thoroughly got rid of, and they have grown again and caused the asphalt in the playground to crack. It is also feared that the roots are growing underneath the corridors inside the schools. Holes are to be opened in the ground, and a powerful weed-killer applied, hoping to reach the roots.

Many of the deciduous shrubs and trees will root from cuttings if the pieces are taken before the wood gets too hard.

The Leura Nursery.

We have received from Messrs. Errey Bros., of the Leura Nursery, Camperdown, Victoria, a copy of their 1914 carnation catalogue; an attractive, well arranged booklet, which carnation growers will find most interesting and helpful. In addition to the ordinary classification of perpetual, spring blooming, etc., each of the varieties listed, of which there are over two hundred, is classified according to its special qualities, whether for garden decoration, for show, or both. The name of Errey Bros. is, of course, well known in exhibition circles, and the list of some of the awards gained during the last few years, in spite of the lateness of the district in which their flowers are grown, is eloquent testimony to the quality and robustness of these carnations. Amongst the novelties offered this season we notice Miss Edith, a pure white sport of the beautiful Kerslake Yellow. Messrs. Errey state that they anticipate that Miss Edith will take the same leading position as a white self that the variety from which it originated, does in yellows. Other carnations offered for the first time are Galicia, a deep yellow with rich markings of rose pink, crimson and chocolate. Cintra, a white, heavily edged and pencilled with crimson. Kioto and Mayence make up the quartette which the growers claim are distinct in color, and likely to maintain the high standard attained by the Camperdown carnations. Last year's novelties, such as Gazelle, Paulina, Dainty, etc., are, we notice, being offered at reduced prices. There is a list of new decorative or American perpetuals, a very charming and valuable class for the ordinary amateur grower, and one which they highly recommend. The Camperdown growers will be pleased to forward a copy of this catalogue to anyone interested, and for general information we have pleasure in referring our readers to their advertisement in this issue.

Diseased Tomatoes.

In reply to an inquirer for the best spray in connection with "Black Spot" in tomatoes, the Agricultural Gazette of N. S. W. states that there is little doubt but that bacteria are the primary cause of this disease, and that the presence of fungi (usually Macrosporium tomato) is secondary; hence spraying the fruit after the spot has appeared is not, as a rule, of much use. Bordeaux mixture (6-4-50) should be sprayed on the plants immediately the blossoms have fallen. Observations point to the conclusion that most of the infection occurs through fissures near the base of the style. Fissures and irregular cell formations are very common on tomatoes at this point, and when the styles fall off a more or less rough scar often remains, which favours infection. This probably accounts for the fact that—(a) Some varieties of tomato are more free from Black Spot than others. (b) the reports of the results of spraying experiments are often contradictory. An irregular and intermittent water supply favours the development of the disease in question, while constant watering with sufficient water to reach the deeper roots is a preventive. Exposure to too much bright sunlight also favours the development of Black Spot; whereas artificial shading of the plants, allowing them to develop sufficient foliage to shade the fruit, or even planting them closer together than usual, tends to prevent the disease. The use of a large amount of nitrate of soda as fertiliser has a tendency to make the tomatoes susceptible to Black Spot.

Fruit Section.

Drying Fruit.

— Figs. —

For drying figs should be allowed to remain on the tree until dead ripe and wilted. They are then picked or shaken off on to sheets in the morning and spread on trays and dried in the sun. The trays are better if made of laths, so arranged as to allow a current of air to pass below. They are turned occasionally as they require it. They should dry in from to 15 days, and then, if for sale, they require to be "fingered" into shape of the Smyrna, and packed carefully. The fingering is a knack which can only be acquired by practice. The dry fig fig should first be dipped in salt water (about as salt as the sea, i.e., 4 ozs. to the gallon), and carefully worked between the thumbs and forefingers until the eye is over the stem and the fig is flat. White Provence and White Genoa are good drying figs.

No figs should be picked before perfect and absolute maturity. Figs picked before maturity will dry, but they will not be sweet and soft, the two indispensable qualities of a dried fig. All figs do not ripen at the same time, and this necessitates going over trees every day in the season. A perfectly ripe fig will not only be soft, but wrinkled, and will hang down perpendicularly from its branch or twig. The best Italian or Smyrna figs show 60 per cent. of sugar equal to about 35 per cent. before drying. Unlike grapes, figs will not become much sweeter after they have matured. The sugar will be more concentrated, but the quantity will not materially increase.

Figs destined for drying should be gathered carefully. Smyrna figs fall to the ground when perfectly mature and ready for drying. To gather figs for drying each one should be cut from the tree. In California some fig men sulphur the figs the same as apricots. Figs are also sometimes dipped in boiling salt water for a second or two at a strength of 1½ lbs. to 50 gallons water. First rinse in clear water, then dip in the salt. Others again use a bath of saltpetre of the same strength.

For drying, raising trays are used in California, and the process is similar to prune drying, except that the figs should at first be turned twice a day, and later once a day to secure even drying. No contrivance has been devised for turning figs on the trays. Any figs turning sour or fermenting should be taken off the trays. Figs should be covered at night from any dew and from any showers of rain, as they spoil very readily. "A fig is dry when the meat is plastic (not elastic), hard, and dry." All do not dry at once, and so they must be removed as they are ready, which means extra work.

— Sultanas. —

Sultana grapes may be perfectly dried by carefully fallowing this simple plan:—

Clean the copper washing boiler. Put in it 10 gallons water. When boiling add 1 lb. caustic potash, and half pint of good olive oil, or less. Have ready all your grapes, freshly gathered. They must be cut into small, thin bunches, and all bad or imperfect grapes cut out. This is the most tedious part of the work. It should be done overnight, and yet you want all your grapes ready and out by noon. Then half-fill a common basket with grapes, dip the basket of grapes three times (three seconds) in the boiling solution, and spread immediately on wooden trays in a very hot sun. Of course, the raisins must be turned and carefully looked over after the third or fourth day.

The sultana grapes must be thoroughly ripe to make a good raisin, for an unripe grape is deficient in sugar, and sugar is essential for good raisins. They will not dry well if only just ripe enough to eat.

— Raisins. —

The grapes should on no account be cut until perfectly ripe. If possible, they should hang until the ripest on the bunches begin to dry. In the cooler districts it is better not to make raisins at all, for the grapes are usually too deficient in sugar to make a first class raisin. The appearance may be all right, but the quality is not so good as those made in the hotter districts.

— Table Raisins. —

For table raisins the finest bunches only should be taken, and all defective and small grapes should be cut out with pointed scissors, the buoch being held by the stalk, so that the bloom will will not be rubbed off. The bunches should be laid carefully on the trays with the best side up. The trays for drying layers should have cleats to keep the tray 2in. off the ground. This will facilitate the drying. In hot, dry weather the raisins may dry in about seven days, but it is advisable to take longer, say, 12 days.

When they are about three-quarters dry, or say, in seven or eight days—these figures are only approximate, as all depends on locality and weather — they are carefully turned by placing an top, and deftly turning both over, leaving the fruit on the new tray, and the old one empty for turning the next. They must not be allowed to become too dry.

— When a Raisin is Dry. —

To ascertain if a raising is fully dry, take it between the thumb and finger and roll it gently until soften, when either jelly or water will exude. If jelly, it is dry; if water, it requires further drying. This testing is of course done before the trays are stacked for sorting.

— Pudding Raisins. —

Loose lexias, or pudding raisins, are prepared much more rapidly. The grapes are picked in baskets or boxes, and brought to the drying-ground, where they are placed on a wire tray and dipped for, from 10 to 20 seconds, into a shallow tank of boiling lye-water, made by adding about one pound of carbonate of potash to three gallons of water, of 1 lb. of Greenbank's concentrated lye (caustic soda, 98 per cent. strength), in 15 gallons of water kept at a temperature of about 180 deg. Fahr.

After being dipped in lye, the object of which is to break the skin and facilitate drying, the fruit is plunged for an instant into clean, cold water, to remove the soda or potash, and are then spread on the trays and arranged on the drying-ground. They dry more quickly, and do not require the same care.

As soon as sufficiently dry, and while the stalks are brittle, the raisins are rubbed off and put through the winnower; or, if possible, the dry fruit is put through a special machine called a stemmer and grader. The loose raisins are placed in large boxes to equalise, and are then packed in clean deal boxes, containing either 28 or 56 lbs. This is called sweating.

Standard trays are most easily made of three 8in. boards, ⅜in. thick, and 3ft. long, of pine or spruce, held together by a cleat across each end 2ft. long, made of 2 x 1in. deal or pine. The cleats are nailed close to the ends by the thinner edge, so that if the trays are packed one above another there is a distance of two inches between each pair. These trays can be handled by one man if necessary.

Humus in its Relation to Soil Fertility.

The brown or black organic matter of surface soils is known as humus, and is derived from several compounds resulting from the decay of both vegetables and animals. The last result of the fermentation of organic matter, whether vegetable or animal, is a few gases and a little mineral matter. The intermediate disorganised mass which gives the upper portion of the soil its dark colour is what we recognise as Humus. When land is first brought under cultivation after being cleared of its timber it possesses a spongy texture, and is found to be more or less fertile, and adapted to the growth of such crops as potatoes and oats. As time progresses the physical condition of the soil gradually changes, and a new series of crops takes the place of those grown on the virgin land. This rotation is brought about by the oxidation of the organic matter, or loss of humus. Many and varied were the theories held as regards the usefulness of vegetable matter in soils by the early chemists. Some thought that humus was the principal source of the nutritive material of plants. When later writers showed that the organic matter of plants came from outside the soil (i.e., that the carbon of the atmosphere and moisture furnished it) the value of humus was not held to be of much importance.

Although the true explanation of the part played by humus was not forthcoming in the early times, practical men noticed that soils possessing a high content of vegetable matter and those which were well dressed with the excrement of farm animals were inevitably fertile. We now know the reasons of this, the principal ones being the supply of nitrogen furnished by humus, its moisture-holding capacity, and the comparative ease with which soils can be brought into a condition of fine tilth. Humus has other properties of value, such as rendering available the mineral matter of the soil, resulting in a class of compounds called humates, besides warming soil by reason of its dark colour clay soil can be lightened by incorporating vegetable matter with it, and the reverse is the case when a sandy soil liable to be shifted by the wind is treated to an application of farmyard manure, or green crops are ploughed under.

From the foregoing it can be readily seen that instead of following a system of culture resulting in an annual decrease of vegetable matter in the soil, it should be the cultivator's sustained wish to preserve, if not increase, the amount of humus. Of course, he will have to be guided by other factors prevailing, because unless the conditions are such that vegetable matter in the soil undergoes gradual decomposition and furnishes its component parts for the nutrition of the plant, changes of a character inimical to plant-growth may arise. If the soil is not well drained, and lacks basic substances, such as lime, the temperature will be low, and decomposition products of an acid character formed, or the soil will be what is commonly called sour.

When the soil is properly drained, naturally or otherwise, and a fair proportion of lime is present, the amount of humus cannot well be too great, and those systems of handling which, if they do not increase the quantity at least conserve it, are to be recommended.

The decline in the crop-producing power can be traced in many soils to the exhaustion of the vegetable matter. The nature of the crops grown is, of course, an important factor in influencing this ingredient. Potatoes and such crops, as also cereals, leave not too much of root residue. Hence soils show visible signs of deterioration, simply because no effort has been made at a rotation of crops, and the interpolation of clovers and other members of the leguminous order.

Cover Crops.

Cover crops exert a great influence upon the supply of plant food in the soil, its retention and the addition of vegetable matter. I think, writes an American orchardist, we are safe in saying, however, that the addition of vegetable matter is probably of greater importance than the retention of plant food. Orcharding is a system of cropping which does not return much plant residue to the soil. If clean culture, without a cover crop is practiced, and unless a large amount of barnyard manure be applied, the productiveness of the orchard soon reaches a very low percentage of what it should be under ordinary conditions. Taking into consideration the other benefits derived from the use of a cover crop, the addition of vegetable matter by this method is probably the cheapest which can be employed.

We have already spoken of the use of the cover crop as a food supplier. Personally I would place this under the secondary benefits of the cover crop rather than among its more important phases. There is no question but that the cover crop may be made to supply a very large amount of food, however, a great deal of precaution must be exercised or the evil effects will outweigh the benefits. The plant food most largely supplied by cover crops is nitrogen and while nitrogen is an essential plant food and very necessary to a vigorous, healthy growth, an over supply in the soil is a drawback to fruit production. Nitrogen favors a large vegetative growth. The activity of the tree cannot be turned strongly in two directions at the same time, and if the supply of nitrogen is sufficient to cause the tendency of the tree towards a large wood growth, which would be very apt to suffer during the winter, it is not wise to grow nitrogen-growing crops as covers continually. Such a procedure would, on ordinary soil soon give an over-supply of nitrogen in the soil, and result in the conditions given above. While cover crops do increase the amount of plant food in the soil they should never be considered as fully supplying the needs of the orchard, or because they are used the application of barnyard manures and other fertilizers be abandoned.

Where lands are more or less hilly or at least rolling, a great deal of difficulty is experienced in preventing washing by heavy fall and spring rains. To prevent the washing of soil and the gullying oue between trees, becomes a very serious question in clean culture orchards in which the site has considerable slope. Considering the washing which takes place even in summer, it is all the more necessary to guard against the same condition during the winter and early spring. The use of cover crops therefore, becomes practically essential on such lands if clean culture is to be practiced during the summer.

— Handling of Cover Crops. —

One of the questions most often asked concerning cover crops is "When should the crop be sown?" As with all other phases of orcharding, this depends upon conditions and not infrequently upon conditions which are largely conjecture. The one factor which will most largely influence the time when a cover crop should be sown for any particular kind of fruit is the proper amount of soil moisture during the late summer and fall months. One of the chief reasons for sowing the cover crop is the regulation of soil moisture during the latter part of the summer in an attempt to control the wood growth of the season. If the season be especially moist, and the indications are that it will so continue then the cover crop needs to be sown early so that the increased growth which the cover makes will draw upon the surplus moisture of the soil, and give the desired result as to wood-ripening. On the other hand, if the season has been particularly dry and the trees have practically ceased to grow, the cover crop need not be sown early, the chief concern being to have it on the ground in sufficient time to prevent any post-season growth caused by late summer or early fall rains.

— Crops. —

There is almost an endless amount of discussion as to the crops best suited for a cover for the orchard. It is almost impossible to get any two orchardists to agree upon the subject, and it is safe to say that no one crop is best under all conditions. Every crop has its particular advantages which may be those of season, other factors. For convenience, we amount of growth produced, and divide the crops used as a 'cover into two chief classes, based upon whether or not they add any considerable quantity of food. We term leguminous crops, food-suppliers, and the others, non-leguminous or non-food-supplying.

The benefits derived from the use of a cover crop will depend very largely upon the good judgment exercised by the orchardist, and while mistakes may be made owing to inability to tell just what the future conditions will be, the cover crop will in the long run vindicate itself as a companion to clean culture in a rational system of orchard management. Occasionally an orchardist stops cultivating at the proper time, and allows Nature to provide him with a cover crop in the form of weeds. It would hardly seem necessary to advance any argument against such a procedure. The growing of weeds as a cover crop simply means that the labor expended in eradicating them will in time, more than offset the cost of using a legitimate cover. Some may say that the season of growth will be too short for the weeds to ripen seed. If this be true, it will only be a short time until those weeds which produce the cover are those which have a short season and ripen their seeds early, for unless this be so, the weed cover crop, must in a short time lose its source of seeding, and become a thing of the past. At the very best, a cover crop of weeds is an uncertain thing, and one which we believe should not be practiced by anyone who wishes to keep his orchard in the best condition at a minimum expenditure of time and money.

Fumigation of Glasshouses Frames, Nursery Stock, etc with Cyanide.

Method of Application. — The glass-house or other place which is to be treated must be rendered as airtight as possible.

The sulphuric acid should be poured very carefully and slowly into the water, which may be put in an earthenware vessel, e.g., a large jam jar. The cyanide of potassium, wrapped in thin blotting paper, should then be dropped into the now diluted sulphuric acid. The vessel into which the cyanide is dropped must be so near the door that it can be reached by the outstretched arm of the operator, who should immediately shut the door and close up its chinks by paper previously prepared. Another, and better, method is for the operator to introduce the cyanide to the diluted sulphuric acid through a window, the cyanide being placed at the end of a long stick or rod, or being lowered into the acid by a string and pulley. The window must be closed immediately after the addition of the cyanide, so that the operator may escape the fumes. Strawson recommends the pouring of the diluted acid from a bottle fitted with a cork in which two slits are cut, one to let in air and the other to allow a small and even stream to flow upon the cyanide, the object being to provide a slow and even disengagement of gas. The bottle should be arranged so that it can be tilted up when all is ready.

It is of importance also that the hydrocyanic acid gas fumes be distributed over the house, and this may be done by an arrangement of fans which can be worked from the outside.

Fumigation should take place in the evening, or after nightfall, and not in strong sunlight. The temperature of the house should be from 50 degs. F. to 60 degs. F. The plants to be treated should be dry. The surface of the soil of the house should also be as dry as practicable.

In the treatment of nursery stock the bushes or young trees should be placed in an airtight box or canvas tent of known capacity and subjected to the fumes of hydrocyanic acid gas for one hour. Large numbers can be treated at once at little expense.

When the time has expired the tent or box should be opened in such a way that the wind blows the fumes away from the operator, and should be left to ventilate for half an hour before the stock is removed.

— Covers for Fumigating. —

Covers should be of a light, durable material, and comparatively gas-tight, the most suitable probably being canvas. Eight-ounce American duck canvas is recommended.

There are three types of covers: sheets, tents, and box covers. The sheets are octagonal in form, and can be further enlarged by sewing on a "skirt" round the edge. These can be easily lifted over small trees. Tent covers take the form of dome-shaped tents, the mouth of which is kept open by a ring passed through canvas loops, and they can be quickly lifted over and removed. Box covers are made to any convenient size by covering a wooden framework with canvas or calico; the latter material should be painted or oiled to make it sufficiently gas-tight. They are especially adapted for small trees and bushes.

As both the potassium cyanide and the hydrocyanic acid gas are deadly poisons, the former should be kept in a tightly stoppered bottle and labelled Poison, whilst the gas as generated must on no account be breathed. Fumigation should not be carried out in a high wind, nor when the trees are wet, but otherwise it may be done at any season of the year.

Curing Lemons.

A correspondent in the Queensland Agricultural Journal, writes: I always cut them (the lemons) when about 2½ in. in diameter, even if they were as green as grass. I then placed them in kerosene tins as carefully as if they were eggs, for a bruised lemon is a spoiled lemon: the slightest abrasion of the skin affords an entrance for the spores of blue mould. Handle them carefully, and the loss will be almost nil.

"When I had filled the tins, I took them over to the house and gently placed them in trays holding one layer. The trays were made of the ordinary fruit case split in two. I then stacked them on the verandah for a few days to sweat or put them straight away as was most convenient, in the cellar. My cellar was dug under the house, about 6ft. deep, and fitted up with saplings as shelves to place the trays upon; and without any further attention they cured a beautiful colour with a skin like a piece of kid and full of juice. Should the market not be good enough at the time, I simply kept them until it improved, and could do so from three to four months. I sent them to market in new cases, stencilled with name, etc., and the prices were always satisfactory. To produce good fruit that is always marketable, the trees need a little care and attention. We cyanided such trees as needed it every year to keep the fruit perfectly clean, for my experience is that a lemon that needs brushing is not a good keeper, and I may say that a dirty tree cannot produce clean, good keeping fruit.

"I fertilised every year, and the best fertiliser was found to be meatworks manure, with sulphate of potash added to make a complete manure. In cutting lemons, I always cut the fruit with a long stalk to the first joint, and found that the new growth invariably produced fruit. The length of stalk was cut off before placing the lemons in the tin. I may there is practically no loss of fruit either from blue mould or fruit fly, the latter being beaten by cutting before the lemon ripens.

Bottling Grapes.

"Bottling," as the word is here used, means to remove the bunches from the vines so that the latter can rest and keep the grapes in good condition until they are needed for use.

Ordinary three half-pint bottles are suitable so long as they have a long neck to them. Whatever kind of bottles are used they must be thoroughly cleaned or sterilized before coming into use. After this fill them to the bottom of the neck with clean water and push a couple of pieces of charcoal in also, which will help keep it sweet. When filled they should be made to take an oblique position either by having racks made for them or by a temporary arrangement.

Cut the bunches with plenty of wood. The base end is usually long enough to push into the neck of the bottle and reach the water. If they should be too short use the other end, which will answer the same purpose, and see that the berries hang clear of the bottle. If the space between the stem and neck of the bottle is sealed up it will stop evaporation, otherwise if left any length of time a little water must be added as that in the bottle recedes below the end of the lateral. When doing so take care not to wet the berries. With a right atmosphere very few berries should go wrong, yet it will be wise to look over them occasionally. Grapes handled so will keep for a long time; a little flavour is unavoidably lost yet they will always be found palatable.

A Trip Through the Orchards of Tasmania and Victoria.

The first thing that impresses an orchardist when visiting Tasmania is the closeness of the planting. The average distance apart there for apples and pears is 12 feet to 18 feet, with 15 feet as the most popular distance.

The soil in most districts is comparatively poor, and it is this fact that makes the closer planting practicable. The orchardist can cut back his trees hard without running the risk of producing nothing but wood. Indeed, hard pruning on poor soil produces fruit spurs. On rich soil such as our own it only causes wood-growth, and fruit spurs can only be obtained by light pruning or by letting the leaders go unpruned now and again. The advocates of close planting claim the following advantages for their system:—The trees shade the ground and thus help to conserve moisture; they are not so affected by windstorms; they say that they obtain a higher price per case for medium-sized apples than for large ones, and that close planting produces them quite large enough; and, finally, that the profit per acre from close planting is larger than when the trees are further apart.

The soil in the great orcharding centres of the Huon, Derwent, and Tamar is a light, sandy loam merging in places into almost a pure sand, overlying a yellow clay subsoil. This latter is most important. Where the subsoil has not a good proportion of clay the trees invariably do badly and soon die out; whereas with a good clay subsoil the trees do pretty well, despite the poorness of the top soil. Thus the orchardist can put to profitable use soil which would be useless for the farmer. I saw only one orcharding district where the soil was not of this character. This was the Bagd Valley where the soil is a rather rich, black, clay loam. The trees here grew stronger than elsewhere were planted further apart, and bore more heavily.

The North-west Coast of the island mostly consists of a deep rich chocolate red soil, similar to that at Batlow only much deeper. There is where the famous potatoes come from, but very little fruit growing is done on this soil as it is too rich. In the older established orcharding centres such as the Huon, one is greatly struck by the slovenly methods employed by many of the orchardists, although, of course there are many men who are very up to date.

— Packing. —

The orchardists are adopting the numerical pack. It is impossible to describe this pack here, but in my opinion it is by far the best. Several of them grade their fruit by machine, but the general idea appears to be that one should not use a grader provided one can secure the services of a first-class packer who can grade by eye. With a grader the most experienced can pack well and quickly. For the numerical pack it is most important that fruit should be graded accurately, i.e., to ¼in., but Mr. Samson, an American packer, whom I saw giving a demonstration, prefers to grade by eye, as he thinks there must be some bruising. In one large shed at Huon the following was the method of handling the fruit:—There is a large shed 60 feet by 30 feet with an additional 20 feet by 20 feet for the waggon, so that the loading can be conducted in all weathers. There are doors at both sides. The cart at one door delivers the fruit packed loosely into bushel cases. It is placed on a trolley and wheeled over to the grader, where it is stacked, and when it is decided to pack the fruit it is run through the grader. It can then either be packed straight from the machine or else put into cases loosely but carefully, and packed from thence. Wrapping paper is used by most growers. It enhances the appearance of the fruit, prevents rot spreading, and maintains a more even temperature; it costs about 2d. a case.

— Pests. —

The most troublesome orchard disease in Tasmania in Black Spot. It causes far greater losses than Codlin Moth. The treatment is to spray with either Bordeaux mixture or lime-sulphur wash just when the buds are bursting and showing pink. The latter spray is coming rapidly into favour, especially in Victoria. It is usual to spray three times for the moth. A method for keeping down the moth which seems to promise well has been discovered by the Principal of Burnley Horticultural Gardens, Victoria. He hangs a bottle containing some preparation in the tree, and the moth is attracted and killed by it. The best orchards are winter-sprayed with red oil or lime-sulphur wash to kill San Jose scale, red spiders, etc. There is none of the former in Tasmania, and rigorous precautions are taken to keep it out.

— Varieties. —

The favourite varieties of apples in Tasmania are Sturmer Pippin, Cleopatra or New York Pippin, Jonathan, Five Crown, French Crab, and Scarlet Nonpariel, a small, brilliantly coloured apple which has not done well on the mainland. Cleopatra is commencing to fall into disrepute owing to its liability to every kind of disease. In the South, Jonathan does not colour well, and consequently is not the prime favourite it is in the North. In the South, Sturmer is probably the most popular apple. It is justly called "the poor man's apple," for it crops heavily every year on short spurs, keeps very late, and sells well in October when the other apples are done.

Other favourite sorts are Crofton, a very good small late dessert apple, Allington Pippin, Alexandra, a large red cooker, and Adams' Pearmain. Granny Smith is not known.

The favourite pears are Winter Cole, Winter Nelis, Beurre Bose, Williams, Josephine, and Napoleon. Dr. Benjafield's pear orchard near Hobart yielded between £200 to £300 worth of pears per acre off 16 acres. He cool-stores and says he averages 15/ per case. He has about thirty varieties, and is a firm believer in the advantages of inter-pollination.

Very few prunes are grown in Tasmania and Victoria; in fact I did not see one tree. For picking fruit, the apron with removable bottom seemed to me the best method.

— Pruning. —

Pruning is conducted on the same principles as in this State. The laterals of such varieties of apples as Jonathan, Irish Peach, etc., are left long until fruit-spurs form;

One grower who has a very old orchard, with trees close and interlacing, told me that he had rejuvenated it by ploughing very deep with heavy disc plough which cut the roots. They then sent forth new fibrous roots, and he said they did not sucker. He has tried various devices for making trees bear, and got excellent results from pears which have previously refused to bear, by nearly ringbarking them or by twisting a wire around the trunk. Another way he made a stubborn tree bear was to weight the branches so that they hung back to the ground. The flow of sap is thus checked and spurs are formed.

The jam and drying factories which are formed in most of the Tasmanian orchard centres are a great assistance to the grower. It costs the Huonville grower 2/8 per case to land his fruit in Sydney or Brisbane, and 5/- in London, and it is the practice of the big growers to send half their stuff to either Sydney or Brisbane, or both, and half to London.

There is more planting going on now on the Tamar than anywhere else in the island. A trip up the river is a beautiful sight with the orchards sloping down to the water on both sides. There is no danger of frosts here, and the fruit colours well. In winter, however, fogs are very bad, and make things very disagreeable.

— Rainfall. —

The rainfall throughout the districts I visited varied from 20 to 40 inches per year, being lightest near Hobart and heaviest on the Huon. The sandy soil, however, retains the moisture well. I had the pleasure of going round with the judge at the Bagdad Valley Show whilst he was performing his duties. He was very strict in ruling out any fruit which showed the slightest disease, or which was without its stalk. He cut several apples, especially Cleopatras and Five Crowns, which are subject to mouldy core, and if they were faulty, out they went, however prepossessing externally and true to type they were. Several exhibitors lost points by exhibiting as dessert fruit apples which were too large, although otherwise perfect.

Most growers used either wood wool, or a corrugated cardboard which costs about 3/ per hundred sheets. As two sheets are used in a case the cost was about ¾d. per case.

All the best growers have some distinctive brand, which they endeavour by honest practice and good packing to make well known in the markets. The produce of many such growers is sold on the brand alone, the buyer not bothering to open the case.

Besides this brand, the cases are all branded with the variety of the fruit and the quantity, thus, "1 bushel apples, F.C." (French Crab), or "F.C.P." (Five Crown Pippin), etc.

The practice of branding the exact number of apples on the outside is rapidly growing in favour. It is readily calculated, especially if the numerical pack be adopted, and enables the agent to obtain for the grower a better price than he otherwise could.

VICTORIAN ORCHARDS.

The Victorian orchards are planted further apart than the Tasmanian, 18 feet being about the average. At Doncaster, a few miles out of Melbourne, a lot of irrigation is done from dams. Pines are grown very extensively as wind breaks, as the district is not naturally sheltered like most of the Tasmanian orchards.

Mr. Stephens, at his orchard at Heaalesville, has installed a cool store on the most up-to-date lines within the packing shed, which is much handier and altogether preferable to having two separate buildings. The ammonia machine is driven by a gas engine, and the cool air arises through cracks in the floor and passes out through similar vents in the roof. Spaces are left between the cases to permit of free circulation of air. The apples are brought straight in from the trees and packed loosely in cases. The temperature is kept about 34 deg. Fah., and the fruit is kept until January. The whole orchard is tile drained.

A disease which has attacked the Five Crown apple was very bad in this orchard. It is called "pig-face" or "crinkle," and consists of a crinkle in the skin under which the apple is discoloured. This disease seems to be a sap trouble, and a first cousin to bitter-pit; spraying does no good. One thousand cases of Five Crown alone were damaged in this orchard, or more than half the crop of that variety. Together with the other waste fruit these were crushed for the juice which was sent to the cider factory, and about 10d. to 11d. per bushel was thus netted. A machine for cutting up the apples costs £16, whilst a small crusher for eight cases costs £10, and a large one for sixty cases £80. The juice is sent in barrels, which are returned. Another way to dispose of one's waste fruit is to dry it, whilst in some districts there is the jam or drying factory.

I returned to Batlow with a firmer belief than ever in the future of the fruit industry, for everyone who was in a position to know spoke glowingly of its prospects, seeing that as yet Europe has hardly been touched. Then there is India and the East as well as other markets. Moreover, England has not been worked scientifically, for too much fruit has been sent to London, instead of sending a big proportion direct to other cities, and last, but not least, there is the American market which, when the Panama Canal is opened, will be most profitable, as it will be possible to ship direct to New York in the off season.—A. C. Arnot, Hon. Sec. Batlow Branch Agricultural Bureau, N. S. W.

Cultivation of the Vine.

A paper read by Mr. H. E. Laffer :—

As far as Australian viticulture is concerned manuring is only in the first experimental stage. When it is considered that the average yield of grapes is only 1.75 tons per acre, it will readily be understood that there is ample scope for experiment. The fertility of any given soil must be gauged, not by its percentage of moisture, nor by its supply of available plant food, but by a combination of the two factors. So far the Australian wine trade is concerned, the question of ancestral sentiment has not to be considered, and the point to be solved is whether manuring will pay or not. It is clearly evident that 100 tons of grapes from 50 acres of vines is a much better paying proposition than a like amount from 75 acres, and this is the point from which the matter must be considered, namely increased returns from smaller areas.

—What is Profitable Manuring ?—

Manuring to be profitable involves a little more than actual cost of the manures, for it means that greater care and better cultivation must be given to the smaller area in order to secure an increased weight of fruit. In advocating a system of vineyard manuring, it is not to the fertile soils of the river lands nor to those choice localities devoted to the growth of table fruits that we look for increased returns, but rather to the less favored districts, where the bulk of the wine varieties are grown. Even in the former, however, it is a matter of doubt as to whether the rich soils, with their strong, robust vines, are yielding their maximum of profit to the growers. We may sum up the main elements which contribute to the fertility of the soil, and with which manuring is chiefly concerned, as nitrogen, phosphoric acid, potash, lime, and organic matter. The three former are largely consumed by the vine as essential to good growth and fruit production, and the fourth one, lime, as a necessary food, but more particularly as a corrective to the physical nature of the soil. In the greater part of the South Australia vine-growing areas we may say that nitrogen is deficient, potash is fairly plentiful, and phosphoric acid is deficient if heavy yields are to be maintained. Nitrogen is conducive to luxuriant growth, potash to heavy fruit production, and phosphoric acid to the general health and vitality of the vine, and, it is said, to quality in wine. The latter element is taken up by the vines in much less quantities than any of the others.

— Deficiency of Organic Matter. —

In the bulk of our vineyards organic matter is deficient, and there is no doubt that the raising of the proportion of humus in the soil will materially assist in overcoming other apparent deficiencies. In fact, it may be said that the question of increasing the proportion of organic matter in the general run of the vineyards is of greater importance than the application of either phosphoric acid or potash. Apart from its actual chemical and physical effect as a soil constituent, the moisture-retaining capacity of any soil is in direct ratio to the percentage of organic matter present. Therefore, if some efficient system of manuring can be practised whereby organic matter is added in such a condition that it is readily incorporated with the soil, apart from its action as a source of plant food, it increases the fertility of the soil by maintaining a more even supply of moisture. To this end the use of organic refuse of any description in a decayed state can be recommended, and one of the best known sources of this is stable or farmyard manure. This commodity, however, is available only in limited quantities, and therefore applicable only to small areas. In addition, the general type of stable manure is not in a form which readily decomposes in the soil except with a large amount of moisture. Thus we find that the only practicable means of applying organic matter to large vineyards is by growing special crops within the rows and ploughing them in as green manure. For this purpose one or other of the leguminous crops may be chosen, that of greatest utility being peas, with vetches as second best. This practice has several points to recommend it—First, the crop is grown generally with a dressing of artificial manure as superphosphate or potash ; second, the crop enriches the soil in atmosphere nitrogen through the agency of its nitrogen-gathering bacteria ; third, there is a heavy bulk of green matter ploughed into the soil which has the advantage of being heavily charged with moisture. Thus, it can readily be understood that a crop of peas ploughed in under these conditions represents the equivalent of good farmyard manure. As an additional recommendation it is in a form leading to its rapid decay, even in comparatively dry conditions, and hence rapidly becomes available as plant food.

— Green Manuring. —

For districts of low rainfall this practice of green manuring should be of great importance in viticulture, and to this end special provision might be made in planting young vineyards to facilitate the passage of a two-horse seed and manure drill between the rows. For established vineyards, where this is not possible, an old drill cut down to suit requirements should prove a profitable investment. The general practice is to sow 2 bushels of field peas with 2 cwt. of superphosphate to the acre. In heavy soils deficient in lime the use of 2 cwt. or 3 cwt. of gypsum can be recommended or else ½ cwt. of potassic manure. Generally the use of gympsum is sufficient, as its action is to free the natural potash salts in such a soil and make them available to the plants. Much depends upon the time of sowing, and, generally speaking, this should be done before the autumn rains set in. This represents a period when there is not a great deal doing in the vineyards, and, in addition, the seed is in the ground early to germinate as soon as the soil becomes moist enough. As a preparation, thorough scarifying is all that is necessary, owing to the fact that the soil should be in good order from the summer cultivation. If good conditions prevail the crop should be ready to plough in by the end of July or early in August. It is generally recognised that the best time to plough the crop under is when the peas are in flower, but, if thought advisable, it may be better to anticipate this period to suit special circumstances. Time should be allowed for the green matter to rot before all the rain has gone; but, owing to the succulent nature of the mass, ploughing can be deferred until fairly late in most seasons. One of the first evidences of the beneficial effect to be derived from green manuring is the manner in a fact which cannot fail to increase their vitality. For several years past peas have been sown on a portion of the college vineyard in a soil of a light limestone nature and under conditions decidedly unfavorable to vine-growing. In spite of unsuitable conditions, the manner in which these vines retain their leaves when other portions of the vineyard are bare is a sure evidence of the benefit being derived by them from the organic matter. Although it is difficult to gauge results as to fruit-bearing under such conditions, it can safely be said that the cropping of these vines has improved since green manuring was started. One of the most consistent and convincing tests of green manuring was carried out at Albury, New South Wales, by Mr. L. Frere. In addition, a series of experiments with other manures were carried out for a number of years, but results did not justify their continuation when set beside those of the green manure plots. At the outset, the growth of vines was weak, and yields had fallen as low as 100 gallons to the acre. After some years of green manuring the growth of the vines became so strong that it was considered advisable to discontinue the experiment for the time being. In the meantime, the yields from these vines had risen from 100 gallons to the acre until they reached from 400 gallons to 500 gallons, and in one instance 600 gallons per acre was reached.

(To be Continued).

Treatment of Fruit Trees.

— Convenience. —

Trees which branch near the ground are most quickly and cheaply handled in all the operations of pruning, spraying, fruit thinning, and picking. Low trees, with obliquely rising branches, are more easily cultivated than any form with horizontal branches unless the head is carried so high that the teams pass easily under the tree. To do this, sacrifices all the other conveniences and economies which actually determine profit, and is really out of the question from a commercial point of view.

— Health and Strength. —

It is imperative in most parts of this State that the sunshine be not allowed to touch the bark during the heat of the day. This protection is secured even for young trees by low branching. The low tree, with properly spaced branches, attains superior strength by virtue of thick, strongly-knit short growth between branches, and by its strong, stiff, obliquely-rising growth, sustains weight which brings horizontal branches to the ground, and thus even high-headed trees are liable to continually increasing interference with cultivation, and the desperate grower has to raise the head of his tree higher in the air, and further above the profit line, while at the same time he renders it more liable to sunburn, to bark-binding, and to unthrift, by forcing the sap to flow an unnecessary distance, and through wood and bark which impede its movement. Besides, a low tree escapes stress by strong winds which a high tree invites, and at the same time is less able to withstand. Pruning for health and strength of the tree also includes the removal of unthrifty or diseased parts, which are not only an encumbrance to the tree, but may communicate to other parts the cause of their ill condition.

— Heat and Light. —

The maintenance of strong-bearing wood in the lower part of the tree is conditional upon the proper pruning of the top of the tree. How far the upper levels or the shade layer of tree can be safely opened depends upon the local climate in each fruit region. The rule must be: the higher the summer heat, the denser the tree; the lower the heat, the thinner the tree; but everywhere the proper condition of openness must be constantly in view in pruning. Not alone must this be done to maintain thrifty growth below, but it is also essential to the best growth and ripening of the fruit in the lower and interior parts of the tree. Fruit inferior in size, colour and quality results in part from lack of pruning to regulate the admission of light and heat—sometimes one, sometimes both—to the shaded portion of the tree.

— Bearing Wood. —

Good fruit develops on good bearing wood, and good bearing wood is the product of proper degrees of light and heat, as has just been urged; but bearing wood in the case of some fruits is new wood, and the reduction of old wood for the purpose of forcing the growth of new wood must be constantly in mind. Renewal is more or less a consideration with all trees, and especially the securing of strong new wood. This is a point upon which close study of the bearing tree will yield most satisfactory suggestions. The size of fruit, providing the tree is healthy and vigorous, depends upon the character and amount of bearing wood which the tree is allowed to carry.

The Farm

Farm Notes.

During the century which has elapsed since Robert Bakewell, the pioneer of scientific breeding, began his work, great improvements have been wrought, and even during the last three decades the changes in type have been very great as pictures of domestic animals of all kinds show. In 1775 animals were slab-sided, slow to mature, rangy leggy, unbalanced, and had too much offal consistent with economy; now reverse conditions are frequently found, and the demand is making the number larger each year.

Every observing stock breeder must have noticed the strong vitality of the scrub animal, which is raised under conditions entirely opposite to those which obtain in raising stud stock. The former is often on the brink of starvation, while the latter scarcely ever knows the feeling of hunger. The strong vitality of the scrub cattle has led some stock owners, particularly in America, to advocate their use in breeding, and on many occasions the razor-back pig has been employed to give vigour to the highly-nurtured domestic animal, but the desired results—vitality and fertility—might, no doubt, be obtained without employing an animal so full of defects, from a breeder's point of view.

A remarkable jump by a nine-months-old colt, got by a thoroughbred out of a hunter mare, is told. The colt was in a field with his dam, when the groom in charge came and took the mare away shutting the youngster in the field. The colt began to grow restless when he saw his mother disappearing, and, after galloping once round the field, went straight for the stone wall which surrounded it, and cleared it without touching. The place where he jumped was afterwards measured and found to be 5ft. 7in. from the ground to the coping.

Bread was once a common food for horses in England, and is still used in some parts of Europe. It is made in long loaves, from third-class rye flour; they are baked as hard as a brick, and are perfectly dry, the people holding that dry bread is more digestible and also keeps longer. Two pounds of this rye bread is considered equal to about 3lb. of oats.

There is probably no kind of cross in horse-breeding in which there are greater possibilities inherent than that between the pony and the horse. The presence of a dash of pony blood is admittedly always found to be in every way advantageous in a hunter, imparting, as it does, an increased degree of stoutness and stamina, while it also tends to promote soundness, ponies notoriously being much sounder, as a whole, than the horse breeds, and especially so as regards the wind. Thus roaring is practically unknown in them.

Indigestion in horses, like the same trouble in the human being is very common, and productive of a multitude of ills and afflictions. Treating indigestion in the four-legged animal is about the same as trying to cure dyspepsia in the human being. The more one uses drugs, as a rule, the greater the need. The logical course in both instances is to endeavour to discover the causes, and the rest is easy.

Often there are four or more types in even a small herd or flock raised by one man: with no definite type at all. It is thus evident that the average stockman does not know what he is breeding for. Where men breed toward a definite market type they are sure to make more money and make it quicker.

It is of the utmost importance to keep strictly in mind the object for which animals are bred, and hold strictly to that end. Any deviation is sure to result in a variation more or less valuless, and thus to be a step in the wrong direction. What has already been accomplished is only an index of what can be done.

The Rambouillet merino originated from a flock of over three hundred Spanish sheep selected from the finest flocks of Spain in 1786. This flock was placed upon a public farm for the improvement of stock at Rambouillet, near Paris. In the selection from various sources it appears that the flock was of a very mixed character, but, by careful breeding through a course of years, the differences became merged into a breed of sheep which in the opinion of its French owners surpassed its ancestors. It was in the increased size of the carcass and weight of the fleece that this improvement was chiefly if not wholly made.

America has grown wheat on an 8in. rainfall, Australia has grown wheat on a 5in. rainfall, but in South Africa they have grown a rainless wheat. That is to say, that at Lichtenburg, which is in the dry zone of the Transvaal, they have grown a wheat without a single drop of rain falling upon it from seed-time until harvest. This is the Durum wheat, Apulia, which was originally introduced from the dry belt of Italy.

The Americans are credited with making the most of their farm products in the feeding of stock, but it will come as a surprise to readers to learn that where cattle are fattened on grain in small fattening yards, pigs are regularly utilized to eat up the unconsumed grain in the droppings of the cattle. A bulletin issued by the Ohio Agricultural Experiment Station states that of forty-five Ohio cattle-feeders a number used no other food for their hogs than the undigested grain in the cattle droppings. In some experiments carried out by the Experiment Station four hogs were put in pens in which seven steers were being fattened, and it is stated that there were not sufficient pigs to eat up all the grain that passed through the steers. In the experiments the average gains per day of pigs feeding only on the grain from the droppings were .81 lb., 1.19 lb., .92 lb., and .99 lb.

Breeding on pedigree without regard to shape is like building a house without the assistance of architecture. A successful breeder of Jersey cows has said that a large proportion of the men who breed cattle are not breeders; they simply mate cattle, that is all. No man should enter upon the work of breeding who does not have a clear idea of the type and form of the animal he wants to produce fixed in his mind, and thus breed to a purpose.

The greatest loss, probably in the manure made on a farm is from the loss of liquid voided by the animals when tied up in their sheds, and which is allowed to run waste down drains and into ditches. It has been calculated that 1,000 gallons of cows' urine would have the same beneficial effect on a crop as would be obtained from the application of 2 cwt. of the best Peruvian guano.

In feeding horses there is no arbitrary rule to be laid down, except as to the quality of the food. Mouldy or dusty hay must never be given. Grain must be clean and sweet. Peas are good for young horses.

Mouldy spots in silage are invariably due to air which gets into the silage through the walls of the silo, or at the time of filling. The remedy is to make the walls of the silo absolutely air-tight, or to exercise more care in filling the silo; that is, better tramping and packing. It may be said that, when maize is put up too dry, it is apt to produce mouldy silage.

A poor sow is in no condition to make a large litter of pigs. Of course the sow should not be over fat, and she is not likely to be over fat if she has plenty of green-feed.

The need for lime in your soil may be determined by the growth of clover. So long as clover grows luxuriantly lime is not required, but when clover fails to grow on well-matured land, dying out the second season, lime should be added. Lime should always be preceded and followed by liberal manuring, for lime used alone, while it may stimulate the land to extra production for a year or two will in the end produce greater exhaustion. By alternating lime with manure the land will be kept in a healthy condition, and will steadily increase in fertility.

Preserving the female progeny of the most valuable cows is one of the fundamental and essential elements of the most profitable dairying. That it is not more generally done is one of the vital defects in our dairying, and one largely responsible for the poor or ordinary results so often obtained on our dairy farms.

The annoyance caused by flies to horses out at grass is capable of developing into serious trouble if the animals happen to have an open wound about them. Any sore place of the kind will attract the attention of the insects, who will probably create a very bad place, if not kept off it. Naturally, the most obvious course of treatment is to bring the horse in and then to apply a dressing in such a manner that the flies cannot reach the sore—in fact, to cover up the wound; but, if this be not possible, a dressing of iodoform will probably keep the insects off, as they dislike the smell.

It is not by any means certain that we regularly give animals credit for having delicate discrimination in sound. Horses, cattle, sheep, pigs, dogs pre-eminently, and poultry know the footstep of of any chance stranger. In a farmhouse composed of a dozen or more individuals a collie half sleeping at the kitchen fireside does not stir when one of his own select community is trampling over cobble stones or thumping with heavy steps anywhere outside; but let a stranger come along, and the dozing critic is up at once with alarmed or "official" bark. The nicety displayed by some dogs in this respect is sometimes entitled to be classed as phenomenal.

A generation ago many a man went into farming because it was said to be the one occupation which did not need any preliminary training. To-day, however, the successful tiller of the soil must come up to his calling fully equipped, as the curious fact has developed that the calling in which the unlettered and untrained man was once supposed to have as good a chance as the educated one is now the calling in which wide and varied knowledge is as imperative as in almost every other known among men.

Some farmers are tempted to buy cheap seed. Poor-quality seed is never cheap; it is usually full of impurities, such as stalks, broken seeds, chaff, particles of soil, and foreign seeds, often weeds, many of which may be noxious.

Most people think that a fly is a fly and that there is no difference between a house fly and a horse fly. The house fly is a dreadful villain but there is something to be said in his favour and that is that he or she never stings. The horse fly does. The former only has a soft, rubber-like mouth for sucking up morsals of of food whilst the horse fly has a sharp-pointed lance concealed within his proboscis by which he pierces the skin and then gaily proceeds to suck the blood.

It is a matter for regret that as much attention is not given by maize-growers to the selection of good varieties and to the improvement of seed as is given by their wheat-growing brethren. A good opening for enterprising men exists in this direction provided the proper course is followed. Demand can only be created by supplying seed of high quality. No market for seed maize will ever be created if seed that is of a mixed chararter and little better than feed corn is supplied. Confidence in a seed-supplier is only to be secured by the high quality, and especially the purity, of the ancestry of the purchased seed, whether for grain or fodder properties.

Ostrich farming is an infant industry but the business is steadily developing. The value of the feathers depends on the London market. When an acre of lucerne will furnish a home for two to four ostriches, with food enough to maintain them; when an ostrich will yield annual 1½ lb. of feathers, with an average value of £4 4/- per lb., and from thirty-six to ninety eggs, which may be hatched out or used for food at the rate of 3½ lb. per egg, readers may be left to decide for themselves as to the profitableness of the industry.

Lambswool.

The question of lambswool is one that is worth considering, for on every station and farm lambs are always welcome, providing there is no drought. One wonders why lambswool is not so plentiful as it used to be, and no doubt the high shearing rates now current in Australia, and the tendency to allow young sheep to run on a full twelve months as hoggets, are two reasons why there is a scarcity of this special class of merino produce. It is not my intention to say one word about lambs being shorn, or to advice in any direction, local circumstances no doubt deciding the actions of all sheep-owners as to shearing young sheep or letting them run on to a full year's growth. But in lambswool we have a very useful commodity, and it will be a pity if sufficient is not produced to meet the wants of manufacturers. Lambs are lambs, and when all is said and done the fleece from these young sheep cannot be replaced by either hogget, wether, or eweswool. It seems to be the very nature of the produce from these firstlings of the flock to give results in manufacture which cannot be got from any other source, and this is well known by the trade. If careful note is made by sheep-breeders, they will see that the wool from lambs is very springy, the fibre is so full of life and vitality, that it cannot be kept down and made to lie like wool from older-grown sheep; there is a special curl and wrinkle—all these being features which are turned to good account by manufacturers.

Then, again, lambs are always beautifully soft and kind in handle, and on that account they have come into much favour for making all classes of under-garments. People with a tender skin will find in the finest quality of all wool vests and pants fabrics which suit them admirably, and the fact is noteworthy that the high prices paid in London last year were for the pick of West Victorian lambs bought for this purpose.

One never sees the high prices made for the lambs grown in New South Wales that we do for the lambs grown in Victoria and here the latter undoubtedly score. Naturally there is a cause for this, and it is not far to seek. Colour is an important characteristic in lambswool, and this is one of the slight weaknesses connected with the lambs grown in the Premier State. I don't profess to explain the reason, but the fact is nevertheless a stubborn one that there is never that brightness, lustre, and excellent white colour about New South Wales lambs that there is about the lambs from Victoria. As a rule, they are more a yellow-white, and when they come into the woven piece there is an altogether different appearance to the pieces made from Victorian lambs. This is an important feature, particularly in the wollen trade, where the biggest weight of lambs is consumed. The hosiery trade as well, which also consumes very large quantities finds that lustre and appearance is a valuable property, and nobody likes dingy, dull, yellow shades of white. Where lambs are shorn, it would be as well to try to have the wool in as good condition and as attractive as possible, and the fewer burrs there are the better.

Then the lambs of New South Wales are frequently rather short, and this makes against them realizing big prices. Why this should be so I am at a loss to know, but there is no doubt but that a decent length of staple is a decided advantage, and lambs should never be shorn that are very short.

Then careful sorting of the lambs is an important thing to do. I have frequently seen lambs sold in London which might easily have realized 1d. to 2d. per lb. more if they had been better classed. It is no difficult job making firsts, seconds, and thirds, paying due regard to length and condition. To growers I would say, do not mix all classes and sorts together. This is very bad, requiring far more sorting afterwards than it does when the lambs are shorn upon the station.—Elder's Review.

The Shorthorn.

"The Shorthorn," says a well-known authority, "is one of the most useful animals of the cattle kind. And perhaps the breed is in the most universal use, while for dairying purposes it has come more into favour. At the same time it is more than likely that the average Shorthorn man does not realize what his cow is capable of doing, and how much she may be improved. The average yield of milk of all cows of the United Kingdom is put at 450 gallons per head per annum; an ordinary good dairy cow will run to over 600 where the cows are milked for, say, 10 months. The British Dairy Farmers' Association some years ago fixed 850 for a registered Shorthorn, and it is said that one of the agricultural colleges has graded its herd of Shorthorns to 1,000 gallons per head per annum. It has been a common experience to come across individual cows of various breeds which gave much more even than this high figure, so that from these results one can judge of the possibilities of our animals and their capabilities for development. We are pretty well assured now that by feeding we cannot control the quality of the milk, though we can influence the quantity, and that good feeding will thus produce more milk. On the other hand, feeding cannot be carried beyond a certain point in the way of developing the milk yield, while the poor-yielding cow may need as much food as a better one. These thousand-gallon cows probably do not require more food or attention than the 500-gallon ones, so that we come back to the point that the power to yield a large supply of milk is constitutional, and that the development of this power can only be brought about by selecting the good animals, and keeping their progeny to carry on the power to the next generation, and intensify the same, if possible.

Goats to Protect Sheep.

The practice of allowing a few buck goats to run with sheep, as some protection against dogs, is, it is said, becoming increasingly common in America; but there is not unanimity of opinion regarding the desirability of the practice. There is practically no danger of sheep or goats cross-breeding, as they belong to different genera. For 50 years or more Angoras have have running with sheep in that country, and to some extent in this, with scarcely a suggestion of any such crossing occurring. In very rare cases, hybrid progeny has been alleged; but it is usually found, upon investigation, to be nothing but a rumor. I have seen an illustration of such an alleged cross, says a writer in the "Rural New Yorker," but about all agree that that danger is virtually nil. One of our first importers of Angora goats, made determined experiments, in the hope of obtaining a cross between the goat and the sheep, and failed in every instance.

The question before us, then, is, will a few bucks help to protect sheep from dogs? I believe they will, if they are well-trained, horned goats, and if the number of them be limited to not more than three. If there are too many, they are likely to flock by themselves; whereas, if there are but few, they incline to stay with the sheep. But there is involved the question of the rams fighting the bucks. Like as a strange queen bee put abruptly into a hive will meet with death, so a gentle, and especially a young buck will occasionally meet death by being suddenly placed with sheep and rams.

A buck goat of vigorous build and mature age, bearing horns, will usually make a strong fight against a dog; and, while we are constantly hearing of injury to sheep by dogs, we rarely hear of injury to flocks of goats by dogs. A male goat is naturally pugnacious, and may usually, if well trained, be expected to vanquish the ordinary straggling dog. But much depends upon the training the buck gets. A well-known breeder of Angora goats, once wrote as follows:

It is quite amusing to see the courage of the doe when she protects her young kid from a dog, or hog, or flock of buzzards. Two of my neighbors' dogs got in the habit of killing my kids, and one doe protected her kid quite a while from the two large vicious dogs, until the neighbor caught one of the dogs and gave him a good whipping, when the goat assisted in this work by butting the dog with all her might. You should train the goats to be brave by taking your dogs into the goat pen with you, and, in case the dog refuses to run from a brave goat, scold the dog to make the goat think that she whipped him. If you had a tame wolf trained in that way you could train your goats to fight wolves.

Some breeders state positively that the goats are as cowardly as sheep, and just as liable to be attacked by dogs; while others cite instances where dogs have actually been driven off. No doubt both statements represent the experiences of respective breeders. It is a fact that one or two bucks will serve to protect a flock of sheep, if they are trained to attack dogs. The practice of keeping a few male goats with the sheep, as a protection against dogs, is becoming increasingly and warrantably common. Hornless goats bring a higher price in the market than horned goats, but this preference is all a mistake, and against nature.

Good handling does not consist in breaking horses of bad habits. The height af the art is in anticipating a bad desire, and in destroying the desire before it takes more definite shape in action.

The Hereford.

The chief points (says the Live Stock Journal) to be looked for on a good Hereford are, first, that the colour should be a distinct red, not too dark or too light; white face and mane, also white breast and belly, and white legs as far as the knee and hock, sometimes running up the flank. The bull should have a good masculine head, not too long, broad between the eyes, which latter should be large and prominent, with a mild look, denoting docility of temper; the horn should be of moderate length, springing straight from the head. The cow's head should be much the same, but finer, and her horns should have a mane, and turn upwards slightly; they should be in both cases of a waxy white, although they are occasionally found tipped with black; the nose should be of a pure-white or flesh-colour. The bull should have a good rise of crest, deep sloping shoulders, well-developed brisket, straight back, and belly line, wide loin, good springing ribs, moderately broad hips, tail well set on, and falling in a plumb line to the hocks. The hind quarters should be long from the hip downwards; the thighs, which are a very important point, should be large and full, showing plenty of width across when you stand behind, and they should be well meated to the hocks. The test of touch is difficult to describe, and can only be learnt by practice.

Like Begits Like.

If the law, that like produces like, were a wholly infallible one, we could get no improvement in farm animals through breeding, because offspring could never be better than their parents. We find, however, that there is frequently a tendency in young animals to differ from their parents. Some will be better than their parents and some will be inferior to them. Then, according to our law that live produces like, by mating young animal together that are better than their parents, we get offspring of the same character, and consequently, get improvement in the herd. Care must be taken not to mate the offspring that are deficient in some respects to their parents because the tendency is that they will produce young live themselves, and consequently we have degeneration rather than improvement. Therefore, the animal that varies from its parents in the right direction varies towards improvement, and is a particularly valuable animal to breed from.

In this connection proper care and feeding will do much toward improviog live stock. It is impossible to make a good animal out of a scrub by the best of care and feed, but it is possible to make a scrub out of a good animal by neglect, lack of sufficient care and proper feed.

In the improvement of farm animals, it is essential that the breeder realise the value of good feeding. Marked improvement cannot be effected by good breeding alone, nor cannot be effected by good feeding alone, but the two must go together if the most rapid improvement is to be secured.

Rat Killing.

A cat that is fed all it needs is a nuisance except for those who want a lazy pet. A hungry cat kept at the barn and fed nothing but a little warm milk is the best rat-trap we know of, writes the "Rural New Yorker." Care should be taken to plug up rat holes or scatter broken glass in them. Of course a new barn can be made nearly rat-proof by the use of concrete. Next to a cat we consider a rat or Scotch terrier dog best. When they are trained properly they make fierce hunters. Ferrets are useful in some situations and where the farmer knows how to handle them. We have caught a number of rats in steel traps, but they may bite off a foot and escape. A large wire trap that catches them alive is useful. So is a barrel trap with a tilting top which lets a rat down into water. As for poison, we have used a paste of phosphorus smeared on bread. The rats and mice leave the house after tasting this stuff, apparently going after water. We should depend on cats or a rat terrier at the barn and this rat paste in the house.

Green Fodder for Pigs.

There seems to be no good reason why green forage crops should not be considered pig's food. Experiment has shown that if cut young enough, such home-grown food, is pretty well digested, although fibrous food generally is not best suited to the economy of the pig.

Moreover, it seems to pay well in America, where this method is in vogue, and many kinds of green crops are there laid under contribution. Recent experiment at the Missouri Experimental Station has, in fact, shown that a greater profit attends this kind of feeding than a corn diet, and this to the extent of 20 to 30 per cent. of the relative costs of the two methods of feeding.

A large number of forage plants were used, and all of them can be used in this country also, though our system of pig-feeding would not compare exactly with the "heavy grain feeding" method of the States, with which forage is compared.

Lucerne and red clover comes out best, lucerne leading, and rape being third. Beans, rye, peas, etc., were not so successful. It appears that the best returns are not to be got without some dry food in addition—2 lb. of maize per day for each 100 lb. live weight. These, however, do not seem to be out of the way, as the gain in weight per acre was 1,310 lb., some 4,000 lb. of maize being fed. If we take the lucerne at ten tons per acre, this would not give a return of 1 lb. of pork to 5 lb. of dry matter in the total food.

With clover little or no dry food is required during blooming time, as the heads give a satisfactory growing food, though as much as 3 to 5 lb. of grain may be used. Over 1,000 lb. live weight increase was made, however, with about three-quarters of the amount of maize used with lucerne. Store pigs of 50 to 70 lb. weight were used.—Exchange.

The man who cannot milk without abusing cows has no right in the cow-stable. Harsh treatment of any kind will result in a decreased yield, and if long practised will permanently injure the cow as a milking-machine.

Dorsert Horne Sheep n Australia.

By H. S. Major, Assistant to the Sheep and Wool Expert, Agricultural Gazette of N.S.W.

— Origin of the Breed. —

Like most of the domesticated breeds of sheep which are popular at the present time, the exact origin of the Dorset Horn is unknown. It is claimed that the breed is absolutely pure, and its history dates back for several centuries.

In "Modern Sheep: Breeds and Management," by "Shepherd Boy," appears the following :—"The Dorset Horn is one of the oldest of the English mutton breeds. As its name implies, it originated in Dorsetshire a very long time ago—some writers claiming 2,000 years. This breed is also found in large numbers in the adjoining county of Somersetshire, where it is highly esteemed as an early lamb raiser, and to it the Christmas and Easter 'hot-house' lamb markets owe much for the wonderful quality which it supplies."

— Points of the Dorset Horn

The adult ram is very massive in build, and the bone throughout is heavy. The head is large, and shows great depth of jaw and breadth across the nose and muzzle. The horns are very massive, deeply corrugated, and turn spirally outwards. The ewes possess very small horns, half-moon in shape. The lips are unusually thick, and the ears, muzzle, and skins very pink in colour. There is a striking likeness between the head of a Dorset ram and that of a clean-faced Merino ram, which would suggest some remote connection between these two breeds.

The chest of the Dorset is very wide and deep; the brisket is prominent and fleshy, and forces the front legs and shoulders very wide apart, thus giving the animal great thickness "through the heart." In this latter respect the breed has few equals. The wither is well formed and flat; the top and bottom lines resemble those of the Romney Marsh.

The rump is well rounded; and on the limbs, both fore and hind, the flesh is carried well down to the knees and hocks. The feet are strong and large; the hoofs are of a clear honey colour. The face and lower limbs are covered with short white hairs.

— The Wool. —

In keeping with its early development and propensity to fatten, the Dorset is a poor wool-producer, and the best feature of its fleece is its pure white colour when washed. The body wool of Southdowns and Shropshires is a dull white in comparison, and the black points are a source of trouble to the fellmonger and wool sorter. The Dorset ram cuts a fleece weighing between 7 and 9 lb., and is very lightly covered on the head, belly, and legs. In texture the wool resembles that of the black-faced Down breeds. It is short, harsh in handle, and deficient in character. Its quality would vary between 50's and 56's counts.

— General Characteristics of the Breed. —

The Dorset Horn is essentially a mutton breed, and should always be farmed as such.

It readily adapts itself to the various conditions of climate and pasture. The breed possesses many points in common with both the British Longwood and Down breeds. It is probably the quickest maturing sheep in the world. As two tooths the Dorsets are very attractive-looking sheep, but they loose their good appearance more rapidly than most breeds; nevertheless, they retain their vitality, and the rams are very prepotent. The ewes are good milk-producers, and can mother twins with ease.

— The Flock at the Wagga Experiment Farm. —

The present flock of pure-bred stock was not formed till 1910, when the Department purchased 18 ewes and 5 rams at the dispersal sale of the stock of Mr. Norman Brookman, Glenthorne Stud, South Australia. These sheep were of two strains, and were the progeny of high-class English importations.

At that time it was the Department's chief intention to establish this flock at Wagga Farm for the purpose of supplying rams for the cross-breeding experiments then inaugurated. As regards the merits of this breed, within certain limits they have exceeded all expectations, and it only on account of their scarcity in Australia that their intrinsic value is not generally known.

At the Wisconsin Agricultural College, U.S.A., tests with different mutton crosses have been carried out over a number of years, and the progeny of the Dorset Horn rams have proved their superiority over all other breeds employed. Americans refer to the Dorset ewes as milk and dairy sheep, and the lambs are termed "hot-house" so rapid is their development.

From the experience gained of the breed at the Wagga Farm we are able to endorse these opinions. At the Wagga Farm all the lambs are ear-tagged, so that individual records can be carefully kept. In 1912 the Farm had only 70 points of rain between January and June. There was no grass and all stock had to be hand-fed on a mere sustenance diet. The little pure Dorset Horn flock of 27 ewes dropped 30 lambs, and reared 111 per cent. At the age of three months the whole lot averaged 67 lb. live weight, and at 5 months the average was 88 lb. Seven of the best ram lambs averaged 107 lb. at this time. This year 36 ewes were mated, and lambing took place under the favourable conditions of a good season. Four ewes missed, and to the remaining 32 ewes (many of which were maidens) 47 lambs were born. Of this number, no fewer than 30 lambs were twins. Forty-four lambs were marked, making a percentage of 122 on the number of ewes mated. A couple of lambs have since died from misadventure.

On the 14th August this year, when the lambs were approximately 14 weeks old, 23 ram lambs averaged 88 lb. live weight, and 16 ewe lambs 75½ lb.; on 9th September, when the lambs were 17 weeks they, they averaged 100 lb. and 90½ lb. respectively. Two days later these lambs were shorn, and cut 2¼ lb. of very dry wool.

Below are appended the exact live body weights of the lambs on the two dates mentioned; and, as the weights are in the same order on both dates, individual increases can be followed:—

— Ram Lambs. —

14th Aug.	9th Sep.	14th Aug.	9th Sep.
lb.	lb.	lb.	lb.
60	80	87	108
93	112	77	91
79	93	94	112
86	101	74	92
82	95	82	97
78	94	84	104
74	90	86	107
101	115	68	81
91	113	90	108
62	78	67	84
110	131	74	92
85	105		

— Ewe Lambs. —

14th Aug.	9th Sep.	14th Aug.	9th Sep.
lb.	lb.	lb.	lb.
67	81	88	102
75	92	68	82
82	96	77	93
65	81	85	100
74	88	77	92
80	88	74	85
78	92	59	73
78	99	84	104

Three lambs which were dropped very late are omitted from this list. It will be noticed that one ram lamb scaled 131 lb. on 9th September. The first Dorset lamb at the Wagga Farm was noticed on 20th April, and assuming that this heaviest lamb was the first dropped, it could not possibly have been more than 4 months and 19 days old.

It also will be seen that in the short time of twenty-six days many of the lambs gained 20 lb. and over in body weight. One would expect this in pigs, but hardly in sheep. These facts, bearing evidence of the wonderful early-maturing qualities of the pure Dorset Horn, are all the more convincing in that, from birth to this last weighing, the flock was depastured on natural pastures only.

The lambs do not retain this rate of increase in weight over the last half of their first year. Adult rams bred from the Wagga Farm flock weigh between 200 lb. and 230 lb. in good but not over-fat condition. Thus the lambs at 4½ months weigh half as much as they they will when fully developed.

— The Dorset Horn Cross for Early Lambs. —

No less than twelve different cross breeds are being tested for lamb-raising (among other things) at the Government Experiment Farms. On every occasion at the sale of these lambs of approximately the same ages, the progeny of the Dorset Horn rams and first-cross ewes have brought the top prices, both in the London and Sydney markets. Though the Dorset Horn crosses lack the finer quality of the Southdown-cross carcases, this deficiency is more than compensated for by the greater live and dressed weights of the former crosses. In lamb-raising the time which lambs take to reach a marketable condition is all-important to the farmer; at the same time, quality must not altogether be sacrificed. Recently a consignment of suckers from the Wagga Experiment Farm, representing twelve different cross breds, were forwarded to Sydney for sale. They were penned separately, and offered in lots according to the breeding. The Dorset Horn-Border Leicester-Merino crosses t... the market at 1-/11. Full particulars will be found in the Agricultural Gazette for March, 1912.

As a breed suitable for lamb-raising, when correctly crossed, the Dorset Horn promises to fill a very important position in this profitable industry, which in Australia has hardly begun.

Recently Mr. Forde, of "Montrose," Tarago, New South Wales, communicated with this branch of the Department, and a few extracts from his letter will interest prospective lamb-raisers. Inter alia, Mr. Forde says:—"I have now been using Dorset Horn rams for two seasons. Last year I used Lincoln Rams and Dorsets, and found the Dorset-cross lambs a long way ahead of the Lincoln cross. This year 8 Dorset Horn and 6 Shropshire rams were joined with 700 cross-bred ewes, on the 14th January; but they did not start to work for about fourteen days later, as it was very dry here. When the lambs came, in the first 200 I don't think there were 20 Shropshire-cross lambs. I only have 1,000 acres of land, and have been running on it 1,000 grown sheep, besides cattle and horses. I spoke of the Dorset Horn ten years ago for producing fat lambs, as I was born in Somersetshire, England, and can remember them all my life."

Mr. Forde's first consignment of this season's lambs recently arrived in Sydney, and were sold in the open market at the Homebush Yards on 12th November. The following are the prices realised:—

56 lambs at 16/10 to 17/1.
111 lambs at 15/2 to 15/7.
43 lambs at 14/ to 14/1

The whole consignment of 210, all of which were suckers, averaged 15/5. All these lambs were the progeny of Dorset Horn rams and Longwool-Merino ewes, and are the lambs referred to in the letter quoted above.

Discing Stubble Land before Ploughing.

The aim of the wheat-grower in districts of limited rainfall should be to endeavour to collect and conserve in the soil as much as possible of the rain that falls throughout the year, in order to supplement the rainfall during the period of growth of the subsequent crop. This is the main object of fallowing; but our present method of fallowing allows of a period of the year in which no attempt is made to store up moisture, viz., from the harvest time to the time of early fallowing in the month of June or July. After harvest, the soil, owing to its hard crusted surface, is in a very favourable condition to part with its moisture, and the great evaporating agencies heat, dryness, and winds — are actively at work. But if the surface of the soil can be loosened, and a soil mulch formed, this evaporation can be checked, and any surplus moisture left in the lower soil over and above the needs of the preceding crop may be saved, and the soil at the same time prepared to receive the autumn rains, instead of allowing them to run off the hard surface or become rapidly absorbed by the hot, dry air.

Since water is the limiting factor of crop production in dry districts, the more moisture that is stored in the soil, other conditions being equal, the larger will be the returns. Therefore, the farmer who can thus start the year's "soil moisture account" with a "balance brought forward" and increased "deposits" in the early part of the year should make additional profits which will much more than recompense him for the extra labour and time expended, and in a dry season this additional moisture conserved may make all the difference between crop success and failure.

The soil at harvest time is usually not in a suitable condition for ploughing, owing to its hard, dry state, nor is it advisable to plough at this time, as the work can be performed more economically and quickly with a disc cultivator. The land may then be ploughed at the usual time during winter or early spring. The disc cultivator will cut into the hard surface soil, creating a loose, dry mulch, which will arrest further evaporation and enable the autumn rains to penetrate the subsoil.

This early discing before ploughing does more than aid the conservation of moisture, and has also much to recommend it to farmers in the more favoured wheat districts, especially where it is the intention to sow wheat again the following season:—

1. It chops up the stubble so that it can be more readily ploughed under, thus adding valuable organic matter to the soil, and returning to the soil the plant-food it has removed in its growth. It is necessary, however, that stubble should be ploughed under early, in order to allow of its thorough decomposition before seeding operations begin, as dry straw decays slowly, and unless thoroughly decomposed it leaves the soil too open, causing a tendency for the soil to dry out readily.

2. It puts the soil into a condition conducive to the germination and growth of all weed seeds that are at or near the surface, which growth will be destroyed by the subsequent ploughing.

3. The soil is in a suitable condition for ploughing at any time. In the event of a dry spell, the operation of ploughing is rendered more easy, and the soil breaks up in much better condition.

4. It cultivates and pulverises that portion of the soil which, when the land is ploughed, will be deposited at the bottom of the furrow. One of the principles for conserving moisture is that the sub-surface soil should be finely pulverised and firmly compacted, thus increasing its water-holding capacity. It also increases its capillary attraction and places it in the best possible physical condition for the germination of the seed and the development of plant roots. The root-hairs of plants feed on the outside of the small particles of soil. Therefore, if the sub-surface soil is cloddy, the plant food is "locked up" in lumps, and the feeding area of the plant is reduced. Thus, pulverising the soil may be the equivalent of fertilising it. If for this reason alone the early discing of the soil before ploughing is a practice that it would be well for the farmer to adopt.—Agricultural Gazette of N.S.W.

Stilton Cheese.

This cheese derives its name from a villgge in Huntingdonshire. Nowadays, Leicestershire is regarded as the chief seat of the manufacture, though it is by no means limited to that country, and can, in fact, be made practically anywhere if certain conditions can be obtained.

The first essential is good pasture-fed milk, and it is because of the excellence of the pastures in the Midland counties that the best cheese is still often considered as being made there only. Yet the fact that American Stilton finds quite a good sale in the English markets proves that the mere locality is not by any means indispensable to the production of a good paying article.

The necessity of having pasture-fed milk decides the beginning of the Stilton cheese-making season.

As to the actual details of manufacture, the milk should be used, il possible, before it has lost its natural heat. This ensures that it shall be perfectly sweet, and where it can be obtained, the necessity of heating it up again after it has cooled to this temperature, is avoided. This is one of the little peculiarities of the method upon which great stress is laid by some cheese-makers and in some localities. If the milk is bought, or if the cheese-making is undertaken on a large scale, warming up to this temperature, 83 deg. to 86 deg. F., is necessary. In the early spring or late autumn, the temperature should be well up to the higher of these two temperatures, and that of the making-room should not be allowed to fall below 65 deg. F.

— Renneting. —

The rennet used may be either the commercial extract or the home-made article. The latter is still the more widely used, but the variation in the strength and quality which is often noticed is a considerable drawback to its use. For convenience and uniformity in both strength and quality, the extract is undoubtedly superior. The quantity of the latter to be used is one drachm to every four or five gallons of milk, according to temperature used and quality of the milk.

If the home-made article is used, 1oz. of rennet should go to five gallons of milk, though here the quality of the rennet varies so widely in some cases, that three or four times this amount is necessary to produce the coagulation at the right time.

The beginning of coagulation should appear in fourteen or fifteen minutes, and the curd should be ready for ladling in about an hour and a half. Whichever variety of rennet is used, this result must be looked for, and with many practical cheese-makers the time of formation of the curd is regarded as a much more accurate guide than any amount of scientific testing of the strength of the rennet.

The thorough, yet gentle, stirring in of the rennet for eight or ten minutes, is of the first importance, so that its effect in producing coagulation may be absolutely uniform throughout the whole of the milk. The stirring has the additional advantage that it prevents the cream from rising.

— When the Curd is Fully Set —

it is ladled out of the vat with a tin scoop holding about half a gallon, into the straining cloths. Each of these is about a yard square, and will hold from three and a half to four gallons of curd. If in the act of ladling, the curd is cut up into slices, this will greatly help the draining of the whey, but this is not desirable. The cloths containing the curd are left standing in the curd sinks for an hour or an hour and a half—the long time if it is soft. The whey is then left off, and the cloths are lightly tied by taking three of the corners together and binding them with the fourth. The whey is drawn off by removing the plug from the sink, and it should then be replaced, and the curd should be allowed to remain in the whey which again collects by draining out.

The draining is helped by tightening the cloths every hour or so during the first eight hours, but care must be taken that in doing this, the curd shall not be crushed. By this time the curd will have become somewhat solid.

Variations in the quality of the cheese obtained, are produced by allowing it to remain for a longer or shorter period in the whey, and it is here that the practice of different cheese-makers varies. If the curd is sweet, it may remain longer in the whey. Tightening the cloths too frequently tends to produce a curd which is too dry. Practice and experience alone will serve as the right guide in these matters.

At the end of eight of nine hours the curd is found to be sufficiently firm to be turned out of the cloths and laid in the draining sink with a light cotton cloth thrown over it. It is sometimes cut up into 4-in. squares before being laid in the sink.

The curd gains acidity and becomes firm over night, while oxidation is slowly going on.

Next morning it is ready for breaking up, and this is usually done with the fingers, and salt is added at the rate of 1 oz. to every 3½ lbs. of curd.

Many seedsmen and a few farmers test their seeds.

Milk-sugar when converted into lactic acid by bacteria makes the milk curdle. Rennet can do likewise.

Jumping.

As the outstanding principle bearing upon the question of the relation existing between the conformation of horses and their jumping capacity, there is to be noted the fact that it is the hind limbs, quarters, and loins which have to bear the brunt when a horse jumps, for upon them devolves the duty both of raising the forehead and of propelling the body upwards and forwards over the obstacle. Consequently the primary desideratum to be sought for as regards a suitable make and shape for jumping, is that there should be indications of plenty of strength in these several parts—good, broad loins, muscular and powerful quarters, and stout hind legs, constituting, so to speak, the fundamental basis upon which good jumping powers are built up. Particularly essential is it that the hocks should be strong, a feature which is indicated by their being broad and large in shape, for these joints play a leading part, and are subjected to special stress in the act of jumping. In fact, they are more or less the pivot of the whole mechanism which is brought into play in jumping, and if one is to single out one particular individual point as being of greater importance than any other for jumping purposes it is unquestionably the possession of good, strong hocks. Nothing is a more fatal fault in this respect than weak, small hock joints, for, besides affording an indication of poor jumping powers, such are quite unfitted to stand the strain which jumping imposes upon them, and if a horse exhibiting this failing is at all frequently jumped the probability is that its hocks will soon begin to show signs of injury and eventually become unsound.

Another most desirable point as regards the hind limbs is that the hocks should be well let down, the distance between the point of the hip bone and the hock joint being as great as possible. This feature indicates that the animal is able to exert a great amount of leverage with its hind legs when jumping, and the more leverage there is the more effective a degree of propulsion can be developed, and the greater, consequently, will be the horse's jumping capacities. Any tendency to sickle-shaped hocks constitutes a very objectionable point so far as jumping is concerned, inasmuch as when the hocks are of this conformation the horse is unable to straighten them out fully in striking off from the ground with its hind legs when taking a leap, and this much diminishes the force of the propulsion, thus materially impairing its powers as a jumper.

— The Quarters. —

In regard to the conformation of the quarters, there is to be specially noted that a well-sloped position of the pelvis is a condition which is eminently favorable to the development of good jumping abilities; and it is, of course, well known that hunters with a drooping croup and quarters—a feature which especially often characterises Irish hunters—are usually found to jump particularly well. Nor is, indeed, an actual goose-rumped shape of the quarters in the least objectionable regarded solely from a jumping point of view, however unattractive this peculiarity may look. In fact, it is just the reverse, for it generally conduces to cleverness in jumping in a hunter. The explanation why sloping or drooping quarters tend specially to promote good jumping powers lies in the fact that horses possessing this kind of conformation are particularly favorably placed for bringing their hind legs well underneath the body when preparing to leap, which renders it all the easier for them to raise the forehand off the ground and to develop a high degree of propulsion with their hind quarters. It may, however, be pointed out that, while favorable to jumping, quarters which droop much will impair a horse's galloping speed to a greater or less extent.

— Raising the Forehand. —

As it is essential that a horse should be able readily and easily to raise its forehand off the ground when taking off at a jump, it naturally follows that for horses to jump well they should be light in front. Lightness of forehand for this reason, in fact, ranks as a leading attribute of good jumping conformation. Such lightness is primarily dependent upon the shoulder blades being well laid back; and this is one of the reasons why sloping shoulders are always deemed such an important feature in the hunter and jumper. A horse with a heavy forehand and straight, thick, and loaded shoulders is not, as a rule, much good at jumping; it will lumber over the jumps in clumsy fashion, and be most liable to come to grief, simply because of its inability to rise freely when taking off. Cleverness in jumping is also to a certain extent dependent upon lightness in front, for a light forehand makes it much easier for the horse to put in a short stride, when required, in negotiating an obstacle, and so enable it to take off with greater precision. Reverting again to the question of sloping shoulders, a further reason, besides that already mentioned, why these are so desirable consists in the fact that this feature is of great assistance to the horse when it lands over a jump, because a well-sloped position of the shoulder-blade, by reason of the elasticity which it confers on the mechanism of the forehand, tends greatly to minimise the force of the impact when the forelegs come to the ground. Yet another consideration in regard to this particular point is that when the shoulders are well laid back the horse is much better able to recover itself should it peck or make a mistake in jumping than if it has straight shoulders.

— The Forelegs. —

To a certain extent horses make use of their forelegs as well as of the hind ones for the purpose of raising their body off the ground and propelling it forwards in executing a jump; but the primary function which devolves upon the forelegs in jumping consists in supporting the horse on landing, they having to bear the whole brunt of this concluding stage of the act of leaping, for, as hardly need be explained, they are the first to come to the ground, so that the weight of the whole body falls upon them. This subjects them to much strain, and therefore it is most desirable that they should be a stout and tough as possible. Strong forelegs are not, however, in themselves actually essential to the possession of good jumping powers, and a horse having weak forelegs may be able to jump very well, and even brilliantly, as is abundantly evidenced by the fact that steeplechasers are frequently most infirm on their forelegs, yet perform very successfully. But the trouble with weak forelegs, as regards jumping, is that such will very soon suffer danage as a return of the heavy strain which falls upon them, and are most liable to become badly strained or to break down.

As another feature which is to be sought for in good jumping conformation, we have shortness of back. A short back means a strong back, and there should be plenty of strength in this part if a horse is to possess good leaping abilities. Shortness of back is, moreover, usually associated with strength of loin, which consideration alone constitutes a sufficient reason for looking upon this feature as essential in a good jumper.

Humus.

Experiments show that where the supply of humus is maintained the supply of plant food is also maintained. The Minnesota Station, says Nebraska Farmer, found that after two years of a proper rotation in which the supply of organic matter was kept ample, or perhaps increased a little, that the amount of nitrogen slightly increased, while the amount of phosphorus and potash remained practically the same. Then farmers know that when they keep the supply of humus ample in their soils they can always produce crops. I saw a field last week that has been farmed for seventy-seven years, and it produced 85 bushels of corn to the acre last year. For the past twenty years it has been rotated as follows:—Corn, corn, small grain, corn, small grain, clover meadow two years, pasture two years, and then the rotation repeated. The last year the ground was in pasture it received a coat of all the manure the farmer could gather around the lots. Twenty-five years ago this farm was considered worn out. It was called a clay farm, and never produced more than thirty bushels to the acre. However, when the present owner took possession and followed the systematic rotation given above, the fertility began to increase till it is the richest farm in Illinois. Not a particle of commercial fertilizer was applied in that time, but the productiveness of the soil was increased.

What one farmer has done in one neighbourhood can be done by every farmer in the neighbourhood. The great need of the worn-out soil is humus; the great need of the soil whose productiveness has begun to show signs of decreasing is humus; if the supply of humus is maintained the fertility of the soil will also be maintained.

Grow more clover or lucerne, rotate your pastures with your crops, and apply all the manure that accumulates around the lot, and we believe that you will never be confronted with a worn-out farm.

Barley is considered a good feed for horses, but in order that they may get the full benefit of it, it is desirable that it should be crushed or bruised, otherwise, owing to its hardness, a good deal will pass through undigested.
FARM NOTES.

The Bird as the Farmer's Friend.

From "United Empire."

He who studies living birds, other animals, and plants, and the relation which those living organisms bear to one another, will soon learn that the main effort of each animal or plant is to preserve its own life and produce young or seed, and so multiply its kind. He will see, also, that the similar efforts of other organisms by which it is surrounded tend to hold its increase in check. This action and reaction of natural forces constitute what is known as the balance of nature.

Vegetation is the prime requisite for the perpetuity of all other forms of life upon the earth. The greatest known enemy to vegetation is insect life, whose multitudes prey not only upon the necessities of mankind, but upon man himself, and upon all other forms of life. Although entomolagists have accumulated careful descriptions of over 300,000 species of insects, they estimate that there remain about 700,000 to be described. Professor Riley, in his elaborate studies of the hop-vine aphis, observed that the species developed thirteen generations in one year, and that the average number of young produced by each female was 100. Assuming that every female at maturity produced its full complement of young, he computed that this insect, if unchecked to the end of the twelfth generation, will have multiplied to the inconceivable number of ten sextillions of individuals. As figures fail to convey to the mind any adequate conception of the fecundity of this insect, I will resort to space and the velocity of light to bring it more intelligibly before you. If the unchecked progeny to the end of the twellth generation were marshalled in a line, ten to the inch, the line would extend beyond the farthest fixed star that the strongest telescope might search out to a point so sunk in the profundity of space that light travelling from the head of the procession at a rate of 181,000 miles per second would require 2,500 years in which to reach the earth. One does not need to be told that the remotest approach to such unchecked multiplication would paralyse the hop-growing industry in one season. While the aphides may represent the extreme fecundity, there are thousands of insect species, the unchecked increase of any one of which would soon overrun a continent. Mr. A. H. Kirkland has computed that the unrestricted increase of the gipsy moth would be so great that the progeny of one pair would produce enough caterpillars in eight years to devour all the foliage in the United States. A Canadian entomologist states that a single pair of Colorado beetles, or potato bugs, as we call them, would, without check, increase in one season to sixty million. At this rate of multiplication the disappearance of the potato plant would not be long delayed. The chinch bug, a fecund and destructive bug, has been found in a clump of grass 8 inches in diameter to the number of 20,000. The progeny of this colony alone, if unchecked, would soon become incomputable hordes, devastating wide areas of the earth's surface. Those of you who have been in South Africa probably have seen locusts in flight which filled the air and hid the sun. What a potency for evil lies hidden in the tiny but innumerable eggs of these ravening pests! If every egg was permitted to hatch, and every young locust to come to maturity, the consequences would be too dreadful to contemplate.

The voracity of insects is almost as astounding as their powers of reproduction. I have time to cite one example only. The daily ration in leaves of a caterpillar is equal to twice its own weight. If a horse were to feed at the same rate, he would have to eat a ton of hay every twenty-four hours. Who, or what is it that prevents these ravening hordes from overrunning the earth and consuming the food supply of all? It is not man. Many, by the use of mechanically applied poisons, which are expensive, unnatural, and dangerous, is able to repel to an extent the attacks on his orchard and garden; out in the fields and in the forests, he becomes, before any great irruption of insects, a panic-stricken fugitive. Neither is it disease, or the weather, or animals, or fungi, or parasitic and predaceous insects within their own ranks. However large may be the share of these particular natural agencies in keeping insects in check, experience has shown that it is lamentably insufficient. That what is it? The bird. Bird life, by reason of its predominating insect diet, is the most indispensable balancing force in Nature. At no period of life is a tree exempt from insect depredations, and every part of it from the genital seed, or nut, to the terminal bud, blossom, or fruit is attacked.

It should be remembered that the period of growth of leaf and blossom is also the nesting season of birds, and that even seed-eating birds now feed their young on insects. As the digestive organs of birds are so constructed and equipped that they can both contain and dispose of a very large quantity of food, and as most birds eat most of the time, the number of harmful insects consumed by parents and nestlings at the very time when such destruction is most needed is almost incredible. This shows the existence of a natural economic relation between these three orders of life. There is a sort of interdependence, and the existence of each one is dependent upon the existence of the others. But for the trees, the insects would perish; and but for the insects, the birds would perish; and but for the birds, the trees would perish.

We can afford to spray an orchard tree which yields an annual dividend of fruit, but, mechanical difficulties aside, we cannot afford to spray a forest tree which yields its crop once only in a lifetime. For the preservation of his forests, man is wholly dependent on the services of the bird. In the woods of Canada, in the forests of Africa, in the jungles of India, in the bush of Australia, this faithful ally of ours, as a matter of course, and without any trouble or expense to us, is daily accomplishing on our behalf the superhuman task of saving the lives of the trees. Yet we are permitting the feather trade, like a giant devil-fish, to reach out its tenacles into the innermost recess of the forests of our Empire, and steadily to draw in the skins and feathers of every one of these feathered guardians of the tree.

The natural inter-relation and interdependence that is established between the tree, the insect, and the bird is also established between the insect, the bird, and every other form of vegetation on the earth. In domiciling our increasing millions in lands beyond the seas we have given no thought to the natural increase of insect pests which invariably attends the operations of the agriculturist. Finding in cultivated crops new and more succulent sources of food supply, insects change their primitive habits to swarm and multiply exceedingly upon the fertile fields and green pastures of man's creation. In addition to this, as the pioneer introduces plants and seeds from the land he has left, he unwittingly introduces with them insects, too, to swell the hordes of native depredators. When we reflect on the number of insect pests to which man's farming operations must always give rise, we must admit that he can ill afford to lose the services of the bird in the war which he must wage continually against organic Nature in order to maintain his artificial standards against her inexorable laws.

— Recognition of an Economic Fact. —

In 1909, replying to the London Chamber of Commerce (which sought on behalf of its Plumage Section to obtain a repeal of the law which prohibits the export of plumage from British India), the Bombay Chamber of Commerce pointed out that the prohibition was meant not only to prevent beautiful birds being exterminated, but also to prevent useful birds being reduced in numbers. It was explained that it was a recognised fact that crops of all kinds were subjected to incalculable damage by insect pests, and that the combating of this evil had become one of the greatest difficulties of the Indian agriculturist. The principal enemies of these pests, it was further noted, were the insectivorous birds, yet these were the very species that hitherto had been relentlessly slaughtered for their plumage. In 1911 the Melbourne Chamber of Commerce, in replying to a letter from the London Chamber of Commerce, pointed out that the work performed by the wild birds in the Commonwealth alone, in keeping in check the ravages of myriads of noxious insects, was worth many millions of pounds sterling. The natural enemies of insect pests, the Melbourne Chamber went on to say, were the birds, and were they destroyed, Nature's equilibrium would be upset, and successful agriculture would become impossible. Birds, it was added, were vastly more really valuable to the community when alive than when dead, and converted into millinery ornaments. In last year's Report on Lord Kitchener stated that the indiscriminate destruction of bird life had allowed an enormous increase of insect pests, for the combating of which steps were to be taken. Lord Kitchener knew that in spite of the improved methods of fighting insects there was only one step that he could take that would be effective. A Khedival Decree was issued forbidding the catching, killing, or taking the eggs of Egypt's insectivorous birds. In issuing this Decree, two things were prominent in Lord Kitchener's thoughts—the destruction of the egret for its plume, and the fact that in the Valley of the Nile this bird is one of Nature's checks on the cotton worm. If it were not for the services of the bird, there are many parts of our Empire in which could not keep his live stock, from which he himself would be driven in headlong flight. No part of our insect-ridden Empire—not even India—has been so exploited for plumage as our Crown colonies in the West Indies. The destruction of bird life in Jamaica has led to such an increase of the grass-tick that the keeping of most breeds of cattle has become impossible.

Because of the number of venomous insects in the neighbourhood af the Panama Canal, one of the first acts of Mr. Wilson, when he became President, was to issue an Executive Order prohibiting, under heavy penalties for infraction, the destruction of any wild bird in the Canal zone.

For every fly-catching and parasite-eating bird that is killed, Nature's fight for the care of her children is weakened by the loss of a very active agent. Yet the number of egrets and white herons, glossy starlings, cuckoos, orioles, shrikes, kingfishers, rollers, bee-eaters, barbets, trogons, and other fly-catching and parasite-eating birds that are killed annually for their plumage in our possessions in Africa must be materially reducing their working power. To gauge the extent of the destruction, take one case only, that of the kingfisher. I should mention that in warm countries these birds belie their name, and feed for the most part on insects. At the last six feather sales in London there have been sold the skins of 272,000 kingfishers. Supposing that each of these ate 150 noxious insects daily —a very conservative estimate—we have then many billions of insect pests saved in a single year that ought to have been destroyed by the agency of the birds that have been themselves destroyed, and their services for ever lost to man. kind, for no worthier purpose than millinery. And this estimate, do not forget, does not take into account the unrestricted increase of these pests. Every one of these kingfishers was worth its weight in gold to the human race. Its skin sold for 3½d. Take another case—that of the Indian roller. Immense value is attached to the food habits of this bird. Besides eating locusts and grasshoppers, which are extremely harmful to crops all over India, it feeds greedily on the dreaded white ant. Yet thousands of these birds are sold annually at the London feather sales. And the price! Last October, just to give you an idea, one auctioneer sold 1,600 skins of this bird for 1d. each, and 2,575 for ½d. each.

The number of pestiferous rodents eaten by hawks and owls is almost as surprising as the number of caterpillars eaten by insectivorous birds. In 1885, before the United States had learned her lesson in the economic value of birds, the Legislature of Pennsylvania passed an Act which provided a bounty on every hawk and owl shot. The bounty was claimed on 180,000 hawks and owls. An irruption of rodents followed, which did 3,850,000 dollars' worth of damage to the agricultural interests of the State. The Legislature repealed the Act.

Were it not for the locust birds, there are many localities in United South Africa in which agriculture would perish. If it were not for the ibises, spoonbills, and cranes in Australia, which check the periodical irruption of grasshoppers, there are many districts in the Commonwealth in which farming operations would be impossible.

The great services which birds render the Empire as weed-destroyers (10,000 seeds of harmful weeds have been found in the stomach of a single bird), as scavengers of bays and harbours (a great human mortality has been known to take place owing to the destruction for their plumage of sea birds, which kept the beaches free from decaying animal matter) as tree-planters, not to mention a dozen other benefits, cannot be dilated upon now. It is of more importance that you should know what the destruction of bird life means to the Empire in increased cost of living. I am obliged to go to the United States for data for my arguments.

It was not until many of the most valuable species of birds had been slaughtered to the point of extermination that the people of the United States realized their immense value. They showed their wisdom by profiting by the lesson of events. The slaughter has been practically stopped. Years, however, must elapse before the balance of Nature can be restored. As a warning to us, I propose giving some facts and figures to show what the destruction of bird life in the past is costing the United States to-day.

Scientific examination, conducted throughout the four seasons, has been made by the experts at Washington of an immense number of the stomachs of all classes of birds, collected from every State and territory of the Union, and from Canada. From the evidence obtained by these elaborate investigations, the Bureau of Biological Survey has proved that the annual loss to the United States, due to the ravages of insect and rodent pests, is 1,000,000,000 dollars.

The survey has shown that thirty-eight species of birds eat the cotton-boll weevil, and that there was not one of these species that was not slaughtered ruthlessly in days gone by. Does anyone believe that the consequent annual loss of 60,000,000 dollars to the cotton crop does not mean an increase in the price of cotton? In Indiana and Ohio, in one year 2,[illegible],000 acres of wheat were destroyed by an irruption of insects, due to the almost total obliteration of their natural enemy — the bird. Does anyone believe that this occurrence did not raise the price of wheat? There are no countries in the world where insects impose a heavier tax on farm products than in many of our overseas dominions. Yet from the trackless forests of Papua round the world both ways, to the sugar plantations of the West Indies, the feather trade is attacking the existance of an immense variety of birds. 'No species whose plumage is marketable is spared. — United Empire.

Rest and quietness are essential for rapid fattening.

Tree-Planting in Southern California.

By W. Mervyn Carne.

Southern California is a very large place, with perhaps as widely diverse conditions as may be found everywhere. But to Americans in general, Southern California means those once barren valleys now known for their wealth and beauty throughout the world. To the Australian, scenting home amidst the ever present gums, come thoughts of the future. Surely we in Australia, with natural advantages so similar to California, can do as much for our land as the Americans have done for theirs? Redlands, Riverside, and many another city have solved the old argument of city v. country by being so much of both that one cannot say where one ends and the other begins. Small areas, intense cultivation, and civic pride have made this beautiful country. It is "up to" Australians to do likewise. Much of the charm of the cities (all are not beautiful) lies in their trees. Almost to a tree they have been planted by hand, for except on the mountain ridges, Southern California is practically treeless. Many kinds of trees are found in parks and gardens, but the following predominate, and will probably prove the most useful in South-eastern Australia. One of the most common is the Pepper tree (Schinus molle), whose hardiness and rapidity of growth is proverbial, and needs no emphasising. Eycalyptus of many species are used, but the Blue-gum (E. globulus) predominates. It is planted in avenues, as breakwinds and in groves for timber and firewood. In avenues eucalypts are usually topped about 6 feet from the ground, and send up three to six stems above that point. For firewood they are cut down, and suckers allowed to shoot from the butt, three or four to each tree. The trees are cut over in rotation every four to seven years.

Silky oak (Grevillea Robusta) is largely used in streets. The Kurrajong, often miscalled Bottle tree, and the Camphor Laurel, give a pretty effect with their lighter greens, and are often alternated. The former does not appear to produce seed in quantity, though Australian trees are usually very prolific in America. Pines are not largely used, though not uncommon, and include the Bunya Bunya and the Moreton Bay pines, as well as Pinus radicata, the common pine about Sydney suburban streets. The most popular street is one not seen in Sydney, yet well worthy of trial, though it grows wild from Tasmania to Queensland. That is the Blackwood (Acacia melanoxylon), one of the largest of our wattles, and a valuable timber tree. It is used in great numbers, forming shapely, clean, dark-green trees up to about 50 feet. It seems very free from the troubles, insect and fungous, which frequently bring about the premature death of acacias in Australia. Last, and perhaps most striking of all, are the Palms. The majority belong either to genus Phoenix or to Washingtonia. The Phoenix palms are relatives of the date palm, itself sometimes used. Being relatively slow-growing it is not so widely used as the Washingtonias. Until a few years ago the latter palms were known as Washingtonia robusta. It has been found that there are at least three distinct species, the best and hardiest being W. filifera. Another species, W. gracilis, is sold by seedsmen as W. robusta. Another smaller palm, Washingtonia sonoroe, is also used, and a glaucous coloured species called Erythea armata. Magnolias are not uncommon.

In Arizona few evergreen trees will survive the combined effects of frost and great heat even under irrigation, and the favourite tree is the Umbrella Tree (Melia azedarach), better known to us as the White Cedar or Bead Tree. It is usually topped to encourage the umbrella habit. The famous Magnolia Avenue at Riverside, consists of three rows of trees—Peppers, Blue-gums, and an alternating row of Silky Oaks and Washingtonias. These, with the Blackwood in the streets, form the bulk of the tree-plantings in Southern California, and serve as a striking object lesson of what can be accomplished among apparently unfavourable surroundings.—Agricultural Gazette of N.S.W.

Recent Investigations at Rothamstead.

Consideration attention has been paid to the conditions under which the production of plant food, and especially of ammonia, and nitrates, goes on. It has been shown that the process is mainly the work of bacteria, but that in normal soils the bacteria are not working at their maximum efficiency. A factor has been discovered limiting the numbers of bacteria and therefore the amount of decomposition they effect.

All the available evidences goes to show that this factor is biological. It is capable of growth, is put out of action by heat or antiseptics and can only be set up again by infection from outside: it does not, however, appear to consist of bacteria, and is provisionally identified with the protozoa, of which numbers have been found in all the soils examined. Partially sterilised soils from which the factor has been extinguished are found to contain larger numbers of bacteria than untreated soils and to accumulate ammonia and nitrates at a greater rate: they are, as might be expecected, more productive. Methods are being worked out for applying this kind of soil treatment on the large scale, but instead of setting up a large number of field plots to discover some cheap and convenient process, the simpler alternative is adopted of inducing horticulturists who go in for intensive culture to adopt some of the methods known to work. This has proved very satisfactory and has led to a considerable cheapening of the method, besides revealing some of the difficulties attendant on its application on the large scale.

— Plant Work. —

The amount of growth a plant makes in a given soil is known to depend on the connection between the plant nutrition work and the soil work. But a hypothesis is current, and is backed by sufficient circumstantial evidence to make it worthy of consideration, that inorganic plant poisons act as stimulants to growth if supplied in sufficiently small quantities. If this hypothesis were well founded it would introduce a wholly new set of factors into plant nutrition relationships, and would, in addition, form a basis for important practical developments. Very careful water cultures have therefore been made by Dr. Winifred E. Brenchley to test this hypothesis as completely as possible. The compounds tested have been copper sulphate, manganese sulphate, zinc sulphate, sodium arsenite arsenious acid and boric acid, and a wide range of concentrations has been adopted. Numerous plants have been tried, but on the whole barley and peas have proved most satisfactory. Copper sulphate was invariably toxic even in such high dilutions as 1 part of salt to ten millions of water. The effect varied, however, with the plant and was somewhat masked in presence of nutrient salts. It is not entirely simple. The fact that boric acid decidedly increased the growth of peas, but never that of barley, raises the interesting question whether boron is in some way advantageous to the pea and therefore to be regarded as a nutrient. Some specific effect is clearly indicated and the hypotheis is shown not to hold in its general form.

Starting from the other end, i.e., from the soil, an attempt has been made to ascertain whether any toxins are thrown off from the roots of plants that will adversely affect succeeding crops. A hypothesis to this effect has long been current, and has been defended by the United States Bureau of Soils. Plants have therefore been grown in succession in the same pots of soil, year after year, and their yields have been compared with those obtained when a rotation was adopted. The results were entirely negative and no systematic difference could be observed: we are forced to conclude that if any toxic property is developed in soil by the growth of a crop its effect is transient and does not persist long enough to affect a subsequent crop.—Monthly Bulletin.

Wealth Made by Chemists.

The expert chemist is an important figure in the industrial world to-day, a writer in the New York Sun truthfully says. He can earn not only fame, but also a large income, and he saves manufacturers many millions of dollars every year. Of course, nine out of ten chemists stick to the old routine, but the tenth goes in for industrial chemistry, and either allies himself to some progressive and flourishing manufacturer, or independently conducts his industrial experiments and spends his time and brains in devising schemes for the utilisation of by-products.

The development of the tremendous aniline colour industry is altogether due to chemical experiment with waste products. In the dry distillation of coal or wood for gas, the gas passes through a succession of washers, which take out its impurities. These impurities, including ammonia, carbolic acid, acetic acid, and various nitrogen compounds, were formerly waste, but are now separated and used. In fact, nearly all of the acetic acid in the market is secured from the dry distillation of wood. . . . The colour industry, which chemists called the greatest of the modern chemical industries, has called for other chemical developments. It demands large quantities of sulphuric acid, of soda, etc., and chemists have sharpened their wits upon the problem of obtaining these products at a minimum expense. Until recently the greater part of the sulphur used in this country was imported from Sicily. Now, through chemical processes, the sulphur occurring with iron, gold, silver, and zinc is liberated and burned to sulphur dioxide, from which almost all of our sulphuric acid is largely made. The silver contained in lead has also been freed and utilised. It was found by chemists that when the metal lead was mixed with zinc the silver formed an alloy with the zinc and floated to the surface. When this mass was taken from the lead and heated in a retort, the zinc, being volatile, was freed, and left a deposit so rich in silver that it was easily purified.

The applications of chemistry to mining processes are legion, but it is in other branches of industry that practical chemistry is now making its strides. The Standard Oil Company is a hardy exponent of the merits of industrial chemistry, and has expert chemists constantly employed. As for that matter, so have all the great gas plants, coke plants, sugar refineries, starch factories, etc. The original waste of the oil business was enormous; now it is next to nothing. . .

The dairy business is one of the industries with which the chemist is busying himself, and the results so far have been most satisfactory, although a much broader field for the use of casein is prophesied. The large creameries, having turned out their cream and butter, were confronted by great quantities of skim milk for which there was apparently no use. Skim milk was a drug on the market, and in many cases was drained off into neighbouring streams. The chemist stepped in and changed all that. The milk is curdled with alkali, and a dried product produced which is soluble in water. This casein has been used for paper-sizing, kalsomining, etc., and successful experiments have been made with it in the manufacture of artificial foods. Moistened with water to a gelatinous consistency, put under a hydraulic press, and then washed in acid, it forms a hard and insoluble substance, of which buttons and similar articles are made. Chemists say that the casein powder, which is like a fine tasteless flour, may be substituted for milk in cooking, and has a great future in this respect.

Chemistry applied to the sugar industry has been invaluable and, particularly in connection with the beet-sugar manufacture, has recently effected a wonderful saving. The waste in the making of beet sugar was at first enormous, because the molasses was absolute waste. It contains products from the beet-roots which give it a very bitter taste, and is also rich in an alkali which spoils its flavour. So, although more than one-half of the weight of the molasses was sugar, it was unavailable save for fermentation and alcohol. Experiment proved that dry lime, mixed with the molasses, combined with the sugar, forming a product insoluble in water. Washing the molasses would then separate this product from all the other elements. The lime and sugar product being heated with carbonic acid, the lime combined with the carbon, forming an insoluble product, and leaving the sugar free to be easily separated. By this process to-day 90 per cent. of the sugar is recovered from beet molasses, and there is practically no molasses in the beet sugar factories.

The glucose manufacturers have called in chemists, and found a new source of profit. The corn grain has, in addition to its starch product, a tiny germ in which lies its life principle. This germ was formerly crushed with the starch and then separated and thrown aside as waste. Of late it has been shown that this germ is rich in oil which can be utilised. The germ is now separated from the starch and crushed. The oil gathered finds a ready market and within the last five years millions of dollars' worth of this oil has been exported to Europe, where all corn products are in great demand. After the oil is taken from the germ the gluten left in the cake is used for varnish, and the residue is used for cattle food. The corn stalk also is ground and used for cattle food, but first the pith of the stalk is extracted and used for the lining of vessels, the theory being that if a fissure occurs in the framework of the vessel the pith lining becoming wet, will swell and to some extent close the fissure.

The cottonseed oil industry has eliminated its waste almost entirely although twenty years ago every part of the cottonseed save the oil was waste product. In the cottonseed oil factory now, the seed is collected after coming through the cotton gin, and is first stripped of its lint, which is used in the manufacture of certain kinds of paper, felts, etc. Next the shell of the seed is removed and either ground for cattle food or used for fuel. In the latter case the ashes are collected for potash. The kernel of the seed is ground and pressed to extract the oil, and the residue is used for cattle food. The oil in process of refining gives off a waste which enters into soap making, and the making of oleomagarine.

When steel is melted in a Bessemer converter the phosphorus, which used to be a nuisance, is separated from the steel by the introduction of lime, with which it readily combines. The phosphorus is then used as a fertiliser. —Scientific American.

Lime for the Soil.

Lime for agricultural purposes may be air-slaked before use, but another method is to take freshly-burnt stone lime, empty it out of the bags in a suitable place in a heap, and use a watering can to slake it immediately before use. About 1 ton to the acre is used. Quicklime is only used when the soil is strongly acid, or is rendered so by the turning under of heavy green crops for green manure or prickly pear. It can be used also for lightening heavy clay soils, at the rate of from 10 to 15 cwt. per acre.—Queensland Agricultural Journal.

Healing Ointment.

To make up an ointment use either lard or vaseline as a basis, and to 4 ounces of either of these add 1 ounce of turpentine and 1 ounce of eucalyptus oil. This well mixed together makes a useful ointment for wounds. All wounds should always be well washed with soap and water, or water with a little lysol added. To measure the ingredients, a tablespoon can be used, as when full of liquid it holds about an ounce. About six times the same bulk would represent 4 ounces of lard.

Poultry Notes

New Breeds.

Australians are not usually considered a conservative race, yet they seem to have a pretty thick streak of it running through their work in breeding poultry. In England and America, it would be considered a very slack season, which did not find at least one new breed or variety introduced to public notice. This has been going on for years, so that very few people could tell you offhand just how many varieties of Orpingtons, Rocks, Leghorns, and Wyandottes there are. Some of the newer varieties have come to stay, no doubt, but in most instances it has been a case of boomed by their sanguine owners and doomed by an unappreciative public. Beyond the Australian Game, we in this hemisphere, have been very moderate in fowl manufacture.

Two breeds we remember started in Sydney on what proved to be somewhat uneventful careers some few years ago. Both put up quite respectable scores at one of the earlier Hawkesbury competitions, but since then they have as far as we know, faded out of existence. One breed was introduced as the Imperial, we had some at the time, they were docile, worthy fowls, unexciting, but various in appearance, so much so that a friend suggested that if one half were Imperialists we ought to christen the other lot Little Englanders, which wasn't so feeble a joke as it looks. If they had had any chickens we might have called them Suffragettes, and they would probably have deserved it. The old birds made good eating if boiled with sufficient severity. They laid a brown egg—we use the singular advisedly—and they took their time over it. With regard to the other breed, beyond that we had some, or wanted some, and that the name began with B, we remember nothing. A dim vision comes to us of something smaller in size, sprightlier in action and more cheerful in colouring that sojourned with us for a time, which may have been them, or perhaps only the result of an open gate. The open door policy plays the deuce in the poultry yard just as it did in China. Berrillees, by the way, was the name of the second candidate for new breed honours.

Mr. Tom Penglase, of Hallet, bred some Duckwing Minorcas, which, if not a new breed, were certainly a new variety. They were shown on one or two occasions if we remember correctly, or perhaps it was only a photograph we saw. Mr. Penglase was good enough to send us some eggs. We took a lot of interest in those chicks, so unfortunately did a visiting cat. Mr. J. J. Gabb bred a strain of Columbian Wyandottes on straight out Brahma White Wyandotte lines, which he found a useful and attractive fowl. A small lot he sent to England in one of the consignments through the Export Department, made good money. Chittagongs, one of the many reputed ancestors of the Rhode Island Red, are certainly not a new breed, nor are Frizzles, but both are interesting. The former at least have been shown, and there was, we were told, a few years ago a fair yard of the latter in one of the suburbs. Mr. Von Bertouch was interested in Black Wyandottes at one time, and has, perhaps, persevered with them.

Our contribution to the manufacture of poultry at the most, however, has been small compared to the innumerable creations of American and English fanciers, which range from the fairly orthodox Cuckoo Orpington, Pile Wyandotte, and Partridge Rock, to the Excelsiors and Albions of half a dozen years ago, and the Buttercups, Daisies, and Exchequers of more recent times. Australia, maybe, cannot do much in fancy manufacture and nomenclature compared with her rivals, but in blending the American and English White Leghorns into the Australian utility article, they have done more than their share for the practical advancement of poultry.

We seem to have got rather off the track for we certainly began this par with the intention of saying something of Buff-faced Wyandottes into which Mr. W. A. E. Smith (President of the General Purpose Club) has put an amount of patience and perseverance worthy of a, we will not say better, but more profitable cause. Just how many years it is since we first saw some whitish birds with faint bluish lacing, which he introduced as the first step towards Buff Laced Wyandottes, we do not care to remember. Success came fairly quickly at first, and it is a long time since we saw a couple of cockerels at the then Black Forest yards, which in type and colour showed that the Buff Laced Wyandottes had really arrived. They were not as good as those Mr. Smith has occasionally shown since, but they were good enough for any man to be justly proud of breeding. "One more year and I'll have them right," said Mr. Smith, but a dog thought otherwise, as he took the precaution to devour the king-pin cock of the strain, besides doing divers other damage to the breeding pen, the dog proved to be the better prophet.. Since then Mr. Smith has bred a few chicks from year to year, just enough to keep the strain going, and can claim to have fixed the type, character, and colouring of a very charming variety of the handsome Wyandotte family, and has shown us birds which in type and colour are certainly superior to some imported birds which were sent over to Mr. H. P. Marshall some years ago. Whilst congratulating Mr. Smith on his success, one is almost tempted to regret that the same amount of careful, painstaking work should not have been put into a breed which would have added a monetary reward to the less practical results. A strain of Leghorns with the same amount of toil behind them, would, we think, have been likely candidates for competition championships. Speaking of these birds with a friend the other day, he said, "I wonder no one takes up the breed. I daresay Smith would sell out." Why not do it yourself? we naturally suggested. "Not I," was the reply, "Leghorns are good enough for me." So it is. Australians are not only conservative in poultry, but they have become intensely practical. Lots of people admire Buff Laced Wyandottes, but we have never heard anybody express a violent desire to buy them (we do not know that they are for sale), for it is undoubtedly true that the hen has a harder job in Australia than in England or America. There she can win on her feathers, here she has to put up figures, and they have to be mighty big ones, unless she wants to get lost in the crowd.

Fattening Turkeys.

The demand for turkeys has increased very much during the past few years, and prices have been on the incline, with the result that one of the most lucrative branches of the poultry industry is the rearing and fattening of turkeys. It is not proposed here to dwell upon the most suitable breeds, the best methods of maintaining the breeding stock, or the hatching and rearing of the chickens, but one should remember how vastly important is size in determining the value of a bird. There is a big demand nowadays for large-sized birds, and the larger they are the more money can proportionately be obtained for them. Thus it will be at once seen how important it is to have large-framed birds, and these can only be produced by using massive stock.

This call for size is to be deplored, because the large birds are naturally coarse, and do not possess the same fine flavour or texture as the smaller ones. If anyone wishes to enjoy a bird at its best, a young turkey hen should be procured, just before she commences to lay, about ten to fifteen pounds in weight. However, whilst these high prices can be obtained for the large birds it pays to breed them so, and all energies should be exerted in this direction.

During the summer and early autumn the turkeys should be given as much freedom as possible. During this time very little extra food need be given to the birds, as upon good land they are able to almost maintain themselves. There is no better form of food than that termed the "natural," being composed of worms, grubs, insects, seeds, and the like. Upon such a diet the birds thrive remarkably well, building up large, strong frames rather than flesh.

When fattening commences the birds should be fed liberally, receiving two good meals a day. First thing in the morning a feed of mash should be supplied. In the afternoon, when they have returned from their wanderings, a small feed of grain should be provided, wheat and oats being very suitable. This process continues for about a fortnight, when fattening proper commences, when the birds should be altogether confined, as during this period the desire is to add flesh on to the carcase, and not to increase the frame. They do not grow at all during this time, and thus all energies must aim at getting them as well forward as early as possible. The turkeys should be housed in a large, roomy shed, in which they remain the whole time, so that light and ventilation are matters requiring careful attention. It is essential that the shed or building used for the purpose shall be absolutely dry, as dampness is fatal to success in either the rearing or the fattening of turkeys. It is advantageous to use an open-fronted shed, enclosed with wire netting. This ensures the birds being kept comfortable, and yet at the same time allows them an abundance of fresh air so essential in successful fattening. The birds must not be over-crowded, and about fifteen feet of floor space should be allowed per bird. Perches should be provided—low ones are best, about thirty inches from the ground—and the floor beneath covered with some kind of litter.

Sebright Bantam.

The Sebright is a very old, but popular, variety of the Bantam tribe, and takes its name from the originator, Sir John Sebright, who commenced to fashion the variety in the year 1800. Two colours are bred, the Silver and the Golden, and although the former is without a doubt the most popular of the two at the present time, the latter can account for a large following of admirers, being a most striking example of what can be done in a variety by special care and management. In my opinion, says Mr. W. Powell Owen, one of the best judges of the breed, every feature of the variety is an art. The Golden Sebright, with its lovely golden bay or chestnut ground colour, and every feather laced or margined with black edging, lustrous beetle green, presents a beautiful picture, and is seen to great advantage on the show bench. At this juncture it would be befitting to say that the characteristics of the Golds and Silvers are exactly identical, except in the case of the ground colour, which is white or silvery-white in the latter, as opposed to golden in the former. The tail feathering in Sebright cockerels is quite unique, as they have no sickles or side hangers, being what is termed "hen-feathered." The Golds should be short in thighs and legs, compact in shape, with a neat well worked rose comb, well fitted on the head, broad in front, and tapering off to a fine leader. A comb that is ugly or coarse, and one that stands away from the head is most undesirable. The bird should possess a medium lengthend, but well arched, neck, back somewhat short, and a medium tail, carried well up. Twenty odd years ago a bird with a red face, comb and wattles, was a curiosity, only those with "gipsy" faces, purple coloured comb, wattles and ear lobes (pale blue centres) being then in vogue. In style the bird resembles a Fantail pigeon, for when alarmed or touched with a judging stick, it will thrust its head well back until it almost touches the tip of its tail. That it is a dainty bird of pride all my readers will agree, for it struts along with head carried high and wings well dropped, the latter in some cases almost touching the ground. The back, legs, and feet should be slaty blue in colour. Uniformity in lacing is an all-important point to aim at, with broad and short feathers regularly laced.

Redcaps.

In the early days they were often called "Pheasants,' 'and undoubtedly are a branch of the Hamburgh tribe. Anyhow, the lobe and comb were points of each sort which continued for years to trouble breeders of both kinds. White would come into the Redcap lobe, as also would red show itself in the lobe of the Hamburgh, and both Hamburghs and Redcaps were in those days called "Pheasants."

Who can look at the remarkable comb of the Redcap without surprise and admiration of that wonderful, massive crown of coral spikes, so entirely peculiar to itself, so thoroughly true to title, and so completely characteristic of the breed, dissimilar to all others? Whatever the alliance between the two in olden time, the Redcap and Hamburgh are now well severed at all points, so much so as to lead present-day fanciers to doubt as to any connection whatever between the two well-defined sorts.

The Redcap is a hardy fowl, a capital layer of large white eggs. It is a non-sitter, a big bird, and a useful one all round. They certainly ought to find favour amongst most poultry fanciers, but they don't! Probably it is their splendid coral comb which, from its huge size, has become the real trouble, like all excessive points of excellence. At the onset the trouble was to get enough of a circular coronet. Now it has become too much. In some cases it is a lop-over mass, too heavy a burden, cumbersome in weight, unsightly, and an obstruction to the bird's vision, necessitating its removal. There again "extremes meet" between perfection and ugliness, as in all things in human experience. The eggs of Redcaps are large and white, and from the breed, pure or crossed, you have an abundant crop, so don't lose sight of this meritorious old sort. They have been sadly overloked and underrated in their value of late years.—Exchange.

Differences.

— Poultry, Pigeons, and Other Fowl. —

The word "poultry" as commonly used is an exasperatingly indefinite term. It may mean so many things, that almost always it must be qualified to show which of its possible meanings is to be taken in which it is used. Everybody knows that it applies to a group of birds. The common members of this group are fowls, turkeys, ducks, and geese. It is these most people have in mind when they think, speak, or hear of poultry. But there are other less familiar birds which are readily recognised as belonging to the group. Guinea fowl, swans, peafowl, no one would think of not classifying as poultry. When pheasants are mentioned, which they rarely are, most people are in doubt. Popularly, the pheasant is classed as a game bird. The others that have been mentioned are domestic birds—some more domestic than others. There is quite as much difference in this respect between the fowl and the Guinea Fowl as between the Guinea Fowl and the pheasant. Then there is the turkey, which only began to be domesticated a few hundred years ago, which is still found in the wild state, and which in domestication retains a great deal of the nature and habits of the wild progenitor. The jungle fowl, too, supposed to be the wild cousin of all the domestic fowls, is unquestionably admitted to the poultry group; and the jungle fowl, as the poultry fanciers in India who have been experimenting with it have found, is quite as shy and wild and as difficult to breed in captivity as the pheasant.

So, while some dictionaries say or intimate that the term "poultry" applies only to domesticated birds, it is quite evident that such definitions are not admissable, and that to properly define the term "poultry," we must define it in accordance with some principle that will indicate definitely the difference between birds which are or may become domestic poultry, and birds which are not and cannot be poultry.

— Domestication. —

Domestication does not afford such a principle of division. Neither does usefulness, or the fact that birds of a certain kind are propagated especially for their usefulness to man. Pigeons are domesticated birds, and pigeons are useful, but pigeons are not poultry. Pigeon and poultry interests do not mix well. Pigeon fanciers, as a class, are in the poultry world—during the show season—but not of it. They join with poultry fanciers in associations to hold poultry shows, and have been doing so everywhere since shows were first held, yet the two interests remain essentially separate. Why is this?

Because pigeons and poultry are adapted to different conditions, and appeal differently to men. It would be difficult to analyse and describe the differences between "pigeon men" and "poultry men," though it would seem that there must be some typical differences of taste or inclination. The conspicuous differences between poultry (the common kinds) and pigeons are readily listed. Pigeons are "birds of the air," having powers of sustained flight, and nesting habitually in elevated and inaccessible places. Fowls and other land birds of the poultry group live and usually nest on the ground, being capable only of making a low flight for a short distance. When pursued or frightened their impulse seems to be to conceal themselves.

While domestic ducks and geese—especially the "improved" breeds—are the most easily restrained and kept within bounds of all domestic creatures, their wild kin, presumably from the same original stock, have powers of flight scarcely inferior to those of the pigeon.

Hence, assuming that the common usage which groups ducks and geese with fowls and turkeys as poultry, while excluding pigeons from the group, is correct, it is evident that difference in power of flight is not the essential difference between poultry and birds that are not poultry, though capacity for modifying birds in directions which reduce the powers of flight is unquestionably an important factor in domestication and in determining the sphere of usefulness of the bird in a state of domestication.

— Mating. —

A conspicuous difference between pigeons and fowls is observed in the mating habits of these two kinds of brids. Pigeons mate in pairs, and permanently—that is, permanently while both members of the pair live. On the death of one of a pair the remaining one usually seeks a new mate, though not infrequently reports are made of birds remaining true to the lost mate, and sometimes apparently dying of grief. As is well known, fidelity to the mate is not a universal and perfect attribute of all pigeons. Whether from the inclination of one of the pair, or because of the meddlesome importunity of an unmated bird, disruption of relations often occurs, particularly in large flocks of pigeons kept in confinement. But, in general, the union of pigeons for breeding purposes is monogamous and for life.

With fowls promiscuous polygamy is the rule. Some birds have their individual affinities and antipathies, but these are only interesting exceptions suggesting that it may once have been their habit to pair. Ducks in domestication, are like fowls in their breeding habits, except that the drake will not mate with as many females as the cock. In geese the young birds usually pair. After the first year the gander will, if there are unmated females about, mate with several in addition to his first mate, but in general these polygamous unions are permanent. Indeed, breeders of geese often find that when they arbitrarily break up established matings, and undertake to make the birds mate as the breeder desires, geese will not breed freely the first season in the new relations, and in some instance will not accept the new mates. Turkeys are more like fowls in their mating habits, though the turkey cock is more intolerant of the presence of rivals during the breeding season than the common cock. Among the rarer kinds of domestic birds kin to the admitted members of the poultry group, as Guinea Fowls and peacocks, the tendency is either to mate or to unite in very small families and permanently. How far this tendency would be modified if men found it to their advantage to breed these birds extensively, we do not know. Broadly speaking, the most popular and useful domestic birds are those which have most nearly lost the tendency to pair in permanent union.

For stock purposes a hen may be well worth keeping, and one that has proved an exceptionally good breeder should be retained as long as it is possible to breed from her.

Inducing Hens to Lay.

— From "Poultry." —

The problem which most poultry keepers face at certain seasons of the year is how to make their fowls lay. Big profits await those whose birds lay well at the right time; but most people's won't lay, and the profits, instead of being greater than usual on account of the high prices, dwindle away, and sometimes a considerable balance accrues on the wrong side of the ledger.

The first matter to take in hand in order to get eggs at the right time of the year is to get the proper kinds of birds. Here, of course, the necessity for careful breeding comes in, and it is mostly by attention to this matter that consistent good records have been put up by birds from some of our best utility poultry yards. But there is more than this. Not only should the birds be well bred, but they must be early hatched, so as to get time to mature properly before the scarce season comes round.

But neither birds well bred nor of the right age will ensure eggs if their treatment is not good. And it is necessary that this treatment should commence from the time the birds are hatched. Chickens, like cauliflower plants, should never have a check from start to finish. Their food should be always sound, well prepared, sufficient given, and in the early days fed frequently. Habits of activity and foraging should be fostered. In small spaces food should be buried occasionally under litter or loose earth, so as to encourage work. They should never be stinted, and never given so much that they will not pick it up eagerly. Then docility should be fostered. The fowls should be taught not to be afraid of their attendant, so that at no time should they be perturbed if he should enter their pens, even when they are sitting on the nest. Some birds are much more timid and harder to tame than others, but all are amenable to treatment if taken in hand early enough. They need to be taught that the attendant is their best friend, and that there is no reason to avoid him.

Egg-laying competitions have taught us much in the management of birds for laying, and amongst the important lessons imparted is that regarding the number of birds in a pen. It has been conclusively proved that a very few birds in each pen will result in very many more eggs than if 50 or 100 are in one pen, or allowed to promiscuously run hither and thither. This is a most important factor, and should not be lost sight of. The size of the pen admits of considerable variation, some of the best results having been obtained in very small pens; still, too small pens are not conducive to vigorous health, and the poultry keeper cannot afford to neglect this feature. On the other hand, it is generally admitted that birds can have too much liberty. A great deal of wandering in search of food does not seem to be an aid to prolific laying.

Shelter is an important provision, and at the same time, so is ample fresh air. Experiments recently carried out in America have shown that, in a far more rigorous climate than ours, open sheds have given the best results, when a period of two or three months was taken into consideration. On the other hand, cold, especially at night, greatly reduces the egg supply. It is, therefore, important that the roofs of fowl houses should be something more than galvanised iron alone, for this material lets the cold in very much, and cold comes in through the roof more than any other way. Yet galvanised iron makes the best of roofing, everything considered, and may be made thoroughly serviceable in winter by having boards or tarred felt nailed up temporarily underneath.

Feeding is half the battle. Time, variety, quality, quantity, and manner of preparation, must all be taken into account. It never pays for birds to remain long without food after they leave the roosts. If they are in small pens, and have little opportunity for forage, this is the more important. The poultry keeper who meets his birds as they leave the roosts with a well-compounded warm meal in cold weather, gets a good purchase on their egg-producing capabilities. The attendant himself can only gauge the quantity to be given; hence, upon his observation a very great deal depends. Birds do not require a hearty feed between the morning meal and evening, but if they are in confinement they require a little. Table scraps and green food, with possibly a very little grain if these things are short, will tide the birds over till evening, when, from an hour to half an hour before sundown, enough grain should be fed to satisfy them, but no more, as it deteriorates by lying on the ground.

To get first class results, some animal food must be given, especially if the birds are in small pens. From an extended observation, the writer is convinced that green cut bone is the best, apart from cost, notwithstanding, analyses which have been published showing larger quantities of nitrogenous matter in other commodities. This may be due to better digestibility, or to its power of assisting digestion. This subject is, however, beyond the scope of the present article. Fresh waste meat is always preferable to dried or preserved, but it should be well cooked, and is best mixed with bran and pollard or other meal.

The great value of grenstuff for laying birds has been amply demonstrated of late years, and every poultry keeper should arrange in good time for his birds to have a plentiful supply. Lucerne stands high in this respect, and where it cannot be obtained fresh, lucerne hay, well scalded, or chaff, which should also be scalded, should be substituted. This should be mixed with the morning meal.

One thing the poultry keeper should continually bear in mind, and this is comfort. He should always be on the watch for everything which will tend to the wellbeing of his birds, whose produce will be to a great extent proportionate to his care in this direction.

— Egg Shells. —

The commercial fowl, the profitable fowl of to-day, which by domestication and selection—by sitting eggs from the best layers year after year—is an unnatural production, but at the same time it is one of the most profitable productions, if properly treated, for the initial outlay of any stock that can be found on the farm. Quite apart from the question of ordinary food, is that of grit. Have farmers who keep poultry ever thought of the great strain put upon the birds under present-day conditions? Nature intended the bird to lay 14 eggs; it produces 14 eggshells; 14 frames of chickens. We ask them to produce anything from 120 to 200, and in selected laying strains even up to 250 and slightly over that. Therefore they have to produce that number of eggshells. In addition to that it should be remembered the hen lays eggs to produce chickens. No one yet has seen a chicken that did not contain bone. The substance to form the bone in that chicken must be in solution in that egg before it is laid. Therefore in addition to asking a hen to produce anything from 120 to 250 eggs and shells, we are also asking it to produce bone for the frame of that number of chickens.

— Chickens. —

Now just think for one moment what a wonderful machine has been evolved in the modern egglaying hen. Natural feeding cannot apply to her. The natural hen would obtain sufficient lime and other bone forming material from grasses and clover, insect life, etc., consumed, to store in its system, and at the right time of the year—the spring—be able to supply sufficient to form those 14 shells of eggs and frames of chickens. Then it has a spell for the rest of the year to recoup itself for the same exertion in the following spring, because it is a fact that a hen can store up in its own body those essential constituents. It will also call on its own frame to a considerable extent after it has used up the surplus. The frames of laying hens which have been laying heavily for some time and not been supplied with lime or other frame forming material have been analysed, and it has been found that the bone of a hen is sadly deficient in lime and similar constituent. It has been utilised by the hen in forming the bone of the chicken and eggshell, but it must be admitted there comes a time when that call upon the hen's frame ceases and when it does, eggs are not laid. Fortunately lime is very cheap and easily supplied to the hens. One of the best methods of supplying it is in the form of crushed shell. Unfortunately stores and others now sell shell which is simply gathered on the beach, and in many cases are far too large for the birds to swallow, the result being a large proportion of the shell is wasted, and possibly the unthinking poultry breeder, seeing this shell still lying about, does not give the birds any more as there is still a quantity in the run, although possibly all that was suitable has been long consumed by the birds. The ordinary broken beach shell answers the purpose admirably, as does broken oyster shell. An improved method of using the broken oyster shells is to throw them in with ashes—hot ashes from the fire—it will then be found that the shells can be broken up much easier than otherwise.

— Shell Grit. —

It should be remembered that shell grit has very little grinding power, therefore it is necessary to aid the digestion by seeing that the birds are also supplied with hard grinding grit in some form. But the shell grit will not do everything, although it will practically form the shell of the egg, and relieve the strain on the hen. We want something more to produce the bone frame of the chicken. And remember whether you are going to hatch chickens or not that bone has got to be available for the possible chick, or the egg will not be laid. This is also a simple and cheap matter to remdey. The ordinary bone, uncooked for preference, is smashed up as fine as possible, to that degree equal to coarse sawdust, and is then given to the fowls. That may be the only thing wanting; the only thing which may be preventing your fowls from laying eggs; and remember this, that no matter how well you feed, how much you feed, how good the quality of the food, how much care and attention you give the birds as regards housing, etc., if the hen has not the surplus of everything required for the formation of the normal egg, it is impossible for her to lay. To come back to the unthinking man who talks about the natural bird which he believes in keeping under natural conditions, he would claim that his natural bird also lays eggs. It does, but it lays the bulk of its eggs, if not all of them, in the spring and summer months. It has then in most cases spring and summer grasses and clover to feed upon. Now they contain four times the amount of bone or frame-forming material that any grain does, therefore the birds are scientifically feeding themselves. The birds are at liberty, and have a choice of feed at that time of the year, and they have the natural instinct which teaches them how to balance their rations. If the food you are giving them is of too fattening a nature, they would consume a large amount of grass. If it is lacking in nitrogenous matter, they would hunt for insect life, and more readily consume those classes of grains or seeds which is largely made up of those requirements.

Chapman Trap Nest.

The trap nest idea has been one of the most abused in poultry work for the reason that poultrymen have expected more than the inventors have hitherto been able to accomplish. No one, of course, has questioned the utility of trapnests in theory, but no one, as far as we know, has put on the market anything approaching a perfect nest until Mr. Chapman, of Port Pirie, S.A., hit on the idea, which, after a lot of hard work and careful experiment bore fruit in the shape of the Chapman Trapnest. There is no doubt that this nest claims to do a lot to help the poultryman and there is equally no doubt that it does just exactly what it claims to do. It appears to us that Mr. Chapman and his friends have been particularly careful not to overstate the case in any shape or form. They will be pleased to send the fullest particulars to anyone who wants to get a solid foundation for his poultry work. Such foundation of individual performance and individual pedigree is essential.

Roup.

Roup is a dreaded disease that attacks the birds of all kinds in fall and spring, that sooner or later affects the whole flock and sometimes develops into canker, blindness, consumption, paralysis, and disease from head to foot. Apparently roup may be cured, but if a male bird has it, discard him for a breeder (says an American correspondent). His offspring will surely have symptoms at two weeks old or in a day or so after hatched, making small and poor layers, not paying for trouble and feed, and no matter whether you keep poultry for pleasure or profit, results are what you want. Kill that male, it makes no difference what the cost; get one that is guaranteed never to have had roup, and notice results of his chicks. Don't look for a prizewinner and score card only, but a bird of vigorous health and vitality, and good layers will be his offspring.

To keep white birds from turning yellow feed salt in their mash; it will make their feathers white as snow. Dry salt will kill fowls; it must be fed in mash for results in digestion and roup and white feathers. I have lost males at moulting time that would develop some form of roup and hens that were valuable would go blind. They would look all right, but would starve to death. Now say from years back the male had the roup handed down to him, and the germ was transmitted to all his chicks, when he should have been salted with the hatchet. Farmers become disgusted, and the man says: "Jane, take those chickens to market that are left." It is a mean practice that could be stopped by salting the male. Have a healthy male in your breeding pen. I never have roup in my fowls now. I learned by close study where it could be prevented. I wanted best results. Sometimes my fowls have colds, but they are salted with a preventive of roup. An ounce of prevention is worth a pound of cure when diseased with roup.

Hints.

Age is a factor which affects in no little degree the value and usefulness of a fowl. This is a point which many who keep poultry—and some in large numbers—do not thoroughly realise. If they do, they pay very little or no regard to the matter.

Farmers are many of them culpable in this respect, and among their flocks, birds are to be found which have long passed their day of usefulness for egg production.

To possess a knowledge of a fowl's age should be made a point of especial care, and a poultry keeper ought to know the age of each individual bird on his ground.

When a bird becomes too old to yield a profit beyond its cost in food it should be disposed of, and not allowed to diminish the profits that may be made from other birds.

To what age a bird may be expected to yield a profit and be worth keeping, depends on the bird and the purpose it is intended to serve. As a layer the limit is two and a half years.

For egg production a hen ceases to be profitable after its second season, and it should then be disposed of.

For sitting purposes and rearing it is well worth while to retain some birds. A hen that is likely to be useful as a good sitter and mother is worth a good deal in the breeding season.

Lice.

Warm weather breeds lice, but I guarantee the following mixture will kill 'em quicker:—Dissolve 1 lb. of napthalene scales in a gallon of kerosene and allow to stand for two days, when it is ready for use. Paint the inside of a large case with the solution, place eight or nine birds in same, and cover with a piece of bagging, leaving them in it for half an hour, and the fumes will have killed every louse. The one painting will last for about two and a half hours, so a goodly number of birds can be done with one application. Repeat the operation in two weeks' time, to kill any eggs which might have hatched since the previous operation, and with ordinary care and and a regular dust bath "biddy" will be a happy creature, and will repay you well in extra eggs. Paint perches and all crevices well once a week, and you will find yourself and hens free from the greatest poultry enemy and pest. Three applications at two or three days' intervals will thoroughly cure scaly leg, and is perfectly harmless to the birds. Cost, to last for 30 hens for six month, is about: 1 gallon kerosene, 8d., 1 lb. napthalene scales 1/4, total 2/.—Exchange.

Home Notes.

Home Hints.

When putting away canned fruit and vegetables, jams, jellies, etc., label each glass or can with the name of the contents, wipe clean with a damp cloth, and set in a dark, dry closet.

Tomatoes can be served in many ways. There should be an abundance to use when fresh, and plenty to can, pickle, and make into catsup.

It may be impossible to exterminate the flies and mosquitoes, yet this danger and trouble may be greatly lessened by the proper use of screen doors and window screens. In this day of inexpensive screens and wire cloth there is no excuse for any householder of even moderate means being without screens, which add so much to the comfort, health, and security of the home. Messrs. Davis, Brown, & Co., make a special line of these necessities.

If a bruised beetroot is boiled, the juice and colour is lost and injured, but if baked instead, the root will, when cooked, come out as juicy and perfect in colour as if it had not been injured.

During the hot months, when the preservation of fresh meat is a problem constantly needing attention, it is well to remember that meat should never be laid directly on ice, as it extracts all the good meat juices.

Beans, when fresh, young, and tender, are most delicious, and should be cooked immediately after being picked to be at their best. If, for any reason, they have lost some of their natural sweetness, they may be improved by a bit of sugar.

Beetroot is a very healthy, wholesome, and nutritious vegetable. It contains a large quantity of sugar, and should be more freely used than it is.

Fruit juices will prove a delightful and welcome addition to the housekeeper's store. Prepare the fruit as for jelly, heat until soft and broken, turn into a jelly bag, and drain. Return the juice to the fire and heat until boiling hot. Stand sterilised bottles in a pan, with a wet cloth beneath them, and fill; insert the corks firmly, and immediately dip the top of each bottle in melted wax. Almost any desired fruit may be treated in this way, and the result will prove invaluable to concocting delicious beverages, flavouring puddings, and other desserts. The clever housewife will find innumerable ways for their use. Sugar may be added when they are bottled, but we prefer most of them without this addition and therefore can use them in a greater variety of ways.

"School Gardening" writes on enthusiastic believer in its potent influence for good, "costs, labour, time, and money. Yes, all these, but the investment pays large dividends. To note the educative influence on the children, to observe the effect on some of the home gardens, to find that the very roughest boy will carefully protect the flowers from injury, to see how proud the parents become of our school garden, to enjoy the wondering surprise of the stranger when told that no plant is ever maliciously injured or stolen, to realise that such a yard may prove an effective object lesson to some fellow-workers. These are some of the rewards.

The frame surrounding a picture should harmonise with and enhance the beauty of the picture itself. A setting of pure gold seems none too good for a painting of great merit. On the other hand, to place around an inferior picture a pretentious frame, means poor taste on the part of the owner. Such a misfit emphasises the defects, and the gaudy frame brings out in strong contrast the poverty of the picture. So in dressing loud colours and over-dressiness of even good clothes emphasise any lapse from the most perfect personal cleanliness and any neglect of the hundred and one little niceties of a woman's toilet.

Success in life does not depend on having immense brain power or a high class and expensive education. Nothing of the kind. The secret is the ability to use the brains you have, and hundreds of men fail because they do not know how to do so, and will not take the trouble to try.

— Stuffed Shoulder of Mutton. —

Ask the butcher to bone the mutton, as a shoulder is a difficult joint to do at home. Fill the cavity with veal forcemeat, cover with buttered paper, and tie securely. Bake in a moderate oven, basting frequently, and serve with a garnish of baked tomatoes.

Cleaning the Storeroom.

Have the room thoroughly cleaned before the contents of the various trunks are touched. Then, after trunks and boxes are emptied, the floor may once more be brushed up. It is well to wipe the floor and the inside walls with a weak solution of chloride of lime, and the insides of boxes that are to contain woollens may be painted with a strong solution of the same. This is sure death to all moths and other vermin, and will destroy any eggs which may have been deposited in crack and crevices.

Perhaps there is no other time when the housekeeper sighs, "Blessed be nothing!" as when looking through the accumulation of "things" in the attic.

Said one woman: "The curse of my life is the things that are too shabby to wear and too good to throw away." Of course there are the deserving poor, and there are missionary boxes to be supplied with cast-off articles, but one would hardly send to the wife of a missionary a low-necked and short-sleeved white satin bodice which is now too small for the owner's portly figure.

I seriously doubt the advisability of keeping many cast-off gowns. They gather moths, and are seldom altered to satisfaction after they are so shabby as to be once relegated to the attic. If a dress is perfectly good, and its only fault is that it is old-fashioned or too small, it is well to keep it on the chance that it may sometime be successfully combined with some other material and made over. Dresses that are shabby should never be put in a missionary box, but may be turned over to the rag man.

When the summer clothes of all the members of the family are brought out, the winter apparel must be put away in good order as to buttons, button holes, rips, and tears. When they are carefully repaired, brushed in the open air, and sunned, they may be wrapped in tar-paper, with moth balls in their folds, and packed down in a trunk or case which has a tight, close-fitting top. Any light clothing which is not to be used this season must be aired and put away again. The rag bag and piece trunk are frequently neglected by otherwise careful housekeepers, but they require painstaking examination, as they are too often the breeding places of the wily moth.

During the summer months the windows of the attic must be opened frequently, and the breezes allowed to stray into all the corners, which should never be allowed to become musty. It is also an excellent plant to leave the attic windows open on clear nights in summer.

Tried Recipes

— Fish Pudding. —

Line a basin with some pastry; cut the fish into convenient sized pieces, and dredge with salt, pepper, flour, and a few minced savoury herbs. Put the fish in the basin with the forcemeat balls and some pieces of fat bacon; add some fish stock which has been thickened with butter and flour. The trimmings of the fish may be utilised for the stock. Fill the basin completely, cover with crust, tie in a cloth, and boil for two hours.

— Vermicelli and Apple Pudding. —

Boil a quart of milk with a strip of lemon peel, add four ounces of vermicelli, and simmer for half an hour. When cool sweeten with four or five ounces of sugar, and beat in two eggs. Pare and core some apples, and put a bit of grated lemon peel in the centre of each to flavour it. Put some of the vermicelli in a piedish, lay in the apples, cover with the rest of the vermicelli, and bake in a very moderate oven till the apples are quite soft. This is a nice pudding either hot or cold, but in summer it is generally preferred when served cold.

— Stone Cream. —

A pint of cornflour blancmange, two sponge cakes, jam, lemon juice, almonds. Mix two ounces of cornflour smoothly with a little cold milk. Boil a pint of milk with an ounce of sugar, pour it on the cornflour, stir well till it thickens, boil for five minutes; when somewhat cool flavour with a few drops of vanilla. Crumble the sponge cakes, put them in a glass dish, spread with a layer of jam, grate the rind of a lemon and squeeze the juice over them. Pour the blancmange over while still warm. Let it stand till cold and set. Decorate with blanched almonds cut in strips.

— Marrow on Toast. —

Break up two boiled marrow bones and scoop out the marrow. Make some small squares of toast; butter these, cover with the marrow, and sprinkle over with finely chopped parsley, pepper, and salt, and a few drops of lemon juice. Serve very hot.

— Plum Gateau. —

Soak an ounce of gelatine in half a pint of water. Remove the stalks and stones from a pound or so of plums. Boil a quarter of a pound of lump sugar in half a pint of water for ten minutes. Add the gelatine to this syrup, also the plums, and a few of the blanched kernels. Pour into a border shape which has been previously rinsed with cold water. Turn out when set, and serve with whipped cream in the centre.

— Devilled Sardines. —

Drain the sardines from oil, and bone a sufficient number. Make some hot buttered toast, cut it into fingers, and place a boned sardine on each. Sprinkle with cayenne, and put in the oven for a minute or two. Serve when quite hot.

— Chocolate Shape. —

Two ounces of gelatine, six ounces of chocolate, quarter of a pound of castor sugar, a pint and a half of milk, four eggs, threepennyworth of cream, flavouring of vanilla. Soak the gelatine in cold water, putting sufficient water to cover it completely. Put the milk, chocolate, and sugar in an enamelled saucepan over the fire till the mixture thickens, but do not allow it to boil. Beat up the eggs thoroughly, strain them into the chocolate; add the dissolved gelatine, cream, and a teaspoonful of vanilla flavouring. When cool pour into a mould to set. Serve with whipped cream, sweetened to taste, and coloured pale pink with cochineal.

— Plum Tart. —

Stalk and stone a pound and a half of plums; heap them in a piedish with plenty of sugar. For the pastry, put three-quarters of a pound of flour in a basin, with a pinch of salt, half a teaspoonful each of castor sugar and of baking powder; mix well, and make into a stiff paste with the white of an egg whisked to a froth and a little water. Roll out the pastry till about a quarter of an inch thick, spread three ounces of butter over it, fold the pastry in three, turn, and roll again. Spread another three ounces of butter, dredge with flour, and roll out again. Make a border for the edge of the piedish, cover with the rest of the pastry, brush over with white of egg, and bake in a brisk oven. Serve cold with cream or custard.

— Pineapple Ice Pudding. —

Peel a pineapple and cut into small dice. Put it in an enamelled stewpan with three ounces of castor sugar and half a gill of water; simmer for half an hour. Strain the syrup from the pineapple, add the juice of half a lemon and mix with a pint of double cream. Half freeze the mixture, then stir in the pineapple. Turn into a mould and place in ice and salt till required.

— Coffee Cream. —

Mix half a pint of milk and half a pint of strong coffee, dissolve an ounce packet of gelatine in the coffee. Whip a pint of double cream till stiff, add four ounces of sugar, and stir to the coffee and gelatine. Mix well and pour into a wet mould. Leave till set.

— Fig Pudding. —

Half a pound of figs, four ounces of sugar, six ounces of suet, four ounces of flour, four ounces of breadcrumbs, a pinch of salt, an egg, a pinch of mixed spice, and two tablespoonfuls of treacle. Cut the figs into small pieces; mix all the dry ingredients; add the egg (previously well beaten), the treacle, and a little milk if necessary to moisten the pudding. Boil in a greased pudding basin for five hours.

— Tapioca Soup. —

Take some of the water in which rise has been boiled for curry, or in which beans or macaroni has been cooked. To two quarts of this add a sliced turnip, carrot, and onion, and an ounce of pearl barley, previously scalded in boiling water; also add a bunch of herbs and half a dozen peppercorns, and boil for two hours. The vegetables may first be fried in butter or dripping, but without browning them; the stock to be added afterwards. Steam, and add four ounces of crushed tapioca to the stock; boil again till this is transparent, and serve.

— Milk Soup. —

Boil three large potatoes and the white part of a leek in a quart of boiling water, together with an ounce of butter, pepper, and salt. When the vegetables are quite soft, pass all through a sieve, and add a pint of milk. When the soup is boiling throw in an ounce of crushed tapioca. Boil till the tapioca is transparent, and stir frequently to prevent it from lumping. Serve with fried croutons.

— Chicken Pudding. —

A chicken, quarter of a pound of ham, seasoning, stock, a few mushrooms, suet crust. Make the crust with a pound of flour and eight ounces of finely chopped suet, salt and water to mix. Line a pudding basin with two-thirds of the pastry. Cut the chicken into neat joints; put these in with alternate lays of ham; season the whole, and add a little good stock or gravy. Cover with the rest of the pastry, and join the edges securely. Cover with a scalded cloth, and boil for two hours and a half.

HORTICULTURAL DEPARTMENT

Garden Notes for April.

April may be said to commence the planting which for the next six months will keep gardening busy. First in importance come the evergreen trees, shrubs, palms, and climbers, which if put out early will get the benefit of the summer warmth, which still remains in the ground; without the sun heat, which makes the result of earlier planting more uncertain, whatever is put out this month, will, with reasonable care, get well established, make good root development, and perceptably increase top growth before winter. If we get the proverbial, but uncertain April showers, the reasonable care is reduced to a minimum, but if the month is dry, watering must not be neglected. In planting from pots, it is not wise to make too much disturbance of the ball, but the longer roots should be straightened out. If the ground you are working on is not nicely moist and mellow, have a supply of fine sandy soil at hand, for packing around the roots. Any trouble taken at planting time is well repaid later on.

— Don't Scamp. —

It is a pity to scamp any garden job, but more particularly tree planting; for mistakes and neglect are difficult to rectify in after years. If the tree or shrub to be planted is one of the larger growing sorts, be sure that it is placed in just the position you want it, not as it is now, but as it will be in time to come. Dig the position selected deeply, and do not grudge doing a good wide margin around it. See that no impervious layer of soil is allowed to remain which might block the roots from getting down to cooler, moister conditions than they can get near the surface. If the ground is poor, thin and hungry, remember that to some extent it can be cheaply improved; a pound or two of bone dust well scattered through the patch turned over may do wonders, not to-day or to-morrow, but a year or two hence. If you have no bone dust, you can take comfort in the thought that there is must virtue in old bones, and some in old boots, either of which are not difficult to come by. There is also a lot of solid stick-by-the-ribs or roots nourishment in the hoof, hide, or horns of any animal. This is the sort of manure which pays you back, like some debtors, after many days. Good, but slow.

— Gerbera Jamesoni. —

The Gerbera Jamesoni and its hybrid varieties are not perhaps the easiest plants to handle, but they make up for it by being some of the most beautiful. A day or two ago we had the pleasure of seeing a bed of them, splendidly grown, and just coming into bloom; an ornament to any garden, and a delight to any gardener. As yet only a flower or two had opened, a beautiful pink, and a vivid crimson, three inches, perhaps, across, but the wealth of buds poised gracefully above the handsome foliage gave promise of exceptional beauty to come. The grower gave us their history in brief, somewhat as follows:—"Small packet of seed, April last year; Hackett's; sown singly; small pots; cool frame; germination not too good; early growth slow; planted out, October; kept growing; quite simple; cost, half-a-crown. Pleased? "Well, what do you think?" We did. It was not untinged with regret that circumstances rather than inclination prevented the wholesale removal of the bed to a place where we could see it more often. We certainly forgot a certain commandment, though we do not, by the way, remember that flowers are specifically mentioned, as amongst the possessions of a neighbour which one may not covet.

— Iceland Poppies. —

Iceland Poppies are not one of the popular favourites in and around Adelaide; probably our climate is a shade too much on the warm, dry side for them to be perfectly happy amongst us. Their name certainly seems to suggest a preference for cooler conditions. In Victoria they do grandly, and readers who have visited Melbourne, Ballarat, and the Gippsland country in spring will remember the beautiful displays of this perennial member of the Poppy family. This Iceland cousin lacks the delicacy of texture and wide range of colour of its Shirley relative, but in yellow, orange, and bronzy-brown shades, and its habit of growth, there is no need for it to take second place to any member of the family. The present is a good time to try a packet of seed wherever you are situated, but especially if you are gardening in the hills or cool districts.

— Mildew. —

Mildew usually troubles the rose grower at this season of the year, particularly when there is much moisture in the atmosphere. Heavy dustings of flowers of sulphur is the simplest remedy. A good deal will apparently be wasted unless you work with a blower, and the foliage is damp, but even the stuff which falls to the ground probably does some good, and certainly no harm. Indeed, some people do not trouble to dust the plants at all, believing that just as much benefit is secured if the sulphur is thrown over the bed and around the plants. When the sun temperature is sufficiently high this no doubt is quite a good plan, and in any case, in combination with other soil constituents, sulphur is said to rank high as a manure.

(Continued on page 484).

Some Desirable Perpetual Carnations.

Messrs. Errey Bros., of Camperdown, Victoria, have very kindly sent us the following interesting notes on the flower which they have so successfully made their special study. We have no doubt that what they write will prove helpful to many of our readers.

If, in Shakespeare's time, as Perdita declares, the carnations were "the fairest flowers of the season," one is inclined to wonder what Perdita would say of the carnations of to-day, and whether a glimpse of some of our modern beauties would not have sent her post-haste for the "dibble" (which is no reference to the character of Perdita's "patron saint"), wherewith to "set slips of them." Great improvements have been made in many of our garden flowers of late years, but it is doubtful if any one of them has had more attention bestowed upon it than the carnation, or with more gratifying results. Though we have still very far to go before perfection is attained, and doubtless it will be possible to say the same thing generations hence, yet any considerable advance on the road to that goal gives cause for gratification.

With the great increase of interest in the question of carnation improvement, and the consequent multiplication of varieties, it is not surprising that many with limited requirements should find the selection of suitable varieties a formidable undertaking. Therefore we trust that a few brief notes on some of the most prominent varieties in a collection of several hundred carnations, selected from the standpoint of general utility, will prove of interest to your readers.

New varieties of this year may seem out of place in an article of this kind, and we would prefer to keep to those which have proved their claim to the title of standard varieties, but a few of the novelties are of such outstanding merit as to demand attention. Prominent among these is "Miss Edith," a very fine white perpetual which originated in the garden of a well-known Brisbane carnation fancier. We do not know what reputation "Mrs. G. H. Kerslake", bears among your S.A. readers; but N. S. Wales and Victorian growers unite in bearing testimony to its splendid qualities. Of the three varieties which have been obtained as sports from it, namely, "Robt Williams," "H. Gazzard," and "Kerslake's Yellow," we would select the last named as the most desirable on account of its lovely color, which, combined with the large size and exquisite form of the flower and the vigorous habit of growth which all the family possess, makes it indispensable in the smallest collection. It is not long since we were badly in need of both white and yellow selfs in smooth-edged or "show" perpetuals. "Kerslake's Yellow," splendidly supplied the want in yellows, and now, strangely enough, it has supplied the white self also, for "Miss Edith" is a pure white sport from this variety. We see no reason why it should not have as great a future as its distinguished parent.

For the benefit of those who have not grown the carnations, "Mrs. G. H. Kerslake" and its "sports," it should be said that they are not as perpetual flowering as, say, the American carnations, or as some of our free-blooming Australian perpetuals, and this is sometimes made cause for complaint. But the carnation fancier is fortunate indeed who can afford to leave any of them out of his collection on that account. Before leaving them we might say that, of the two needing description, "Robt. Williams" is a rich-colored fancy of an orange ground color, barred with bright red or scarlet. "H. Gazzard" is a white ground fancy, pencilled with rose.

Another very promising new carnation we must mention is "Galicia," a large flowered yellow ground perpetual having an excellent calyx and vigorous habit of growth. It resembles closely "Kerslake's Yellow" in all but color, being a seedling from that variety. Of the new carnations from New South Wales, which we tested last season, "Gold Lace," and "Isabella" stand out ahead of anything else. "Isabella" belongs to the decorative section, being a fine large crimson self with fringed petals and a strong calyx. "Gold Lace," on the other hand, is of the smooth, clean-cut show type, and possessing qualities which make it a good "all-round" carnation. The colour is yellow, striped with scarlet. We recommend this as a perpetual which will appeal to keen exhibitors.

There is another of this year's carnations which we must not forbear to mention, for it is a sport from "Enchantress," namely "Washington." In fact, if there were a dozen new sports from Enchantress we should have to notice them all, for we join with growers all over the world in describing "Enchantress" and its "sports" as the finest of all the American carnations. This latest sport is a pink self of a color midway between that of "Rose Pink Enchantress" and the "Mrs. Lawson" color. The rest of the "Enchantress" family are, "Helen Gould," silvery pink, pencilled with carmine; "Rose Pink Enchantress," salmon rose; and "White Enchantress." All have the same large flowers and excellent constitution of the original variety, and are all worthy of a place in the smallest collection of American Perpetuals.

Having commenced upon the American carnations we will note very briefly a few other standard varieties which should not be overlooked when making a selection. "Beatrice Jean" and "Othello" are two excellent crimsons, while in whites there is a choice between "White Perfection" and "White Wonder." White Wonder is reckoned by some growers as the better of the two, but we still prefer the older variety. "Scarlet Glow" and "Beacon" are two scarlets of first-class quality. The latter should not be allowed to bloom in the spring, but be reserved for autumn and winter flowering. There are many good pink selfs, but beside those of the "Enchantress" family we will just mention:—"Mona," bright rose pink"; "May Day," salmon flesh"; "Salmonia," deep salmon"; "Mrs. T. W. Lawson" and "Mrs. C. W. Ward," cerise. A very fine white ground perpetual in this section is "Winsome"; colour white, with deep rose pencillings. With us it gives an unusual percentage of large, beautifully formed flowers. "Glendale" is another of the same type.

Though several of the carnations just mentioned are of Australian origin it is customary, for convenience, to class all perpetual carnations having fringed petals as "American" or "decorative" carnations. On the other hand, that delightful class of perpetuals which has been evolved in Australia is dubbed "show," simply because its petals are smooth edged. We suppose these carnations are generally accepted as the most suitable for garden cultivation in Australia, and, of course, for exhibition also, so we will not waste time in commending them as a class, but pass on to notice a few of the most desirable for general purposes. Among the best of these is "Sabine," a large flowered variety with perfect calyx, stiff flower stems, and robust constitution. It is one of the carnations to which the term "ever-blooming" may be justly applied. Color blush white, laced with rosy cerise. "Leura Scarlet" was raised at Camperdown, so we are reluctant to describe it as the best garden scarlet in this section, yet we are unable to put any other scarlet beside it from the garden or decorative point of view. It is not an exhibition carnation but is first class for all other purposes.

Among crimson selfs "Sultan" and "Corangamite" in the darker shades, and "Frank Errey" in bright crimsons, are all to be recommended. "Corangamite" has the largest flowers, and it and "Sultan" flower most freely. "Sultan" and "F. Errey" are the best for exhibition. In yellows and yellow ground fancies we have already noted "Kerslake's Yellow," "Mrs. G. H. Kerslake," and "Gold Lace." In this color the list of desirable varieties is a long one, so we can only mention a few which should not be passed by in any case. "Tessie McGann" will be too well known to your readers to need any description, and another of somewhat similar color is "Lucy Manette." In other ways these two are not at all alike except that both are carnations of the first order. "Raphael" and "Laurence" are also good yellow ground fancies, the first named being at its best in autumn.

Some of the best of the white ground perpetuals are:—"Ivernia," having large flowers of the best show type; color white, edged and marked with rosy scarlet; "Gazelle," also a fine exhibition variety; color white, laced with carmine; and "Estelle," white, heavily edged and marked with scarlet. "Chevalier," "Chrissy," "Cassida," and "Bernard" in w.g. perpetuals, and "Mrs. A. Waterhouse," "Brilliance," and "Militum," in other colors are all worthy of detailed description, but we fear your readers will refuse to endure much more.

For fear of wearying them we have passed by many we might have included, and, for the same reason, have ignored the many excellent carnations in the spring blooming section. Probably, too, we have failed to mention some varieties which are well worthy of notice, but which for some reason have failed to reproduce their true form with us. If so we trust some of our fellow-fanciers will remedy any such omissions, and conclude with the hope that our notes will prove of some little service to your readers.

Coal Ashes.

The ashes of both soft and hard coal contain little more than traces of potash and phosphoric acid, and as plant food are almost worthless. For stiff, clay soils, however, they usually have a desirable loosening effect, and as a top-dressing and mulch, especially in fruit gardens, etc., they are very beneficial. Still, the best use that can be made of them perhaps is to sift and put them under the hen roosts as absorbents, or use them in a similar way in stables, etc. Sifted coal ashes absorb liquids, fix volatile ammonia, and prevent offensive odors.

Streak Disease.

Streak disease in Sweet Peas appears to be causing English gardeners a lot of trouble. Many remedies and preventives have been suggested but little appears to be definitely known either as to its cause or cure. The National Sweet Pea Society is now offering a prize of ten guineas and a gold medal to the first person who can prove to the satisfaction of the committee that he or she has a cure. As arrangements are being made to thoroughly test all reputed cures, it should not be long before something more definite is known on the subject.

(Continued from page 481).

— Buying Bulbs. —

In buying bulbs do not forget that the best flowers naturally grow from the best bulbs. A good bulb, as long as it is well-ripened, is one which is clean and big, feels solid, and weighs well for its size. There are good and not so good bulbs in every seedsman's supply, whether imported or grown locally, and as most buyers pick, or try to pick, the good, the proportion of the not-so-good increases as the season advances; and the last man is apt to be left with less than his full share of good. The remedy for you is simple. Don't be the last man—or woman. Buy now.

— Dahlias. —

We shall soon be in the thick of the Dahlia season. All tying and staking which has so far been neglected should be finished at once. Liquid manure where it has been used, or is begun, should not be continued after the first flowers come; and this applies equally to autumn Roses and Chrysanthemums. Keep the ground around the plants continually stirred, and do not grudge a liberal supply of moisture; at the same time it should be remembered that they want a drink, but not a bath. For those who have grown single and other varieties from seed, the time is one of pleasant but anxious anticipation, for there is a double dose of uncertainty. Colour and form are still in most cases doubtful. To hope for the best and be prepared for the worst is best as the seedlings come into flower. What generous doers and doners they are. Sown as late as November or even December, they have been growing full steam ahead without a check ever since, and this month they are going to tell you the result. One good flower rewards you well for the sixpence or shilling paid for a packet of seed, and you may of course be much more fortunate than that. Don't trouble about the failures; just make short work of them and try again next year.

— Roses. —

It is early to talk of rose planting yet, but the sooner the preliminary working on new ground to be planted is taken in hand the better. If you have not decided on varieties, this month is a good one to make a choice. Having made your selection, don't leave your order to the last moment. Your little order, of course, is not going to worry the nurseryman, but if many similar little orders come in and all want prompt despatch, that nurseryman's life does not err on the side of too much peace and quietness, at all events for the time being. You expect him to do his best for you, of course; then just do what you can for him. It is quite as easy to make up your list now as a month or two hence. Do so, and send it along. It will give him an idea of what will be wanted, and you may then be sure that when you are ready for the plants, the plants will be ready fof you. Having made the list and sent it, do not begin to tinker with it and find that you want this or that alteration. If you are that sort of person, leave your order till the last moment, send it by first post, and specially ask that the goods shall be sent at once. Your opportunity of changing your mind will thus be reduced to a minimum.

— Planting Bulbs. —

When you get a lot of good bulbs don't spoil a good beginning by poor treatment. The average bulb is a hardy proposition, but there is no need to abuse this good quality. You can get fair flowers in a gravel path, but you can get much better ones in a well-cultivated bed. A bulb by nature is abstemious, not by way means a glutton for food or water; don't, however, take this to mean that it thrives on a starvation diet. A fair share of old manure will do much more good than harm, but be sure that it is old. It is the ammonia given off by fresh manure that they object to. Do not be afraid of a partially-shaded position for your Daffodils; the flowers will be all the richer and brighter if they do not have too continous a share of direct sunlight. The flower stems and foliage will come through quite a thick covering of soil; they will also grow and thrive reasonably well even if the bulb is almost on the surface, but if the top is about one and a half times its own depth below the surface, that is, a bulb 2 in. deep should have a 3 in. covering, so that the roots will start at five inches below ground, that bulb will have no reasonable cause for complaint. Planting a little deeper in light sandy soil than in extra heavy loam is perhaps advisable. In rich soil or where the ground was heavily manured for the summer crop, there seems to be little to be gained by artificial manures, but in poorer positions Basic slag or mineral super at the rate of 1 lb. and sulphate of potash at the rate of ½ lb. to 8 square yards of bed or row, will do good. Never plant when the ground is sodden.

Sweet Peas.

(A paper read before the Horticultural Society of New York.)

The following from "Horticulture" is by an American grower, but it is quite as useful for us as for those for whom it was written. One gathers that the prdouction of exhibition blooms is as serious, as painstaking, as back-aching, and as engrossingly delightful there as it is in Australia. All honour to men who do and give their very best to making yet more beautiful one of the most charming flowers that grow. In this case, at least, a few labour that all may enjoy. We have heard it said that the little extra quality of a few blooms on a show table are not worth the effort to secure it. If the superiority of the few blooms began and ended on the table there would perhaps be some truth in the statement, but the grower learns by growing to grow still better blooms, and those who see his results learn to appreciate and to desire a share in this increased beauty, and so the high standard of the specialist gradually becomes in a year or two the standard to which the average grower tries to attain. He may minimize, may perhaps ridicule the work of the expert grower, but he, quite unconsciously perhaps, gains by it. Better admit it and be grateful.

How to treat the sweet pea so as to get a maximum of quality and quantity. The ordinary everyday method is to sow the seed in rows very thickly, as soon as the ground is ready to work in spring; then with the exception of giving supports of some kind, the grower leaves the plants to take care of themselves until the flowers appear, and on some naturally rich soil, if perchance the rainfall is more than ordinarily abundant, very good results may now and then follow. However, the true lover and sweet pea enthusiast will not be satisfied by any such uncertain methods, but will cast about to find means whereby success is more nearly assured.

Apart from good seed, the fundamental basis, the all-important foundation of success, lies in the proper preparation of the soil, and if this operation is shirked or in any way skimmed over, your efforts will in a large measure be set at naught, and disappointment will almost surely be your lot, unless you are fortunate enough to possess one of those rare conditions of an ideal soil, rich, deep and porous. Possessing this, you might well ignore this part dealing with the preparation of the soil, but as in about 95 per cent. of the cases we are only blest with about six to eight inches of tolerable good soil we must labour heartily to improve this so that we may have from twenty-four to thirty inches of well-manured compost.

Let me now describe the method which I have found very satisfactory, though making no claims to superiority over other methods. Assuming a hypothetical case of six rows, each fifty feet long, we would lay out a rectangular plot thirty-six feet by fifty and on the chorter of thirty-six foot side, three feet from the corner, set a stake, then every six feet a stake, until the six rows are indicated. Stakes should be placed opposite each other at both ends, and should denote the centre of each row. Now commencing on the fifty foot side, we remove the top nine inches to soil from three feet on both sides of the centre of row one and place it outside of our plot entirely, to be later carted or wheeled to finish the last row. The top soil being removed, we dig a trench (always using the end stakes as a centre) eighteen inches deep and two feet wide, placing the subsoil removed on either side of the trench where the good topsoil has just been dug off. Then commencing on row two, we remove the topsoil off the six feet wide and to the same depth as before, and use it for filling trench one, but not without mixing about a ton of half-decayed farmyard manure and fifty pounds each of bonemeal and woodashes, also about two pounds of well pulverized sulphate of iron, being sure at all times to thoroughly incorporate the whole mixture. Proceed thus to the last row when soil from row one will be used for filling. As each row is finished endeavour to leave the soil ridged up so as to give the frost a chance to do all the disintegrating possible. That all this sounds like a heavy task I know full well, but if you would have good, long stemmed peas, over the longest possible season, this, or some modification of this method, must be followed.

—Sowing the Seed.—

Having prepared the soil we next come by logical sequence to the sowing of the seed, and by all means spare no effort to secure good seed from a reliable seedsman. If you would not be disappointed in securing some choice variety which you have set your heart upon, get them as early as possible and keep in a cool place until sowing time arrives.

Before we sow, or perhaps before we buy, it will be in order to determine how many seeds we require. On the basis of six rows fifty feet long, it will require six hundred plants to space the plants six inches apart, which is quite thick enough. At any rate, if we start to raise six hundred, the chances are that from one cause or another a few will succumb between germination and planting-out time, if they do we can plant eight inches apart, and this will fill up the row and possibly give better flowers than if planted six inches apart. To raise our six hundred plants we must put in about nine hundred seeds, estimating a seventy per cent. germination, which is about what we may reasonably expect. At the outside it will only require three ounces, as each ounce contains more than three hundred seeds.

— Choosing Varieties. —

The Sweet Pea grower has to make his choice of the varieties he intends growing, and when he views the lengthy lists contained in every catalogue (writes The Garden), may be pardoned if he quails before the task, for the difficulty is not so much what to select as what to neglect.

Personality is a potent factor in choosing varieties, for without a true love of the flower no real success is possible; thus, each exhibitor will select the varieties and colours he likes.

Of the novelties offered this present autumn (1913), these twelve are good:

King White.—Without doubt the largest white Sweet Pea that has yet appeared; a vigorous grower, producing fine, beautifully-waved blooms, mostly fours, on good stems. Blue King.—A Lord Nelson in Spencer form, good grower, carrying nicely-placed flowers (abundance of fours), which stand rain and sunshine well. New Marquis.—An improved stock of this much-prized mauve variety, and now the best thing in its class. Illuminator.—A richer and deeper-coloured Edith Taylor, excelling it also in growth and size of flowers. One of the prettiest varieties yet raised. Sincerity.—A deep cerise, brighter than Kathleen, a novelty of the previous year, and it is also an advance in size of flowers, of which it carries plenty of fours. An altogether first-class Sweet Pea. Blue Picotee.—An improved Mrs. W. J. Unwin, which, in all probability, it will oust from popular favour. Edith King and Mabel Baccus will delight all lovers of the Helen Pierce family; both are vigorous and free, and will please either for the garden or exhibition. Mrs. McIllwrick.—A bicolor with rosy mauve standard and wings of a deeper tone. A vigorous grower, producing plenty of fours. It is delightful when seen growing under glass. Wedgewood.—A medium blue, superilor in size and colour to Flora Norton Spencer. Anglian Royalty attracted attention at the Chelsea Show, and lovers of this colour should procure it. It requires to be grown in partial shade, but I did not see this variety growing, hence cannot say further of it. Quaker Maid was first seen by me under the name of Grey Lavender. It is a large Sweet Pea of good substance, a fine free grower, with flowers having a dove grey standard and blue lavender wings.

Some at least of the above will be grown here this season, and it will be interesting to see how they shape under Australian conditions. As a rule, of course, a flower which is good in England or America is good in Australia, but there are exceptions which, of course, can only be discovered by experience.

When planting bulbs, particularly in heavy soil, a bucketful or barrowload of sand will be helpful, just a sprinkling in and around them will be helpful, especially at lifting time, when they will come out in a nice, clean condition. It is quite possible to overdo the sand idea in heavy clay, in which moisture does not drain away rapidly, for if you make a pocket of sand as is sometimes done, and the bulb has a bad time. You cannot use too much sand in reason in such soil, but it should be incorporated throughout the whole bulk, not in isolated patches.

The Winter-Flowering Sweet Pea.

The winter flowering sweet pea has certainly not yet ousted its later blooming brother—or should it be sister—but it is coming along. When first introduced to Australia, it had apparently little chance of successful rivalry for the blooms, as generally grown, were small and the colours undoubtedly inferior. Things have moved with it since then. One reason of its comparative failure in its early days, and for the first few years, probably was that the seed was "foreign," and even when Australian grown, it was not from thoroughly acclimatised plants; probably also, it was, as a rule, sown too late, and finally Australian plant breeders had not had time to get to work on it.

If and when blooms of this family of sweet peas can be grown of the same quality as the spring flowering section there is no doubt but that it will quickly surpass it in popular favor, for its advantages are many and important. It comes into flower in less than half the time, and remains in bloom for more than twice as long. It can be grown to bloom through the season when even in Australian gardens there is sometimes a scarcity of flowers. With it, unlike its rival, the hot winds of November and even of late October, have no terrors for the grower, he will be quite content to let them go, for he will have months of bloom to remember.

Perhaps, by the way, it is just because we feel that the beauty of the dainty, delicate sweet pea is such a fleeting pleasure that we value it so highly. There is always the thought that we must make the most of them, partly because we have waited so long to greet them, and partly because we know that a sudden burst of early summer will put a speedy end to our pleasure. During the last three or four years these charming occupants of our gardens have been immensely popular, our early summer temperatures have been some degrees below normal, and hot winds conspicuous by their absence. There is probably more connection between these two facts than may be at once apparent.

Returning to our less fleeting friends it is evident that by growing them we may have sweet peas practically all the year round, whether this would be altogether desirable is a question which each one can answer for himself. With regard to the growing of them we print the following paper, which was read by Mr. H. C. Mott, at the meeting of the Carnation, Dahlia, and Sweet Pea Society, Victoria :—

I regard the winter flowering sweet pea as undoubtedly the sweet pea of the future for hot climates, and if recent developments in the winter, or early flowering, varieties are only maintained, this race will lose nothing whatever by comparison with the spring blooming race. The flowering season of the latest winter varieties is from March to October. I have actually had inferior blooms in December, when the spring blooming plants had been scorched away to vegetable dust. Take my own experience in Southern Riverina last season for a comparison between the new race and the old.

The winter varieties were sown in seed boxes on January 1st, 1913. They germinated in a week, and a fortnight after this were planted out, each with its ball of soil, in the open. The sunniest possible position had been chosen. The ground was trenched two feet deep, and a very liberal allowance of stable manure dug in the lower 18 inches of soil, leaving, with the mound above the surface, a foot of unmanured soil. The country was 8 or 9 inches of loam, with a large proportion of clay lower down, and the line of trench ran north to south. The weather in February and March was intensely hot; actually unseasonably hot in March. The varieties were my own crosses, and I had no idea as to what I was going to get in the way of blooms. Before the plants were a foot high, buds began to form, and on March 2nd came the first flower, only a single, but, from its size and form, giving promise of good things. And the promise was most liberally fulfilled. Some of the plants, notably those I afterwards named Mrs. Hamilton C. Mott (and which your Society, gentlemen, encouraged me by considering worthy of your Certificate of Merit), shot up to a height of 10 feet. The flowers, up to three to a stem, were little lacking in size, and of great brilliancy in colour—a purple-blue shade; while the length of the stalks left nothing to be desired. These plants—I had then three varieties—bloomed riotously till frost came. During the frosty months the blooming was not quite so free, and there was not a sign of a pod setting. Towards the end of July, the blooming improved again; and in August the flowers almost smothered the foliage. The flowers were shown in May and June at the monthly meetings of your Society. They were also repeatedly on exhibition in Melbourne, and on September 10th flowers from these six months' old plants took first prize at the annual show of the Albury and Border Pastoral, Agricultural Association. By October the vines started to go off, and in November a decent bloom could not be found. I thus had seven, in some instances, eight, months' bloom off the same plants; had only to attend to the plants for two months before I obtained flowers; and the perfume was much stronger than can be secured in the spring bloomers. The sowing season is from January to early spring. Seeds sown in May will give blooms two months earlier than the spring blooming varieties.

Now, let me say, briefly, how the spring varieties treated me. The seeds were sown in seed boxes in March. They were planted out in properly prepared trenched ground in due course; ran the gamut of hungry sparrows in winter, and dodged the slugs and snails somehow. They bloomed with me towards the end of October, giving a proportion of fours on 15-inch stems—most excellent blooms. But this happy state of affairs lasted not more than 10 days; Maud Holmes had not even shown herself properly. A hot spell came on, and Clara Curtis and Snowdon shrivelled their petals to brown; Stirling Stent and Scarlet Emperor showed more scald than colour, while the blooms and stalks of Asta Ohm, Zephyr, Mrs. W. J. Unwin and the others I have mentioned shrunk dishearteningly. I had waited over six months for flowers, and after only a few days' blooming a cream winter pea of my own was immeasurably superior to Clara Curtis! The whole display of winter plants showed a constitutional vigour which the spring varieties lacked, the latter, upon which so many months had been wasted, being represented by a shrivelled wall of bloom and foliage.

Such, gentlemen, is the case I make out for the winter or early flowering sweet pea in climates wherein hot spells and north winds are liable to ravage the rows. I make out no claim whatever for them in cooler climates, such as Tasmania or New Zealand. I do say, however, that in a few months, we shall have ten or a dozen varieties blooming in the months of April or May, which will rival the typical blooms of the spring flowering race in size, form, colour, and number of flowers, and length of stem; while at the same time this new race—for it will be a new race—will remain in bloom for as many months as the present darling of fashion in the floral world does weeks.

Some Peculiarities of Mistletoe.

As everyone knows, the Mistletoe is a parasite living upon various trees. It is most often seen growing upon the Apple, but it is also met with on the Hawthorn, Willow, Poplar, Lime, Maple, Mountain Ash, and even on Cedar of Lebanon and Larch. There is a popular impression, writes "The Garden," that the Mistletoe has a great liking for the Oak, while, as a matter of fact, the two are seldom found together. The rare occurrence of Mistletoe growing upon Oak was held sacred by the Druids and regarded as a Divine gift. Dr. Bull, in a paper in the "Journal of Botany," only mentions seven authentic instances of the growth of Mistletoe on the Oak in this country. Since then, however, other instances have been recorded.

The very slow growth made by the Mistletoe plant in the first few years of its existence has been a cause of anxiety to those who have fondly hoped to grow large bunches of Mistletoe in their gardens in a short space of time.

Unquestionably, the most frequent host plant of the Mistletoe is the Apple, and it is notorious that some old orchards, notably in Herefordshire, carry heavier crops of Mistletoe than of Apples. A most singular thing concerning Mistletoe is that although it occurs on a wide range of trees and is so very common on the Apple, yet it is never found on the Pear. Some attempts to grow Mistletoe on Pear trees were made last year, and the results were so remarkable that the subject has since been brought before the scientific committee of the Royal Horticultural Society. Mistletoe seed was sown on a number of Pear trees, and in many instances germination took place. In no case, however, did the Mistletoe get beyond the stage of germination, and no leaves were developed. The effect upon the Pear was very noticeable, for the Mistletoe, in its attempt to establish itself, killed all the tissue of the tree stem just within the bark, completely encircling the stem. All growth was killed above the point where the Mistletoe had germinated.

Planting Shrubberries.

Whether the proposed new shrubberies are to be large or small, every effort should be made to prepare the soil well, to put in the most suitable kinds of shrubs, and to arrange them in the most attractive way. Even a very small shrubbery makes a dwelling-house look more substantial, inviting and comfortable. Furthermore, shrubs afford the cultivator a great amount of interest. He derives pleasure from watching their growth, and in association with them he can, all the more effectively, arrange other subjects in the garden. Some shrubs look best when grown in beds on the lawn, others are more suitable for growing in side borders near paths and walls, while many are most effective when treated as specimens. Very fine shrubs can be grown in quite poor soil if it is well treated. So many cultivators are under the impression that it is useless for them to attempt to form a shrubbery because the rooting medium is indifferent as regards quality. Of course, really rich soils helps matters wonderfully; but there is a great deal that is of poor quality, and those persons who have to grow shrubs in such should make it as suitable as possible before putting in the plants. Trenching is the first consideration. Whether the soil be rich, gravelly, sandy, peaty, or clayey, it must be trenched to a depth of at least 20 inches. Thirty inches would be better, especially in cases where the larger kinds of shrubs are to be grown. In carrying out the work, the cultivator must keep the surface soil on the top, simply turning it over and breaking it up. The subsoil must be kept below and well loosened with the aid of the garden fork. If there is a grass turf to deal with, the latter must be buried about nine inches below the surface and chopped into squares. In a short time it will commence to decay and supply nourishing food for the shrubs for a considerable time. In every case the best soil must be kept near the surface, but where poor soils obtain, the most nourishing foods should be placed on the surface or just below it, as, owing to the porosity of the soil, the rains will soon wash down all the best portion below the reach of the roots.—"The Garden."

Sweet Peas as Bedding Plants.

During recent years the cultivation of Sweet Peas for garden decoration has been carried out in many ways, and in some a great deal of ingenuity has been displayed. With such a free-flowering and easily-grown annual it is not difficult to understand the desire of the amateur to put it to as many uses as possible; but we do not ever remember seeing it used as a bedding plant. We refer, of course, to the Sweet Pea proper, says The Garden, and not the Cupid forms of it. When visiting a market-garden establishment in a country district last summer, we were surprised to come across a large bed of Sweet Peas that were grown primarily for providing cut flowers, but which had, by some means or other escaped being staked. The result was that the plants had become procumbent and the growths had intertwined, so that the whole made one glorious bed of fragrant, delicately-poised blossoms. No doubt Sweet Pea enthusiasts would term this bad cultivation, but with this we should not agree. It is unconventional, but the effect was most pleasing. The flowers were of good size and quality. The owner informed us that immense quantities of good blooms had been cut from the bed, and that the plants had been in good and floriferous condition for many weeks.

Those who have large lawn beds to fill, and who are looking out for a cheap and unique method of doing so, might well sow or plant them with Sweet Peas on the lines suggested. If desired, a good pillar could be formed as a centrepiece by providing supports in the form of sticks or wire or bird netting for the plant there to scramble over. The only drawback to growing Sweet Peas in beds in this way is the difficulty of keeping the plant well picked and free from all spent bloom.

Seed Boxes.

An empty galvanized roofing iron case makes an excellent seed bed. Make a number of holes with a large brace and bit in the bottom of the cases for drainage, put in a layer of gravel or charcoal, and nearly fill with the compost. Rake the soil in the case smooth, press it down, and draw a number of shallow drills across the surface of the soil about half an inch deep, and from 2 to 3 or 4 inches apart. At this rate you can get one row 2½ feet long, of each of, say, 24 kinds of flower seeds in a 6-ft. case. Fill the earth back on to the drills, press down well, and water, using a very fine rose.

By sowing in drills you can save space, economise your soil, can weed the rows perfectly, and be sure you are not pulling up flowers. You can transplant perfectly by using an old knife or a small flat, thin-bladed trowel, to cut out just as much or as little as you want without disturbing the rest. Always water when you transplant, but if the weather is moist and warm no watering may, after the first one, be necessary, but usually a watering every day, or two or three days in autumn and spring, will be necessary.

Never allow the soil of the seed-bed to dry after the first day, as if the young germ of the seed, after starting, once become dried (and a few hours of hot sun is sufficient to do this), the life of the seed is gone, and cannot return or revive.

It is a very elementary lesson, but it is a very necessary one, to insist upon keeping the soil once moist always moist; and, further, to reduce the shading immediately growth is observed, and to so manage matters in this respect that one's tender plants feel this beneficially and not injuriously, as is much too frequently the case with them when removing the whole of this from above. If scrim is used reduce the time by a little every day. If branches are employed take a few off the bed or box or pan every day until your plants are sufficiently advanced as to appreciate their removal altogether, and your young seedlings will grow sturdily and thrive admirably, and your seedsman will escape a castigation he has very frequently not deserved. Where much bedding has to be done it is essential in order to save time to have one set of plants (seedlings generally) advancing while the beds are occupied by the other things in bloom. The former are usually kept in the background until wanted, and it is not always possible to pick and choose one's time to plant. The beds should be made as fine as possible and also receive a thorough watering. Some people think this is well done if the surface is moist, but we assure them it is not so; saturate the soil thoroughly until, in fact, it will absorb no more. When moderately dry next day rake the surface very fine. Plant out in the afternoon or evening. Mulch the surface between the plants with dried grass taken from the lawn mower, or short litter of any description, water in your plants, and the chances are no more will be requisite for a week. Treated in this manner the soil in your beds will not run together, will not crack, and everything will be in the most congenial condition for ramification by the tender roots.

— Time of Germination. —

Some seeds, such as pansy, phlox, carnations, will come up in from eight or ten days to a fortnight; others, such as rose seed, clematis, Sturt pea, and most of our natives will take months unless the seed is soaked to artificially weaken the hard shell and allow the germ to burst at once.

In the early autumn and late spring, and, of course, all through the summer, while the sun's heat is strong, shading of seed boxes and beds is most necessary to protect the soil from drying up too quickly, and the tender plantlets from being scorched. Little, if any, of this will be required now.

There is no necessity to flood seedboxes or pots with water; too much will rot the seed. There is no need to keep the seed boxes or pots covered in the later autumn or early spring; you will lose seed and plants by rotting and damping off.

Sowing Seeds.

One of the first essentials for germination for the finer seeds is a light, fairly rich, porous soil. To make this you want equal proportions of well-decayed vegetable matter, such as old leaves, grasses, weeds, etc., and thoroughly decayed manure, such as the sifted soil from a cow camp under a gum tree. Cow-dung is especially good, as it is not so heating as other kinds of manure. If you cannot get stuff from a cow camp, a good way to get a lot of nice peaty soil is to dig up a number of good spadefuls of grass sods with the green moss and a mass of fibrous roots attached and pile them grass side down in a heap to decay. The following season add to the above a proportion of good sand from some river or creek bed or bank, and a fourth of good rich loamy soil. Vegetable matter, manure, loam, and sand; this compost will give the perfect material in which to raise your seed.

— Planting in the Borders. —

If planting in the open beds or borders, make a light covering of this compost half an inch thick, scatter the seed thinly, cover with same soil to a depth of one-eighth or a quarter of an inch, according to the size of the seed, then flatten it well down with the back of a spade or a board.

When the weather is showery no other care will be necessary than the thinning of the plants. This should always be done if they come up quickly, or the plants will later on choke and starve each other. One well-grown plant is worth a score of weedy ones. If you can make time for it, you will prefer to plant your seeds in small beds or boxes, for transplanting later on.

The Value of Digging.

The great mechanical effect of digging is that it makes the soil finer in grain, and the finer the grain the greater is its fertility. It is well known that all the food taken up from the soil must be absorbed in solution in water. No solid particle, however minute, can pass through the membrane that acts as a covering to the young roots and root-hairs. But it is a peculiarity of all plants that their roots are slow to take up water that is free to drain away from the soil. The water they really take in is the water that clings to the surface of each little damp particle of soil, as such water is more highly charged with food slowly disolved out of the little solid mass to which both the film of water and root-hair are so closely attached. Ordinary digging tends to break up the soil into a finer mechanical condition, and so tends to increase its water-holding power.

A little hard cube of soil will have six sides or surfaces. If it is broken in two, the six sides become twelve, and if these two are again divided, there will be twenty-four sides, over each of which a water film can cling, and so the work of dissolving out plant food substances from the soil can be extended over four times a greater area in the last-mentioned case than in the first. In fact, a cubic foot of soil such as is used for potting purposes represents in reality about an acre of absorbing area for roots. As long ago as the year 1733 Jethro Tull, when advocating the thorough cultivation of soils, referred to this extension of the absorptive area as the "root-pasturage," and so in sober truth it is. Remembering that all garden soils contain practically an unexhaustible supply of plant food, if only it could be made available, and also that the only natural way in which it can be so made ready for the roots is through the dissolving action of tightly-clinging water films, it follows that fining the soil is equal in effect to manuring it. Furthermore, such thorough cultivation, by increasing not only the water-holding power of the soil, but also its air-holding capacity, encourages the growth and general activity of useful bacteria in the soil.—The Garden.

The Rubbish Heap.

A valuable addition to the stock of domestic fertilising materials is the results of what has fitly been termed the "annual roast of rubbish." The great spring cleaning—in doors and out—accumulates a large amount of waste materials, such as brush, rotten wood, and rails, chips, sawdust, weeds, leaves, wet straw, old bones, old boots and shoes, rags, old papers, old mortar, perhaps oyster and other unsightly things, too numerous to mention, that have outlived their usefulness. To get rid of all this stuff is worth something, and it may be disposed of in a way both convenient and useful.

First, I select a spot suitable for the great autotafe, usually back of the house, and far enough away from the buildings for safety. Here lay a foundation of rotten rails, timbers, or anything of a woody nature, that is of no value for other purposes, and upon this start the fire.

The trimmings of the orchard trees, and bush fruits, etc., are piled on next, until the fire is going on briskly. The come the yard rakings, and the house sweepings, chips, wet sawdust, wet leaves, grass, and weeds, with what old bones, oyster shells may be on hand, or a small quantity of limestone, also wet straw, old sods, and anything else of a similar nature. The rakings and sweepings are usually quite damp, and mixed with wet soil, etc., and should be spread pretty evenly over the roasting heap, so that the fire is merely glowing underneath an outside covering, not blazing up in open flame.

The entire mass may thus remain glowing and glimmering away for several days and nights, perhaps for weeks, and left thus until the stuff is wanted as a top dressing for the garden. Exposure to air and rains will slake the caustic lime.—Exchange.

Planting Sweet Peas.

No one should think that rows the the best and only means of planting the Sweet Peas. Rows undoubtedly are the most satisfactory means where cut flowers and economy of labour are the main objective, but where a pleasing artistic effect is desired, then we may place in clumps at the back of herbaceous borders, or in beds or in curved lines, or yet in tubs for standing on terraces or verandahs, or they may be planted to hide an unsightly wall or building; in fact, there is almost endless scope for the grower's ability in forming harmonious colour combinations and pleaesing effects in general by the proper disposition of this charming plant.

Dust should be kept out of the milk, for its presence means bacteria in the milk in increased numbers.

Snapdragons and their Culture.

Few among the many beautiful hardy plants are capable of giving such good and lasting displays as the newer and more delicate shades of Snapdragon. Strictly speaking, these plants are perennials ; but as they may be so easily raised from seeds, most cultivators do not trouble to retain old plants unless extra large specimens are required, the modern practice being to treat them as annuals.

A good soil mixture for sowing the seeds in is composed of loam (one part), sharp sand (one part) and leaf-soil or well-decayed manure (one part), the whole being passed through a small-meshed sieve, so as to render it fine and suitable for receiving the rather small seeds. Some of the rougher portion must be retained for placing over the drainage material in the bottom of the pans or boxes, as this will prevent the finer particles being washed down into the drainage, which, if allowed, would prevent a free escape of superfluous moisture.

When the rough and fine soil has been placed in position and made moderately firm it should be within half an inch of the rims of the receptacles, and the surface must be made quite level, when it will be ready for the seeds. As mentioned above, these are rather small, hence care will be needed to scatter them evenly and thinly over the soil. A light sprinkling of very fine sandy soil is all the covering needed, and this may be pressed down gently with the bottom of a clean pot.

As soon as the young plants are large enough to handle, pricking off must be resorted to, and boxes about 4 inches deep are the best for this purpose. Good drainage is essential, and the soil mixture advised for seed-sowing will answer very well, but it may with advantage be used in a rougher state. Three inches apart each way is none too much for the seedlings, and it is imperative that the soil be made firm around the roots of each as the work proceeds, a firm (not hard) rooting medium inducing that sturdy growth which is so desirable.

Soil of a rather poor nature tends to free-flowering and good colours better than that of a very rich character. Old mortar or lime added to the soil will be much appreciated. If the tall and intermediate varieties are planted 1 foot apart each way and the Tom Thumb sorts 9 inches, they will quickly fill up and form a beautiful mass of colour. It is really wonderful how much these charming, old-fashioned plants have been improved during recent years, a fact that has led to their being more extensively cultivated in all gardens where beautiful colours and quaint forms are appreciated.

Hybridising Carnations.

Probably hybridising or hand-fertilising is the most interesting study in carnation cultivation. Hand-fertilising is necessary for the production of new varieties, but to bring this work to a successful issue great care has to be taken in selecting suitable parent stocks. Those that have strong constitutions and are, as far as possible, free from all defects, such as too crowded with petals, or short, stumpy calyx, or inclined to be twisted or serrated in the petal. It is just as necessgry for the flowers from which the pollen is procured to be free of similar defects. Do not disbud, but let every bud flower, as the large disbudded plants seldom seed. The female flower should be of nice compact habit, and not too full with petals, and have a non-bursting calyx. Having chosen a perfect flower to cross upon, on examination you will find that from the point of the seed pod (the ovary) two or three cord-like filaments grow. In light-colored flowers these are generally white, and purple in the darker ones. These are termed pistils, and each one has one side covered with short hairs, from which exudes a glutinous substance, to which the pollen adheres.

The stamens, or male organs, of the plants should be removed as as early as possible from the female flowers ; before they burst. The stamens are composed of little stems carrying a tiny cup at the extremity of each. This cup is called the anther, and contains the pollen or dust-like power which is the active fertilising agent. The pollen should be perfectly dry and loose and transferred from the anther to the pistil, during a nice bright day, with a pair of small pliers or a camel hair brush. If the impregnation takes place the petals show signs of drooping in a day or two, generally in about 24 hours. After a few days pull the dead petals out and tear the calyx down. This prevents rotting of the pod to a great extent. Carefully watch for the ripening of the seed, which will take about six or seven weeks from time of fertilising, and can be removed from the plant in that time, having fully matured. Some seed may be white or piebald, but will be found to be just as good as the black. It is a noticeable fact that white seed will germinate much quicker than black, as the shell or covering is softer. Seed sown immediately it is gathered will spring up in five or six days.

When you have crossed a flower, always tie a little label on it with the name of the flower by which it has been fertilised, and the date on which it was done. The offspring takes more of the characteristics of the female plant than of the male.

Carnation Figures.

Commercial flower growing is, comparatively speaking, unknown in Australia, but in America, in England, and in Europe generally, it is a huge and well organized industry. Hundreds of acres of glass are required to supply the demands of New York, for instance for forced carnations, roses, lilies of the valley, sweet peas, orchids, etc., and many hundreds of acres of open air gardens in England, Ireland, France, and further afield to grow the daffdils, violets, lilies and roses which London uses every year.

Flower growing under glass is more especially an American development and with the competition which exists, the men who invest big money in these flower farms under glass have to know pretty exactly what their working costs are likely to be. In this connection the following extracts from a paper read by a grower at the annual meeting and exhibition of the American Carnation Society in January last, and reported in "Horticulture," are of interest :—

It is just as essential to success for the carnation grower to keep tab on his varieties and discard the drone as it is for the successful dairy man to rid himself of the cow which fails to produce the required number of pounds of milk per year, or the up-to-date poultry man to chop off the head of the hen which fails to "come across" with her allotted number of eggs.

These figures which I will proceed to give you of the productiveness of the so-called standard varieties are compiled from an accurate record of each day's cut of blooms, and is absolutely free from guess work. No account was kept of flowers cut before they had attained character enough to be marketable. Of sorts that are accustomed to "split" we have kept a separate record and were able to tell at the end of the season the percentage of imperfect flowers.

White Wonder heads the list for productiveness with an average of 16.6 good flowers, and 1.1 faulty ones per plant.

From that grand old variety Enchantress which, with its long list of sports, constitute over 50 per cent. of the total plantings of carnations in this country, the yield was 14.6 perfect blooms per plant and 2.8 with split calyces but saleable flowers. From white Enchantress our yield was 16 perfect flowers and 1.6 "bursts" per plant.

Next comes Beacon with a yield of 14.2 perfect and 2.4 split flowers, and Mrs. C. W. Ward with an average of 12.3 blooms.

Taking all these varieties and others into account, the average per plant was a fraction less than 15 blooms and in addition to this an average of 2 cuttings from each plant.

Now just a few words as to the cost of producing these 15 blooms. The plant upon which these flowers were grown occupied ¾ of a square ft. of the entire ground surface covered by glass. The recognized market value of a strong healthy carnation plant at the time of benching is, say 6 cents. The cost for coal last winter to grow that plant was 2.3 cents. Ten cents. was expended on the labor on that plant to make possible its required production of blooms. 3.4 cents represents that plant's share of the interest on the investment. 2 cents was the tax on the plant for shipping cases, fertilizer, soil, repairs, and other small incidentals. Not until the plant in question earned 23.7 cents net did it begin to "bring home the bacon."

New Gardens.

As soon as we get a good rain a start can be made in the laying out of new gardens. After the beds have been marked out according to a prepared design they should be dug deeply or trenched, the latter for preference. Then spread over the surface a four-inch layer of good old manure, if procurable, and dig the ground a second time, taking a little more care to have the surface level and fine. Time permitting, it will do the bed good to dig it a third time before planting. This ensures the thorough incorporation of the manure with the soil, pulverising of the soil, and its aeration (the effects of the atmosphere on the soil are very striking, as far as the increase of fertilising properties upon the plants are concerned). Every time the bed is dug the fork should be driven a little deeper, so that gradually your ground is "trenched," without that operation being actually performed.

Primroses.

The primula tribe includes the polyanthus, primrose (English), cowslip, etc. Seed of these planted now will flower in the spring. These dwarf herbaceous perennials form a very pretty edging to a bed, but require to be taken up when their blooming season is over, and placed in some cool shady spot during the hot weather. In this, as with other things, it pays to buy the very best seed. To raise the seed, put a handful of broken potsherds into the bottom of a five-inch pot or a seed pan for drainage, and fill with a compost made of very old cowdung, leaf-mould, and a good loam, with a moderate portion of silver sand. Make the surface quite even, and water with a fine-rosed can so as to soak it through; let it drain for an hour; then sow the seed thinly over the surface, and cover to the thickness of a shilling, cover lightly with some moss, and place a square of glass over all. Very little, if any, watering will be needed till the plants are up. By the time the seedlings have several leaves prick them into pots containing a similar soil.

Cyclamen.

Cyclamen are easily raised from seed, if the seed be fresh, but it sometimes comes up very unevenly, some germinating in a few weeks, some taking one or two months. When the little plants appear give as much light as possible to prevent them becoming lanky, and when large enough to handle, prick them out into another box containing a good sandy loam, placing them about two inches apart. They will form in these, corms half an inch in diameter. Transplant into pots, well drained and filled with a compost of leaf-mould and rich loam. Like most plants of this character, the cyclamen requires a season of rest, after the blooming period. When this is over, renovate the soil in the following manner:—Knock the edge of the pot on the side of the potting bench, so that the plant, soil, and drainage come out together. Brush away the drainage and a part of the soil below the roots, and also scrape away the soil from the top, until the whole of the corm is exposed, and the only earth still adhering will be that covering the roots. A fresh pot, a size larger, should then be prepared, by placing in it one or two inches of drainage and a layer of fresh compost. Replant the corm, filling up with more compost, until only half the corm is exposed. Give a good watering to start growth.

"Have you ever noted," began the bald gentleman, who liked to entertain the people gathered in his corner of the hotel piazza, "that little men invariably marry large women?" "It may be so," murmured a mild-eyed fellow guest, "but I had always supposed that it was the other way about—that the large women married the small men."—"Youth's Companion."

Vegetable Garden

Herbs.

These necessary plants should be grown in every vegetable garden. Frequently, however, one finds them in some out-of-the-way corner partially smothered with weeds. It is far better to grow a few plants of each kind and devote a good piece of ground to their culture.

— Anise. —

Sow the seeds where the plants are to remain and thin out the seedlings to 8in. apart. The leaves are used for garnishing, and the seed in pickling cucumbers, etc.

— Borage. —

Sow seeds and thin out the plants to 1ft. apart as they require plenty of space to grow in. The leaves are used in salads and for flavouring claret cup, etc.

— Sweet Marjoram. —

Sow in beds of light soil where the plants are to remain, and thin out the latter to 6in. apart. Used in soups and stuffings.

— Summer Savory. —

Sow the seeds where the plants are to remain in light soil, and thin out the seedlings to 6 in. apart. The tops are used in salads and soups, and are also boiled with peas.

— Caraway. —

Sow and thin out the plants to 4in. apart. Used for flavouring soups.

— Dill. —

The seeds are best sown in drills and the resultant seedlings thinned out to 1ft. apart. The leaves are used in soups and sauces, and both leaves and umbels in pickling.

— Angelica. —

The soil should be deep and fairly rich. The mid-rib is used in the same way as Celery.

— Balm. —

Increase the stock by root divisions either in the spring or autumn. Put in the divisions about 1ft. apart. A rather heavy soil suits it best. Used for making Balm tea, and also for flavouring claret-cup.

— Fennel. —

Sow seeds in spring or autumn. Also propagate by off-sets. Allow a space of at least 1ft. between the plants as they grow tall, and select a dry soil. Used in sauces for fish and for garnishing.

— Pot Marjoram. —

By seed and the division of roots or slips. Used in soups and stuffings.

— Rampion. —

Sow the seeds in drills 6 in. apart. The leaves are used in salads and the roots may be eaten.

— Rue. —

Easily raised from seeds, or from slips inserted in a sandy soil. Poor ground is best for this crop. Used for making a medicinal beverage.

— Sage. —

Young plants are better than old ones, and may be raised from seed in a light soil. Used in sauces and in stuffings.

— Skirret. —

Sow seeds in shallow drills and treat the plants similarly to Parsnips. The tubers are boiled and eaten with butter.

— Sorrel. —

By seeds, also by division of roots. Cut down the stems to induce large leaves to grow. The leaves are used in salads and soups.

— Tansy. —

Propagated by division and cuttings. Used for colouring and flavouring confections, and as a medicinal drink.

— Tarragon. —

By seeds, but stock may be increased by the division of the roots. The leaves may be pickled or used in salads.

— Thyme. —

Sow seeds, take cuttings, or layer the old plants. A medium light soil is best.

— Wormwood. —

By division of roots. A light, rather poor soil is best. Used to make tea for medicinal purposes, and to impart a bitterness to certain drinks.—Exchange.

Seed Potatoes.

The importance of the use of "green" potato tubers for seed has been a good deal discussed of recent years, but many practical growers do not appear to have realized the difference which "green" as against ripe seed may make in their crop returns. After referring to previous experimental work carried out to determine this point locally, Mr. Seymour, in the recent Report on the Victorian Experimental Potato Fields, writes under the heading—

— Immature v. Ripe Seed. —

"These experiments were resumed in 1912 by harvesting portion of a plot of Up-to-Dates and Carman. A parcel of immature and ripe seed was planted by Mr. Ricketts, of Bentleigh, in July, and harvested on the 18th December, 1912. The ripe seed returned 3 tons 1 cwt. 12 lbs., the immature seed 4 tons 1 cwt., being an increase of 1 ton per acre in favour of immature seed. The sample of the latter was much superior to the ripe seed.

A field plot at Romsey planted with Up-to-Dates gave the following results (planted 9/12/12, dug May, 1913):—

	Tons.	Cwt.	Lbs.
Immature Seed ...	6	8	64
Ripe Seed	3	17	104
	2	10	72

Field plot, Carman, Romsey—

Immature Seed ...	5	5	60
Ripe Seed	2	17	80
	2	7	92

In the above experiments it will be noted that the increase is considerably over 2 tons per acre; and it should be stated that in both varieties the produce from the immature seed was a much finer sample than from the ripe seed.

In the above experiments seed was taken at various stages of growth, and it was found that those in the most immature conditions produced strongest buds, the most vigorous plants, and the heaviest crop.

Some striking results were obtained from a crop of Up-to-Dates treated in the above manner. No 1.—One drill was lifted in January, 1913; the plants at this stage were quite green, and the skin on the tubers was easily rubbed off.

No. 2.—The next drill was allowed to remain in the ground until the plants were quite dead, and these were lifted in May. At planting, in October, they were examined and tested for germinating power. No. 1 produced 95 per cent. of vigorous buds; No. 2 had only 9.09 per cent. of vigorous buds. These results are very remarkable.

The Cultivation of Celery.

Celery (Apium graveolens) occurs wild in marshy ground in England, and in Europe generally, but the taste and smell when found in its natural habitat are most disagreeable. It appears, however, that the higher the state of cultivation and the more thorough the blanching, the better is the flavour of the all-important crop. Celery is regarded as one of our most wholesome vegetables, and it is valuable in the kitchen garden for more reasons than one: apart from its being in great request both as a green salad and a cooked vegetable, no crop leaves the ground in better condition for the succeeding one. Celery responds to, and also pays for, good cultivation, and it is one of our vegetables that cannot be produced too large for table use, i.e., consistent with good quality, as the larger the "sticks" the better is the flavour. The principal point to observe in the cultivation of this crop is that throughout the whole season of growth, from the time the seed is sown until growth is finished, the plants ought not to receive any kind of check; and dryness at the root when in a young state, and lack of attention in pricking off the seedlings when ready, are the two principal causes of ultimate failure.

Probably one of the most important items is the sowing of the seed, more especially the date of sowing, for if sown too early the crop may run to flower prematurely, and the flavour is then lost. A fairly light compost should be prepared, and pots, pans, or shallow boxes used according to the quantity dealt with. After carefully draining and covering the crocks with some good rough material, the pans, etc., should be nearly filled with good loamy soil, which should be pressed level. The seed should not be sown too thickly, and should be just covered with sand or fine soil, watered with a fine rose, covered with a sheet of glass.

The site for the trenches should be marked out and got ready some time in advance, especially on heavy, retentive soils. The trenches should be taken out to a depth of twelve or fifteen inches and the bottom be well broken up with a fork. A liberal amount of good half-decayed farmyard manure should be added, filling the trench to within three inches of the top and making firm; sufficient soil should then be placed on the top in which to put out the young plants. Planting should take place when the young plants have attained sufficient size, each one being lifted with a trowel, with a good ball of soil attached, so disturbing the roots as little as possible. The plants should be inserted firmly at twelve to fifteen inches apart, and a good watering in should follow. In hot weather too much water can hardly be applied to the roots, and once the plants are growing freely, stimulants in the shape of artificial and liquid manures properly diluted may be given with advantage. During the growing season the crop should be examined at intervals and all side growth and split leaves removed.

Successive plantings will require similar treatment, and will help to keep up the supply; for the latest plantings it is a good plan to take out a trench between early peas so that the plants may enjoy the shade afforded.

Blanching is one of the most important items in connection with the production of high-class celery, and demands careful attention. It is carried out in two ways, and the method about to be described for the earliest plantings has much to recommend it. Instead of being earthed up in the usual manner, the blanching of the stems is effected by the use of cheap but stout brown paper cut into strips about five inches in width, wrapped round the plants, and secured with a strand of raffia. Further strips may be added at intervals of about ten days. Where good "sticks" are required, this method has much to recommend it, as the plants are very easily watered and fed, and are more free from attacks of slugs and other pests, while the flavour is not in the least affected. It usually takes about six to eight weeks to blanch celery, and for the latest supplies blanching should not be put into operation too early, or the celery will be rendered much more tender and susceptible to frost.

For the blanching of late supplies the method described is useless, and the ordinary method of earthing up should be carried out. Fine weather should always be chosen for the work, when the foliage is dry. A good watering should be given if necessary the day before, and the plants may be prepared by removing all side growths and split leaves. A garden line should be stretched tightly on either side of the row and the soil broken finely and worked well between the plants. Three men may most usefully do the work, one on either side of the trench and the third to walk backwards and place the soil well around and amongst the plants, keeping the foliage together so that no soil gets between the leaves. Blanching by this method should be done gradually, more soil being added about every ten days until the desired depth is obtained.—Journal of the Board of Agriculture.

The land intended for a potato crop should receive a liberal dressing of farmyard manure. The researches of chemists have shown that a crop of 6 tons of tubers extracts from the soil 47 lb. of nitrogen, 21 lb. of phosphoric acid, and 76 lb. of potash. If we compare those figures with the amount of constituents taken from the soil by a wheat crop—about 33 lb. of nitrogen, 16 lb. of phosphoric acid, and 10 lb. of potash—we get a good idea of the heavy feeding capacity of the potato crop, particularly as regards potash.

Fruit Garden

Fruits for Succession.

PEACHES.

A selection of the following varieties will give the amateur grower a fairly constant succession of fruit from the first to the last ripening.

Sneed—the earliest peach grown of medium size, oval in shape, skin creamy white, with faint red blush. Early December.

High's Early Canada—this is still one of the handsomest and best of the early peaches. The fruit is large, the flesh tender and melting, the skin yellowish white, with stripes and markings of crimson. A good cropper for the season. Middle of December.

Triumph—a fine yellow fleshed peach, a good grower, and free cropper, fruit large, and rich deep color. Late December.

Wiggins—a handsome popular peach of large size, and highly colored. The tree is a good cropper. Late December.

Carman—the flesh of this peach is white, tender and melting, fruit large, skin yellow, with red blush where exposed. Late December.

Hale's Early—a handsome large peach, creamy white, juicy flesh, skin greenish white with a very dark rich blush. Late December.

Louis Grognet—a white fleshed peach, very large, melting and juicy, skin creamy yellow, with dark red cheek. Early January.

Ruby Red—white fleshed peach, of excellent quality, skin creamy white, with brilliant red coloring. The fruit is large, and the tree a good bearer. Early January.

Mountain Rose—fruit large, color rich where exposed, flesh tender, melting and rich; one of the best peaches of the season, combining size, good appearance, and quality. Middle of January.

Early Crawford—a very useful peach, good quality, and excellent for canning, crops well; the skin is a rich yellow, covered with bright crimson. Flesh a rich yellow, and of good flavor. Middle of January.

Sure Crop—flesh white, very good flavor, fruit large and handsome. Tree a vigorous grower, a heavy cropper. Middle of January.

Peregrine—a free bearer, fruit large and handsome, highly colored, one of the best. Late January.

Royal George—fruit usually of medium size, skin pale yellowish white, mostly covered with red. One of the best. End of January.

Elberta—a fine market peach, large to very large size, skin yellow, highly colored, flesh firm but very juicy. End of January.

Old Mixon Free—large fruit, flesh rich and luscious, skin yellowish, marbled with deep red. Early February.

Sea Eagle Improved—a very popular market peach, fruit large, skin pale yellow, bright red cheek. Tree a good grower and heavy cropper. Middle of February.

Shipley's Red—an excellent and beautiful peach, fruit large, with white flesh; tree a good grower and cropper. Late February.

Kalamazoo — handsome fruit, large and round, said to be a good cropper. Flesh bright yellow, of excellent flavor. Late February.

Finlayson's Seedling—very fine peach, fruit usually extra large, and well colored, one of the best quality late peaches. Late February.

Lady Palmerston—fairly large, skin greenish yellow, flushed with red; flesh yellow and tender, a good drying peach. Early March.

Pullar's Cling — another large highly colored peach. The tree is a good grower and heavy bearer, particularly good for canning. Middle of March.

Salway—one of the best peaches for canning, very large, skin golden with crimson cheek, firm yellow flesh. Late March.

Camden —Golden — very large peach, flesh yellow, rich and juicy, skin golden yellow with bright red cheek. End of March.

Late Red Italian Cling—this is a very useful peach. Tree a strong grower and good cropper; fruit very large, skin greenish with rich dark cheek. End of March.

APRICOTS.

— Early. —

Sardinian—a small fruited, prolific apricot. Warwick—rich sweet flavoured fruit. Newcastle Early—medium size, good colour and heavy cropper. Oullin's Early Improved—large well flavoured fruit. One of the best. Early Moorpark—large good quality fruit.

— Mid Season. —

Riverside—large handsome fruit; a good regular bearer. Royal—large fruit, good for drying. Paviot—a very large fine quality fruit. Moorpark—the most popular variety. Hemskirke—very fine flavoured fruit. Alsace—large and of good flavour.

— Late. —

Mansfield Seedling—a most excellent apricot; very large luscious fruit. Dundonald—large and good. Robin's Imperial—fruit medium to large, of good quality. Royal George—a fine large fruit. Twyford Seedling—heavy bearer of good quality fruit.

— Apricots for Drying. —

Moorpark is perhaps the most popular drying apricot. Royal is another valuable variety for this purpose. Tilton, a more recent introduction, is said to be considerably superior to either for this purpose.

NECTARINES.

— Very Early. —

Irrewarra—not large but excellent quality. River's Cardinal—medium size, distinct flavour. Followed by Early Rivers—one of the best. Lee's Seedling—fruit large and well coloured. Mid season—Olmstead—a large handsome fruit said to be exceptionally good bearer. Balgowan—one of the best nectarines. Late—Goldmine — fruit very large, good bright colour. Stanwick—a popular variety.

Some Good Oranges.

Though the Washington Navel is usually considered to be the best of all oranges, some of the newer varieties of the navel type are becoming increasingly popular. Most of these originated in California, but are becoming fairly well known in the Commonwealth.

Golden Nugget Navel—the fruit of this variety is said to be very smooth and solid. Skin thin and of fine texture. Color a rich golden yellow. The tree is of pendulous habit of growth, and under good conditions, a regular and even cropper.

Buckeye Navel—another American improvement on Washington; ripens early in the season, is said to be a good cropper. Fruit of distinct and delicious flavor and very juicy.

Navelencia—as the name indicates, this variety is a hybrid between Valencia and Washington Navel, it is said to retain the good qualities of Washington and the hardiness and lateness of Valencia.

Thompson's Improved Navel.—This is yet another of the navel type said to be an improvement on Washington. The fruit is of equal quality, but earlier in ripening, and the tree is a good, even and consistant cropper.

The Gembrook Nurseries.

We have much pleasure in acknowledging the receipt of the 1914 edition of the catalogue of fruit and other trees forwarded by Mr. C. A. Nobelius, of the Gembrook Nurseries, Emerald, Victoria. This is the twenty-third catalogue Mr. Nobelius has issued and in every way it maintains the reputation of the biggest fruit and ornamental tree nurseryman in Australia. At the present time over 200 acres are planted and contain over two and a half million trees in various stages, of which about half are available for distribution during the coming season. Mr. Nobelius is distinctly a utility nurseryman, that is to say, he almost entirely confines his attention to the growth of the best commercial fruits and ornamental trees for parks, gardens, pleasure grouods. For this reason the catalogue is not a lengthy one, the feature of the nursery being the immense beds of single varieties of approved sorts. This is well illustrated in the photographs in the booklet before us. The soil and climate of Gembrook render artificial irrigation unnecessary and appear to be very favourable to the production of a fibrous root system which is probably a very advantageous quality in young trees which have to be transplanted. A copy of the catalogue, which, in addition to the fine views of various parts of the nursery, includes some fine colour engravings of specimen fruits, will be sent to any reader of the "Garden and Field" on request.

We notice that a seedless orange from Japan, called "Oonshi," is recommended for cool districts; it is said to be a very hardy tree, standing frosts well, it is drooping in habit of growth. The flesh is firm and the skin thin. In size it is midway between an orange and a mandarin. Mr. Nobelius says that this orange has fruited in the Gembrook Nurseries and that he finds it a heavy bearer and the only one that is really good in cool districts. Another citrus variety which is of special interest is the Tahitian Lime; this is said to be a strong grower and heavy cropper, fruit about the size of a "Lisbon" lemon, exceedingly thin rind, juicy, and almost seedless. Mr. Nobelius adds, it cannot be too highly recommended for hot districts where it may be considered superior to the lemon.

Pruning Early Peaches.

Most, if not all the early ripening peaches, are given to dropping their fruit buds in early spring. This tendency cannot be wholly overcome, but its unfortunate results in seriously reducing the crop may be lessened by cutting out surplus wood in late summer or autumn, as is usually done in winter, but leaving the wood for fruiting full length until the bloom commences to open. It will then be easy to determine what wood to leave in view of the distribution of the buds and the strength of the wood and shorten back accordingly.

"Yes," said the fancy farmer, "we had to let our imported Swiss milkmaid go." "What was the trouble with her?" the sympathizing friend inquired. "Carelessness. If we didn't watch her closely she'd do the milking in her second best pair of kid gloves, and once we actually caught her cleaning our prize Jersey's teeth with an ordinary scrubbing brush!"—Cleveland Plain Dealer.

Watering.

There have been various suggestions made for the purpose of irrigating fruit trees on a small scale, some of which, no doubt, taking into consideration local conditions, etc., have proved satisfactory, and some have not.

The use of drain pipes, etc., sunk upright into the soil, within the radius of the tree tops may not give good results, as the earth above the bottom end of the pipe remains comparatively dry and gets very little of the water poured into the pipe; also is apt to become clogged, and will finally retain water for days. The only remedy is to take out pipes and sink in a fresh place or replace the clogged soil, but as this gives trouble and expense and injures the roots, it is frequently neglected.

Pipes that are provided with holes throughout their circumference, so that water is distributed evenly, are more practical, but here the cost is too great, and prevents an extensive use, besides which the roots clog the holes, and there is the same trouble as in the former case. In the following arrangement the principle of irrigating through sieve-like tubes is explained, so that anyone is able without great expense or trouble to do the work himself.

After excavating the required number of holes around the tree you take a piece of stove-piping and set it upright in the centre of hole, fill up pipe for about 6 or 8 inches with stones, that are easily procurable in every garden, then place outside pipe cuttings of bushes, garden refuse, manure, etc., which will serve the purpose of preventing the earth from clogging the centre, after ramming the outside layer tight up to level of inside filling, withdraw the stove-piping as far as it is filled and continue filling in like manner to the surface. After the pipe has been withdrawn it is only necessary to keep the top free from soil, by covering with small stones or gravel to prevent clogging. A further advantage is that the roots find nourishment in the surrounding layer of refuse matter.

Another plan is to begin when a tree is being planted with bundles of prunings, and place one in each corner of the hole. Then the tree is planted in the ordinary way, and a few stones or mulch placed on top of the faggots to keep the loose soil from clogging the drain. The water can easily be applied at each corner, and will at once find its way right down into the soil.

These methods may prove very useful in dry places, where every drop of water is valuable, and may enable one or two trees to be grown with the aid of the waste house water, but not where there are old fig, pear, plum, almond, elm, gum, or pepper trees, for they will form a sponge of roots round the drains.

Preservative Measures Against Wireworms.

A recent German publication gives an account of some experiments carried out in order to test the measures usually recommended for combating the attacks of wireworms. A number of field trials were first undertaken. From these it was concluded that rolling, which is often recommended as hindering the movements of the wireworm, produces little or no useful effect. Kainit also met with no success, but, owing to the weather being very dry, the experiment was hardly conclusive. For gardens and small pieces of ground the use of pieces of potato as traps was found to be the most effective measure for ridding the land of both wireworms and millipedes. Five or six pieces of potato were distributed over each square yard of ground, and replaced by fresh every two days. In this way about 10,000 to 12,000 wireworms, and 6,000 to 8,000 millipedes, were caught per acre.

With the wireworms caught some laboratory experiments were carried out, the conclusions arrived at being as follows :—

Cotton seed meal is not in any way harmful to wireworms.

Carbon bisulphide is too expensive for general use, as considerable quantities are required.

Kainit has practically no effect, as the wireworms soon become accustomed to it.

A very damp soil is distasteful to them.

The best general preventive measure is to adopt cultural methods which will promote a quick, strong development of the plants, while for small areas of ground potato traps are of great use.

Rod or Spur Pruning Vines

For some vines rod-pruning is necessary, and, therefore, the better: but wherever spur-pruning answers the purpose, rod-pruning is not necessary. The question of rod or spur pruning depends on the bearing habit of the vine. All grapes are borne on the current year's shoots. Some vines bear on nearly all shoots that grow, and such vines are spur-pruned for convenience. Others only bear, or bear best, on the shoots growing from the fifth, sixth, to the eighth or tenth bud. These vines must be rod-pruned to get good crops.

- Drying Apples -

The American Agriculturist suggests the following as a practical method of drying apples :—

Put up a box building 18 x 18 feet on the ground and about 14 ft. to the eaves, although 12 ft. will do. Any kind of a roof will answer. Along the ridge or comb of the roof an opening a foot wide is left. This should be covered with a raised roof, leaving the sides open or slatted for the vapour to pass through and out. Up through the centre of the building should pass a smoke flue of brick or tile. On each of the four sides openings one foot square should be cut, two on each side, and each should have some kind of a tight shutter to regulate the air supply. These openings are near the ground to allow fresh air to enter. The floor may be just earth, or brick, or cement, or cinders.

A heater of some kind should be placed on this lower ground floor and a flue for smoke and heat may be carried around from 4 to 6ft. above the ground, if desired, before entering the chimney. The old style greenhouse flue with furnace door and ash-door outside the building and a brick or tile flue running around inside, gradually rising to the chimney, would be excellent.

Now, 8ft. above the ground is the drying floor. This is made of lumber. The floor timbers are boards 1 x 12 in. set up edgewise 8in. apart; across them the floor is laid. This floor is of 2in. stuff, sawed endwise into strips; each strip when finished is 2in. wide on top and only 1½in. wide below. In laying them down they are put 3-16 of an inch apart on top. This arrangement keeps the floor from getting gummed up or the cracks filling with debris. As the cracks are widest below all fine stuff falls through. Above all heaters, stoves, flues, or horizontal heating pipes should be hung tin or sheet iron plates to keep dust from falling on hot surface, as it burns and smokes, thus flavoring the fruit to its detriment. If these metal shields are bent like a house roof they will shed the dust on to the ground. A door to enter each floor completes our dry-house.

The upper door to the drying floor is entered from a balcony, built outside, with stairs to the ground. With this dryer is used a bleacher. A box or chute 2 ft. square and 10 ft. long is made. This chute is set up on end outside, so that the lower end is on the ground and the upper end reaches about 2 or 3 feet above the floor of the balcony, and is wholly outside of the building. A short door is made in one side at the bottom. Boxes about 2ft. square and 6in. deep, with slatted bottoms, are made to fit inside the chute. Any kind of an elevator (made, perhaps, of a couple of old ratchet wheels and a chain from an old pump, or any other device your ingenuity suggests) that will allow these trays to be slipped into the chute near the ground and then raised 6 or 8 in. for another to be put in will do. An iron pot with coals of fire on which is sprinkled sulphur is sunk into the ground in the centre of the chute. This bleaches the fruit, and as the trays rise to the top a second man on the balcony takes each succeeding tray off, and after slicing steps in on the drying floor and empties the fruit, sending his tray back for more.

Culls that can be pared are usually used for drying, but any apple that can be pared will do. It is not necessary to name any special parer, as they are constantly being improved or invented. The fruit is pared near by. One woman with a good machine and two assistants to fetch and carry can pare 70 bushels in a day. They are carried in trays from the parer to the trimmer. It will take from two to four girls to trim, removing with a knife all the other blemishes. Then they are cored and go into the bleacher before slicing, which latter operation is performed by a machine at the top of the bleaching chute.

The prepared fruit is spread about 6in. deep on the drying floor. The temperature is kept at about 180 degrees, and this fruit dries in 24 hours. Much of it is then very brittle, so the fires are allowed to cool, and the fruit is shovelled into a heap and allowed to sweat, which makes all pliable, when it can be at once packed and pressed into barrels or boxes for shipment or storage.

The above described dryer will dry 100 bushels every 24 hours. Mr. Wellhouse has six of them in one orchard, and by filling in succession the work goes rapidly and merrily on. Of late years Mr. Wellhouse has sold all culls, giving free use of the dryers to the purchaser, which is an inducement to pay more for the culls.

Value of Thorough Cultivation.

Many people do not realise the importance of deep, through, and frequent cultivation as affecting the growth of plants and the cash value of a crop. As long as the soil is not actually baking they think cultivation is not necessary. This is a costly mistake. Cultivation improves the mechanical condition of soils for root systems, purifies soils by admitting sunlight and air, saves moisture, and renders fertilisers available to plants. On this subject we adapt the following from a paper by Carroll B. Smith, of Redlands, California, as reported in the "Californian Fruit-grower" :—

A well-cultivated soil will settle in a week or two without being rained upon in the meantime, and the ground must be stirred again.

In the preparation of land for a crop a deep ploughing and after-fining is of the greatest value, for when a seed sprouts and sends down its rootlet, the ground is open to receive it. The penetration is therefore deeper, its hold firmer, and its feeding area larger. In time of drought it is rooted deeper and is safer. This principle holds true for all sizes of plants and trees. It is the early good start which largely influences their after life.

The conservation of moisture is affected by the mulch produced by cultivation. Loose, light ground is a poor conductor of moisture, and the more so if there is plenty of organic material present. It is not the moisture in the top four or six inches that it is desired to save, but rather the sub-moisture below the cultivator depth. That is the moisture the roots are drawing upon. When the soil settles again by its own weight it conducts some moisture to the surface. The lighter and more loose the mulch is kept the more effectively moisture is retained.

The way in which cultivation affects the availability of fertilisers is little known and little thought of. Plants take up water through their roots, and the fertilisers which are applied to the top 6 in. of soil must so change that they can be carried by the waters which the plants take up, otherwise the plants could never get them.

Now there are many agencies at work accomplishing these changes. Among them are fermentation, heat, light, and water. Every one of these agencies is made active by cultivation, and dormant by non-cultivation. The grower who gives his crop an extra cultivation has a better return than his neighbour, because he has aided the conditions which make fertilisers available.

Fermentation is probably the chief agent for making these insoluble plant foods soluble. It produces carbonic acid which, with water will dissolve what water alone would not. The heat of fermentation also helps. There are acids of fermentation at work at this besides the direct action of the roots in corroding and dissolving insoluble substances.

This fermentation is produced from the organic matter in the soil, and is wonderfully helped by cultivation. The process is a slow one naturally, but is increased so by frequent cultivation that the effect of a short season may be partly overcome, or a late planting made equal to an early one.

Suppose one uses manure or peas, or a blood and bone fertiliser. These must first decay. Now the little micro-organism which converts decayed matter into nitrogen must have oxygen for its work. Cultivation supplies this. The more frequent and deep the cultivation, the more actively the nitrifying germs can work, which results in more active growth by the plants.

The yearly fertiliser bill is one of the largest on every successful farm, and the quicker the farmer gets the most benefit the better. The best means to this end is cultivation, and it is so simple and so cheap that it ought to be more freely used.

One can lock money in the ground by applying fertilisers and then allowing the ground to settle. All the friends of plant life then become inert or disappear. The little nitrifying organism cannot get its oxygen. Sunlight is driven back from the soil it tries to warm only to dry and curl the foliage, and the moisture which the roots are trying to absorb is carried straight to the surface and lost in the air.—Exchange.

The Soil.

Many agricultural terms are difficult to define exactly and some have varied and interchangeable meanings. One minute we may speak of the earth, meaning our planet: and in the next talk of a handful or a load of earth. A man may speak of buying 1,000 acres of land and his friend may at once ask him whether his land is sand, loam or clay. One may speak of cultivating the soil, another of ploughing the land, a third refers to digging the ground, and the three mean the same thing.

The soil, the ground, the earth, or the land produces plants, animals subsist on plants, and, in so doing, produce waste which, with their bodies when they decay, goes back to the land as manure. This is merely a general statement, but it broadly expresses the rotation of nature on which agriculture is based.

The soil is, in a sense, the farmer's workshop and his raw material. We therefore, have to consider among other things whence came the soil? What is soil? How and why it varies? What principles are involved in cultivating it? and many other questions.

— Whence Came the Soil. —

In answering this question we have to go far back in the history of our planet, or in other words, to understand the origin of soils. The student should know a little of geology. He must realise that, at the present time, and far back through countless ages, the history of the earth has been a process of building and destruction, of making and unmaking. Some of the agencies are violent, aggressive and easily seen; others are unobtrusive or actually hidden. All that we can do in a limited article like this is to give such an outline as will enable the student to understand the elements of the subject as it affects practical agriculture, because for deeper study he will naturally read the special works on soils, as he will go to his geology for his understanding of the rocks from which soils have been mainly derived.

— Soils Derived from the Decay of Rocks. —

It is usual to say that soils are formed by the decay of rocks and that is in the main true; but there is an essential difference between decomposed rock and a fertile soil, which an illustration may serve to explain. It is in the main correct to say that bread is made from flour and water, but flour and water also make damper, which differs from bread much more in appearance, texture and palatability than in composition.

The illustration is better than it first appears, although like all illustrations it should not be carried beyond the point it is intended to illustrate. The essential difference between the damper and the bread is due to the action of yeast, which is a single-celled microscopical plant which produces comparatively slight chemical changes, but the carbonic acid gas it produces causes great physical difference in the resulting bread. In a similar way the change from unfertile decomposed rock to a fertile soil is largely due to living organisms, many of the most important also being microscopical plants, of which bacteria are the most numerous.

— Factors Determining the Character of Soil. —

Put more definitely, an ordinary soil is a complex material, the basis of which is the ground or decomposed rock. Its character depends, first, on the chemical composition of the rock from which it is derived; second, on the degree of grinding and decomposition it has undergone; third, on the amount of washing to which it has been exposed; fourth, on the amount and character of organic matter, i.e., decayed animals and plants incorporated with it; and, fifth, on the microscopic (chiefly bacteria) life it contains.

Sand is ground rock from which the fine particles have been washed out. Clay is also ground rock and is composed of the fine particles washed out of the sand. The difference between sand and clay may be partly due to the decomposition of the material; but all the physical characteristics of clay may be due to the fineness of the grinding and this will be explained later on. Peaty soils are almost entirely composed of decayed or decaying plants. These extremes are not good soils. The farmer desires a soil which is composed of all three: but the mixture may vary in character. If sand predominates, the soil is sandy. If clay is the chief constituent, it is clayey. When vegetable matter predominates, the soil is peaty. And when the three are more evenly mixed, we have the varied series of loams so highly prized by all classes of agriculturalists. Later on it will be necessary to be more exact, but this much is requisite to prepare for the study of how soils are formed.

— Aristocratic Soils. —

Were soils gifted with the weaknesses of men, some would no doubt be equally vain in claiming superiority on account of their origin, and certain it is that the pedigree of a soil is of vast importance to the man who has to cultivate it. Admit this personality and imagine the aristocratic air of the rich chocolate volcanic soils of Warnambool, Ballarat, Mount Gambier, Colac, and Northern Tasmania as they boast their descent direct from Old Pluto and glory that in their birth the very earth shook and trembled. Think of the rivalry of the rich alluvials which might with equal right claim to be the result of the erosion of ten thousand hills which were old when Mount Gambier and other extinct volcanoes started into activity.

The point I desire the reader to realise is that, in considering the origin of soils as well as some other questions underlying agriculture, we cannot draw a clear distinction between supposition and fact, in other words we do not quite know where fact ends and imagination begins.

The study of the origin of soils is largely a matter of geology. In addition to geology the principles of agriculture involve the study of meteorology, chemistry, physics, and natural history. It is important that the student of the principles of agriculture should get a good grasp of this question of the origin of soils, but it must be candidly admitted that the knowledge will help the farmer but little in his daily business of getting a living from the farm. It will explain many of the ways of his work, but if he keeps his plough idle while he studies the origin of soil, he may obtain pleasure and knowledge, but he won't get crops. Cultivation of the mind is not a substitute for tillage of the soil. Many a farmer has failed, not from knowing too much, but from doing too little. Study why—but keep the team going.

(To be Continued).

The Composition of Irrigation and Non-Irrigated Apples.

It is generally believed that irrigated fruits are inferior to non-irrigated fruits as regards taste and power to resist the various agencies which effect decay, and in support of this belief it is frequently stated that the former contain abnormally high percentages of water, and consequently low percentages of dry matter, and are therefore deficient in those compounds which determine the taste and body of the fruit. Although the quality of fruits may not be capable of determination from analysis alone, it would appear, in so far as taste depends upon the presence of certain compounds, analytical data would be of material service in the settlement of questions relating to quality. In some recent experiments, apples were obtained from parts where irrigation is imperative, and the non-irrigated samples from districts where the annual rainfall varies from 25 to 35 inches, determinations were made of total solids, acids, sugars, nitrogen, ash, and waste in several varieties, when they were in a condition similar to that in which they reach the retail trade. It was found that the differences between the irrigated and non-irrigated in total sugar and acid were so small that in the analytical data obtained there was no substantial basis for the claim that the irrigated apple is inferior in taste.

Oranges.

For raising seedlings for stocks select only seed of oranges from vigorous-growing trees, and the pips of oranges having plenty of well-developed seeds. Harcourt in "Florida Fruits," says:—"Do not dry the seeds before planting," and recommends that if it is desired to keep them half-fill a box with moist sand, mixing the seeds with the sand. Cover with a good mulch of moss or straw, and put in a cool, shady place, and they will keep good for weeks; but if they show signs of sprouting hurry them into the seed-bed.

Orange seedlings are usually raised by nurserymen in cold, glass frames: but a seed-bed covered with calico will do. Make a bed filled with sand and decayed cow manure and leaf mould. Pack it firmly, and soak it well. When it becomes mellow, make drills 1in. deep and 6in. apart, and plant the seeds, say, 3in. apart.

Nurserymen often make drills 3in. wide, and sow thickly to prick out when about 3 in. high. Others sow broadcast at about 1in. apart, and prick out when 3 or 4 in. high. Sown as directed they may stand until a foot high. Keep the soil just moist, not wet.

When large enough plant out the seedlings in nursery rows 3 ft. apart, and 9 in. to a foot in the rows.

As the seeds are to be sown after the orange is fully ripe, and while the seeds are fresh, it follows that the time is spring or early summer.

The disproportion between the weight of a small boy and the noise of his boot-heels as he walks out of church at the quietest moment is a curious problem in dynamics.

Cultivation of the Vine

Continued from last issue.

By H. E. Laffer.

— The Addition of Nitrogen. —

It may be contended that the practice of green manuring necessitates delay in the ploughing under most conditions, but, even so, there will be little difficulty experienced in getting the crop to decay, which after all is the controlling factor. Then, again, it is always possible to crop only alternate rows each year where large areas are being dealt with, thus rendering it possible to plough half of the vineyard early each year; in fact, this was the practice adopted in the vineyard at Albury, already referred to. So far, the green crop has only been referred to in connection with the increase of organic matter as 'a physical improvement to the soil, but it has a further action as the source of organic nitrogen. In this respect it has a twofold action, namely, the accumulation of atmospheric nitrogen on the one hand, and the decay and subsequent nitrification of the organic matter on the other. This nitrogen must undergo transformation into one one or other of the mineral forms before it can be assimilated by plants. In dealing with the addition of nitrogen to a vineyard, it must be borne in mind that in addition to the organic form referred to, there are also purely mineral forms of nitrogen, such as sulphate of ammonia and nitrate of soda, which are readily soluble in water and are in a form that can be absorbed by the plants. The effect of these two forms of nitrogen are characteristic and opposite. Organic matter on the one hand tends to the development of an excess in tannic acid in the wine, thereby materially increasing the keeping quality and prolonging the period of maturing. Mineral nitrogen in excess tends towards the opposite extreme, promoting an excess of albuminoids, which are a frequent source of danger to the resulting wine if not properly dealt with. In the well-balanced soil tannin counteracts the albumen, causing its coagulation and precipitation. Many vineyards benefit by dressings of purely mineral nitrogen, and for this purpose recourse must be had to either ammonium sulphate or sodium nitrate. In price they are both high and about the same, but the former will give the better equivalent of nitrogen. Owing to their expensive nature, it is possible to apply them in such costly dressings as to render their use unremunerative, owing to the value of the manure applied being in excess of requirements and beyond the value of any ordinary increase in crop. It is here that the need for experimental work is emphasised, because no hard and fast rule can be laid down for any one soil. As a general guide, it may be said that from 1 cwt. to 2 cwt. of either of these substances may be applied per acre. Its method of application is in the early spring, either by means of a drill or else placed in shallow furrows along the rows of vines. In addition to these forms of mineral nitrogen, there are various other forms of nitrogenous fertilisers to be obtained, such as dried blood and slaughter-house refuse; also bonedust and bone super., which contain a fair percentage of nitrogen as well as their phosphatic properties. All these substances are valuable as fertilisers if they can be obtained in sufficiently large quantities and there is enough moisture to dissolve the vital elements from their composition.

— Phosphoric Acid. —

South Australian vineyards, in common with the bulk of our agricultural lands, show a deficiency in this element of plant food. Its application may be said, then, to rank next in importance to nitrogen. So far as manuring is carried out at the present time in South Australian vineyards, superphosphate is, in many cases, the only form of fertiliser used. There can be no doubt, however, that where super. is giving good results at the present time the need of organic or mineral nitrogen will become apparent in the near future if consistent yields are to be obtained. The vine uses less phosphoric acid in proportion to its growth and fruit production than do most plants, but nevertheless it is of vital importance to the general health and fruit development of the vine. Particularly does this apply at the latter end of the summer, when the plants are ripening off their wood and storing up in the pith a reserve supply of nourishment to feed the young growth in the early spring. The use of super. in connection with green manuring has been dealt with, but whatever may be the claims of this practice, it must be remembered that in many cases phosphatic manures directly applied are giving excellent results. There exists a considerable difference of opinion as to the best time to apply phosphates, but if we look into the matter carefully we find that it depends upon the type of soil and the amount of moisture available during the growing season. Being a slowly soluble manure, it is generally recognised that it should be applied in the winter months along with the first ploughing, and this would appear to be the most common practice. There are some growers, however, who prefer to drill in their super. during the summer months, while others, again, claim the best results from spring application. The first case suits the bulk of our vineyard areas. In the second, the result of the manure is not looked for until the following year, and the third is adapted to certain special cases, mainly light sandy lands in districts of good rainfall. The latter is the case of those light-colored sandy soils, such as is found in portions of the Barossa district. Upon these soils winter application of superphosphate gave no increase, as the manure was leached from the open loose soil by the winter rains; in fact, it is said that one grower applied a heavy dressing of super. to the vineyard upon a slope during the winter, and in the spring found the greater part of it in his dam on a lower part of the property. With spring application on the same class of land yields have been increased fully 100 per cent.

— Improvement of Inferior Soil. —

It must be remembered that this class of soil is very poor in its natural state, and incapable of producing heavy crops, but if by manuring the yields can be increased from one to two tons per acre, it is putting such lands to a very profitable use. There can be no doubt that the application of phosphates and the results achieved must depend on the type of soil on the rainfall of any particular locality, and it is also certain that the greatest percentage increase will be observed upon lands of the type referred to. As the opposite to the loose sandy soils there are the heavier types, containing a large proportion of clay, which retain the super, in spite of heavy winter rainfall, and, finally, there is the other extreme, represented by those areas of scant rainfall where no results are obtained from artificial manures, except under irrigation. If we take an average of the vinegrowing districts it will, in all probability, be found that the winter application gives best results. In the heavier types of soil one of the main difficulties appears to be the placing of the phosphate deep enough to allow the vine roots readily to come in contact with it, owing to the fact that the phosphoric acid is persistently retained by clayey lands in the upper layers of the soil. Thus it is possible to apply heavy dressings of superphosphate without any benefit accruing to the vines. This question was investigated in connection with the Rothamstead plots, and an analysis showed that in soils which had been manured for 50 years with super., 83 per cent. of the unused residue of phosphoric acid was retained in the upper 9in. of the soil, while in the next 18in. no accumulation of phosphoric acid was noticed. It was further demonstrated that practically the whole of the phosphoric acid applied and not used by the crops could be recovered with a a weak solution of citric acid from the top 9in. of the soil. At the University of California the same question was investigated by Professor Loughbridge in connection with the manuring of fruit trees. Soil of a stiff, clayey nature retained 30 per cent. phosphoric acid in the first 6in., while the next 6in. had only .05 per cent. Clay retained 1,000 lbs. in the surface 3 in., loam retained a similar amount in the top 6in., while sand allowed free percolation to the lower strata. The remedy then must be to place the super. as deep down in the plough furrows as it is possible. Probably the simplest plan is to open out a deep furrow in the centre of the rows, and by means of a simple distributing machine place the manure in the bottom. In the more open, gravelly, or alluvial soils there is not the same necessity to apply so deeply, and here, no doubt, application with a drill before the second ploughing will give good results. The quantities for application will vary from 2 cwt. to 4 cwt. per acre.

— Potash. —

Whereas we find nitrogen concentrated in the green portion of the vine, potash, on the other hand, is centred in the fruit, and is responsible for heavy cropping. In combination with the natural acidity of the fruit it forms acid potassium tartrate or cream of tartar. Large quantities of this substance are held in solution by the juice of the grapes, and during the processes of fermentation it is precipitated by the formation of alcohol deposits in the storage vessels as crude tartar ; in fact, so great is the quantity, that this commodity forms the base of the commercial supply of cream of tartar. In view of the amount of potash contained, it will readily be understood that a large supply of this substance in an available form is necessary for prolific cropping. It is a well-known fact that an analysis of most of the South Australian soils shows a percentage of potash equal to all general requirements of the vine, but it does not necessarily imply that this potash is in a form readily available as plant food. Possibly some corrective treatment may be necessary to bring about a conversion of the element from an insoluble to a soluble form. Particularly does this [illegible] in the surface of clay soils deficient in lime, where the potash is retained in the surface as carbonate and cannot penetrate to the roots in the lower layers. This retention of potash salts is an important factor in the fertility of the soil, whereas the corresponding salts of sodium, which are injurious to vegetation, are leached out by the rainfall. Plants absorb potash more readily as carbonate than as sulphate and consequently deep-rooted ones, such as the vine, cannot obtain an adequate supply for their needs when it is locked up in the surface layers. Under these circumstances some corrective treatment is needed to release the carbonate of potash. This is usually done with gypsum. A double decomposition takes place between the pot. carb. and calcium. sulph. Pot. sulph. is formed on the one hand and calcium carbonate on the other. As sulphate the potash is washed down into the subsoil and comes into contact with the roots; but before it can be used another conversion into the carbonate must take place. First, a decomposition of the sulphate into the sulphide is brought about, and this in combination with water and carbonic acid reverts to the carbonate. In lighter soils, particularly of limestone formation, potash is deficient, and such soils will probably benefit by the application of any of the potassic manures available. Of these the sulphate and muriate are the most desirable forms. Farmyard and all organic manures are fruitful sources of potash, but even where these are obtainable the necessity of some additional quantity of the element will be needed to balance the effect of the other nutrient elements. It must be borne in mind that an increased fruit production consequent on the use of potassic manures is weakening in its effect, and therefore the other elements of plant food—nitrogen and phosphoric acid—must be raised in sympathy in order to maintain the vigor of the vines.

— Lime and Gypsum. —

The amount of calcium needed by the plant is not excessive, and is generally covered by the natural percentage of lime in the South Australian soils. Even here, however, lime is in many cases needed, more particularly so in the heavy clay lands. Its effect is mainly physical, namely that of flocculating the clay particles, opening the soil to the passage of water, and tending to free other necessary elements of plant food which may be in an unavailable form. Heavy soil is made to work more freely if well limed, and in soils tending to be sour, owing to an excess of decaying vegetation, the alkalinity of the lime acts as a corrective, destroying the weak humic acids and preventing their accumulation. It is also essential to the life of the nitrifying bacteria, the work of which goes on much more rapidly where there is a good amount of lime in the soil. Gypsum, or calcium sulphate, has much the same effect as ordinary lime, though it is probably not so caustic nor active in its effect. As a manure its value was over estimated, but its indirect action upon the soil fertility, especially as to the freeing of potash salts, renders it a valuable addition to a vineyard soil; thus it is important to the growth of those deep-rooted crops requiring potash, such as peas, etc., and therefore, in soils deficient in lime, it is the practice to use gypsum when growing peas as green manure. For this purpose ground gypsum may be used at the rate of 3 cwt. to 5 cwt. per acre. As a corrective to heavy clay soil it may be applied at the rate of 10 cwt. to 20 cwt., although for this purpose it is not so active as ordinary lime. Dealing with manures in general, we find that an acre of vines will absorb annually 50 lbs. of nitrogen, 45 lbs. potash, and 10 lbs. phosphoric acid. After all, manuring aims at the maintenance or the increase of the fertility of the soil, and if this is to be accomplished, it becomes necessary to add annually these quantities of the various fertilising elements.

A German actor refused to learn English on the ground that he could make nothing of a language where people wrote "ass" and pronounced it "donkey."

Forestry and Fruit Growing.

Mr. J. Osborne, jun. (Tasmanian Fruit and Forestry Expert), recently read the following paper Forestry as applied to the Cultivation of Trees for Shelter, taking into Consideration their Value for Timber Purposes. He said, "the great loss caused by late frosts in several fruit districts in the State during the past season has given rise to a number of surmises and questions as to the cause, with an unmistakable desire to avoid a recurrence of the trouble. In several cases the whole crop was lost; the foliage, being young and tender, suffered also, the trees presenting a brown, scarred appearance, very unusual during the spring season in Tasmania. The orchards most affected were situated in rather deep valleys, the hills on either side rising in some cases about 200 feet. In other cases the orchards were in the open, flat country, the loss, however, being much less in such instances. During the last week in October the days were exceedingly bright in certain districts, causing undue excitement in the trees. These bright days were followed by clear, cold nights, with a chilling light breeze from the south and south-west, leaving in its track a thick crop of frost particles. It is almost certain that the great fall in temperature, assisted by the keen, cutting wind, caused the fruit to fall, the effect being readily seen when the sun began to be felt during the forenoon. From this it would seem that cold winds from the south or south-west are likely to cause more loss than what is called a natural frost, which is due to too great a radiation of heat from the surface of the soil on still, clear nights. If such is the case, the losses mentioned are due to preventable causes, there being no doubt that the presence of shelter-trees which retain their leaves during the whole year will mitigate, if not entirely remove, the trouble.

It has been said for many years that the greatest danger to fruitgrowers is the lack of shelter from cold winds during the early spring, or indeed the whole of that very variable season. Fruitgrowers do not fear an ordinary frost; but look on cold southerlys with positive dread. This feeling has induced a few to indulge in the planting of trees, and not without success, one grower having told the writer that his shelter-trees were the most profitable in the orchard, as before these had attained much size his crops were much lighter, pears particularly. The presence of a large number of trees in the near vicinity is always found to prevent loss from frost. In the fertile wooded valley of the Huon, and indeed any country so situated as regards shelter, the loss from the effect of cold winds is almost nil. On the other hand, take the losses reported from situations that have long since become deforested, and it will be found that the comparison is, to say the least, awful. It is sometimes urged that timber trees are too exacting, and remove too much from the soil for their own use, and if these strong-growing trees were planted side by side with fruit trees there would be some excuse for the statement. Fruitgrowers are not advised to go to such lengths. It is certain, however, apart from the fact that the very necessary shelter will be given by large, strong-growing trees when planted on exposed situations, that deep-rooted plants form as it were a network of fibrous matter in the soil, enabling them to retain for a long period the moisture that falls, keeping rivulets, creeks, etc., running for a long time after the streams that pass through deforested country have disappeared. The roots bore deeply into the soil, and permit the entry of air and moisture that is retained for use during dry seasons, the trees exhaling moisture in the form of vapour during dry, sunny weather, and radiating conserved heat during cold spells. There are not wanting instances where certain trees have caused the drying up of stagnant water in low, swampy places, rendering habitable an area that previously was unfit for occupation by human beings, showing that moisture is freely given off by the foliage of trees. To the farmer or grazier the value of shelter is equally great, the cold, high-drying winds being responsible for much loss of pasture, to say nothing of the mortality among sheep and cattle in the open, exposed country, a condition that is to be frequently found in nearly every part of the State.

The agriculturist, in taking up a selection, acts as though every tree was a mortal enemy, to be removed at the earliest possible moment. This spirit has caused wholesale destruction, the idea of reserving a few native trees or planting conifers in out-of-the-way places on the farm being altogether foreign to him, and, indeed, when such a thing has been suggested, the reply would be to the effect that he had had too much to do in removing the trees from his farm to think of planting again. Quite recently, in the month of April, the writer visited the Woolnorth estate on the far North-West Coast, and was given a great treat in examining the grazing areas of the farm. The land originally was covered with ti-tree, running in some cases to a height of 30 feet. When clearing, belts of trees were reserved in order to provide shelter for stock and to prevent the grass from destruction by the high and dry winds that are often experienced in that part of the country. The effect has been to provide at all times for large numbers of cattle and sheep, ensuring also the safety of root and grain crops that are regularly planted. Nothing could be more pleasing to the eye than the wide, park-like expanse stretching for miles on every side, giving the greatest proof of the value of shelter-breaks of timber. To plant successfully shelter-belts, it is not necessary to use the best positions on the farm or to place the trees too close to the orchard; nor is it imperative that straight lines should be followed. All spare or unused spaces should be filled, choosing the south, south-western, and westerly sides, especially if dealing with an orchard. Indeed, in any case it is not wise to plant heavily on the northern side of an estate, as such planting would interfere with much-needed supplies of sunlight during the late autumn or winter season. Fence lines, rocky knolls, sandy ridges, and even low, swampy places may be treated, draining enough of the water off to give the trees a start. For timber purposes, as indeed for shelter, the plants may be put in fairly close—in any case close enough to prevent a too low branching, and encouraging the trees to produce a long clean bole before forming a head. To bring this about, planting at from 6 to 8 feet apart should be followed, for quick returns using a rapid-growing, hardy conifer. The farmer must look forward to an enormous increase in the production of butter, making necessary a 'greatly increased number of boxes (at present imported from the mainland). The fruitgrower is, or should be, aware of the fact that something like 2,000,000 cases are required yearly, at a cost of over £50,000, to hold the fruit produced in the State, and that these cases go forth and never return; also that year by year the number required is steadily increasing, and while there are still many large beds of timber suitable for cases, the cost of procuring the logs for cutting is going up rapidly, owing mainly to the distance and inaccessibility of the forests, and in a measure to the increased cost of labour, the cases having cost in several instances as much as 7d., as against 4½d. and 5d. two previous seasons. This is a serious matter for the orchardist, for while the cost of production is increasing in every direction, there is no certainty of an increase in the prices obtained for his fruit. Having in view the foregoing facts, the farmer and fruitgrower, in their own interests, should begin a policy of planting for future requirements, and without delay.

There are not many estates on which it would not be possible to start a small nursery for the production of young forest trees (supposing the owners do not care to purchase their supplies). The seeds are easily collected, and when the soil has been well prepared, may be sown thinly in drills some 6 inches apart. The tiny plant will soon appear, and should be cared for during bright sunny weather, weeds to be vigorously excluded. With care the trees should be ready for the operation known as "wrenching" in the month of March or April. A spade is put down at an angle that will ensure the cutting of all large roots, being careful to keep at least 4 inches from the stem of the plant when the spade is in position. After severing the large roots, a gentle pressure is put on the upper portion of the handle, lifting the soil containing the seedling sufficiently to ensure the breaking of the fibres mentioned. The soil is then allowed to settle, and should the little tree show signs of distress, a gentle watering may be given. The "wrenching" operation is usually repeated about the middle of the month of May, following the lines already laid down. The permanent planting is done during July and August in each year, the soil being well broken, protection from stock being provided. It will be seen from the foregoing that the trees may be got ready for planting from the seeding stage in one year, saving much loss of time. Tasmanian farmers and fruitgrowers are advised to use the Monterey pine, known generally as Pinus insignis, or Remarkable pine, a native of California, famous for its rapid growth in nearly all situations. It is known that in 15 years the tree, even when planted on the poorest soil, will produce large quantities of timber suitable for butter boxes and fruit cases, the wood being tough, light, and durable. This pine will grow at sea level, and is found luxuriating at an elevation of 1,500 feet. This fact alone should commend the use of the tree in place of the many other beautiful conifers that might be brought into use for timber purposes but are of slow growth. The case is an urgent one, necessitating the use of a tree that will give the best return in the shortest time. While there are areas of eucalypts that are becoming reafforested naturally by being closed against selection, it is certain that from 30 to 40 years must elapse before the trees growing thereon are fit for use, it being a well-known fact that our Bluegum is quite an infant at 60 years of age, other representatives of the genus being much the same. It seems hopeless for the present generation to look for much assistance from the source mentioned. In these circumstances it would seem advisable that the exigencies of the situation can only be met by having recourse to the wide planting of the known rapid-growing members of the pine family, of which the Remarkable pine is easily first.

— Another Opinion. —

Colonel Legge, at the same conference, read the following paper on the Monterey Pine as a Shelter and Timber Tree.

To recapitulate shortly: the pine was dealt with under two aspects; firstly in relation to its value to the farmer and pastoralist as a "shelter" tree. In regard to its qualifications, it was shown from statistics of Australian forestry that it grows more quickly in this southern region than any where else in the world: that its foliage is denser, and its habit more umbrageous, than any other pine in Australia, or, indeed, anywhere else; and that it is unique among all known pines in retaining its branches to the butt, the consequence being that, if protected from damage by stock when young, it makes the best possible shelter tree.

Secondly: an attempt was made to show the fallacy of the idea, so much abroad, that its timber is useless. It was pointed out from wide statistics that the wood, on the contrary, is of excellent quality, and that if people can be induced to grow the pine on their holdings it will prove more useful to the man on the land than any other tree. Owing to its density and toughness in grain it will prove useful for all kinds of farm work and implements, such as fruit cases, barrows, bodies of drays, churns, butter boxes, and so forth. As regards a return for labour in planting, as it comes to maturity so rapidly it will supply timber from the same land three times in 60 years, or in the ordinary lifetime of a healthy man. No other cone-bearing or softwood tree will give this result, except the Larch which, however, is not so fine in grain or tough in fibre, and not so valuable as a cabinet wood.

In concluding this short reference to the salient points in the foregoing article, it may be helpful to any in the audience who are interested in the Monterey Pine as a shelter tree to comment again on what has been recently written in refutation of the mistaken notion as to the absence of butt branches. No one who has ever seen the habit of growth in the young tree, or the appearance of a good adult (properly cared for), could entertain such an idea, for it has been proved over and over again that it is only want of guarding when young which prevents the Pinus radiata from being "feathered to the ground," and that it retains its branches down to the butt until it has acquired an immense size. It is, as just said, the only pine in which this characteristic obtains, a proof of which can be had by referring to the descriptions of the foliage of the genus Pinus in standard works.

Turning now to the main object of this note—namely, the use of the Monterey Pine as a timber tree—planks of the wood of a young tree only 12 inches in diameter, show its excellent quality and toughness of fibre, the latter being made evident by driving a 3-inch nail close to the edge of the sawn end. Its use for fruit cases is then demonstrated, which is further proved by the feasibility of extracting the nails without any injury to the lids, and so making the case do a second time.

No pine stands higher in the opinion of the experienced Conservator, Mr. Walter Gill, F.L.S. He has all along endeavoured to bring its value to the front by experimenting in various directions with its timber.

The Farm

Land Drainage.

One characteristic of undrained soils is their coldness. As the air passes over a wet surface evaporation takes place with greater or less rapidity, according to the state of atmospheric humidity and to the degree of motion of the wind. This is easily exemplified with regard to the last mentioned factor by moistening the forefinger and exposing it to the air, when a sensation of coldness will be experienced upon the side exposed to the direction of the wind, which simple experiment is sometimes tried when the motion of the air is too light for one to be sure from what quarter the wind comes. These winds exert a most powerful evaporating influence, with a corresponding lowering of temperature, which is liable to exert an injurious effect upon soils as well as upon stock and vegetation. The latter may be protected to a large extent by shelter belts of trees and other means, though with regard to the soil the sun exerts a powerful evaporative effect, which is, however, to some extent compensated by the heat which it imparts. In the case, however, of the undrained soil, this benefit is largely nullified by the physical properties of water in relation to heat. Warmed-up water is lighter than cold, and if the source of heat is applied to the surface the warmer water remains there, and the water beneath it remains for a long time unaffected. On the other hand, if heat is applied to water from beneath, the water rapidly rises to the surface, layer after layer coming up, until the water acquires one uniform temperature, and eventually boils, if sufficient heat is applied. This property of water is exemplified in the process of heating a copper of water, for soon after the fire is lighted if the hand be immersed in the liquid, it will be found warm at the top and colder as the hand is more deeply immersed. In the case of water being cooled at the surface by wind evaporation or by a reduction of the atmospheric temperature, as in the case of frost, a cold layer is formed upon the surface, which sinks owing to the contraction of its particles, which renders it heavier. This same process goes on in the case of an undrained soil, which approaches the saturated condition near the surface; but, where a comparatively dry layer of soil of any thickness overlies the saturated soil beneath it, reduction of temperature by the abovementioned process need not be seriously considered. The coldness of the surface in the latter case would be owing to evaporation of the water brought up from below by capillary attraction, and this might affect the growth of crops to a serious extent, as well as act in an injurious manner upon the health of stock, especially in the case of grass land so circumstanced. The effect of evaporation in reducing temperature is well exemplified in the case of the porous earthenware jars used to keep water cool in warm climates, or in that of the porous butter-coolers now so much used in households. The water carried off by evaporation, especially in dry windy weather, from exposed reservoirs and water tanks is very great, and where these can be covered in there is naturally much less waste of water from this cause, which, although an invisible one, should be sufficiently manifest in its effects to make it worth while, in districts where water is scarce, to go to the expense of roofing in (where this is practicable) reservoirs or tanks devoted to water storage.

Drained soils, both on this account and from other causes alluded to in the foregoing, and because water condensing from its gaseous condition in the atmosphere to that of rain evolves the heat which was previously latent in its particles, much of this finding its way into the soil when there is a free passage for moving water. The warming-up of the atmosphere after a shower of rain is often noticed, and is due to the heat being discharged which was previously employed in keeping the water in its vapourised or gaseous condition. On account, therefore, of the warmth of drained soils and the greater freedom with which the roots of crops pass down into the subsoil in the more favourable circumstances thus afforded them, the harvest is generally earlier upon such soils, and the quality of the grain superior, as well as greater in quantity. Moreover, drained soils are easier to work, manures are more effective when employed upon them, and the health of stock tends to be better. It must not be overlooked, too, that tillage operations can be undertaken much earlier in the spring upon drained soils, and this is another reason why crops tend to mature earlier upon them.

Kerosene Emulsion.

Take 2 gallons of best kerosene, 1 gallon of boiling water, and 8 oz. of soft soap. Dissolve the soap in the boiling water; when dissolved add the kerosene and churn the mixture with a spray-pump or syringe for fully 10 minutes, so as to get the oil and water thoroughly emulsified, when the mixture becomes stable and the oil will not separate from the water, even when kept for a considerable time. If the oil is not thoroughly emulsified, and there is free oil present, it is apt to injure the foliage when applied, and if free oil gets on to the roots of the tree in any quantity it will probably kill the tree; therefore it is always best to be on the safe side, and be sure that you churn the mixture till it is properly emulsified. The strength at which kerosene emulsion is applied varies with the trees to which it has to be applied, and with the insects that are to be destroyed. For scale insects on citrus trees, olives, and hard-wood trees generally, 1 gallon of emulsion added to 7 gallons of water will not injure the tree, except perhaps a few very tender shoots; but when used on peaches, Japanese plums (not persimmons), it must be used much weaker; in fact, it is not recommended for these trees when they are in leaf, though it is valuable as a winter wash for destroying scale insects. Where peach trees are attacked with black aphis, then the resin and soda wash is best. Kerosene emulsion is one of the best remedies for all insects that live by suction, especially scale insects of all kinds. It can be used by itself, or if the trees to be sprayed are covered with fumagine—the sooty fungus which always accompanies certain scale and other insects—it can be used in conjunction with as thick a solution of starch as can be got through the nozzle of the pump. The starch solution is made by making a paste of flour the same as that used by billstickers, and straining it carefully from all lumps. The combined mixture forms a thin coating over the scales, leaves, branches, fruit, etc., which peels off when dry, taking the dead scales and fumagine with it, and leaving the trees clean. In addition to using kerosene in the form of an emulsion, it is now frequently used mixed with water, specially constructed spray-pumps being required to mechanically mix the oil and water. When used in this manner, the proportion of kerosene in the mixture varies from 1 to 10 to 1 to 20, or even more, according to the condition of the plant treated and the nature of the pest to be destroyed. Instead of using pure kerosene, there are several other preparations on the market, such as the well known red oils, that can be used in place thereof. These preparations form a stable emulsion with soap, and are largely used as a winter spray for destroying scale insects on deciduous trees.

Unprofitable Cows in the Dairy.

An examination made by the direction of Hoard's Dairyman of one hundred herds kept for dairy productive in the State of Iowa affords a basis of illustration of the unprofitable cow that gets into the dairy and is permitted to stay there through a lack of knowledge of her actual butter capacity. In the hundred herds the total number of cows was 982.

In four of the herds the average production ranged in value from 8/ to 9/ for each 4/ worth of feed fed to the herd. This, of course, would be clearly profitable dairying. There were 61 herds out of the hundred that averaged upwards of 4/-, but less than 8/- as the return for each 4/ worth of feed used. Twelve of these ranged from 6/3 to 7/9. Twenty-three other herds of the 61 returned from 4/ to 5/ for every 4/ expended in feed. A good many of these cows of low producing power were, of course, unprofitable when the cost of care, milking, etc., is taken into consideration; for a cow that barely returns the cost of feed is not a very promising investment. But there is a worse side to the investigation than this.

Thirty-five other herds in the hundred whose owners were patronising a creamery, earned less than 4/ for every 4/ spent in feed. The losses ran all the way from 1d. for the 4/ to 2/6.

In these 35 herds there probably were, of course, some profitable cows; that is, the owner of the herds could have weeded them down half or three-fourths perhaps, and found the remaining cows a profit; but as the herds stood, there were so many poor ones that the herd ate their heads off, even though some were able on their own merits to more than pay for their food. Probably the very best of the herds in the hundred—those that produced from 8/ to 9/ in return for each 4/ worth of feed, could have been improved by weeding out a few of the poorest producers. But the test as a whole shows that in a hundred herds kept for dairy purposes in as good a dairy State as Iowa a little more than one-third of the herds fail to pay for the feed they eat, while a still larger percentage in the hundred barely pay for it. This is surely no profitable dairying, and the situation affords an excellent opportunity for owners of herds to investigate their producing capacity and get rid of the unprofitable cow.

Developing Milk Cows.

To make a good milk cow depends not upon heredity alone, but also upon the development of the heifer from calfhood until her own second calf is dropped. Until that point is reached no very definite judgment can be formed of the success that has attended the effort to develop the milker. Beginning with the heifer as a calf, the feeding should be of a kind that will afford plenty of nourishment without encouraging a tendency to put on fat. The calf must never be stunted on the one hand, nor must it lay on flesh on the other. This will imply the use of a large proportion of nitrogenous food as compared with the carbonaceous or fattening elements. The profitable milker must also have a large and very fully developed digestive system, and must be capable of utilising advantageously a large proportion of coarse food. This will require early feeding of coarse forage when grass is not available to the full extent of the animal's capacity to consume, and the growth of this capacity should be encouraged.

A great mistake made by many who seek to develop heifer calves is caused by their desire to have the calves look well, but a heifer calf which is being developed as a milker must be expected to look somewhat rough and ungainly; not rough in coat, necessarily, but rough and angular in the points which the growing frame presents. A heifer calf designed for the dairy should be bred just as early as possible, so that the maternal function on which milking capacity depends may be established early and divert to its own development some of the vital energy that would otherwise be devoted to growth and flesh-making.—Nebraska Farmer.

Plump Seed Wheat.

Many good practical farmers will say that shrivelled seed is as good as plump. We have heard it scores of times when the question of plump grain for seed has been discussed. Quite often a farmer will go further and tell you that one of the best crops he ever had was from shrivelled grain. Quite so, but as he had not sown plump grain alongside for comparison, the only deduction was that under favorable conditions good crops may be obtained from shrivelled grain, a fact which no one denies, because that is so people forget that under such favorable conditions immensely better crops would be reaped from plump, well-developed seed.

It is a matter of history that after the great red rust year of the sixties, there was practically nothing but badly-shrivelled wheat available for seed in many places, and there are scores of farmers who tell how they got good crops from the shrivelled seed. No one wants to argue that shrivelled seed cannot produce good grain, but it is reasonable to say that under the same conditions plump, selected grain will produce so much better crops, and so much finer grain; that it is very profitable to pay extra, or take extra trouble, to secure plump, good seed, for like has a tendency to produce like.

A great deal of our wheat is grown under conditions ordinarily called precarious. Our seasons are less reliable than those of many parts of the world where wheat is grown. Hence, on account of this uncertainty of our climate, the vicissitudes that probably confront our wheat crop at the outset of any season, are exceptionally great. Now, we know that in tiding over the untoward circumstances of climate small and weak seed stands a poorer chance than large, plump seed, a much poorer chance than under favorable climatic conditions. That is the great and special reason why in such a climate as ours we should give particular attention to the quality of our seed. Under our conditions this attention is likely to yield a maximum of profit. The same amount of attention to the same point in a country where the climate is more uniform and reliable would not be likely to be attended with an equal amount of profit.

Economic Feeding.

The economic feeding of live stock does not mean the putting of animals upon a starvation ration in order to save feed, or to make a certain supply of feed reach over a specified time. Economy in feed means the saving of feed from loss or extravagant use. The turning of stock into paddocks, where they have aceess to stacks is a waste of feed, and therefore a violation of system and economical methods in handling live stock. The shovelling of food out into muddy yards for the hogs to gather up is not an observance of economy, it is waste of food and a danger to the health of the swine.

All grains and feed products of all kinds that are produced on the farm or brought on to the farm as commercial feeds have a feed value and should be turned to some account in maintaining the farm stock. The economy of feed and feed products on the farm is the great source of profit in farming. It matters not how much is produced on the farm, if it is not harvested and properly taken care of to save it from loss and damage the farm industry will suffer and farming will be pronounced a failure on such farms.

The economical management of what is produced on the farm has as great a bearing on profit as the growing of the crop. The study of live stock requirements is a necessity. Every farmer and handler of live stock should know, as nearly as can be, what the requirements are of the animals he feeds. This can only be had by instruction and practical work.

During the grazing season it is an easy matter to handle stock; give them the run of the pasture where they can get plenty of good, pure water and a fill of grass, and they will do well. But when the pasture is gone, then a different programme is on. The pasture must be replaced by a substitute of prepared feed of some kind; hay, fodder, straw, and other forage crops will serve to take the place of the pasture if given in liberal quantities. Here is where a knowledge of feeds is required in order to keep the flesh that the animals laid on during the time of natural feeding from being wasted away during the dry season.

It is folly of the worst kind to starve off during the dry months the flesh that has been put on during the grass season. Yet this extravagant practice is common.

It matters not what plan is adopted, but that which results in the starving off of flesh is poor economy from a feed standpoint. It has been ascertained that the greatest profit in live stock growing is in the rapid development of the animal; the more rapidly the young thing is pushed forward into a fully-matured beast the greater the profit. It would be folly to attempt to disprove this statement so well grounded has been the evidence in its support.

It is economic feeding to give all animals liberally of such feeds as are available. It is economy to sell such stock as cannot be fully supplied with feed. The economic feeding of stock can never be traced to starvation methods, not in a single instance can this be attended with other than loss. Economic feeding means liberal feeding without waste.—"American Farmer."

Breeding Dairy Cows.

We often see farmers go on year after year trying to make butter from cows no better adapted to that business than the Clydesdale is for a racehorse; leastwise they let their wives go on, that being easier. This is generally, but not always, the result of carelessness or indifference. Some—very few though—spend their money freely to bring their herds up to their ideal, but the nearer they get to their model the further they are from getting a profitable dairy animal. Why? Because they are trying to produce a physical impossibility called a general purpose cow. A cow that will combine in one carcase all the good qualities of all the different breeds from the gross phlegmatic Hereford which has been bred and trained for the purpose of laying on flesh, to the highly organised and nervous-tempered Jersey, which has been bred for an entirely different purpose, that of giving a large flow of rich milk. No amount of reasoning will convince them of their error. But it is noticeable that they are the ones who are always grumbling that dairying doesn't pay.

Another class want a large cow, one that they can sell for beef after her usefulness is over. But first consider, what are you keeping the cow for? If for making butter then you want the cow that will give the largest return for the feed eaten. If the larger cow will not make such return in proportion to her size over the medium-sized one she is kept at a loss. Few seem to realise that it takes a certain quality of food just to support the cow and keep her alive. After that what she eats goes to milk or meat.

Now the big cow, of 1,4000 lbs. live weight will require, just so much more food for support than the medium one of say 900 lbs. as 1,400 is to 900. And unless the extra food eaten goes to the production of butter a loss is the result. Keep this up for eight or ten years, and the extra 500 lbs. of old cow beef will not make the loss good. We should first find out for what purpose we want a cow, and then breed the cow that comes nearest to our needs.

— Jerseys for Butter. —

If butter is the object there is no breed that can approach the Jersey in the economical production of a first-class article. Why? Because she is the oldest and best established of all our dairy cattle, having been bred pure for over 200 years for this very purpose. You may say we cannot all have pure-bred Jerseys on account of their high price, but you may as like as not have cows as good if you know how. Suppose such is the case, it by no means follows that every dairyman cannot avail himself of this blood to improve the herd he now has, as young bulls of this breed can be had at prices very little in advance of the price of mongrels, and by the continued use of a pure-bred sire a herd of common cows may in a few years be brought up to a point that for all practical purposes will be equal to pure breds.

Thus the first progeny of such a union will have 50 per cent. of pure-bred blood, the next generation 75 per cent., the next 87½ per cent., the fourth generation will have fifteen-sixteenths or 93¾ per cent. of pure blood, while the sixth generation has 98 and seven-sixteenths per cent. of pure blood, and would be what is called a full bred very nearly.

— Selecting Cows. —

In selecting cows care should be taken to get them as nearly uniform type as possible. The head should be small and lean, eyes full and mild, neck full and thin, shoulders thin, backbone prominent and open between joints, hips wide, legs short and fine-boned, barrel well rounded and large, deep through behind the shoulders to give plenty of room for heart and lungs, udder large, running well forward and back, teats rather short, but thick and wide apart. Avoid those whose udders show a tendency to collapse after being milked. The skin should be soft and mellow to the touch, covered with thick, soft hair. Such a cow, if weighing about 900 lbs., will invariably have a good constitution, which is indispensable, but do not mistake size for constitution or a capacity for dairy work.

— A More Important Selection. —

Having selected the best cows possible for a foundation, the next step is to find a bull to mate with them, and it is of the utmost importance that he should be a good one, as the future herd will be largely composed of his blood. For this reason he ought to be strongly in-bred to great butter-producing cows. Examine his breeding on both sides as far back as possible, and see that he has no taint or imperfection in his make-up, for it must be borne in mind that he is quite as likely to transmit imperfections, if they exist, as good qualities, and the more prepotent he is the greater the danger. He should have a good disposition, strong and rugged constitution, and yet be free from coarseness of any kind, full of vitality or nervous energy, which will prove his ability to stamp his imprint on his offspring. If such a bull nicks well with the herd it will usually be safe enough to breed him to the second or even the third generation, but here the skill and judgment of the breeder must come into play in determining how far inbreeding can be carried in any particular case.

— Test, Prove, Cull. —

After having secured good foundation stock the only thing necessary to ensure success is eternal vigilance in testing and weeding the poorest from the herd. This is where a great many make a mistake in not testing their cows separately. Many a grand cow has passed the whole of her life without the owner knowing what a prize he has, she probably helping to support some worthless brute that was not worth her keep as a dairy cow, and anyone who has never tested his cows will be surprised at the great difference there is not only in the quality, but in the quantity of the product.

The cows should all be tested for butter three times during the year—Once when fresh, once about the middle of the milking period, and again about two months before they are due to calve. As their milk is weighed separately every day we can form a fair estimate of the amount of butter made from each cow in a year, and are thus able to determine which are the most profitable. This, to be sure, takes some time, but anyone who will try it for a year will be well paid for the trouble. Some farmers have adopted the system described for grading up their herds and have brought them up in a few years from 150 lbs. to over 300 lb. a year, there is no reason why every dairyman in the country cannot do likewise.

Calf Freeding.

In order to ascertain whether nipple or bucket feeding of calves was the better method to adopt, five tests were made with eighty calves at Kentucky Agricultural Experiment Station. In one lot in each test the calves were supplied with milk direct from the bucket, while those of the second lot sucked the milk through nipples or "call feeders." The several lots of calves were equal in respect of age, sex, weight, and condition, and all the calves received the same amount of food. It was found that while the bucket-fed calves took, on an average, 39½ seconds to drink their milk, those fed through the nipple required 2 minutes 21 seconds. During the first seven to ten weeks the nipple-fed calves were more thrifty than those fed from the bucket, but it is stated that calves fed carefully from the bucket will make almost as much growth by the time they are six months old as those fed on the nipple when they are young.

Some Hints about Harness.

A harness room is a necessity on every farm.

In this room should be kept all harness, combs, brushes, sponges, oil, tools and a medicine chest.

Never put away harness until you have dried it thoroughly. Do not allow knots in the traces, and examine frequently every part of the harness for weak and worn places.

Special attention should be paid to the collar. Keep it clean and oil it once a month. All the harness should be oiled at least twice a year.

In cleaning harness, use a good soap.

In purchasing harness, buy the best and then keep it in good condition.

Never have tight check reins, and use a bit to control, not to torture.

Keep all nickel bright and clean.

The harness room should be built in a convenient place, and so arranged that every article can be found quickly.

Have in it a stationary lamp or lantern, and near it a box of safety matches, so that when you go in the room at night a light can be quickly made.

Rape for Sheep.

For speedily fattening lambs and sheep rape can be highly recommended. It is unrivalled as a pasture for sheep in autumn. When successfully grown as a fattening food it is without a rival in point of cheapness and effectiveness; for sheep that pasture upon it do the harvesting in a most effective manner, with little cost to the owner. The manure made from it is widely distributed over the paddock, and adds to the fertility of the soil. As the crop cannot be advantageously harvested and preserved, it is of most value as forage, when hand-fed, or for pasture. In the latter instance, when sheep or lambs are first turned in on the crop they should have fairly full bellies, so as they will not gorge themselves, and cause bloat or scours. At the time of changing the food they should have free access to a grass pasture. For the first few days keep the animals for a few hours in the forepart of the day on pasture; the latter part turn them in on the rape for another short spell. After that they do not again require removal. In two or two and a half months they should be ready for market. If it is desired to carry on the lambs into the winter months at the close of the pasturing season they will continue improving under judicious management. They do not require water when feeding on rape, but a little salt is of advantage. The average yield of the crop, under fair conditions, ranges from 20 to 27 tons per acre. Rape is of two varieties, dwarf and giant. The seed can be sown in spring or winter, either in drills or broad-cast. In the latter case at the rate of from 3 to 5 lbs. per acre; when drilled from 1½ to 2 lb. On poor land in dry weather the quantities given can be increased. When sown in drills the soil should be cultivated and kept free from weeds.—Elder's Review

The Self-Sucking Cow.

The self-sucking cow is possibly the most aggravating animal to deal with that is to be found in all the lists of domesticated beasts. It would seem to the person not familiar with the persistency and determination of this class of cows that it would be a very difficult matter for the cow to suck herself when given perfect liberty and entirely unobstructed. This is not the case, however ; the cow can soon acquire the habit of milking herself, and then tax the ingenuity of the most inventive genius to devise obstructions or appliances to prevent her from doing so.

Why a cow gets the habit of sucking herself is not fully understood. Some attribute it to lack of water in the pasture, and she uses this means of quenching thirst, others attribute it to a too full condition of the udder, which causes pain and uneasiness and the cow licks the teats as a means of relief, and thus gets a taste of the milk and relieves herself by sucking. Others still attribute it to leaking teats, and the cow gets a taste of the milk in this way and becomes a sucker. It is safe to say that none of these excuses will answer all cases of self-milking in the cow. It is perhaps accounted for more correctly by accident, or any of the above reasons may apply, and others not mentioned. It is an unnatural habit acquired by certain cows, and is very hard to correct, is all that most persons can say.

The following are some of the plans put in operation to keep cows from continuing in this habit :—

A popular method is to place a halter on the cow, having the band over the nose studded with sharp nails pushed through from the inside. When the cow attempts to suck herself the nails will prick her flank and udder and prevent her from grasping the mammary organ.

Another plan is to put a bull ring in the cow's nose and hang two loose rings in it. These will not prevent her from feeding, but when she attempts to suck she cannot grasp the teat. This plan has succeeded where numerous other ones have failed.

A simple and often effective method is to put a girth round her body, back of the forelegs, and a halter on her head, and connect the two by a rod, passing between the forelegs. It should be fastened quite close up to the cow's body, but it should be suspended a few inches from the halter.

Condition in Horses.

One often wonders whether the "condition" in which horses are brought up for sale is really as effective in increasing the price, as the vendor supposes. The average man who has anything to do with horses knows, or ought to know, that fat does not mean working condition, and should, one would think, be able to judge of the quality of the animal in the condition in which it would be seen after a few months' work in the team. But the facts that animals always are got up for sale, and that breeding animals shown at agricultural exhibitions are fatter that they ought to be if the purpose of their existence be alone considered, show that the average purchaser, like the average judge, will not pay much regard to merit unless it is clothed in an attractive dress. It seems very foolish, for the fat put on for sale purposes has to come off again before the animal can be said to be really in condition for his work but it is no use ignoring obvious facts. The conclusion we come to, therefore, is that it is a wise man who offers a fat horse for sale, but a foolish man who buys the animal.

Apart from fatness, however, the seller can do a great deal to improve a horse's appearance by careful grooming and trimming, and on the principle that it is of no use hawking stinking fish, it is both legitimate and wise to let the animal offered for sale be made as attractive as possible to the eye of the purchaser.—Exchange.

Prolificacy in Pigs.

Among pigs in general, the range in number of pigs per litter is wide, running from three to eighteen. Averages are from six to ten, depending on breed, family, or strain within the breed, age, feeding, and handling of the sow and on the vigour of the service boar.

The relative efficiency of old and young brood sows was tested out at the Iowa experiment station. Fifteen gilts bred at eight months, averaged seven and two-thirds pigs per litter. Sows twenty-four months old averaged nine and three-fifths pigs per litter, and aged sows averaged ten and three-fifths pigs per litter.

The larger litters are unquestionably an advantage. Litters of from three to five are too low, and the sow that can do no better after a fair trial should be discarded from the herd. If an average sow, however, can save eight pigs, this number will be found to take care of a normal milk flow and will make bigger, more uniform pigs, and in most cases be more profitable to the farmer than an abnormally large litter of pigs small in size and low in vitality.

To make handy chaff scoops, cut a kerosene tin in halves from corner to corner lengthwise, double down the edges to stiffen them ; you then have two scoops deep in centre, shallow at edges, requiring no handles. They will clean out corners of bins, etc., and prove very useful for chaff, bran, crushed oats, etc.

Many cases of so-called colic, and others of general unthriftiness, are attributable to faulty teeth. The construction of the horse's stomach is such that the food must be digested by the gastric juices and passed out quickly, if he is to get sufficient to eat. If the food is not presented to the stomach in a thoroughly masticated condition, and well mixed with saliva, delay in digestion takes place, and overloading of the stomach, which should be about two-thirds full for rapid digestion.

Sore Shoulders on Horses.

For the treatment of horses' sore shoulders one of the best remedies is lard, or even clean fat, with the addition of blacklead. This forms a glossy surface of the sore as well as on the collar. The collar should be eased a little by pounding, or, still better, by taking an awl or sacking needle and working the hair under the lining to a different place. Care should be taken not to form a lump. Oils or sharp ointments are useless unless the horse is turned out. Another thing always helpful is to have a piece of collar-check sewn on to the top of the lining of the collar, thus giving it a double lining. As soon as a horse shows any sign of a sore, cut a hole out of the outside lining in that particular spot. This is only necessary with horses that are very susceptible to sores. Cutting deep holes into a collar is a bad practice.

Colour Studies.

Those who have studied the origin of the horse may mentally weave a pretty story around each and every horse in the city or in the bush, says the Sydney Stock and Station Journal. For instance, when we see a dun-coloured horse drawing a light vehicle on the city blocks we know by his colour alone that he is descended from the hardiest of horses ; for in a wild state the dark-creamy with black mane and tail was as active as a mountain goat, for he belonged to the rockiest and most precipitous part of the world.

Again, when we see a black horse—even a black thoroughbred—we know that in his veins is the blood of the draught horse ; for in ancient times all draught horses were black, and all black horses were draughts, and all belonged to the valleys of the Rhine.

When we see a flea-bitten grey draught horse we know that he has Arab blood in him, for in the early history of the horse only the Arab was "flea-bitten."

I fancy I hear some owner of a black thoroughbred protesting against the suggestion that his horse has draught blood in him. It is there, all the same.

So may the owner of a flea-bitten grey Clydesdale object to the statement that his horse boasts an infusion of Arab blood. It is there, all the same.

A horse's colour gives away his ancestry in many cases, just as blue half-moons on a man's finger nails tells of black blood in his veins.

Resting Horses.

A horse that is deprived of a sufficient amount of rest is sure to knock up sooner or later, but even when this rest is given its value will be practically neutralized if the animal is habitually worked at a rate of speed beyond its powers. Thus the horse which gets through a certain amount of heavy work a day at his natural speed will thrive better than if he is made to do it in less time, though in the latter case he will have more time in his stable. An over-tired horse, like an over-tired man, will often refuse his feed, and although clearly worn out by his exertions, will not lie down. Hence the objection that exists against driving as a pair a fast horse and a slow one. A little more attention to the respective speeds of their horses might be beneficially bestowed by owners. —Sydney Stock and Station Journal.

The disposition of an animal to fatten depends much on breed and temperament. It is almost impossible to fatten a wild animal, while its domesticated descendants, especially if bred with the object of obtaining rapid increase, may be readily fattened.

The Digestive Juices of Plants.

It has long been known that both plants and animals carry on their various chemical operations by means of specific agents known as enzymes. Thus, when a plant requires the starch which is stored in its leaf, tuber or elsewhere, a special enzyme, diastase, is put in contact with the starch grains, corrodes them, and converts the starch into sugar. The mode whereby the animal makes use of the starch which occurs in its food is precisely similar to that employed by the plant. Both saliva and pancreatic juice contain diastase, and hence such starch as escapes the action of saliva—and in these days of quick lunches much escapes—is acted on by the diastase of the pancreatic juice and is hydrolysed to sugar. Each of the many chemical actions which go on in the body is presided over by a specific enzyme, of which the starch-converting diastase may serve as an example. The digestion of proteins—the complex nitrogen-containing substances which are of special nutritive value is effected by stages, and for each stage there is a special enzyme. In the animal these proteolytic enzymes are contained in the gastric and pancreatic juices. Since the processes of digestion are similar in plants and animals, we shall expect to find that proteolytic enzymes occur in plants as well as in animals. This expectation was realised long ago by the classical investigations on the substances excreted by insectivorous plants, such as Droser and the Pitcher plant (Nepenthes). These substances bring about the solution of proteins in a way similar in all essentials to that whereby the proteolytic enzymes of animals act.—Gardeners' Chronicle.

Loose Smut in Oats.

Experiments designed to ascertain the best treatment for this disease have been conducted for five years in succession at the Ontario Agricultural College. The following are the treatments which were employed throughout :—

(1) Untreated.

(2) Immersion for a short time in water at about 115 degrees F., and subsequent immersion for 15 minutes in water at a temperature of between 130 degrees and 135 degrees F.

(3) Immersion for five minutes in copper sulphate solution; strength: 1 lb. in 1 gallon of water.

(4) Immersion for 12 hours in copper sulphate solution; strength: 1 lb. in 25 gallons of water.

(5) Sprinkling with copper sulphate solution; strength: 1 lb. in 10 gallons of water.

(6) Immersion for two hours in potassium sulphide solution; strength: 8 lbs. in 50 gallons of water.

(7) Immersion for 20 minutes in a solution of formalin; strength: half pint in 21 gallons of water.

(8) Sprinkling with a solution of formalin; strength: half pint in five gallons of water.

The following table gives the average percentage of smut and the average yield of grain per acre :—

Materials.	Percentage of Smut.	Average yield of Grain per acre.
1. Untreated	5.7	60.3
2. Hot Water	0.0	63.7
3. Copper Sul. (5 mins).	0.8	58.5
4. ,, ,, (12 hours)	0.1	56.0
5. ,, ,, (Sprinkled)	1.3	61.8
6. Potassium Sulphide	0.2	66.2
7. Formalin (Immersed)	0.0	68.3
8. ,, (Sprinkled)	0.0	61.3

It will be seen from the tables that the several treatments adopted the one in which the grain was immersed for 20 minutes in a solution of formalin (half a pint in 21 gallons of water) gave the best results.

The Effect of Bastard Trenching on the Soil and on Plant Growth.

Bastard trenching as ordinarily performed consists of two distinct operations, viz. (a) loosening the lower spit of soil, and (b digging into it farmyard manure or other fertilising material. In a Rothamsted experiment the first and second spits of soil were removed, the third spit was broken up but not removed, and then the second and first spits were replaced in their natural order. The cultivation and surface manuring of the trenched and untrenched plots were similar. The experiments extended from March, 1909, to the end of 1912, a period during which extreme conditions of temperature and moisture were experienced. Four distinct soils were investigated: a light sand, two loams, and a strong clay. The results of the experiments showed that bastard trenching when unaccompanied by manuring has very little effect on the soil. The main use of bastard trenching in the absence of a "pan" seems to be that it allows of manure or other fertilising material being added to the bottom spit.

According to the Fruit Grower apple pomace is a profitable feed for dairy cattle, being equal in food value to maize ensilage.

Nitrogen Enrichment of Soils.

Summarise observations and the results of work in the field and laboratory in Canada since 1905, on the nitrogent enrichment of soils, appear to indicate :—

(1) That, as regards the cultures of nitrogen-fixing bacteria experimented with, while there were many instances in which they distinctly favoured the growth of the legume, their action on the whole was more or less uncertain. The profitable employment of these preparations seems, therefore, problematical. Their vitality is very quickly impaired by light and heat and unless made by a reputable firm or institution, and still fresh, satisfactory results can scarcely be looked for.

(2) The employment, as an inoculating material, of the soil from the surface of a field bearing a luxurious crop of the specific legume has given better results than the use of cultures. Where cost of transportation is not prohibitive, inoculation with soil will be found the most reliable for the general farmer. Provided the proper precautions were observed, the authors have never found it to fail on any soil which merely lacked the specific nitrogen-fixing bacteria. notable instances of successful inoculation by this method have been recorded for Alfalfa in the North-Western Provinces of Canada.

(3) Failure in many cases has been caused by one or more of the following: deficiency of moisture, unsuitable mechanical condition of the soil due to lack of humus; inadequate drainage, or improper working of the soil, acidity of soil denoting deficiency of lime.

(4) The systematic analysis of a soil continuously in clover shows a constant increase in its nitrogen content. The work reported was continued for nine years, and at every examination was found to be richer in nitrogen. In spite of losses which must have ensued from bacterial activity and other causes, there had been a constant, though not regular, accumulation of this valuable element. The work points to the high manurial value of the residues from a leguminous crop, and emphasises the importance of a rotation which includes a legume, if soil fertility is to be economically maintained.—Journal of the Board of Agriculture.

Lubrication of Farm Machinery.

One of the little things that is lacking on a majority of farm implements is a good and convenient system of lubrication. The common oil cup with open or loose cap is sure to get filled with dirt and grit which cuts out the bearings, largely increasing the power required to operate the machine and greatly reducing its period of usefulness. The hard oil cup, which holds enough oil to last a week or more, is always tight and can be screwed down a little each day, thus insuring a clean bearing and a regular supply of grease. Many of the common implements could be vastly improved by replacing the common oil-holes with hard oil-cups. The oil holes can be easily reamed out and threaded to the proper standard, and the hard oil cups screwed into them. The amount of work and expense required will be returned many fold in the saving of horseflesh and in the increased life of the machinery.

Ostrich Farming.

The selection for a suitable holding for ostrich farms is important, says a Queensland Ostrich farmer. The birds require good grazing ground and fairly well watered. They live on grass and herbage, but they need plenty of succulent green food to secure the best results. The growth and value of the feathers largely depend on this. It has been estimated that one ostrich requires as much grazing ground as two sheep. Lucerne land is the best, for a good supply of lucerne when a dry spell comes will keep the birds in good producing condition. The hen birds are somewhat uncertain in the number of eggs they lay. One has been known to lay as many eggs as 50 in a season, while sometimes the number is not more than 12. To keep the hen from sitting, and to use an incubator is often advantageous, as the hen will lay more eggs, and the young birds that are brought out and cared for by hand are more tractable and tame. They are not difficult to rear; they need at first to pick up a little gravel, and then to be fed on lucerne and bran, or crushed barley or bone meal, and sheltered at night, and they can be turned out into the runs at two months, and at six months they can look after themselves. At seven or eight months they are ready for the first feather plucking, and at intervals of eight months the feathers may be taken from them. The construction of a plucking pen is needed where the birds can be treated separately, and during the operation a hood is slipped over their heads, and the feathers from the large wings and tail are removed with shears, the quills being left in, and taken out afterwards, when they have become dried or dead. The operation is not a painful one, and the bird seldom shows any resistance to it. The labour necessary to work a farm is not a heavy expenditure.

A Good Whitewash.

Whitewash requires some kind of grease in it to make it durable. Any kind of grease, even though it be old and partly spoiled, will be all right, though tallow is best. The grease imparts to the whitewash an oil property the same as in good paint. To a 40-gallon barrel, say, of whitewash thinned ready to use, have incorporated in it 10lb. of tallow or any grease; mix in lime in the slacking stage, also 10lb. of salt. In order to incorporate the grease properly, it is necessary to put it in a vessel on the stove, and boil it into a part of the whitewash so as to emulsify and get it into such condition that it can be properly incorporated with the whitewash mixture. Use your judgment; on smooth wood or hard stone it needs a stronger binder than it would on cement or rough sawed timber, which would do with less. Experience will lead you up to doing or having a good job done this way.—Queensland Agricultural Journal.

Kedzie's Mixture.

Boil 1 lb. of white arsenic and 2 lb. of washing soda in 1 gallon of rain water till the arsenic and and soda are dissolved. This forms the stock solution. To use, take 1 pint of the stock solution and add it to 40 gallons of water, into which the milk of lime (from 6 to 8 lbs. of newly slacked quicklime is strained. Keep well stirred and apply.

Wheat and its Cultivation.

A. E. V. Richardson, M.A., B.Sc. (Agric.), Agricultural Superintendent, Victoria.

The following extracts from a series of articles from the pen of Mr. A. E. V. Richardson, in the Victorian Journal of Agriculture, will, we know, be read with interest by many who remember the good work done by Mr. Richardson when a member of the South Australian Agricultural Department Staff.

Ever since the dawn of history civilised man has used wheat as a staple article of diet; and, in competition with foods of other races, it is displacing rice, millet, and other grains to such an extent that its production has become one of the most fundamental problems of the time. No problems in the realm of agriculture should be of greater moment than those relating to the production and distribution of our daily bread. Particularly is this true with respect to Australia, for the prosity of her finances are in a very perity of her people and the stabillarge measure dependent on the success of her wheat harvests.

It is estimated that the world's average annual production of wheat for the past five years has been 3,150 million bushels. Of this vast quantity Australia has only contributed about 2 per cent. Although the wheat industry of the Commonwealth has made enormous progress during the past decade, it will be many years before Australian production will exert any appreciable influence on the price of wheat in the great markets of the world.

— Importance of the Wheat Industry. —

Some idea of the importance of the wheat industry to Australia may be gained from a perusal of the latest figures of the Commonwealth Statistician. Of the total acres, 60 per cent. of the total were reaped for wheat, whilst in 1909-10, namely, 10,972,299 acres were reaped for wheat, or 60 per cent. of the total, whilst 2,228,029 acres, or 20 per cent. of the total, were cut for hay, the greater portion being wheaten hay; that is, probably 75 per cent. of the total area under cultivation to all crops was placed under wheat in 1909-10.

The man in the street naturally seeks some explanation of the extraordinary popularity of this single cereal, and under the existing economic conditions convincing reasons are readily forthcoming. Wheat is an excellent pioneer crop, and it lends itself admirably to the extensive system of farming common to all comparatively new countries, where, compared with densely-populated countries, land is cheap, and individual holdings considerable, high-class farming is rarely practised, and the object of the cultivator is rather to secure a small average return from an extensive acreage, than a large average return from a small area. With our multiple-furrow plough, 20-tine cultivators, and 4-horse drills, large areas can be cultivated with the minimum of hand labour, and the complete harvesters enable the grain to be taken off with the greatest facility. With the increase of population, and the inevitable increase in land values ahead of us, this system of farming, particularly in Victoria, will gradually be modified, and a new era will be ushered in, characterised by smaller areas under individual cultivation and higher averages per acre.

Under existing conditions of cultivation, it does not require the exercise of much skill, or of a great deal of labour, to secure a payable crop of wheat, though it does require the very highest skill, ability, and intelligence to secure the maximum crop the soil and season will allow.

As long as the wave of expansion in Russia, Canada, Argentine, and Australia, enormous supplies will be raised for many years to come under pioneer conditions—under conditions of extensive farming —and it is owing to the capacity of these countries during the last generation for raising cheap wheat that wheat is being displaced from its position in the rotation system of highly-farmed and densely-populated countries.

An additional reason for its popularity lies in the fact that for wheat there is always a ready market, and that, unlike many agricultural products, it does not suffer by storage or transportation over long distances. Moreover, it is a most reliable crop, especially when treated in a rational manner, and, being more resistant to drought than any of the other cereals, it is more likely to succeed under arid Australian conditions than other crops.

Finally, during the last decade, prices have been most satisfactory, and the standard of efficiency in wheat cultivation has been considerably raised by the recognition of the value of fallowing, judicious crop rotation, rational soil cultivation, and systematic manuring. The wheat farmer has, therefore, greater confidence in the future, for he feels that he knows more of the essentials for successful cropping than he did a decade ago.

In subsequent articles, some of the more important phases of the wheat industry will be discussed, including problems relating to the cultivation and manurial requirements of the crop, seeding and harvesting operations, crop rotation, wheat improvement, and experimental and research work.

Although the number of varieties of wheat in the different wheat-growing countries of the world runs into thousands, all these varieties are included in the one genus —Triticum. It is generally admitted that there are eight general types in cultivation, with differences sufficiently great to enable them to rank as seperate species or sub-species. Hackel, however, recognises but three true species, and classifies the remainder as sub-species.

Now, though many of these species are likely to be of very little value to the Australian farmer, they are of the highest interest to the breeder of wheat suitable for our local conditions. By the crossbreeding of some of these species with those wheats in general cultivation in Australia, some very desirable characteristics, e.g., drought resistance, non-shattering of grain, rust resistance, and early maturity, may deliberately be imparted to our local varieties.

After briefly describing the botanical and structural peculiarities of the great family to which wheat belongs, Mr. Richardson referred to the eight known types.

(1) Einkorn, (2) Spelt, and (3) Emmer.—Of these different types, the first three (Einkorn, Spelt, and Emmer) are to be found on most wheat-greeding stations, and are frequently of service in imparting such properties as hardiness, drought resistance, ability to hold the grain, and capacity for thriving on poor soil. They have all been cultivated from the very earliest times, but their cultivation is now chiefly confined to portions of Germany, Spain, Italy, and Russia. Both for forage and for food purposes, however, they are gradually being displaced, even in those countries by varieties of Triticum sativum vulgare—common bread wheat.

(4) Club or square-head wheat differs from common wheat, principally in its short stiff straw and short but compact head. Its yield is unsatisfactory, however, and it is very susceptible to rust.

(5) Poulgrd wheat is grown principally in the hot, dry areas bordering the Mediterranean. It very closely resembles the durum or macaroni wheats in the appearance and characteristics of the grain. Egyptian, and the so-called compound heads, belong to this sub-species.

(6) Polish wheat (T. Polonicum) has not done well in experimental plots under Australian conditions, though it is successfully cultivated in the drier portions of southern Europe. The grains of this wheat are very long and somewhat resemble rye.

(7) Sativum vulgare — common bread wheat—is the most widely cultivated of all the species, and it enjoys this popularity on account of its high yielding power, and because it makes such excellent bread. The greater majority of the varieties of wheat grown in Australia belong to this important sub-species.

The future of the Australian wheat industry is largely dependent on the profitable utilsation of those vast areas at present considered outside the margin of "safe" farming.

From the remarkable developments that have resulted during the last decade in the profitable opening up of lands that hitherto were considered practically useless, it is quite apparent that it is not safe for any one to predict the possible confines of profitable wheat-farming in the future. To further extend the zone of profitable cultivation, it is evident that attention must be concentrated on those factors which will enable the grower of the future to raise wheat successfully on the more arid portions of the Commonwealth.

In the past efforts have been mainly directed to the question of cultivation and the devising of methods to secure the maximum conservation of soil moisture. While great improvements have been effected in the system of cultivation and manuring during the last decade, are we to assume that further advance with respect to these practices is impossible?

There is, however, another important factor to be considered, but this is frequently ignored in discussions relating to the ultimate utilisation of our arid areas, viz., the influence of the plant. Very little attention has been devoted to the question of raising varieties of wheat which will thrive under extremely arid conditions, though, manifestly this is a problem worthy of the best efforts of our wheat-breeders. Though the wheats which are at present popular with growers seem to be well adapted to the conditions under which they are grown, there is not a single variety which can be safely described as free from defect.

While a great deal may be accomplished by scientific effort in the production of new varieties suitable for our driest areas, it is not reasonable to expect that more would be accomplished in a decade in this way than by centuries of care by past generations of wheat-growers under arid climes. That is to say, the production of drought-resistant varieties is likely to be successful if we use as foundation stocks those varieties which have been grown for generations under the very driest conditions.

(To be Continued).

Laughing cheerfulnets throws sunlight on all the paths of life.—Richter.

Egg Production for Profit.

The following description of an English egg farm in Hampshire, and the account of the methods that have been adopted by the proprietor to make egg production in that country successful, will be of interest to all who keep poultry for profit. The circumstances under which the farm was established are as follows:—The proprietor was perhaps one of the most successful of the large egg producers on Vancouver Island; two years ago he returned to England, purchased ten acres of farmed-out land, and commenced to build up a plant suitable for egg production on a large scale. The farm is run purely for profit, and is at present stocked with 1,600 White Leghorns. As regards housing, four large laying houses have been each accommodating four hundred birds, while a brooder house for 2,500 chickens, and various houses for cockerels and other stock are provided.

— Hatching and Rearing. —

Until recently half a dozen incubators were used on the farm, each capable of holding 360 eggs, but the proprietor has now installed an incubator of a new type, capable of carrying many thousands of eggs, and of effecting a saving in fuel and labour.

Eggs are set for hatching from pullets may commence laying in
pulfets may commence laying in
October. On the average, six per cent. of the eggs prove infertile, while the number of fertile eggs hatched usually reach 75 per cent. One half of the flock is reserved for breeding purposes, and for the remaining half pullets are substituted every year. In order to accomplish this, it has been necessary, up to the present, to incubate 4,000 eggs in two hatches. Eight hundred pullets are reared annually for renewing the stock on the farm. Some 20,000 eggs are sold for hatching each year, and the price obtained is 5/- for each sitting of 15 eggs, 35/ for a batch of 110, and £15 for 1,100. The extra number of eggs is given in order to cover inevitable breakages and infertile eggs. A sitting of eggs from a first-class laying pen of birds will, of course, be an expensive item. The proprietor of the farm in question states that he has paid as much as £5 for 100 for such eggs.

— Brooders or Foster Mothers. —

The ordinary hot-water type of brooder is held in no great favour on this Hampshire egg farm. The ventilation is said to be faulty, and requires continual adjustment to keep in proper order; there are numerous lamps which require attention; the cost of working the brooder is described as being excessive, and the initial cost is high, while a great deal of valuable time has to be devoted to the regulation of the temperature. On the farm in question the temperature in the brooder house is greater near the pipes than elsewhere, so that the chicks, if cold, go near them, and if too hot away from them. This house is very large, and provides plenty of air space. Anthracite coal is used as fuel, and in order to attend to the fire properly, two visits in twenty-four hours are required. The proprietor estimates the actual cost of fuel at ½d. per chick for two months.

The special type of brooder used on this farm has a capacity reckoned at 2,500 chicks. The brooder house is 110 feet long, 12 feet wide, and is divided into twenty pens, each 5ft. wide, and 8 feet long. There is a furnace pit in the centre, 10 feet by 8 feet, and a passage at the back, 4 feet wide, running the entire length of the building, with doors at each end, and one door at the back opposite the furnace, with removable windows in the doors. The floors are of boards, which are covered with sand and small litter to a depth of 3 inches. On the north side are six windows, and the south side is of glass. Wire netting is used for the divisions and gates into the passage. In each of the twenty separate pens in the brooder house 125 chicks are accommodated, the number being gradually reduced by, say, twenty-five per cent of deaths, and by the removal of a certain number of cockerels as soon as the sex can be distinguished, thus reducing the number of birds in each department as they grow in size. The birds actually remain in the brooder house for from six weeks to two months, according to the weather conditions; but in the case of White Leghorns, practically all the cockerels can be detected at two months, and quite a large number at from five to six weeks.

— Housing Accommodation. —

The farm itself is situated at an elevation of six hundred feet. The housing accommodation for the birds is a matter of difficulty, especially in the case of a commercial egg farm where large flocks have to be catered for. On the farm under consideration, the pullets are removed to small portable colony houses when the laying-houses are full of adult stock; and they remain there until they are about five months old. Each of the temporary colony houses is large enough to accommodate 50 birds. The floor is of loose boards covered with earth and straw; the front is of wire, and there are three perches. These colony houses are 6 feet wide, 4 feet high in front, and 3 feet high at the back. They are built of timber, and covered with a patent roofing felt, and are portable. In short, they may be described as miniature laying-houses.

The permanent quarters for the adult fowls are much larger, each house being built to accommodate four hundred birds; they are 9 feet wide, 180 feet in length, 7 feet high in front, 4 feet high at the back, and are divided into a number of partitions at every 10 feet by a board running 6 feet across the floor. The houses are also fitted with glass fronts, and there is a wire covering under the hood to allow free circulation of air. There are perches at the back, fixed over a dropping board 2 feet wide and raised to a similar distance above the ground; the boards are covered with fresh earth every week.

In the front are placed removable nest boxes, and over these and under the hood are situated broody coops. At the north and south sides of the house are doors for hens, and the attendants can enter by means of doors placed at the two ends of the house, and also at intervals of 30 or 40 feet along one side. Each house stands on one acre of ground, and the birds run on to the south half-acre in winter, and on to the north half-acre in summer; and as soon as the plot of ground is vacated by the birds, it is immediately ploughed and sown with wheat and thousand-headed kale. This system of management ensures an adequate supply of fresh green food for the birds, and at the same time keeps the soil sweet and wholesome.

— Feeding. —

The thousand-headed kale that is grown as described in the preceding paragraph is supplemented by an extra half-acre or so of the same fodder crop, which is grown every year, and, if necessary, a few tons of roots, such as turnips, swedes, or mangolds, are purchased and scattered whole — not cut up—on the ground so that the birds can peck all the flesh out of them. The latter course is, however, only adopted when the green food is short in the yards. Fish or meat in a suitable form is always provided, to the extent of at least 10 per cent. by weight, in the dry mash, as a substitute for grubs, worms, and similar natural food. Ground raw bones are also sometimes fed, but not regularly, for the supply of these is intermittent, and an engine would be required to grind them at home, which would involve a further outlay of capital.

The following statement indicates the general system of feeding as practised on this egg farm (a) from the time of hatching until egg-laying commences, and (b) during egg production :—

(a) Chick food is given for one week, then chick food and dry mash. At three weeks a little wheat is introduced into the ration, and at five weeks all the birds are on wheat. The chicks have food before them continuously.

(b) During the period of egg production the birds are fed on a ration consisting of two-thirds of wheat and one-third of cracked maize. This is fed in 6 inches of litter in the morning, and dry mash food is always at hand for the birds. The latter are also provided with as much green food as they will eat, especially in the winter, as well as grit, shell, and charcoal.

The cost of feeding during the period from the time of hatching until egg-laying commences is roughly estimated at 2/- per bird; in the second case the cost of feeding during egg production is a variable quantity to a certain extent, according to market fluctuations, but it is reckoned that from 6/3 to 6/6 per bird per annum is a fairly representative cost.

A good supply of clean, pure water is available, and in the present instance the proprietor is fortunate in having a continuous supply from the borough main, and if that fails he has at least 1,000 gallons always in reserve for his birds. Pipes are laid on to each house from the main, and short lengths of piping are also fixed under each house, with taps easily available at both sides. The taps are underground, and there is a length of piping screwed on and projecting above ground; the latter can be easily unscrewed, and, as the water runs out of the tap, which is below ground, it does not freeze. A little permanganate of potash is put into every drinking dish that is placed before the birds.

— Precautions Against Disease. —

One of the outstanding features to be noticed on this farm is the entire absence of disease in the poultry pens. The birds are all bred from perfectly healthy stock, and the houses and yards are kept in a scrupulously clean and thoroughly sanitary condition. No outside stock are purchased, and all weakly and puny birds are killed at once, so that there shall not be the slightest risk of disease. In order to aid in the maintenance of cleanliness and sanitation, the perches are creosoted monthly, the laying-houses are disinfected at similar intervals with a spray pump, and the floors and dropping-boards are tarred annually.

— Labour and Marketing. —

The following particulars furnished by the proprietor are connected with the economic side of commercial egg-production, and the cost of labour and marketing of the produce. The amount of attention required by a flock of 400 birds is reckoned as follows :—

	Hours per week.	Hours per year.
Water twice daily (30 m).	3½	182
Grain once daily (30 m.)	3½	182
Dry feed twice weekly	4	182
Cleaning house once weekly	1	52
Spraying once monthly	—	12
Creosoting perches	—	12
Annual clean	—	12
Providing grit and shell	—	12
Col. eggs (15 mins. daily)	1¾	100
Total number of hours for one man per year		832

As only one breed is kept on this farm, and the system of dry mash feeding is practised, two men are able to look after four houses and 1,600 hens, water and feed the latter, collect, pack and despatch the eggs, attend to a pony, do all the gardening, and clean a motor.

As regards the cost of marketing the eggs, the railway charges from the nearest station to London, a journey of 47 miles, amount to 1/8 per 30 dozen eggs, or a little less if 120 dozen eggs are sent to one address. Particular care is taken to sell only infertile eggs, and not a single egg is purchased from another farm. The old hens are disposed of as follows: the best are kept for breeding, either for the home farm or for sale for the same purpose, and the others are sent to London and sold at Smithfield. Some are sold at twenty months, and others at thirty months, after their breeding season. The average prices realised may vary from 2/- to 2/6. When sold for breeding, they are usually expected to realise from 5/ to 7/6 each.

— The Market for Eggs. —

The business is entirely a wholesale one, and the proprietor has been very successful in establishing a first-class connection with big London dealers. Further, the is able to secure good wholesale prices for them, as the following record shows :—

	per doz. s. d.
March, April and May ...	1 0
June, July, Aug., Sept. ...	1 3
Oct., Nov., Dec., Jan. ...	1 9
February	1 5

Complete records are kept of the number of eggs produced at all times of the year, and the totals for the best winter months were as follows :—

	Eggs.
January	7,616
February	7,310
March	8,606
Total	23,532

The figures given above represent the total number of eggs produced by a flock of 402 pullets during a period of 90 days. Two hundred of the birds had been hatched in June, and some as late as June 26th. A poultry farmer expects about a gross of eggs per bird, but often the average of the ordinary farm flock falls as low as 70. The records kept on had been kept, The records kept shows results, per bird. On the average, each egg weighs 2 ounces or a little over.—Journal of the Board of Agriculture.

Readers! **Can you write us something about your methods of breeding, rearing, and managing Live Stock? Let us have it if it will only fill the back of a Post card.**

Wool Combing.

It is said that the British wool-working industries are the most highly developed of their kind in the whole world. There are no wool goods cheaper than their cheapest and in the open market none commands a higher price than their best.

It is of interest to follow the path of one consignment of wool in its course from the raw to the finished stage, writes "Dalgety's Review," quoting from "The Times." The wool, blended in accordance with the customer's liking, arrives first at the washing or scouring machine. It is conveyed by a travelling apron into the first "wash bowl," or trough, and is carried forward by the periodical advance and recession of iron forks, one step at a time, until it is led untimately into squeezing rollers, from which it emerges perceptible cleaner and almost dry. The process repeats itself and the material arrives with a minimum of disturbance and dishevelment at the end of the last bowl.

Although remarkably cleaner, the wool has not inevitably lost all its sand and its vegetable concomitants, but these are lessened upon the machines known as "cards" fitted with large cylinders. These cylinders are themselves furnished with bent wire teeth, and the minor cylinders working upon their circumference are fitted with the same in differing degrees of fineness, sharpness, and strength. After teasing out the wool into a filmy veil, thus freeing it from all the sand and many of the vegetable burrs, the carding engine eventually brings the filaments together, and these, passing quickly through a funnel, form a rope or "silver" sufficiently coherent to undergo subsequent treatment in this continuous form.

The wool passes to the back-washing machine to be washed free of any impurities which may still sully its colour, and to be dried continuously in a compact hot-air chamber. The material is oiled by measured drops of the best olive oil as it passes through a "gilling" machine designed to straighten the fibres of the silver preparatory to their passage into the combl

— The Wool Comb. —

Only after this sequence of preliminary processes does the wool enter the machine which combs out the short and work fibres and the remnant of vegetable impurities, and divides the wool into two parts, "tops" and "noil." The former is the long wool with all its fibres parallel, which constitutes the raw material of the worsted spinner. The noil, or short wool, is invaluable for making blankets, flannels, tweeds, and other woollen cloths. The separation of long from short is effected normally upon a Noble comb, fed with carded silver supplied from balls set around the circumference near to the ground. The carded wool is led upwards through conductors, and thus to the pins or teeth of an annular comb rotating in the horizontal plane. This is a comb called the large circle, inside of which revolve two smaller circles furnished also with pin teeth. At the points of contact of the outer with the inner circles dabbling brushes work vigorously up and down to press the uncombed wool into the teeth. The wool overhangs the edges of the circles and is engaged and combed by the passing teeth. The long fibres are drawn off, leaving the short or noil fibres within the pins. The top is carried off upwards and is coiled away and the noil cleared out of the pins is passed downwards.

The operation is not over until the combed top has been passed through a "finisher" box, in which the silver is made equal and uniform in all respects and has restored to it the moisture lost in the preceding operations. Thereafter the top is wound into balls ticketed for identification, and passed down a chute to the cellar, to be weighed and packed in paper ready for the spinner or dryer or for the conditioning-house.

The operation of combing is a fundamental one upon which all subsequent results are built, and there is everything to be said for having wool combed in the most economical and accomplished manner. The Roubaix Commission's report suggests that Bradford woolcombing is economical because it is simple, and it is not to be gainsaid that the simplest way is naturally the best. The simplicity is none the less a highly organised one in which advantage is taken of every mechanical arrangement for facilitating production and minimising expense. Nothing is wasted by the commission wool-comber. The suds from the washing machines after they are spent are run into tanks where the wool grease is separated from the water by vitriol. The fat thus recovered is pressed under heat in modern machinery built for the purpose. The fluid oil is run off and casked, to be sold to America or elsewhere for axle-grease. The press cake remaining behind makes a valuable manure much used in continental countries. The burr-dust and sand picked from the teeth of the cards is saved and sold for shipment to France.

— Work and Wages. —

The prices charged for performing a long round of delicate operations upon an expensive and easily spoiled commodity are impressively low. Wool is combed on commission at prices varying with the quality, and ranging from a fraction more than one penny to a fraction over threepence per pound. Withal, woolcombing is not an ill-paid employment for the operative, for there are in force in the trade standard rates of wages which give women 14/6 a week as a minimum, and men a minimum of 25/6 a week. Materially higher wages are earned by the more competent workers, some women making £1 a week and some men 33/. The industry gives employment also to numbers of skilled men, who are paid on a higher scale in accordance with their duties. Employers in the industry have to compete with the other trades of the locality for the available supply of labour, and in wages and in conditions of work they maintain a level not inferior to that of the locality at large. Where a comparatively high temperature is necessitated by the nature of the work a steady circulation of cooler air is ensured by the movement of large fans. The atmosphere of the sheds is free alike from dust and from steam. Rooms and stoves are provided for the cooking and eating of meals, and the surroundings and conditions as a whole, the scale of wages, and the general appearance of the operatives in person supply striking proof of care for the physical well-being and comfort of those who handle the wool and attend the machines.

Poultry Notes

THE MARCH SHOW.

It cannot be said that the poultry section at the March Show is particularly interesting and progressive. If we exclude the General Purpose entries from the exhibits last month the display was rather weak, particularly in numbers. Writing from memory, we believe there were about 400 birds staged when the section was first included some years ago. That was no doubt a good beginning, but later shows have not fulfilled the promise of the first attempt. As a result there is, we believe, a feeling amongst members of the Royal Committee and poultry people generally, that the section may as well be dropped. This attitude is perhaps natural, for no one can deny that it has had a fair trial. At the same time any such action would, we think, be a mistake. Anything which encourages the breeding and exhibition of such birds as the leading pens of the General Purpose section and in the open classes is doing good work.

It is true that the time of holding the show is not that which would be chosen were poultry only to be considered. That objection, of course, cannot be overcome, but it should not be considered as final. One reason for the reduced numbers is undoubtedly the lessened general interest in what is usually spoken of as "show" poultry and therefore considered as of little practical value. This idea is quite erroneous, but it certainly exists though to a less extent than formerly. Another reason in the feeling which has grown up amongst breeders that it is of no use exhibiting unless their birds are practically matured, or, in other words, young adult birds.

The question is how to make the best of conditions which cannot be altered and how to alter those which may be improved. In the first place the time of the year cannot be changed, neither can the probability of hot weather during show week be done away with, but it may be greatly mitigated by a well planned building. No doubt this part af the question will have the first consideration when the architects get to work on the new show grounds.

Secondly, the growing importance of "utility" with a conspicuous brand on it must be recognized. The General Purpose people are tackling this question in the right way, but more can be done in the same lines. There were, for instance, ten thousand specially well bred, well selected and well grown White Leghorn pullets in the State during Show week, and there were about six in the show. Seems a bit out of proportion somehow. We cannot take the people to the pullets but it ought to be possible to encourage the bringing of a thoroughly representative collection of the pullets to the people. It may be said that such birds may be seen by the hundred at Parafield, which is of course cruel, but how many people, country people that is, take advantage of the fact. We remember reading that 70 farmers went up there on one occasion, but on a moderate computation 7,000 go through the poultry exhibits at show time. As an opportunity of getting the pure bred utility bird idea right home, Parafield as a first line of attack is not in it with the Exhibition Building. Parafield figures can do good work in backing up and filling in the mental picture, but let us get the clean, healthy, active, tight feathered, fine boned ornamental bird idea fixed in the producer's mind, at all events, as an essential even if secondary point.

The duplication of the main features of the General Purpose idea for the light breeds seems to offer opportunity for the development of a show-utility programme. In doing this there would be no reason or necessity to go back on the bedrock principle of agricultural shows, that is the encouragement of standard variety in bird and beast. By all means let us have, if it is at all possible, increased interest in and provision for the "show bird" section, for after all the "standard" of the fancier is the foundation of "utility," whether for the poultry man, the wool man, the dairyman, or the butcher.

We want numbers, we want interest, and we want enthusiasm in poultry shows. That being so is it good policy to start by trying to kill all three? In other words, is it wise to make the exhibiting of reasonably good young birds in early March more difficulty than it naturally is? There seems to be a tendency to think that birds must not be this and must not be that and that judges should be instructed to do or not to do this or the other, but if we insist on this severe weeding, theoretically excellent as it no doubt is, there is rather more than a probability that we shall weed the crop out of existence. Let us recognize that a chicken is a young bird and not an adult, and therefore eligible for what is in fact, a Chicken Show. If a three months' old chicken is the best of his class why not give it the ticket and its owner a bit of perhaps needed encouragement. It probably won't be wasted. Don't let's worry about faults he may not develop three months hence. There is of course the remote possibility of disappointment for a buyer on show card recommendation, but in the present state of the "show bird" market, the contingency is too remote to keep the committee or anyone else from enjoying their usual night's rest. As a breeder said in discussing this point at the show, "this ain't no Tango Tea, there's no rush for the first prize proposition."

Tommy Tuff seemed particularly obtuse that morning, but "dear teacher" was determined to make him understand. "You say you own a dog, Tommy," she said. "Then you have a quadruped, don't you see?" "No'm,': replied Tommy. "But I explained to you a moment ago that any animal with four legs was a quadruped." "Yes'm, but Buster lost one o' his'n fightin' a tram car."

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Poultry Notes.

For many years past Mr. D. Lanyon has been putting out large numbers of his well-known "Simplex" incubators, which have had such a big say in increasing the poultry population of the State, but this year he has certainly beaten his previous best; at all events in the matter of size. His incubator built to the order of the Government for the Parafield Station, and which was on view at the show last month, was of interest to all poultry breeders. Not many of us, of course, want to hatch our chickens in five thousand lots, but we all like to know how simply it may be done. There are many interesting features about this mammoth chicken hatcher. To begin with it is the biggest thing of its class, in the State, probably in the Commonwealth—and perhaps in the southern hemisphere. It may be run as one concern, or on the instalment plan, by separate compartments at different temperatures, and as far as we could judge, it can be used, as a street barracade, a footbridge, or a fire escape. As it was constructed by the poultry experts own plans and specifications, there is no doubt, that the most will be made of it, but we venture to hope that it will be allowed a fair trial as an incubator first of all. It is at all events sufficiently like one to indicate its primary purpose in life. Considering its size and contingent possibilities, it seems to have been an unusually economical deal for something under a couple of hundred pounds. One could not reasonably expect to hatch 5,000 chicks and escape from the burning incubator house on the same machine upended for less than that. Possibly neither the 5,000 chicks or the fire will come off; in which case of course the financial aspect of the question would have to be re-considered.

WHAT ABOUT IT?

A correspondent writing on other matters, refers to the "Pearl" theory of the influence of the male bird in the egg production, of which we wrote some months ago, and asks whether "Pearl or the roosters are dead." On the contrary as far as we are aware they are both very much alive. Since that time we have read what Mr. Pearl himself had to say on the subject to the American Poultry Association, and also the technical bulletin published, and after doing so, we should say that the theory is more interesting and more complicated in its working and detail than we had previously supposed, that there are more practical difficulties to be overcome or allowed for, but that the importance of the male bird stands out just as clearly as ever, both in theory and judged by experimental result. It was a little unfortunate perhaps from some points of view, that the scientific paper on the scientific side of the question published first was the basis of what afterwards appeared in various agricultural papers, for it is certainly true, that anyone reading that paper or the Bulletin of the Maine Station would be excused for thinking that the breeding of layers on Mr. Pearl's showing and the multitude of results of actual breeding tests was as comparatively simple as falling off a log, or two logs for that matter, yet reduced to actual proctice, there are more difficulties than are at first apparent. These practical difficulties don't affect the question from the scientists point of view; from the poultryman's they undoubtedly do. Elsewhere we print what Doctor Pearl himself had to say on the subject to the American poultry world. He can certainly put the matter more clearly than we can hope to do.

THE SAME IDEA.

In connection with this subject we have received an interesting letter from one who has been, and still is, one of the most consistent and successful breeders. One of the select circle of fifteen hundred pen men and a keen and careful observer, he wrote: "To keep up my strain I look to the roosters which, provided the hens are healthy and vigorous and of a decent egg strain, will give me good laying pullets. I have no particular use for the champion hen as a breeder, though I have owned many of them, for her class have gone back on me too often for me to have much faith in her." Another man wrote: "Trap nests are no good to me except —and this is the crux of the whole question—that they show me the father of my good layers. He is the bird to keep, and breed from till he dies, or till by trapping the pullets, I find a better." Mr. Haddington, the New South Wales expert, in an article on utility breeding published in the Gazette a few weeks ago, wrote: "The best layer does not necessarily produce the most prolific progeny. In fact, it is of more importance that the male bird be bred from a good layer, because fecundity is more likely to be transmitted through the male bird than the female, and better results will be obtained by using males bred from prolific females, mated to hens of good flock average than vice versa. It has also this in its favor, that stamina is more likely to be maintained."

THE COMPETITIONS.

The interest in this round of competitions is centered in Victoria, where the leading pen, Gill's, has already put up a big total, and which if all goes well, promises before May 14th. to put up new figures on the world's record slate. Just what the real record is, is not quite clear, it all depends on how you look at it. Nixon in N.Z. put up 1632. Some people object to that, because the birds had warm houses, though a climate cold. The Hawkebury ducks put up 1601 or 1623 taking the full twelve months from the first egg laid. They had no housing, and a warm climate, for that and other reasons they seem to be out of it. At this present moment Walch (Victoria) at Roseworthy, 1589, seems to be officially credited with it, but as they did not end up with the same full term, there is a fault in that claim also, but technically they hold it—unless Nixon does. Rules and conditions which permit replacement of defunct members of a team cannot be said to be ideal at this late stage of the game of competition winning. Failing Walch the belt seems to belong to Pope (Vic.) whose original pen at Burnley put up a few eggs less, but lived to the finish. A few days hence Gill will have settled the 1589 record, the ducks will certainly go, and it seems at least probable that Nixon's 1632 will have to give place to the conquering Victorian. If the original team is now in the pen, the matter will be settled beyond question; if not prabably most people, remembering the tremendous importance of vatility, will hold that Pope's was and still is the better performance. As a matter of fact, all had done so extraordinarily well, that it is perhaps only justice that they should sort of share the honor. If Gill comes home with 1633 and the original team, then of course it will be hats off to Mr. Gill and his famous six. Everyone wishes him, and them, the best of good luck for the remainder of the run, for in any case it is surely a great performance.

OTHER HONORS.

Apart from this pen, the honors of the year most certainly go to Moritz Bros., who can hardly fail to be first second or third at Parafield, Gatton and Burnley. Not since Padman's memorable years has anyone put up a performance to equal that of the Kalangr loo breeders, this on top of their Kybybolite win, and other good scores, stamps their strain as "one of the very best." Of the other breeders who have gone forth to battle for their State. Padman puts up his usual 1,500 odd at Gatton and will be first or second to Moritz Bros. Mr. Padman has already won three competitions in Queensland, so one would naturally like to see a fourth on the slate. Bertlesmeir has as usual put up good scores at Burnley and Gatton, but in neither case does it appear probable that his pen can get even with the leaders. Just on the 1,500 mark will be their limit, which is thirty odd eggs below his Roseworthy win, some few years ago. Nothing sensational in the way of scoring is to be expected from Hawkesbury, but as usual the various results obtained there, will do more in the cause of practical poultry education, than all the other competitions put together. They of course have a live committee of practical breeders at the head of affairs, and in the Director of Agriculture and the Principal of the College are exceptionally favored with the possession of two influencial and sympathetic friends.

LOCAL AFFAIRS.

At Parafield we have just been jogging at a steady gait. Leading scores will be on the low side, but the aggregate average will be about as usual. We appear to possess several strains more or less intermingled, which can be depended on for a normal average of about 1,500 for picked birds. If they get more than normal luck they run up another fifty eggs; and if they get less they go down fifty. From 1,450 to 1,550 seems to be the limit of variation for the last seven or eight years. This year for instance, we are about a hundred below the 1907 figures; it does not of course mean that our best birds as a whole are inferior to what they were then; probably they are quite as good, perhaps, although unfortunately there is no evidence of the fact, they may be a little better. Next year to keep up the regular see saw the leading pen ought to be well up towards the 1,550 mark again. The lesson is obvious. We were fortunate enough to strike the natural laying form of the best strains, either pure or inter-bred, of our birds early in competition history; but unfortunately no one has yet been able to increase this natural normal average permanently, or kick biddy up a few rungs of the ladder. We all talk influence of feeding, influence of breeding, influence of selection, inflence of Government encouragement, influence of poultry education; and we all try to believe that the facts are with us, but the hen has been putting records on the slate which appear a little at variance with what we would all like to believe. Our aggregate average has of course gone up a few points, in say the last five years, not because the good strains have improved, but because the bad ones have been gradually killed out. Another factor is, that the earlier aggregate was weighted by a fifty per cent proportion of heavy breed entries; at present this is reduced to about 10 per cent, and their seems little reason to doubt, that the S.A. Leghorn average is at least ten per cent better than the S.A. heavy breed normal average. In coming to individual results, it may be said that the Victorian contingent have not altogether made the runaway break on the S.A. pens that was expected, but it must be admitted that the honours easily go to the Easterners this trip.

THE NEXT COMPETITION.

The next Parafield competition will be a departure in some respects on preceding ones. The number of pens entered show a considerable falling off as was expected when the ten-in-a-pen alteration was decided on, but the number of birds competing will be little less than last year. The new rule has apparently choked off interstate entries, which from the local competitors point of view, is not perhaps to be regretted, though it certainly lessens the interest in the test. The pastoralists, etc., section has gone out, killed by its own futility we should imagine. The single testing is of course the great attraction, and we are surprised that there are no more entries in this section. It is a great idea, from the competitors' standpoint, for he can have his birds tested for less money, and certainly less trouble than he could do it himself. What use he will make of this knowledge and what use the public and outside poultryman can make of it is problematical. Anyhow there will be good business for the men who put up exceptional scores from one or two of their birds. The value of this single test in itself is probably greatly exaggerated. What it may lead to is another question; it certainly has points to recommend it. Practically the main idea has been proved and failed in the past, for many breeders have been single-testing for years, and a glance at their records is not encouraging. The single pen has great possibilities, but what it tells the breeder will have to be regarded from a different point of view, than has hitherto generally been the case, if the cost of competition is to return interest on the money, in added knowledge of the principles of poultry breeding.

Breeding for Heavy Egg Production.

Paper by Dr. Raymond Pearl, read before the American Poultry Association.

It s safe to say that never has there been so keen and widespread an interest in the improvement of poultry in respect to egg production as exists at the present time. All over the world poultry keepers are waking to the fact that some hens lay more than others ; that it costs no more to hatch, rear and care for those which lay more, and that they want this sort in their flocks.

There would seem to be little doubt that this awakening is due in considerable degree at least, to the rapid development during the last ten years of egg laying contests in different parts of the world. We are indebted for the inauguration of such contests on a large scale to the enterprise of the Australians. In recent years we have seen their development in this country. It seems likely that we shall see a much further growth of the laying contest idea in the United States as well as in European countries.

To be sure some of our friends of the poultry press who apparently see little or nothing of value in laying tests of any sort have been predicting that the laying competition has about run its course and that the end is now in sight, that we are, in point of fact, witnessing its last decline before utter extinction. Unprejudiced observation, however, would seem to indicate that these contests make a strong appeal to the poultry public. It is difficult to conceive of any single measure better calculated to arouse general interest in poultry keeping and to call attention to the results which follow good care and breeding. In other words, the educational value of laying contests would seem to be beyond question. That they can be so conducted as to contribute to existing knowledge of the laws of egg production, also is beyond doubt. I have recently had the opportunity of examining the detailed plans for conducting a series of such laying competitions, which are to be undertaken with government subsidies in two European countries. There can be no question that these plans, if carried out, will contribute materially to scientific knowledge of the laws of egg production.

Underlying the immediate stimulus afforded by the laying contests are to be found two fundamental reasons for the present interest and activity in the direction of improving egg production. These are :—

(a) The poultryman's belief that egg production is an inherited character. In holding this opinion he is certainly quite correct. One might, indeed, say "knowledge" instead of "belief" here.

(b) His belief that any character which is inherited is capable of improvement by intelligent breeding. Again this belief is entirely well founded, provided only that an exception be made for characters (if there be any such) in which all possible improvement in innate hereditary constitution has already been made.

To say, as we have above, that "egg production" is an inherited character is not quite enough. This might be taken to mean only the fact that the mode of reproduction characteristic of birds—which is to say, reproduction by means of eggs with albuminous and calcareous envelopes—is an innate and hereditarily fixed matter in the fowl.

But the poultry man is interested, as well as the investigator, in the field of genetics, in something more than this. He wants to know whether the differences which he observes in egg laying capabilities among different breeds, or flocks, or finally individuals are inherited. General observations indicate to the poultryman that at bottom the foundation of a great many of these differences in laying ability with which he is familiat, is hereditary. But how and under what limitations ? For plainly this is not a simple matter. If it were, none of our hens now would ever lay less than 200 eggs per annum, except in the case of remote, backwoods regions, where the gospel of the trap-nest has not penetrated. Trap-nest selection of high producers has opened the eyes of the poultryman to one thing certainly, even though it may have obscured his vision in other directions. This thing which is clearest is that all high producing hens are not equally capable of transmitting this valuable quality to their progeny. So that while it may be perfectly certain that the difference between a 200-egg producer and a 50-egg producer is in some way or other an hereditary difference, we shall not get far towards a practical utilisation of this fact until we know something more about its nature.

— Improving Egg Production. —

So, then, the first essential step to be taken towards the improvement of egg production by breeding is to find out the way in which variations or differences in producing ability are inherited. For some six years past I have devoted considerable attention to this problem, with results which have been set forth in detail in a series of papers from the Biological Laboratory of the Maine Agricultural Experimental Station. The most recent of these papers is Bulletin No. 205, which has the title "The Mode of Inheritance of Fecundity in the Domestic Fowl." This Bulletin is technical in character. It was not written for the poultryman, but for the professional student of Genetics. On this account it has apparently not been quite clearly understood by some poultrymen, and the results and conclusions have, in some cases, been misinterpreted. It will be my endeavour here, as briefly as possible, to make clear the essential results of our studies.

First, as to the fact:—The following are simple statements of the actual results obtained in trap-nesting Barred Plymouth Rocks and Cornish Indian Games, and all possible sorts of crosses between these breeds, over a period collectively of nearly fifteen years. The total number of birds involved in these trap-nesting operations has been large, aggregating all told between 5,000 and 6,000 individuals. Out of these records, the following facts clearly appear:—

1. The record of egg production of a hen, taken by itself alone, gives no definite reliable indication from which the probable egg production of her daughters may be predicted. Furthermore, mass selection on the basis of egg-laying records of females alone, even though long continued and stringent in character, failed completely to produce any steady change in type in the direction of selection.

2. Differences in egg producing ability are, in spite of the above results, certainly inherited. There are two lines of evidence showing that this is the case. The first is that derived from the general observation that there are widely distinct and permanent (under ordinary breeding) differences in respect to egg laying ability between different breeds of fowls and between different strains within the same breed. In the second place, a study of pedigree records of poultry at once discovers pedigree lines in each of which a definite, particular degree of egg producing ability constantly re-appears, generation after generation, the "ii thus "breeding true" in this particular. With all birds kept under the same general environmental conditions, such a result can only mean that the character is in some manner inherited.

3. The number of visible oocytes on the ovary bears no definite or constant relation to the actually realised egg production.

4. This can only mean that observed differences (variations) in actual egg production uepend upon differences in the complex physiological mechanism concerned with the uevelopment of oocytes, and the separation of them from the ovary and the body (laying).

For reasons which cannot be gone into here on account of lack of time, attention has been focused during the later phases of my study on winter egg production.

5. It is found to be the case that birds fall into three well-defined classes in respect to winter egg production. These include (a) birds of high winter records; (b) birds with low winter records; and (c) birds which do not lay at all in the winter period. The division point between (a) and (b) for the Barred Plymouth Rocks used in these experiments fall at a production of about 30 eggs.

The next step is to enquire for each of these classes separately how egg producing ability is inherited within she class. We may first deal with high production.

— Inherited from the Sire. —

6. High productiveness may be inherited by daughters from their sire independent of the dam.

This is proved by a mass of detailed concrete evidenre presented in the complete paper. This evidence consists of the results of mating after mating, in which the same proportions of daughters of high laying ability are produced by the same sire, whether he is mated with dams which are poor layers or with dams which are high layers.

7. High laying ability is not directly inherited by daughters from their dam.

This is proved by a number of evidence of which the most important are: (a) that continued selection of high producing dams does not alone alter in any way the mean egg production of the daughters. If an alteration does appear in any case following such selections, further analysis shows that some additional element other than the dam's egg record came into account in making the selections of breeders. (b) The proportion of high producing daughters is the same whether the dam is of high or of low fecundity, provided both are mated to the same male. (c) The daughters of a high producing dam may be either high layers or poor layers, depending on their sire. (d) The proportion of daughters which are medium or poor layers is the same whether the dam is a high or a poor producer, provided both are mated to the same male.

8. Mediocre or poor laying ability may be inherited by the daughters from either sire, or dam, or both.

Now, all of these eight points are merely statements of fact. They are the results which any intelligent person who examined our extensive trap-nest and pedigree records would be bound to reach. They depend in no way upon any "theory" of inheritance. I can assure those to whom Mendelism is as the proverbial red rag to the bull, that nothing which has been said so far is even to the slightest degree tainted with this dreadful (?) doctrine.

An isolated fact does not alone contribute to the body of organized knowledge known as science. Its relation to other facts must first be understood. Now the facts regarding egg production, which have been set forth above, do, as a matter of fact, accord in a remarkable, clear manner with a Mendelian interpretation of the inheritance of fecundity in the fowl. Such an interpretation has been worked out in detail in Bulletin 205. Through this interpreation this isolated group of facts is brought into relation with a much wider range of facts about inheritance in poultry and other animals. In this way we are much better able to understand (in the light of present knowledge) the meaning of our facts and on this basis to make plans for investigations which shall take us again a little further into the realm of the unknown beyond the boundaries of our present knowledge.

(To be Continued).

The General Purpose Poultry Society.

When this Society, which now seems in a fair way to make a name for itself in the South Australian poultry world, first came into being and announced its programme, a good many people thought it had, what is vulgarly known as "bitten off more than it could chew." It is therefore pleasant to know that time and its own good work have fully justified the somewhat ambitious proposals. To have got the men together, outlined a practical scheme and carried it successfully well beyond the starting point, is a matter upon which the leaders of the movement may with justice heartily congratulate themselves. They have deserved, and will no doubt receive the commendation of all interested onlookers.

An excellent beginning has certainly been made, and we have no doubt that this first attempt, which must, in the nature of things, be somewhat experimental, will be carried to a successful conclusion and lead to important developments amongst the show-utility, or utility-show—you can put it which way you like—fraternity. The present is by far the most practical attempt to combine the indirect benefits of show qualities, with the direct utility qualities which go to the make up of a profitable fowl and profitable poultry keeping. Getting down to more tangible present results, it may be said that the General Purpose people saved the poultry section of the recent show from something very like failure, and incidentally covered themselves, and their birds, with much glory. To the winners in the various classes we extend congratulations, it is a good thing to breed good birds, and a good thing to show them. It is profitable to the man who does it, and also to those who see the result. If Mr. W. Dawkins can put up a pen of six well grown, uniform, matured White Orpington pullets in the first week in March, there is apparently no earthly reason why other people should not do the same. Also if Mr. J. E. Padman can put up cockerels of the same breed which, at eighteen weeks, are prime quality table poultry, that is, good in size, and fine in flesh, and bone, there is equally no reason why other folk should not do the same, and reap the corresponding reward, and there were several other entries which were close at hand when the cards were distributed. It is satisfactory to know that the judges, Messrs. Naismith, Pitman, and W. A. E. smith in the cockerel classes, with Mr. D. Hart in dressed cockerels, were successful in making awards which were thoroughly approved of by all concerned. Any complaints? the President was asked. "Not a whisper," was the reply, which appeared to sum up the situation.

A full entry consisted of 6 pullets, 3 cockerels, 12 eggs. Twenty-four full entries were staged.

The possible points for the six pullets were :—

Evenness of quality according to standard, 75.

Growth and development, 25.

W. Dawkins' pen of White Orpingtons stood out easily as the winner. The judges awarding 90 points. These were well grown birds of real good quality.

Koonoowarra Poultry Yards, second with a nice pen of White Rocks, scoring 82 po,nts.

W. S. Pearson's, 3rd prize, Black Orpingtons, scored 76 points. It was a hard fight for the third prize, as W. E. Greaves pen of Barred Rocks was only 1 point behind, while three more pens scored 74 points each.

Breeds represented were :—White, Buff, and Black Orpingtons, White and Barred Rocks, Silver Wyandottes, Langshans, Indian Game, and Rhode Island Red.

Lowest points awarded in this class, 46 points (birds far too young).

Eggs (Points) :—Freshness 30; Shell 20; weight 30; Evenness of appearance 20.

Pope Bros 1st, 93 points (Black Orpingtons).

W. E. Greaves 2nd, 92 points (Black Orpingtons).

C. W. Perkins 3rd, 92 points (Silver Wyandottes).

Points not to be included in aggregate.

— Cockerels. —

Judged alive the first day of show.

Evenness of quality according to Standard, 40 points.

Growth and development, 10 points.

Winners were :—

J. E. Padman, White Rocks, 39 points.

W. E. Greaves, Black Orpingtons, 38 points.

W. Dawkins, White Orpingtons, 37 points.

Killed and dressed on second day.

Condition 20, age and finish 20, Fineness of skin 5, Fineness of bone 5 points.

J. E. Padman, White Rocks, 1st, 44 points.

Koonoowarra Poultry Yards, White Orpingtons, 2nd, 43 points.

W. E. Greaves, Black Orpingtons, 3rd, 42 points.

At 4.30 the whole 24 lots were sold by auction by Mr. Horace Wilcox. Bidding spirited. Buyer of 1st, 2nd, and 3rd prize lots, Kither. Other buyers of several lots, Conrad and Fleming. Buyers evidently had different ideas to the judge.

1st prize fetched 12/9 for the three.

2nd prize 12/9.

3rd prize 9/9.

W. E. Greaves' Barred Rocks, nice birds, but 7th on the list, went for 12/. The 24th, presumably worst lot, with 33 points, was knocked down at 8/6, though the lowest price fetcned was 5/6. Probably these auction prices should not be taken too seriously as a test of merit, but some of the differences between white and coloured birds were significant.

Entrants who failed to come up to scratch were Bronzewing's Poultry Yards (White Wyandottes); Eldridge (Golden Wyandottes); Hawker (Old English Game). We were sorry to find the latter amongst the absentees, for it would have been interesting to see how they shaped with their more popular rivals. Mr. Coleman did his best, for the Indian Game pullets were on view, though, as he was not able to pen the necessary cockerels, the pen had practically no chance in the aggregate. This is the right sort of spirit to tackle this or any similar proposition. Just do the best you can to help things on.

The above are the results as awarded by the judges. The following shows the position of the various competitors to date, on the system adopted by the society for this competition :—

Exhibitor. Breed.	Six Pullets.		Three Cockerels. Alive.		Dressed.			
	Points.	Award.	Points.	Award.	Points.	Award.	Total Points.	Position.
J. E. Padman—White Rocks ...	8	21	1	28	1	28	77	1
W. Dawkins—White Orps. ...	1	28	3	26	8	21	75	2
W. E. Greaves—Black Orps. ...	7	22	2	27	3	26	75	2
T. B. Howie—Silver Wyandottes	5	24	7	22	4	25	71	4
W. E. Greaves—Barred Rocks ...	4	25	7	22	5	24	71	4
W. S. Pearson—Black Orps. ...	3	26	5	24	8	21	71	4
Koon. P. Yards—White Rocks ...	2	27	6	23	8	21	71	4
C. W. Perkins—White Orps. ...	5	24	6	23	7	22	69	8
Koonoowarra P. Yards—W. Orps.	9	20	8	21	2	27	68	9
F. W. Hocart—White Orps. ...	8	21	8	21	6	23	65	10
W. Palmer—Black Langshan ...	5	24	12	17	6	23	64	11
Pope Brothers—Black Orps ...	16	13	4	25	7	22	60	12
Kapper Brothers—Silver Wyan.	12	17	9	20	6	23	60	12
C. E. Bennett—Buff Orps. ...	9	20	15	14	4	25	59	14
J. C. Hagger—Barred Rocks ...	6	23	16	13	6	23	59	14
J. E. Padman—Black Orps. ...	10	19	12	17	8	21	57	16
Koonawarra P. Yards—Rhode Is.	13	16	12	17	7	22	55	17
Alberta P. Yards—White Rocks	17	12	10	19	6	23	54	18
L. F. Dunne—Silver Wyandottes	11	18	11	18	11	18	54	18
Kappler Brothers—Black Orps. ...	16	13	13	16	5	24	53	20
F. Gibson—White Wyandotte ...	10	19	14	15	10	19	53	20
Albion P. Yards—White Wyan.	14	15	14	15	9	20	50	22
C. W. Perkins—Silver Wyandottes	13	16	21	8	8	21	45	23
J. C. Hagger—Black Orps. ...	15	14	17	12	10	19	45	23

We have no doubt that careful consideration has been given to the system adopted above, and probably it will work out all right in practice; but it certainly seems that, without undue criticism, one might suggest that a system of per centage of possible points in each case would perhaps arrive at a more just estimation of the values of the competing pens. Apparently there are to be seven sections—in each one of which the maximum possible points will be twenty-eight. Of these seven sections, three with eighty-four possible points are to be awarded on show qualities, two with fifty-six points are awarded on table form, and two—supposing quality of eggs sent down from Parafield in June to count on a par with the total aggregate of eggs for the twelve months, which is absurd—for egg laying qualities. Thus, at the best, eggs in the Society's aggregate prize only count for as much as table qualities, and for less than show qualities, apparently. No doubt, however, the society will be able to announce a more satisfactory and equitable solution of the all-round-best-bird proposition than that which appears to be outlined in their present proposals. Even if they don't, no particular harm will be done, for it is only in the event of a run away victory, and by some big scores at Parafield by those low on the list at present, that there is likely to be any reasonable room for dissatisfaction with the present method, but there certainly are possibilities of trouble in it.

— Future Work. —

The President of the club, Mr. F. Gibson (we credited Mr. W. A. E. Smith with the office last month in error) informs us that the reading of papers by members and others will be continued, and an interesting programme is being prepared for the ensuing twelve months. The Poultry Expert has kindly consented to lead off with "Commercial Poultry." It seems to us that the subject is a particularly interesting one and that the discourse, especially if pointed and punctuated with reminiscences of the commercial achievements at Murray Bridge, will be listened to with interest, and possibly profit. Amusement of course, is not catered for, indeed, we understand that not a single member of the committee smiled when the subject of the initial lecture was made known. This, we take it, is pleasing evidence of the seriousness with which they regard their duties and responsibilities. "Not what I do but what I say," said a successful temperance lecturer, with a look at his convulsed audience, as a ponderous whisky flask unexpectedly protruded from his coat pocket. Recollection of that incident leads us to hope that proper precautions will be taken to prevent that Murray Bridge balance sheet, if such a thing exists, obtruding itself on this occasion and possibly marring the seemly decorous harmony and general joy of the proceedings. Our Poultry Expert may possibly not have done much in commercial poultry as expressed in profitable financial results, but we know of one better able to talk about it.

Farm Poultry.

Farm poultry can only be profitable where some consideration is given the birds. You cannot expect them to roost all the winter in the open and lay eggs, for they simply cannot do it. They must have a comfortable house and a fairly warm place in which to roost. They want some feeding and the proper thing is to feed these birds in deep litter; then they will have to work in order to get their food. This exercise is good for them, and they require it as much as we do in order to have good health. If the farmer will get thoroughbred fowls, house them in a proper manner, and feed them as carefully as he does his other stock, he will find them even more profitable, proportionately.

According to the Fruit Grower apple pomace is a profitable feed for dairy cattle, being equal in food value to maize ensilage.

Home Notes.

Children's Teeth.

"In the first place," said one of the leading dentists, "mothers should know the time at which their children's teeth should appear. They begin to show at about six and a half months, and the set of temporary or milk teeth is completed about the second year, though boys as a rule are rather more backward than girls. Even before the teeth appear, however, mothers should consider them, for the development of the teeth has begun before birth. For this reason babies should be given lime water at times, and as soon as any starchy foods are added to the diet it should be brown bread rather than white, as it is so much richer in earthy phosphates, which are essential for the proper making of sound teeth, and is also beneficial because it helps in the making of good strong bones. Bananas, too, are among the best fruits for children during the time they are developing their teeth, for that fruit contains nearly everything which is necessary for the development of the body.

"At about six and a half years old the first permanent tooth is got. Most people are under the impression that this is one of the lower central teeth, but it is a popular error, for the first of the permanent set is one in the jaw bone. It is at this time especially that proper attention should be given to the teeth, for if the temporary ones are not shed at the right time the services of a thoroughly competent dentist should be called in, otherwise the retention of the temporary teeth beyond the proper time may mean irregularity in the arrangement of the permanent set.

"All, during the time of the eruption of the first teeth, and subsequently, children should be taken to a good dentist to find out if any of their teeth are decaying. The importance of this will become evident from the fact, which is by no means well-known, that immediately under the first set of teeth the permanent teeth are being developed. If decay sets in in one of the first teeth, it often goes so far as to perforate the tooth and injure or decay the young enamel of the permanent tooth which is immediately under it. Bad as this is it does not end here, for the decay may spread to the teeth on each side of the decaying tooth, and thus a single neglected first tooth may cause injury to three permanent teeth.

"Decay should, therefore, be arrested as soon as it is found out, so that it may not contaminate the permanent teeth, and it is almost more necessary, were that possible, to stop children's temporary teeth than the permanent ones of adults, otherwise it becomes more difficult to cure them, and delay is as stupid as it would be to allow a disease to run to a certain extent before any attempt were made to cure it.

"Sometimes it is necessary to extract a temporary tooth in order to allow a permanent one to get into its proper place. This at first appears a very simple statement, but it is nevertheless one which demands a good deal of skill and not a little thought on the part of the dentist, for there is no general law to be laid down, and each case must be considered on its own particular merits. It is certainly highly necessary that the temporary teeth should not be taken out until the right moment, and the common practice of mothers to extract their babies' teeth by tying a piece of string or cotton round them and pulling them out is most severely to be condemned, not only because of the unscientific and needlessly violent mode of procedure, but because it may afterwards cause crowding of the permanent set, and be the means of giving a great deal of discomfort and even pain to the child. Great cleanliness in regard to the mouth is, I need hardly say, imperative for the preservation of the teeth. In very young children this may be sufficiently obtained by means of a handkerchief stretched over the finger, but for children of three or four years old a soft and small tooth brush, with a little powder, is absolutely necessary. A very admirable powder for this purpose can be made quite cheaply by taking equal parts of powdered orris root and prepared chalk, rubbing them together so that they are thoroughly mixed, and adding a small quantity of bi-carbonate of soda and a drop or two of scent. It is often difficult to get children to stand still while their teeth are cleaned in the proper way, for, as a matter of fact, the brush should be used from above down rather than from side to side. This is not so important for the first teeth, but it is vitally necessary for the care of the permanent ones, for the constant friction of the brush may cut through the enamel where the teeth and the gum meet and be the cause of more or less mischief. It is well, therefore, that children should be taught the right way as early as possible, especially as by this method the spaces between the teeth are far more thoroughly cleansed than they would be by brushing from side to side.

"The permanent teeth, which begin to come at about six years old, go on practically without stopping until the age of thirteen by which time the child should have all his teeth, with the exception of the wisdom teeth. These do not come, as a rule, until between the ages of seventeen and twenty-five, although they are often much later, and not unfrequently do not appear at all. As a rule the average age for attacking a case of irregularity is about ten, but no one without professional training can say exactly at what time the proper steps should be taken. If the permanent teeth are neglected they may not only grow permanently out of the proper direction but sometimes one may be crowded out of its place and appear behind another, producing what is commonly called 'a double row.' This is especially true with little girls, for the beauty of a young woman is often marred most materially by irregular or crowded teeth, for which the mother or father are alone to blame."

Exercise to Improve the Figure.

A judicious system of home gymnastics, faithfully followed, will correct round shoulders, flat chests, and stooping gait. Among the best movements to accomplish this purpose are the following:—Stand perfectly erect with the heels together, inflating the lungs, drawing in the breath very slowly and expelling it in the same way. This should be repeated eight or ten times. Then bring the arms forward at full length, with the palms of the hands together, and throw them vigorously backward until the backs touch. Repeat this motion 75 or 100 times. Then put the arms down with the hands close to the sides, the thumbs pointing forward. ..ow raise the arms straight up till the backs meet above the head. Next bring them down again until the palms again rest against the thighs. For the next movement the arms must be extended to the utmost above the head, with the palms pointing forward; now lean gradually forward, without bending the knees, until you touch the ground in front of your toes with the finger tips. Then slowly recover your former position, and repeat this movement ad libitum. These three simple movements vigorously executed for half an hour each day will have a wonderful influence upon the health. They will also considerably increase the size of the bust and arms, and give agility and grace to the figure.

Hints to the Housewife.

It will save you considerable trouble and annoyance if you see that—

The dish towels and glass linen are scalded each day and thoroughly washed and ironed each week and dried in the open air.

Cupboards and storerooms are overhauled at least once a month.

Money spent should be accounted for in a book kept for that purpose.

All dusters are hemmed and regularly washed.

The draughts are checked in the kitchen range as soon as the meals are prepared, to reduce the fuel bill.

The beds are stripped and aired daily, and the clothes placed where the fresh air can reach them.

A regular routine of daily work be planned and carried out.

The servants' room be kept as neat and clean as any room in the house.

Old rags are not used in the housework, but suitable cloths be provided.

"What subject have you taken for your address at the Civic Club?" "Woman's moral obligations as a citizen." "What a lovely subject. And what are you going to wear?" "That new gown I brought home with me from Paris. And just think, I had it so cleverly packed in with my old clothes that the custom-house inspector never discovered it was there."—Baltimore American.

Customer: "Do you keep a good corn cure?" Druggist: "Yes, sir. Here is an excellent preparation. One of my customers has been using it for the last fourteen years with very good results."

Tried Recipes

— Cream Puffs. —

Half a pint of water, half a pint of cream, sugar, lemon, or vanilla flavoring, four eggs, ½ lb. of butter, 6 ozs. of flour, half a tea. spoonful of baking powder. Place the butter and cold water in a small clean saucepan, and bring to the boil. Have ready the flour and baking powder, sifted together on a paper. When the water boils, stir this in quickly, and beat till quite smooth. Cook for a few minutes and then turn into a basin to cool a little. Break in the eggs (one at a time), and beat thoroughly for a few minutes after the last is in. Have ready a greased baking sheet. Place the mixture in spoonfuls on the tin (taking care they are not too close, as they rise and swell very much). Bake for half-an-hour in a moderate oven. When they are done, take them from the oven and place on an inverted sieve until cold. Slit them open with a sharp knife, and fill with cream. Dust the tops with castor sugar.

— Fruit Salad. —

Fruit salad is made of all fruits in season; very often, preserved, canned, or crystalised fruit is used for this purpose. All the fruit should have the peel removed and be cut into small pieces. Place in a basin, and thickly sprinkle with sugar. Put aside for an hour or two for the sugar to melt into the fruit. Now add one wineglass of brandy or sherry, and squeeze a little lemon juice over all. Cover the top with chipped and flavored cream.

— Croquettes of Crayfish. —

Put 1 ounce of butter into a small saucepan; let it melt. Add one ounce of flour, mix smoothly off the fire. Then pour over it a gill of milk, in which a blade of mace has been infused, with a small piece of shallot. Cook the sauce till it leaves the sides of the saucepan. Add a spoonful or two of rich cream: cook a few minutes longer. Cut the crayfish into very small dice-shaped pieces; add it to the sauce in the pan; stir lightly. Then mix with the mince one or two raw yolks of eggs, and stir over the fire for a minute to set them, but do not boil the preparation. Season it with salt, a little nutmeg, and cayenne. Spread it on a plate to cool. Cover with a round of butter paper, and leave till cold. Then divide it into small equally sized pieces. Dip into beaten egg, taking care that they are brushed all over, then roll them in the crumbs. Shake off the superfluous crumbs; put into a frying basket, and when they are all ready, plunge the basket into boiling fat, and fry a golden color. Drain and serve a sauce flavored with anchovy with them.

— Vanilla Souffle. —

Four eggs, 1½ ozs. of butter, 1 oz. of flour, ½ oz. of sugar, one gill of milk, essence of vanilla. Put the butter into a saucepan, and when it is dissolved put in the flour and cook well without browning. Then add the milk and stir quickly. Let it boil for a minute or two; then take the saucepan from the fire, and beat in the yolks of three eggs, one at a time. Add the sugar and vanilla. Whisk the whites of four eggs in a basin to a very stiff froth, stir these into the other ingredients. Butter thoroughly a plain high mould, line round with paper three or four inches above the tin (this must be well buttered, too). Pour in the souffle, cover with a buttered paper. Stand in a saucepan of boiling water, which should come half-way up the tin. Steam it for three-quarters of an hour. Turn it carefully on to a hot dish, and serve instantly.

— Trifle. —

Twelve sponge cakes, quarter pound of macaroons and ratafias mixed, half a pint of sherry, half a pint of cream, one pint of custard, raspberry jam. Cut the sponge cakes in half lengthwise, spread with jam, arrange them in a deep dish. Lay round them the ratafias and macaroons. Pour over all the sherry. A little brandy may also be used if liked, about a wineglass. Baste the cakes, etc., with the sherry, and when well soaked pour over the custard. Let it set, and pile the top with whipped cream.

— Brandy Snaps. —

One pound of flour, one pint of treacle, two tablespoonfuls of ginger, two teaspoonfuls carbonate of soda, quarter pound of butter, quarter pound of lard, quarter pound of brown sugar, one cup of sour milk. Melt the butter and lard, beat in the sugar, treacle and ginger. Dissolve the soda in the milk, mix it in, then beat in the flour, and, if necessary, add more flour; roll out thin and cut into cakes. Bake in a slow oven till snappish.

— Royal Apple Tart. —

Line a pie dish with good puff paste, and bake it to a delicate brown. Meanwhile make a boiled custard of three yolks of eggs, half a pint of milk, and sugar to taste. Have ready half a pint of good, thick apple sauce. When the pastry is baked, put a layer of apple sauce in it, then a thin layer of red currant jelly. Over this slowly pour the cold custard. Have ready-baked straws of pastry cut the length and width of the tart. Put these on the custard lattice fashion, and set in the oven for five minutes.

— Apple Amber Pudding. —

Peel, core, and slice half a dozen large apples; place them in a stewpan with 2 ozs. of fresh butter, 2 ozs. of sugar, the thin rind of one lemon, and stew slowly till all is tender, then rub through a hair sieve. Line the edges of the pie dish with a good short crust, and ornament it with some pattern. Beat the yolks of two or three eggs thoroughly, and add to the apples, etc. Pour all into a piedish. Bake in a moderate oven for about twenty minutes. Meanwhile whip the whites of the eggs till stiff, pile these over the apple, sift a little white sugar over, ornament the edges of the whipped eggs with preserved cherries, and strips of angelica. Place the pudding in a cool oven to set the meringue, and tinge it a delicate brown.

—Lincoln Pudding.—

Four ounces each of bread-crumbs, butter, sugar, and strawberry jam, half a teaspoonful of carbonate of soda, and three eggs. Melt the butter, add the bread-crumbs, sugar, eggs, jam, and soda. Mix all well together, and steam in a buttred pudding basin for two hours and a half. Serve with jam sauce.

Don't shut out the shunshine, except on the hottest days, from your houses. Never mind if the curtains and carpets do become a little faded, for sunlight means health, and therefore should be allowed an entrance. It is especially important to admit sunshine into our bedroom, if we would have our sleep as resting and invigorating as it ought to be.

Open Border Notes.

Gardeners and Amateurs as a rule are a busy set of men, and in no other class of business or recreation are the results more apparent than in gardening, where one's attention is always occupied with one thing and another—something requiring attention, seeds to be sown, plants to be set out, seedlings pricked out in boxes, bulbs started, cuttings put in; in fact, a hundred different things that will need seeing to.

With May we can consider a new season fairly started, and with our extremely short winters we always advise an early start. There are a few exceptions, but in most cases get the plants that are required from the nurseryman as soon as it can be conveniently done. In doing this one has the pick of the stock to select from, and in many novelties or scarce plants this will be found most advantageous. Order late in the season, and the result will probably be, sold out, or one has to be content with the leavings of others. Though this is more prudent, it does not follow, having the plants in one's possession, that one is compelled to plant at once. Most amateurs are under the impression that all decidous plants do not make root growth during the winter, but this is a great mistake, Nature is never idle. For instance, put a few Rose cuttings in this month, and look at them in, say, July or August, and they will be found to have formed a callous around the base of each cutting, so we advise early planting in most cases on the plains.

Everlasting flowers are exceedingly useful in the making up of bouquets, wreaths, crosses, &c. The seeds of most of them may be planted now. Among the prettiest is Rhodanthe, the West Australian wild flower. It is of easy culture, but the slugs are especially fond of it, and care is needed to protect it from their ravages. Those who wish to grow a collection will find these about the best: Rhodanthe, Statice, Acroclinum, Gomphrena, Xeranthemum, Helichrysum, and Waitzia.

Cuttings of all kinds of soft-wooded plants can be put in. They strike best in a mixture of loam and sand. Pelargoniums (Zonale, Show, and Regal), Carnations, Penstemons, and such-like plants should be propagated in this way. The flowers on young vigorous plants are always better than on old worn-out ones.

The old plants of Penstemons should be cut severely back, dug up, separated into several pieces, and replanted in different positions, the soil having previously been well manured with cow dung. The bushes of Spiræ, Perennial Caliopsis, Perennial Asters, or Michaelmas Daisies, and Antirrhinums, should be treated in the same way. If allowed to remain in the same position year in year out, the plant wears itself out, and you stand a chance of losing it altogether.

Dig the beds as soon as possible to bury all weeds that are now starting into growth, and at the same time turn in the plant food in the shape of manure, either cow manure or superphosphate, and sulphate of ammonia. If the chemical manures are used, the proportions should be four parts of superphosphate to one of ammonia, sowing it evenly and thinly at the rate of ten pounds of the mixture to the forty square yards. There is one advantage in manuring with chemical manure. If cow manure be used, there is always a great crop of weeds to contend against, and constant weeding and hoeing is needed to keep them in check, but there are no weed seeds sown with the chemical mixture.

Keep the hoe bright with constant work. The advantages are many. The weeds are kept under; the soil is kept loose, so that the sun and air can penetrate the surface, and the roots can go down or spread out, as their nature is, and the plants are thus stronger and more vigorous, and come to maturity quicker, giving better flowers.

Keep a sharp look out on your Roses that were worked a month or two back to see that the briar stock throws up no suckers from the root, or shoots from the stock itself.

The young shoots are likely to be attacked by Aphis. An occasional dose of Gishurst's compound, or a mixture of tobacco and soft soap. Take a pound of cheap black stick tobacco, or tobacco waste, untwist it, and tie it in a calico bag and boil it for fifteen or twenty minutes with a pound of soft soap, and a gallon of water. Allow it to cool, and then add five or six gallons of water. Syringe the affected parts of the plants with this mixture, and then, about half-an-hour later give the Rose a watering over its foliage with a hose or can. Two or three applications through the season will effectually clear your bushes of the pest.

Mildew is another disease to which Roses are subject. It should be attended to as soon as it appears.

Water the plant over head, and then dust it with flowers of sulphur. If this is done before the mildew has a good hold upon the plant, it will be found a slow, but sure cure.

Chrysanthemums are now in the zenith of their glory. Their beauty may be maintained much longer if they have been carefully tied up to stakes. The heavy rain beats them down, and they soon become bedraggled and dirty if this has not been done.

Sow ornamental grasses. A good plan to get a variety of these plants is to procure one of the collections put up by the seedsmen at a cheap rate. Plant them in an experimental plot to flower, and then you may select for yourself those you consider worth fuller cultivation. There is no doubt that they are exceedingly useful for wreaths, bouquets, &c., or even placed by themselves in specimen glasses.

Do not sow inferior Carnation seed. Even with the best you can only hope for an average of one in every twenty being worth further cultivation. Take every care with the young plants until they flower, and then, if the bloom be inferior, pull it up at once, leaving only the very best. This is the only way of getting a decent collection by means of seed. You will find that some of the seedlings will not flower until the second year; take every care of these, as they are likely to be the best of the whole lot. The plants that you decide on keeping should be named or otherwise marked, so that when you are propagating from them you know what colour they are, and when planting them out into position in the beds you will not get all the same kind together.

The lawn mower should have a rest, and grass allowed to grow, flower, and seed. If you have not already done so, give it a coating of short manure, and brush it with a yard broom. Do not use cow manure, as it is too weedy for the lawn, and entails too much extra work afterwards.

Plants Under Glass and Shade.

—The Shadehouse.—

It is hardly likely that we will experience any more hot weather this season, and with the shorter days and probably dull and rainy spells, very little watering will be required, and this must be applied judiciously.

In most shadehouses there will be found a number of plants that either, from want of space, or the owner being tired of seeing them, overgrown (or over-potted), will do planted out in suitable situations. A great number of so-called shadehouse plants will do well planted out in sheltered places if a little discretion is used.

Shift on any plants that may need a larger size pot, but by no means over-pot; we are all aware that a plant shifted from possibly a 6-inch to a 10-inch pot looks immeasurably larger, but where the ability of the gardener is shown is by his producing the finest specimens in the smallest-sized pots, with clean foliage and abundance of blooms, or in cases of foliage plants, bright, large (or small) leaves.

Camellias are quite hardy in the hills, and in some instances prove satisfactory on the plains planted out in the right places. If a selection is planted out permanently in a shadehouse in suitable soil, the result cannot be but highly gratifying. These plants will have set their bloom buds, and must be watered with care, or they will undoubtedly cast off the greater part of them. Do not pot at this time of the year; the right time to repot Camellias is when they have finished flowering, and are beginning growth. Do this as soon as possible before the warm weather sets in, but avoid having the pots too large, and do not put any manure in the soil.

Now will be a good time to divide any Aspidistras, Asparagus, Anthericums where the specimens have become too large, taking care to save a few nice foliaged pieces for five or six-inch pots for table decoration.

Cinerarias will be growing fast, and attention must be given them in dipping for green fly, &c.

Cyclamens will be throwing up plenty of foliage and embryo flower buds; it would be well to keep these on a shelf, in a sunny aspect, to prevent them becoming drawn.

All potted Azaleas, Camellias, Heaths, and Rhododendrons should be stood on a shelf or firm and dry surface to prevent being water-logged.

Give the shadehouse a good cleaning up, and keep all snails, slugs, &c., under careful watching, frequently dusting of the stages, and underneath with fine slacked lime.

Fuchsias and Hydrangeas will require less water, the object being to secure well ripened wood.

—The Greenhouse.—

A walk through a well-kept greenhouse is always interesting, whether there is a blaze of flower or not, and at this time of year there is a scarcity of good flowering plants, and if we exclude Zonale Pelargoniums and Chrysanthemums there is also a lack of color. A few fruit-bearing plants may be added with advantage to the collection. Ardeseas (white and scarlet), and later Skimmeas (Japonica and Obata), and Aucubas, these tend to brighten, will last many months, and serve to break the monotony of the average greenhouse, their bright scarlet berries are very attractive, and, besides, they are admirable plants for indoor decoration. A few of the most forward Cyclamens and Camellias may be brought in to obtain early flowers; do not use liquid manure to Camellias.

A few of the smaller and best specimens of Chrysanthemums will create a display if the hohse is sufficiently large, of course, specimens in proportion may be used, but really good plants require a lot of room for their proper display, otherwise they become lopsided and misshapen without frequent turnings.

A great number of the tuberous Begonias will show signs of going to rest, and where the seed is not required, can be placed on their side in a dry place under the staging or elsewhere, but free from moisture or damp.

One of our most popular herbaceous plants suitable for forcing small pots for table use is the old Spirea Japonica; it is most useful for buttonhole bouquets and other floral work; some plants of these should find a warm corner, also start some of the beautiful Dielytra spectabilis (red and white). These are magnificent for the conservatory, require little care, and bear racemes of lovely pink and white flowers, with most elegant foliage; a grand house plant. A few Deutzia Gracilis may also be started, shaking them out and putting in fresh pots, with good rich soil, using convenient sized pots.

Zonale Pelargoniums that were cut back a few months ago, and the young ones should soon be ready for the greenhouse, and, aided with a little weak liquid manure, should keep the house gay after the Chrysanthemums have served their term. A little care must be taken with them, and the branches regulated; there are many very fine varieties of these ever-blooming plants to be had.

Keep the house well ventilated on bright sunny days, closing early to keep in the warmth. In every greenhouse there is a spot that is cooler or warmer than any other, and adaptability of plants to the various situations should be studied. Avoid all cool draughts, which are fatal to a large number of plants as they are to animal life.

All staging should be kept scrupulously clean, decayed foliage and other matter removed; the foliage that have any dusty appearance should be sponged over, using a little soft soap and water, with the slightest addition of kerosene; be sure and sponge the under surface as well as the top, many insects will thus be destroyed.

Great care must, during the winter months, be exercised in the use of the watering can, as at this period the plants will need less moisture.

—Stovehouse.—

The stovehouse will need regular artificial heat during the cold weather, reducing it on fine, bright days, but having the house nice and warm through the nights. What air that is given should be done early, and only then on suitable days, but never in cold or damp changes; these, though apparently small items, must not be forgotten. Stove plants that have once received a chill will take a long time (if ever) to recover.

There should be a good display of Gloxinias, Achimenes, and Tydæs, also some of the Begonias will add to the attractions of the stove. Many of the orchids will produce a few blooms, although not orchid season. In a small collection one can manage to have some kinds in bloom all the year.

Crotons, Ixoras, Gardenias, &c., should be kept very clean, the foliage being regularly sponged. Many small plants will require potting off, and some others will need dividing.

The Silver and Golden Ferns (Gymnogrammas) will do better placed by themselves, and watering overhead carefully avoided. Should any require dividing, very great care must be exercised, as these plants, like some of the Pteris family, are very sensitive of being in the slightest degree disturbed; it is better to try and increase any of these from spores, the greater number come true by this means; and if grown on make far better plants for all purposes. All ferns will require well looking over, all decayed foliage removed, and in some cases water partially withheld, especially where it is noticed they show signs of needing a rest.

Cuttings of a number of plants may now be put in; Coleus cuttings for keeping through winter, a few seeds may also be sown. Gloxinias will require either pricking or potting on, and kept growing; endeavour to get them to flower the first season. Leaves of the best sorts may also be inserted in peat and silver sand. Sow Begonia seed as soon as saved, at least, a portion.

Keep everything sweet and clean, and insects well looked after. Try and maintain a nice moist, regular temperature throughout, though this will rise a little during warm days.

—Pits and Frames.—

This month will mean the clearing out of a number of plants in this department. Hundreds of bedding stuff should be large enough to take their places in the borders, &c.

Pansies, Carnations, Daisies, Antirrhinums, Aquelegias, Dianthus, Foxgloves, Stocks, Polyanthus, Phlox, &c., should all be, if sufficiently strong, planted out.

All pot Chrysanthemums should ere this be under cover of some description, and those not required for decorative purposes, plunged in the borders in bare spots or blanks. Put out everything that is not actually required, thus making room for other stuff.

Pelargoniums, Show, Regal, and Fancy, should be potted on where necessary, shoots nipped where required; give plenty of light and exposure to procure dwarf, sturdy growth. When established give a little weak manure water, and do not overpot. Recollect pelargoniums, like a number of other plants, will not produce a good head of bloom unless the pot is full of roots.

—The Fernery.—

There is little doubt the Adiantums (Maiden Hair) hold the premier position as regards usefulness, as well as beauty, and the great number of varieties there are, and a number comparatively hardy, should induce growers to add many more to their collection. There are scores of other very beautiful and useful ferns, some of which, when the fronds are changing to their autumn hues, are most useful for table and floral work. Now the cold weather has fairly set in, a great number of Ferns will be showing evidence that a rest from growth is needed. This the amateur must assist by not giving the plants the same quantity of water, as was necessary in their full and vigorous growth. As autumn advances, remove all yellow and dead fronds (with the exception of Davallias and a few others), and keep all the stems free from scale. By careful watering, &c., the plants will winter safely, and be ready for potting or dividing in early spring. Many small sporelings may be potted on now, especially if they can be kept nice and warm.

The great secret in growing Ferns is to have them properly drained. The soil is not such an important matter as it has always been considered to be. The time has gone when to successfully grow Ferns without peat was considered impossible. It has been proven that specimens have been, and still are, grown in soil perfectly innocent of peat that will compare with others grown in the best imported material. So much for the soil. We do not say for a moment that the use of peat is not a great advantage to some species, but we contend that it is not absolutely necessary. Use half sharp sand and half made up of the well-rotted scrapings from an old cow camp under a gum tree.

During the winter slugs usually make their appearance in greater numbers. The grower should endeavour to trap and destroy these, for they do incredible damage to the young fronds in a short time; they lie often concealed amongst the crocks at the bottom of the pots. These plants should be carefully knocked out, and the drainage examined. Many may be trapped with a little moist bran, or a few lettuce or cabbage leaves.

It is scarcely advisable to do much potting at present; leave this operation till later on. A few pots of Selaginellas may be got ready and placed under a bell glass, also a few boxes; these can be covered with a sheet of glass. This Club Moss is most useful for the surface of table plants, &c.

Should insects appear on the young fronds, vaporise with pure tobacco juice, but do not smoke with disinfectants or tobacco, and beware of using sulphur.

Let all the surroundings be kept perfectly clean and slightly moist, except on very cold nights.

As before stated, the drainage is the great secret of good culture, and this must be done thoroughly. A pot 10 in. in diameter should have at least four or more inches in depth of broken crocks or rough charcoal, with a layer of cocoanut fibre or shreds torn from an old tree Fern trunk placed over them to prevent the soil mixing with drainage. When repotted, any plants should be kept moist and shaded for a few days, but avoid giving too much water at the roots for a time; one good soaking after potting to settle all the soil in its place will last for a while.

Evergreens.

Few suburban gardeners have room for an extensive collection of shrubs, but some varieties are so dwarf in habit that quite a number can be grown in a moderate-sized bed. Daphne Indica rubra, with its red and white sweet-smelling bloom will, of course, be one of the first selected. It is small and neat, so are Diosma alba, white; Abelia rupestris, rose and white; Pimela decussata, rose; Lantana sellovina, purple; Punica nana, fl. pl., scarlet; Adenandra uniflora, white and pink; Agathea coelestis, blue; Chorozema cordata, orange and red; Ageratum Mexicanum, blue; Correa speciosa, scarlet; Statice macrophylla, white and blue; Veronica imperialis, red and Veronica Andersoni, blue; Swainsona alba, white; and Swainsona rosea, pink; Linum Trigynum, yellow; Genista fragrans, yellow; and Libonia floribunda, orange and red. Coming to those which though naturally not quite so dwarf, are quite suitable for the smallest garden, we have Choisa ternata, white; Hibiscus peachblow, rose pink; Veronica lindelyana, white; Duranta Plumeri, lavender; Christia grandiflora, yellow and red; Berberis Darwini, orange; Cistus, white and yellow; Cottoneaster microphylla, white; Russelia juncea, scarlet; Plumbago capensis, blue; Genista Andreana, yellow; Escallonia macrantha, red; Romneya Coulteri, white; Podalaryia acerifolia, pink, and various Buddleas Lantanas, Tecomas, Abutilons, &c., are well within the limit; whilst Brugmansia Knighti, with white trumpet flowers; Genista monosperma pendula, the white flowered weeping broom; Spartium junceum, yellow; Wigandia macrophylla, lavender; Acacia Baileyana, yellow; Eucalyptus ficifolia, scarlet; Melaleuca hypericiflora; Garraya elliptica; Leucadendron argenteum, and Sparmannia Africana, Arbutus uneda, and many others are specially worth a place wherever room can be found or made for them.

The following shrubs are amongst the best of those which are grown principally for their foliage:—Aralia sieboldi, Enonymus radicans variegata, Andersoni variegata, Ligustrum Japonigata, Coprosma lucida variegata, Pittosporum tobirae, Baloghia lucida, Brassia actinophylla, Rhamnus variegata, and Eugenia myrtifolia.

EVERGREEN CLIMBERS.

Hibberti volubilis, Sollya heterophylla Aphanopetalum resinosum, Asparagus plumosus, Bignonia gracilis and princeps, Bignonia Lindleyana and Venusta, Kennedya rubicunda, Canavallia Bonariensis, Coboea scandens, Lonicera aurea reticulata, Tacsonia Mollissima, and various. Tecoma Mackeni and various; Stephanotis, Lapageria, Hoya, &c., are, of course, beautiful evergreen climbers, but cannot be classed with the above for ordinary garden work.

The Hyacinth.

—Culture in Beds.—

For the garden in spring this is one of our best bulbous flowering plants. any ordinary garden soil is suitable, providing that it is not too wet. Should the soil be heavy it can be improved by digging in some leaf mould, sand, or road grit. Early planting is the best. Choose a fine day when the surface soil is dry and can be easily worked, and begin by lightly treading the soil, afterwards levelling the surface with a rake. In dealing with a round bed the first bulb should be planted in the centre, afterwards following on by planting in circles until it is completed. For square beds or on borders plant in lines, except when it is desired to fill in between other plants in a mixed border. A trowel should be used in preference to the dibber for opening the holes. These should be made 4 inches deep, a little clean sand placed in the bottom, and then the bulb in position, after that carefully fill in the soil. Take great care in making the holes to have them all the same depth. For a very rich effect plant the bulbs 6 inches apart, but a very good display will be secured if they are planted 9 inches apart.

—Culture in Pots.—

This is a charming way of growing the Hyacinth, and can be undertaken by every one. There is nothing better than the common flower-pot, and in quite small pots very satisfactory flowers may be produced by placing one bulb in a pot. It is an advantage to use small pots for this purpose when the plants are grown for decorating rooms, as they can be easily placed in ornamental vases, or on stands, without being turned out of the pots.

Use a rich soil, consisting of good loam two parts, manure one part, leaf-mould one part and sand one part. The best manure is equal parts of cow and horse manure mixed together. This should be turned frequently before being mixed with the soil to prevent overheating. It is wise to prepare the soil some time before it is wanted for use. Mix the compost thoroughly and see that the pots are perfectly clean and dry before using them. If small pots—viz., 3½ inches—are used one hollow crock will suffice as drainage, but if larger pots are used then several smaller crocks must be placed over the larger one and a layer of moss or coarse soil over the whole. When all is ready and a start is made to pot the bulbs, begin by filling the pots quite full of soil, press the bulb into it, and finish by pressing the soil moderately firm round the bulb. They must not be potted loosely or they will fail, and if the soil is made too firm it is quite likely that the flower-spikes will be misshapen and quite spoilt.

When several bulbs are put in a large pot, they may be almost covered with the soil, but in small pots they should be only half covered, so as to allow the largest possible amount of root-room. After potting give a good watering through a rosed watering pot. The pots may then be placed on a hard bottom of ashes and covered with 6 inches of cocoanut fibre refuse or sand. Coal ashes are sometimes used for this purpose, but they are not recommended, as they contain too much sulphur. When there is no convenience for standing the pots outside, they may be placed in a dark cellar or cupboard, but must be kept quite cool until well rooted.

Attend carefully to the watering of the plants, and as growth advances a neat support must be given to the flower-spike. The best support is made of stout wire bent at the end so as to encircle the stem, and insert it in the soil without injuring the bulb. When the flowers fade, cut them off and stand the plants out of doors or in a frame to ripen. Hyacinths in the flower garden always look best in masses; if dotted about here and there they have a most disappointing effect. Doubtless many who say they dislike Hyacinths do not plant them as they ought to be planted for effect.

Types of Chrysanthemums.

—Hairy Chrysanthemums.—

Varieties that may be placed within this category are few in number, and new sorts are seldom raised. Chrysanthemums of this description chiefly belong to the Japanese or Japanese incurved sections, and their chief peculiarity consists in a covering of short, glandular hairs on the reverse of the petals. These hirsute appendages are more pronounced in some varieties than in others. The plants are not difficult to grow if second crown buds are retained; these are the third series of buds that appear on the plants in the course of a season's growth, and they invariably produce blooms of good colour with the glandular hairs well developed.

Reflexed Chrysanthemums.

In this type the flowers are of medium size, more or less spherical in form and notable for their bright colours; the petals reflex, building a bloom of reflexed or recurving form.

—Pompon Chrysanthemum.—

This is a much-neglected type, and embraces what are known as early-flowering Pompons, Pompons and miniature-flowered Pompons. They are all very pretty, developing their flowers on plants of bushy growth and in the greatest profusion. Their diminutive character adds to their charms, both as cutflowers and as plants. The blooms are either somewhat flat or nearly globular, averaging 1½ inches in diameter, neat and compact in form, and formed of short, flat, fluted, or quilled petals; very pretty when gathered in free-flowering sprays that have had some of the buds thinned out.

—Miniature-flowered Pompons.—

These are miniature representatives of the type. Some of the flowers are not more than three-quarters of an inch in diameter, and others, generally speaking, seldom exceed 1 inch in diameter. They are dainty in form and make excellent decorative material when cut in free-flowering sprays.

—Anemone-flowered Chrysanthemum.—

These flowers are very quaint, and as plants for decorative uses should be more largely in request. They are divided into three sections, viz., large Anemones, Japanese Anemones, and Pompon Anemones.

—Large Anemones.—

Have two distinct sets of florets, one quilled and forming the centre or disc, and the other flat and more or less horizontally arranged, forming the border or ray.

—Japanese Anemones.—

Are noted for their large size and fantastic form. The disc is more or less regular in outline, the ray or guard florets varying considerably in length and character. In some cases the florets are narrow and prettily twisted, and in others they are broad and curled. In some instances the ray florets droop and form a beautiful fringe or tasselling to the flowers.

—Pompon Anemones.—

These are miniature forms of the large-flowered sorts, and for decorative uses are very beautiful. They are of easy culture and dwarf growth, and have small leaves.

—Spidery Chrysanthemums.—

These are flowers with horned, forked, notched,, wire-like or thread-like petals, and embrace some of the most delightful of all the decorative Chrysanthemums. With few exceptions the flowers are small and are borne on plants varying between 3 ft. and 4 ft. in height. Another of their characteristics is that the plants are late flowering.

A New Plant Fertilizer.

During recent years, owing mainly to the increasing difficulty experienced in obtaining natural manure, scientists have devoted considerable time and thought to the question of fixing the free nitrogen present in the air so as to render it available for use by green-leaved plants. As any student of botany is aware, many plants belonging to the Pea family, such as Beans, Peas, and Clover, have on their roots little swellings, technically known as nodules, which contain bacteria that are capable of extracting this free nitrogen from the air and so converting it that the plants, and also those that follow them, are able to make use of it. It was argued some years ago that if these bacteria could be artificially added to the soil in sufficiently large quantities, and induced to carry on their work, plant life generally would be considerably benefited thereby. Then came Professor Bottomley, with a culture that he called nitro-bacterine, and for which he claimed that it would, if properly treated, inoculate the soil with sufficient bacteria to render the application of artificial nitrogen unnecessary. Time has proved that this did not, under practical conditions, always do what was claimed for it. Now, says "The Garden," Professor Bottomley comes forward with inoculated peat, and proved beyond all doubt whatever may be the reason, the application of this prepared peat has a very marked effect on vegetation. Briefly, the peat is treated with aerobic bacteria to destroy the injurious humic acid that it contains. Next it is sterilised by steam, and finally inoculated with a pure culture of nitrogen-fixing bacteria.

Experiments have been conducted in various parts of the country with this inoculated peat, but two instances will suffice for our purpose at present. One experiment—and the most important—has been conducted at Kew. Here the curator, Mr. W. Watson, has personally supervised the work, and those who are privileged to know him are fully aware that he has little faith in scientists of any kind, and would be only too glad to be able to condemn their theories. Two each of plants of widely diverse characters, such, for instance, as Abutilons, Fuchsias, Salvias, Hippeastrums, Asparagus plumosus and Maidenhair Ferns, were selected, one of each being grown in ordinary potting soil and the other in potting soil to which the prepared peat had been added, in proportions of one part peat to two of soil, one part peat to four of soil, and one part peat to eight of soil. The plants had been brought from Kew for members of the Club to see, and in every instance both root and stem growth of those growing in the peat-charged soil was very much better than that of those grown in ordinary soil. Mr. Watson states that he had no doubt whatever that the prepared peat, when added to the soil, had a highly beneficial effect on the plants. He also stated that when used at its greatest strength, i.e., one part of peat to two of soil, it had no injurious effect on vegetation, yet the one part of peat to eight of soil mixture gave just as good results.

The other experiment, discussed at a recent meeting, has been conducted by Mr. Peter Lees, the well-known authority on golf greens. Apparently Mr. Lees has been using this prepared peat at the rate of 3 oz. per square yard as a top-dressing to badly worn or thin greens, with a result that is little short of marvellous. Not only was new top growth made in abundance, but roots also of a fibrous and far-reaching character were formed. If this were all, it would seem that we have a panacea for all the troubles that beset the grower of plants. But Dr. Vockler rather put a wet blanket on the enthusiasm of those present when he asked the pertinent question whether the benefit was due to the nitrogen-fixing bacteria or to the plant food that peat naturally contains, and which would be rendered available by eliminating humic acid and by sterilisation, and to the mechanical effect that peat would have upon soil used in the proportions named. Dr. Keeble, who also had something to say on the subject, supported Dr. Vockler's statement that probably sterilisation of peat by steam would have a greater beneficial action upon it than the inoculation with nitrogen-fixing bacteria.

The question of cost in producing this prepared peat was raised by several members, but on this important point Professor Bottomley would not express an opinion. If it can be producel cheaply—which we very much doubt—it will certainly prove a boon to the gardener, no matter whether its beneficial action arises from the natural manure that the peat contains or from the nitrogen-fixing organisms. Meanwhile, we must wait and see..

Weeping Roses.

— From "The Garden."

Weeping Roses are so beautiful in the garden that a few general notes upon their cultivation may be serviceable to amateurs. The name is comprehensive but applicable, though one might as fairly describe them as shower Roses, seeing that the long, pendulous shoots when flower-laden form, present, perfect cascades of bloom. The best stocks for forming weeping standards are those of the Polyantha or Dog Rose; the latter is the common briar. These should be straight and strong, averaging 10 feet to 12 feet in height. Plant the stocks in any good garden soil and stake firmly and well above the head; then shorten the stocks to 8 feet or 10 feet and tie securely. As the buds begin to swell in spring, remove all except those selected for forming the shoots to bud into, and any growths which show from the roots must be carefully pulled out, as cutting with the knife tends to increase suckers. When the Briar shoots begin to lengthen they must be supported by cross stakes securely fastened to the upright pole; this prevents any damage being done to the head by winds. December is the best month for inserting Rose buds into the stocks; generally from the middle to the end of the month will find the sap running freely; and while the shoots are in this condition success can almost be guaranteed. Select plump buds; those near the base of a shoot are preferable to those from the top, as the latter are too soft, but the former soon "take" and ultimately develop strong growths. A fortnight after budding the ligatures may be loosened to examine the buds, and if these are progressing favourably the budding cotton or raffia is replaced, not tied quite so tight, and in four or five weeks this can be dispensed with entirely. At this season the pole which supports the stock should be made perfectly rigid, as also the cross stakes, after which no further attention is necessary until the plants are pruned, by cutting the Briar shoots back to the inserted buds, if this has not been done previously, and when these have grown long enough they are tied to the cross supports, to prevent rupturing, until the union becomes thoroughly hardened.

Good examples of weeping Roses may be had in two years by this system, provided a good foundation is laid, first by selecting strong Briars, then securing a limited number of strong breaks from the stocks, and by employing good sound buds. After two seasons' growth they can be permanently placed in the garden. Use a good stout painted iron stake to support the stem, to which by four or six arms a light iron hoop is attached; this ensures perfect rigidity, while it materially assists in developing the drooping habit. The foregoing notes will be most serviceable to amateurs who can procure and bud their own stocks; others must, necessarily, buy their plants ready formed through the channel of trade growers. The positions in which weeping Roses become effective are well-nigh innumerable and vary in almost every garden. It is best to avoid positions where any depression marks the ground, but a slight eminence increases the weeping effect; angles of walks or those formed by shrubberies are suitable, while central positions or marked points within the Rose garden may gain both in variety and picturesqueness by introducing standards in weeping form.

Almost any well-enriched garden soil grows this type of Rose well. The ground should be dug two spades deep and manured—decayed farm manure and bone-meal—previous to planting. The soil under the Rose may be carpeted with Violas or similar plants until the Rose shoots touch the ground. Subsequent manuring must be according to the vigour of the plant and at the discretion of the cultivator, increasing the stimulants either by liquid manures in summer or as solids worked into the ground during winter.

Pruning will be confined to shortening back a few of the shoots at planting, after which some of the old growths may safely be removed every year after flowering.

The best varieties are, unquestionably, those having wichuraiana blood. Not only does the natural disposition of these lend themselves to this form, but their extended season of flowering combined with the bright glossy semi-evergreen foliage gives them priority, as these are features so marked as to be almost essential in a plan where the plants must often be conspicuous for the greater part of the season.

Colour in Carnation Breeding

In order to develop more brilliant shades, I have, as a rule, writes a correspondent to "Horticulture," confined my crosses to plants both bearing flowers of the colour which I desire to improve, that is to say, crimsons were crossed with crimsons, light pinks with light pinks, dark pinks with dark pinks, whites with whites, and so on; and the result seems to indicate the following hypothesis, viz., that the percentage of colour contained in the percentage of several generations back controls to a very large extent the colour of the progeny. I do not, of course, mean that by using parents on both sides that have practically a scarlet pedigree for several generations back all scarlets will be invariably produced, but that where such parents are used, the chance of securing the improved scarlet colour desired are greatly increased. True, the progeny of such parentage frequently show many shades varying from the red or scarlet, such as pinks, maroons, purples, and even white and yellow grounds with more or less variegation of all of the colours mentioned. Again, a cross between a white variety, having practically a white pedigree for several generations, frequently produces scarlet flowers; but, as a rule, such scarlets are not as brilliant or persistent as those produced from plants having mainly scarlet pedigrees. One of the best ways of proving this hypothesis is to take two scarlet parents, the pedigrees of which are mainly white. By crossing these, very few scarlets will be produced—sometimes none at all—but a large percentage of the progeny will frequently be pure white, or white grounds marked with scarlet or various shades of pink. I have sometimes thought that by taking a scarlet variety of comparatively pure scarlet pedigree and crossing it with a white variety of the pedigree of which is largely scarlet, more clear and persistent scarlet tones are produced than where the pure scarlet pedigrees are used. For I have often found that with pure scarlet pedigrees there is a tendency for the colour, even though it be very brilliant, to blacken, or turn a slaty shade when exposed to bright sunshine.

— A Summary of Results. —

The summary of the results of crossing different colours may prove very interesting. For instance, where crimson was crossed with crimson the results produced twelve crimson and five scarlets; where dark pink was crossed with dark pink, thirty-seven dark pinks were produced; where white was crossed with white, thirty-four whites were produced, and only one white variegated with pink, there being no solid colours. Where white was crossed with crimson, five whites were produced and two scarlets, the balance being divided between dark pink, flesh pink, and crimson, but where white was crossed with dark pink, the result was three pure whites.

There is another element in making up these studies which may interfere with their value in deciding the question of paramount influence, and that is that only varieties that possessed a number of characteristics were preserved and records kept of them. There is a great mass of stuff that was thrown away, and in making these crosses we were constantly selecting plants possessing all the characteristics desired. I am inclined to think that the fact that we threw away a lot of useless stuff will not change the result. For instance, taking the result of crossing white with white, there were saved for observation from these crosses thirty-four whites and one white variegated with pink, as all the white parents of both sides were selected not only for their good colour, but also for size and form of flower, integrity of calyx, healthy constitution, stiffness of stem, vigour of growth, and also for freedom of bloom. The fact that thirty-four whites were selected for trial as against only one white variegated with pink and that the results of these white crosses did not produce anything in solid colours that were worthy of selection for trial would seem to indicate that whatever laws exist in regard to the influence of the parents upon the progeny would finally prove to be applicable not only to colour but to all other characteristics.

Planting Carnations.

Choose a spot for your bed in the open—not too near a fence, and sheltered from the prevailing strong winds. If compelled to plant near a fence running north and south, keep as far away from eastern side as possible. Beds must have the early morning sun. If fence runs east and west keep away from north side to avoid shadows of fence in winter.

Trench all beds to a depth of 2 ft. This operation must be done thoroughly. Don't bring the subsoil to the top. After removing the top spit, loosen the bottom soil to a depth of a foot or more. Put in old bones, rubble, &c., to provide good drainage. This is imperative. A fair amount of sand and old mortar, well-rotted cow manure, and bonedust may be well worked into the top spit. Avoid a soil that is too rich in plant food. A badly drained soil is death to carnations.

A change of soil every four or five years is advisable. When making fresh beds add some road sweepings to clay soils. Lime in some form—old mortar, etc., is quite necessary. Lime is a plant food in itself, but it has also a most beneficial mechanical effect on soils, rendering heavy clays light and porous and sandy soil more compact.

Planting is a very simple matter. Make your beds 4 ft. wide. Put in a line about 9 in. from the edge, and with a trowel put in young plants in three rows about 15 in. apart. Make the centre alternate with the outer rows. Paths about 18 in. wide are all that are required between beds of carnations. Plant firmly, spread out the roots, cover well, but do not bury too deeply, and see that the foliage is kept above the ground. Water well at once and as often afterwards as necessary. The soil must not be allowed to become dry. Fix permanent zinc labels, and use No. 8 fencing wire for stakes. If labels are painted white and the name written on with an indelible pencil before paint dries, the writing will remain for years. As the plants shoot into growth they will require fixing to stakes. A patent copper clip is found useful for this purpose, and is preferable to raffia.

Wall Gardening,

—How to Beautify Eyesores.—

Beauty and utility do not always go hand in hand, and so it sometimes happens that some old wall about garden or grounds may be a hideous eyesore, yet serving some useful purpose, it cannot be removed. In such cases it is usual to cover the wall with climbers or plants of some sort,but many such walls in favorable situations might be covered with flowering and other plants, which, from a picturesque point of veiw, would be more effective.

An old, roughly-built stone wall is easily covered, and the rougher the wall the better do the plants thrive afterwards, while the rough, projecting corners of the stones projecting through the greenery adds to the effectiveness of the whole. Even the smooth outline of a brick wall may be draped in greenery, but the bricks being usually closely set in the mortar this involves more labour in making the crevices for the plants, and also in watering afterwards.

In such cases the best method of securing a proper pocket for the plants is to remove half a brick at intervals all over the face of the wall, then, after the hole thus made has been filled with suitable soil, the plant should be inserted, and a miniature retaining wall built up with clay or cement in front of the soil. This prevents the soil getting washed out, and should be carried up till nearly the top of the pocket, and should project outward somewhat from the perpendicular, thereby making provision for water or rain being carried inward to the roots of the plant.

Stone walls are usually built with plenty of wide joints over their surface, and the removal of sufficient mortar from these to form a pocket for the plant is generally an easy matter. Stone walls are usually built with more "batter," or slope, than brick walls, and this ensures water finding its way into the crevices more readily than a more perpendicular brick wall. Provision for water should still be made when planting, as in the case of brick walls, as in a period of dry weather water must be given, so due provision should be made for such being effectively applied. This can be done with the watering can with low walls, but where beyond the reach of the watering can, a hose or syringe will be necessary. Many plants lend themselves to this form of gardening, and in some cases seeds may be sown instead of using plants, though the wall is not so quickly furnished when seeds are used.

Sowing Seed.

It is not advisable to sow the whole of a packet of seed at one time, as, should anything unforeseen happen to the first sowing, you still have one, or perhaps two, more charges left in the locker. Use a fine, sandy loam, sow thinly, cover lightly (the thickness of the diameter of the seed), keep surface damp, using a fine rose-can for the purpose. If these directions are carefully and consistently carried out it is not too much to say that almost any seed (except those, of course, requiring bottom heat) may be successfully raised. Lists of annuals will be found in the very complete catalogues, issued by the nurserymen. But often the very completeness of these is their most bewildering quality. Don't forsake the old favourites, but at the same time, it is well to introduce something new, at least, to your garden, each season. If it proves unworthy, discard it in the following season. The time and trouble will not be altogether wasted, for you will have at least learnt something to avoid, and to advise your friends to avoid, planting.

Some Winter-Flowering Shrubs.

A deliciously sweet-smelling shrub is the Japanese "Witch Hazel" (Hamamelis mollis). It unfolds its flowers in the winter, so that all the branches are decked all over with tassels of crimson and gold. The Chimonanthus fragrans, or the Japanese "all-spice" plant, has singular flowers of yellow and red, they are mostly highly perfumed, and although this deciduous shrub is not of striking appearance, its fragrant flowers make it worthy of a place in almost any shrubbery. Some of the Loniceras or honeysuckles bloom in the winter. One of the best of these is L. Standishi; it produces its white and purple blossoms in abundance, and they are sweet-scented. The Jasminum nudiflorum produces masses of rich yellow flowers before the leaves come out; Olearia Forsteri comes from New Zealand; its flowers are inconspicuous, but delightfully fragrant; it has very pretty foliage, and forms a fine evergreen shrub. The Californian "catkin plant" (Garrya elliptica) is a fine, bold, evergreen shrub, and, when laden with its long pendulous green catkins, is a striking object. The Japan quinces (Pyrus japonica), red, pink, and pure white, are amongst our showiest winter-flowering shrubs. The Laurustinus is a general favourite. Many of the Ericas flower in the winter. The Protea melifera is a very showy shrub, growing in quite poor soils. The Natal "wedding flower" (Dombeya Natalensis) needs a sheltered spot, and is generally an abundant bloomer. Some of our native Acacias flower in the winter. A discolour and A. maideni are good examples. Hakea eucalyptoides and H. suaveolens are very distinct plants. Templetonia retusu is a fine winter-blooming shrub from Western Australia.

How to Arrange Foliage and Berries.

On no account should these be arranged so densely as to block the view across the table. A light arrangement is absolutely essential. Sprays of a light nature should be laid on the cloth itself, and others arranged in tall vases so as to depend gracefully from them. Leaves also may be laid on the cloth. A formal design one night and an informal one the following night would be welcome. The berries should be associated with the foliage in as natural a manner as possible, and all leaves should be dry. Overcrowding must be strictly avoided, as nothing looks worse than a table so packed with decoration that no room is left for the plates, glasses, and other ware. Different kinds of leaves and berries can be used extensively in the decoration of both very large and small dinner-tables, and please by the charming effects secured. Visitors who are suddenly and unexpectedly confronted with decorations of this kind are delighted, and very rarely fail to express their astonishment and pleasure at the display.

Australian Plants for Garden Culture.

A leecture on the above subject was given before the Canterbury Horticultural Society by Mr. E. E. Pescott, principal of the Burnley School of Horticulture is reported in "The Leader" as follows:— Commencing with the Wattles, the lecturer said there weree 500 different forms comprising at least 400 species and their variants, but those who know the plant best are only familiar with some sixty varieties, and have a botanical acquaintance with about 150. Many of the wattles are suitable for garden culture, notably Acacia Pycnantha, or Golden wattle; A. Baileyana, Cootamundra wattle; A. spectabilis, a shrubby variety with very fine flowers; A. leprosa, with spotted leaves, which flowers within twelve months of sowing the seed; A. prominens, which may be cut and trimmed for hedge purposes; A. podylariæfolia, the favorite wattle in Queensland; A. pravissima, and many others. All the wattles can be grown from seed, but the latter should be soaked in hot water, chipped, or even boiled for a few minutes before sowing. Most of them may be cut back with advantage after flowering. The only eucalypts grown for their flowers are E. leucoxylon rosea, the red flowering iron-bark; E. calophylla and E. ficifolia, the scarlet and pink flowering gums of Western Australia. The eucalypts are fairly hardy and stand water well, but must not be given manure. Neither will the wattles tolerate manure, and they thrive best in poor soils and dry situations. The tea-tree (so called because Captain Cook used an infusion of the leaves to cure his crew of scurvy) makes an attractive flowering shrub, and is excellent for hedges. Then there are the clematises of several different kinds; Hardenbergia, or sarsaparilla, Eriostemon, Boronia, Stenacarpus, Beckia placata, Thryptomene, Swainsonea, Darling Pea, and a great variety of heather, all of which are susceptible to garden culture, and may be grown from seed. Amongst the herbaceous flowers there are terrestrial orchids, several kinds of which are native to Victoria, and a fine dendrobium, the New South Wales rock lily, which needs a dry stony soil and freedom from frosts. The lilium and iris families are also represented, but for some unaccountable reason the Australian species are smaller than those of corresponding latitudes in Asia, where the climate is similar.

In reply to questions the lecturer said the best time to transplant wattle from the bush to the garden is in spring; use a round trowel and take a ball of earth with the roots. Clematis seeds should be sown as soon as ripe; they sometimes take six months to germinate. It is essential in growing native plants to reproduce as nearly as possible their natural conditions; they must have what a gardener considers poor soil, no water in summer and not too much in winter. Manure is absolutely fatal; if you want to kill a gum tree whose roots are intruding in your garden, heap manure on them. The only kind of soil enrichment permissable is the addition of a little leaf mould. Cultivation in the way of digging should not, however, be ommitted.

Dentist's Wife—"Why do you open the door of the patients' room when I sing?" Dentist—"Want to let the waiters know it isn't the patients."

Removing a Large Yew Tree.

The directors of the Old Botanical Gardens at Frankfurt-on-Main some years ago were compelled to remove their old gardens to a new site near the new Palm garden, a distance of two miles. In the old garden stood a Yew tree, which was planted when the Botanical Society was formed 300 years ago, and the directors did not like the idea of leaving this tree behind. The tree stood 46 feet high, with a spread of branches 40 feet wide, with a girth of bole 8 feet. The services of an English firm of landscape gardeners were requisitioned to carry out this important work, with the result that this large and old-established tree was moved. Plans drawn to scale, of the timbers, boxing and other accessories were furnished by the contractors, and one of the firm's foremen superintended the removal of the tree. When out of the ground, during transit, it stood about 55 feet high, and weighed nearly 50 tons. The removal, in face of many difficulties, was perfectly successful; the tree is now looking very well. Besides the obstructions overhead, such as narrow streets, sharp turnings, electric tram-wires, and overhanging avenue trees, in many cases the roads had to be securely timbered on account of the subterranean canals, of which there are many in the city.

To Get Rid of Tree Roots in a Small Garden.

The gardener in town and suburb is usually more anxious to get rid of trees than to plant them. His garden is too small, the space too precious to allow of his thinking of tree planting. Often a large tree with its trunk in the garden of a neighbour—who values it, perhaps, for its welcome shade in summer time, and who, having no instinct for gardening, thinks nothing of its hungry depredatory roots—is a source of annoyance and sometimes despair to the enthusiastic gardener whose garden is overshadowed by its shoots and leaves, and whose border is permeated by its roots. He has a right, it is true, to cut off the branches that overhand his property, but even when that is done matters are often hardly improved. In the treatment of the encroaching roots, however, he can be more drastic, and can, although not without considerable trouble, completely rid his ground of them. The way to do this is to dig a trench, 3 feet or 4 feet deep, quite close to the fence nearest the large tree. Many of the offending roots will be chopped through as the work proceeds, while those which are too hard to be thus dealt with may be sawn through. Having thus severed all the tree-roots that can be found, the next thing to be done, if one wishes thoroughly to clear the border, is to dig it over 2 feet deep or even trench it. When the garden is first planted, however, this ought to be done in any case, so that if the extermination of the intruding roots is taken in hand then it will not cause much extra work.

Try Something New.

Don't be afraid of trying a few new things. There is a lot of pleasure in watching the growth of fresh garden acquaintances with which you may become fast friends. It is not necessary to look amongst the novelties, there are quite a lot of beautiful things you have not tried yet. We met a man the other day who had never grown Sweet Peas. By the way it is time these were in. Try the winter flowering sort with the other and see which suits you best. Have you grown the yellow Delphinium, Salpiglossis, Gillia, Iceland Poppy, Berberton Daisy, Lavatera, Linaria, Scabious, Dimorphotheca, which is much prettier than it sounds, Phacelia, Sturt's Pea, Minulus, Cleome, Aquilegia, Godetia, Nemesia, Schizanthus, Rhodanthe, Nigella, Acroclinium, or Clarkia? Have you grown Nasturtiums, one of the kindliest most beautiful of flowers? Have you sampled the Ornamental grasses? There are some beautiful things to be found here. Of one thing you may be sure that however many plants you have grown there are just as many which are just as beautiful which you have not grown, and pretty well all of them may be sown now. Try some of the above anyway.

Useful Hints.

How often do we hear the remark concerning some variety or other of annual, "Oh, I don't care a bit for that, it is such a weedy, spindly thing." Yet probably, with proper cultivation, that same annual is a robust subject, and very beautiful. The majority of annuals often receive such a rough and ready treatment that does not permit of their showing in anything like their real beauty.

The great fault generally is in the plants being allowed to grow very much too thickly. We often see in small gardens when the seeds have been sown in little round clumps, each plant has been allowed to remain, no matter what number has come up, and the result has been when in flower they are scarcely recognisable as the variety they really represent.

With just a little more time and attention the result would be vastly different, and lovers of this beautiful race of flowers will be amply repaid by attention to the few following hints:—

Select some small corner in the garden, suitable for small seeds, and draw out a few shallow drills. When the seedlings are up and have made their first "rough leaves" transplant into the borders or beds where they are to flower.

Well soak the seedlings before lifting, and plant with a trowel, thereby loosening the soil, and giving the young plants a good chance to quickly establish themselves. Plant thinly; with the majority of varieties, a foot apart each way is a good rule. Make each plant firm and water thoroughly, even if the ground is quite damp. Keep the hoe stirring occasionally among them, and as they grow and eventually come into flower they will amply repay for the labour that has been bestowed upon them.—Exchange.

Unley Park Nursery.

Mr. H. Kemp, the well-known nurseryman, of Unley Park Nursery, Adelaide, is now offering good collections of flower and vegetable seeds for present sowing. These have all been specially selected, and in every case will be found to be true to name. Mr. Kemp has been a consistent prize-taker at the leading flower shows, and his seeds have everywhere given satisfactory results. A special feature at the nursery is the collection of roses, which is very fine, and has already secured for Mr. Kemp an interstate reputation. Although early for planting, it is not too soon for customers, who delight in the queen of flowers, to make their selections. As the coming season promises to be a favourable one for planting, orders should reach the Nursery early. In carnations there is a stock of several thousand fine plants ready for sending out. The Zonale Pelargoniums are just now a great floral feature and include all the latest novelties.

Fair Visitor—"Oh, don't trouble to see me to the door!" Hostess—"No trouble at all, dear. It's a pleasure."

Vegetable Garden

Notes for May.

Where Cabbages or Cauliflowers are attacked by the green caterpillars (Plutella cruciferarum) treatment should be applied at once, or the plants will be ruined. Tar water is recommended as a cheap and effective remedy. Boil water, rain water for preference, or add a little soda. Then while it is boiling add tar, a few drops at a time, keeping it stirred. It will dissolve slowly, and the water will not take up much. This can be applied with a water-can, but better with a spray pump.

Early sown Parsnips, Carrots, and Turnips require to be thinned out to about 3 to 6 inches apart according to the sizes usually attained by the varieties planted.

Make sowings of Cabbages, Cauliflowers, Broccoli, Lettuces, Onions, and Beets for future transplantings, and each fortnight make a small sowing of Radishes, Cresses, and Spinach.

Continue planting out Cabbages, Cauliflowers, Broccoli, and Kohlrabbi at every opportunity. All of these require well enriched soil, and manure strong and fresh may be worked into the soil.

Old Asparagus beds, if not already cleaned of last year's growths, should be cut free of them at once. They are cut down to the surface of the bed. The growth should then be lightly forked, and a good dressing of stable manure, ashes, poultry droppings, superphosphates, or other fertiliser should be spread over, and a moderate quantity of common salt sown over the surface and forked in. Young beds of Asparagus may be planted any time during the next three months.

Onions should be planted out after working the soil up finely. These succeed best in free, open soil. If the plants are grown pretty large in the seed-beds, it will be advisable to cut the roots off cleanly to about a couple of inches long, and to cut the tops back to a certain extent. This practice does not seem to have any very injurious effects, and facilitates the operation of dibbering in the plants. The young onions are set about six or eight inches apart in ordinary soils, but wider apart in rich ones. The rows need only be a foot wider.

When inserting the roots of Onion plants, care should be taken to place them straight down into the hole, and the soil must be pressed firmly against them, but the base of the stem should not be buried, as the Onion forms and swells better when only half covered with soil. Ordinary wood ashes are useful in forming onion beds, having both mechanical and manurial effects.

Peas and Broad Beans may be sown, but in wet spots, where the soil becomes somewhat stagnated, they will not thrive just now. Early sown Peas will require staking and the soil loosening frequently between the rows. The soil should be kept stirred as often as practicable between growing crops.

Where danger from frost is rare potatoes may be planted, using small sets about the size of a hen's egg. Uncut tubers are generally considered best, and seed potatoes should be procured from a different locality each year, if possible. These like good, rich, loose soils, and are benefited by potash manures, perhaps in small gardens most readily supplied by wood ashes. The sets are usually planted four inches deep, and, of course, should be "started" to sprout before planting is done.

Garlic, Tree Onions, and Shallots may be planted now.

Suckers of Globe Artichoke should be planted now, and young plants raised from good seed.

Keep on planting beds of salad plants.

If slugs are troublesome, go out every evening and dust with dry air-slaked lime. A few specks settling on a slug will kill it. This is the simplest plan, although it is apt to make the bed look untidy.

Tubers of Jerusalem Artichoke may be planted any time during the next three months. This is a much neglected vegetable.

Earth up Celery, and plant out later sowings.

Early planted Celery is now fully grown, and should be earthed up to blanch. This is done by drawing the earth into the trench and banking it around the plants until only the green tops are showing. Before doing this remove all dead or damaged leaves; see that no grubs or worms are present, and tie the stalks lightly together to prevent soil from getting into the heart. If there is no trench a board on edge may be fixed on each side of the row and the space between filled with soil. A drain pipe slipped over each plant is also effective, and some people use cylinders of brown paper, but the soil itself imparts a sweeter and more nutty flavour.

The amount of seed for a given area of ground is approximately as follows:—Cabbage and cauliflower, for a seed bed of 8 square yards (say 12 feet x 6 feet), 1 oz.; carrot, 1 oz. for 50 yards; onion, 1 oz. for 50 yards; parsnip, 1 oz. for 60 yards; spinach and turnip, 1 oz. for 40 yards; dwarf peas, 1 pint for 25 yards; medium peas, 1 pint for 30 yds.; broad beans, 1 pint for 30 yds.; lettuce, 1 oz. for bed of 16 square yards; radish, 1 oz. for 6 square yards. Cabbage, cauliflower, and turnip should appear above the soil in 6 to 10 days; spinach, 10 to 20 days; onions, 10 to 15 days; carrots, 12 to 20 days; parsnips, 14 to 21 days; beans, 7 to 14 days; peas, 7 to 21 days; lettuce, 6 to 10 days.

An effectual method of protecting newly-sown peas from birds, mice and slugs is said to be half an inch of sawdust strewn over the drill after the peas have been raked in. Any kind of sawdust will do, but pine is the best, and yellow deal the worst. Mice will not attempt to get through the sawdust, and birds will not touch the peas, even when they appear through the soil. Slugs are absolutely bewildered by the sawdust adhering to them. To prevent wireworms or other insects harbouring in the sawdust a little lime or salt may be mixed with it.

Birds are seldom troublesome until the peas are coming through the ground, and by that time the rows should be covered with fine wire-netting. As soon as the peas are 6 in. high the birds won't peck them. The wire guards are then removed to the next succession of peas, which should then be coming through, and so on. If a coil of wire-netting of the length required was procured and cut into 6-ft. lengths, then each length cut longways through the centre, and bent by placing one length after the other over the row, a very handy guard is supplied, which will soon have paid for the cost and trouble.

Exhibiting Vegetables.

Obviously it is useless to spend a great effort in the production of fine exhibition vegetables and then to undo it all by a poor preparation when the crucial time arrives. There has been a marked improvement in many of the suburban and country shows in the past few years in the manner that vegetables are staged for exhibition, but some shows are lamentably deficient in this particular. Let us then begin to prepare at least a week before the show.

Potatoes—Wash the potatoes with a sponge carefully, not to scratch them with any grit that may be clinging to them. Use several lots of cold, clean water. Having prepared a liberal amount by washing clean, proceed to select the exhibition specimens. Have an ideal and try to get your tubers as near as possible to your ideal, medium size, shallow eyes, clear skin and perfect freedom from bruises, scab, wormholes or other blemishes. Then every potato should be as nearly uniform with the rest as rigid selection can make them. The specimens having been selected, carefully wrap them in tissue paper and lay away in a dark cool cellar till the day of the show arrives.

Beets, Carrots, and Parsnips may be washed and selected the same way, perfect form, uniformity and freedom from blemish being the ideal, as well as being as large as possible.

Onions—The onions may be selected and rubbed carefully over by the bare hand to remove any rough, loose skin. The tops should be bent over and neatly tied with rafla or string. The ideal here is: size as large as possible, a smooth skin, well ripened and conformity to type. Handle the onions with care, as they bruise readily. Common newspaper makes a fine wrapper for them, and each bulb should be wrapped separately.

The foregoing having all been cleaned and selected some five days to a week before the show we come now to the more frail kinds.

Cauliflower may be cut a couple of days ahead and wrapped in wax paper, but first see that there are no slugs or worms in among the leaf stems. Trim off all the leaves except a few of the youngest, which may be left till staging time, when they should be trimmed off. A good cauliflower for exhibition measures from six to eight inches in diameter, is round, convex, solid, and as nearly pure white as possible.

Leeks should be peeled, cleaned of all rough or dirty skin, then sponged with cold water and wrapped with wax paper till staged.

Globe Artichokes may be cut and the stems put in water a day or two prior to the show, if necessary to protect them from the weather.

Egg Fruit should be uniform in colour all around, large and good shape, and the several specimens shown should match as nearly as possible. Don't show one large one and two or three small ones if you can avoid it. Egg plants may be gathered some days ahead if desired, as they keep well.

Brussels Sprouts should be round, solid and dark green. They will stand picking a little in advance, and should be soaked for an hour or two in clear cold water to clean them and fill them with moisture, then lay them out thinly in a flat and cover with paper.

Celery should be full-hearted, brittle, crisp, and clear of rust or slug marks, as well as perfectly blanched. A good soaking in cold water and sponging will clean it and keep it fresh. Then after pulling off the coarsest outside leaves tie it with a piece of raffia and when staging trim off the roots.

Tomatoes should be as nearly a perfect ball as possible, bright and clear of colour, uncracked, firm, medium and uniform size, and showing a fresh green stalk attached. Pick not more than a day ahead, and wrap them separately in two or three thicknesses of tissue paper.

Peas should be reasonably full, young, free from mildew and a good variety.

Beans should be as large as possible so long as they are tender, crisp, and young. Every pod should be perfectly straight.

Cucumbers for exhibition should be green, straight, uniform in thickness, round and fresh, carrying a good bloom.

Lettuce should be large, fresh, and solid, having the outer leaves all in perfect condition.

Asparagus.

As Asparagus is usually left in the same position for a number of years it is well to bear this in mind when preparing the ground they are to occupy. There is some difference of opinion as to the best method of doing so. The older plan in home gardens at all events was to dig deep trenches up to four feet deep, four to seven feet wide, as long as required. This great trench was filled with the best possible material and the roots planted thickly, so that the preparation of an asparagus bed was with reason regarded as a somewhat costly laborious business. It must be admitted that many amateur gardeners got splendid results for their trouble. The newer idea is, that as asparagus is a comparatively shallow rooting plant, this extreme depth of cultivation is perhaps unneccessary and that as the roots spread probably two feet all round the plant it is better to decrease the depth of the prepared root bed but increase the distance between the plants. Many commercial growers in the big Californian asparagus districts prefer to leave a hard unbroken subsoil at a depth of about 18 inches below the surface. They plant in single rows not less than four feet apart and do their feeding from the top. They claim, and there seems to be good reason for it, that as one crop is dependent upon the proper growth and development of the previous year's foliage and root growth, a free circulation of air and sunlight is imperative. For the amateur gardener however the question of space is important. Few like to devote more of it than is necessary to any permanent crop. If he can get good results by crowding his plants, as he undoubtedly very often does, it is natural that he will continue to do so. It appears to be largely a matter of conditions. Whatever method is adopted the present is a good time to commence preparation. Take out the soil to whatever depth is decided on, use only the best of this in returning and make up the deficiency with liberal amounts of manure, and any well decayed vegetable matter with a few lbs of bone dust. If you have any choice of soil, that which most nearly approaches a good sound sandy loam should be preferred, the nearer it can be brought to this quality the better.

Herbs in the Kitchen.

(By Kennedy Herbert, in "The Garden.")

I am induced by your interesting article in "The Garden" on "—The Herb Border," to send you a few lines in respect of the use of herbs in the kitchen, especially in connection with vegetable cookery. It is a subject to which I have given much attention for some time past, and now I have a culinary herbarium under my personal care in my garden. In my various works upon cookery I have endeavoured to show how, by judicious selections from the herb beds, flavours of soups and stews can be pleasantly diversified, and the characteristics of certain vegetables more fully developed. As you say, of late, unfortunately, the herb border has not received the attention that was formerly bestowed upon it, and many varieties of herbs have in consequence slipped out of general cultivation. This probably has been more the fault of the cook than of the gardener, for, naturally enough, the latter will not waste time and space upon the rearing of plants which are never asked for. Hence it is that we now see but rarely Chives, Chervil, Purslain, Summer Savoury, Tarragon, Burnet, Rosemary, and Sweet Basil in English gardens.

Continuing the custom handed down from olden time, our cooks still use mint with lamb, green peas, and new potatoes; Thyme and marjoram in the stuffing they make for veal and hares; sage with ducks, geese, and pork; and fennel with mackerel. Specialists, too, in the preparation of turtle soup recognise the value of Sweet Basil in their flavouring, the true assaisonnement a la tortue being made of that herb, with Marjoram, Thyme, and Bay Leaf. But in few kitchens is Summer Savoury (Sarriette) used with Broad Beans; Basil in cooking Tomatoes; Rosemary in seasoning poultry, particularly for the poullet a la casserole; Purslain (Pourpier) as a garnish in vegetable soups; Chervil (Cerfeuil) in salads and fish sauces, or Ravigote—a blend of Burnet, Chives, Tarragon and Parsley—for a like purpose. Then do we often get a true sauce verte with salmon, trout, &c., for which Chervil, Chives, Tarragon, and Cress have been selected; or Green Butter similiarly seasoned.

Chives (Ciboule) ought to be grown in every kitchen garden, for they supply a delicate flavour of Onion in omelettes, salads, &c., without after-effects, which many consider regretable. Chervil makes an effective trimming for cold dishes, but owing to its delicacy does not retain its freshness as well as Parsley. Purslain, because of the nutty crispness of its leaf, is welcome in soups; it also can be cooked like Spinach, and is nice in that form with poached eggs.

It is amusing to see in the lists of herbs given in English handbooks on gardening and seedsmen's catalogues the word Sorrel, for assuredly the proper place for its entry is among vegetables; I mean to say that it has just as much right as Spinach for a place in that classification. Cooked in the same manner as Spinach, it makes an excellent accompaniment for veal and pork. It may be blended with Spinach in half or one-third proportion, and served as an entremet garnished with fleurons of puff pastry, while in association with eggs cooked in various ways it is delicious, being constantly in request at restaurants in France and Belgium in that form.

Touching Bay Leaf, mentioned apropos of turtle herbs, it should be pointed out that the French word for this shrub, Laurier, is often mis-translated Laurel, by which the reader, may be led to think that the ornamental garden shrub is indicated. This is a grave mistake. The Laurel of cookery comes from the Bay tree (Laurus nobilis), the leaves of which are harmless, possessing an aromatic scent not unlike Cinnamon. The garden Laurel, on the other hand (Cerasus Lauro-cerasus) is a Cherry containing prussic acid, and not to be used in the kitchen at all for fear of accidents. The French word Pimprenelle —the name by which a favourite herb in salads is known abroad—has been mistaken by some writers for the English Pimpernel. This is another dangerous error, for the latter plant is poisonous. The correct translation is Burnet.

Lime-Sulphur v. Bordeaux Mixture for Spraying

Experiments conducted at the New York Agricultural Experimental Station last year seem to show that lime-sulphur cannot be recommended as a spray for the potato disease. On the other hand, six applications of Bordeaux mixture increased the yield of marketable tubers at the rate of 111.5 bushels per acre. The lime-sulphur wash dwarfed the plants, though it did not appear to burn the foliage. On the other hand, the Bordeaux mixture prolonged the life of the plants about two weeks.

Fruit Garden

Notes for May.

Though the past summer has not been particularly hot it has been a trying one for fruit trees which are not under irrigation, because they started the season with smaller reserves of moisture in the soil than is usually the case. In suburban gardens also many trees which in normal seasons are very heavily watered throughout the summer have had their supplies curtailed during the last few months.

The showers we have had lately have been of little service, so every preparation must be made for making the most of rain when it does come. Keep the surface of the fruit garden rough and open so that every drop may get into the ground and not be allowed to run to waste as is often the case with the first rains. It is especially important to have land which is to be planted this season in good condition to benefit by the rain, which we all hope will not be long delayed. It should be ploughed deeply and left in the rough except in such positions where there is a danger of soil washing away under heavy rain. Such positions are however exceptional.

The season for winter pruning of deciduous may be said to commence this month, though there is usually a fair amount of foliage still on the trees. In most cases it has fulfilled its functions and no harm will be done by making a beginning. There is little apparently to be gained by rushing the work and as a touch of frost followed by a high wind will practically strip the trees and make the work much easier it may well be left till then. Almonds may be begun first followed by apricots and peaches, except those known to drop their fruit buds, which should be left till later. Except when grown commercially almonds are comparatively rarely pruned. Many of the trees in suburban gardens are almost beyond pruning, but with young trees it is possible and profitable to keep them low and force the growth of fruiting wood each season.

When pruning, wood if required for grafting may be selected and merely heeled in till wanted. It should of course be chosen from healthy well-grown trees which are proved good croppers. The safe plan is to burn all prunings as soon as possible, though few people do it in small gardens as this waste wood when dried is useful for kindling and for small stakes, etc., but there is certainly a danger of insect and fungus life to be carried over and again distributed in spring. A little apparently saved may mean considerable annoyance later on. Where citrus trees are to be planted this autumn they should be got in without any delay or left till spring. Where the ground has been well prepared the former is the better course, but thorough preparation even if it means waiting till September is preferable to planting in badly worked ground. Do not plant too deeply and plant carefully. It is certainly wise to have as little delay as possible between the nursery bed and the orchard.

June is probably the most popular month for planting deciduous fruit trees, but there is no particular reason for waiting till then. The state of the land to be planted rather than the calender is the better guide. Before planting the area should be thoroughly cleared, well fenced and well worked. Lay out the orchard properly, give the trees plenty of room so that there will be a sufficient area from which they will draw moisture to keep them in good growing conditions during dry years. Ascertain the varieties of fruit which find most favour on the markets, then select such kinds as will thrive best in your soil, situation and climate. Plant the trees with some brains and there should not be much disappointment ahead though there will be a good deal of work.

The present is a good time to see to any repairs which may be necessary, fences, gates, etc., clean out drains, gutters, etc. If the land or any portion of it is sour do not forget that lime is the best corrective. If any trees are lagging behind the others they will be benefitted by any stable manure which is available. All scrapings from drains, gutters, dams' etc., should be scattered over the orchard and any rotted vegetable matter of whatever description.

Wherever it is necessary to enclose an orchard with wirenetting, it is best to use a good wide netting, with small mesh at the bottom, as it is wonderful through what a small mesh a young rabbit will get, as well as how high a fence he will scale. Therefore, if the orchardist wishes to preserve his trees from the attacks of these pests, he must see that the orchard is securely fenced before planting.

The present is the time when manuring the orchard, except in the case of quick acting artificial fertilizers should be undertaken, but it is far more important, unless the need for feeding be very apparent, that the soil be placed in a perfect physical condition by draining subsoiling and thorough cultivation, so that the tree roots may derive the greatest possible benefit from the soil itself. Then when that is done, the grower may turn to soil additions as a further means of increasing his yield.

There are several methods by which the soil may be enriched for orchard trees; humus may be added in the form of animal manures, green manures, plant or animal refuse; the trees may be stimulated by a chemical plant food; or the food in the soil may be released by the application of lime in one of its many forms. Whatever method is selected, it is wise to adopt a regular system of rotation, so that the soil may be assisted and enriched in a different manner each year, and so that it may not be over-stocked with any one particular form of tree food

Orchards will benefit if an attack is now made upon the codlin moth. All hiding places, nooks and crannies, wherever the larvæ have hidden, should be thoroughly searched and cleaned out. The orchardist has far more time now to do this work than he will have in the springtime. It is now a favorable time to spray the trees where such pests as Bryobia mite, wooly aphis, scale insects, and peach aphis have been or are prevalent. Any of the recognised sprays are suitable, these being red oil, crude petroleum, kerosene emulsion,, or lime-sulphur wash. The latter wash is again becoming popular, partly owing to its effectiveness, and also to its possessing certain properties as a fungicide.

The Loquat.

This useful fruit should be more generally cultivated in this part of the world, as it has much to recommend it. In the first place the trees as a rule are very prolific, and when grown under fairly favorable conditions, seldom fail in bearing heavy crops. These conditions are in localities that are not subject to heavy frosts; though the trees will not be seriously affected by light ones. Trees will thrive in any fairly good soil, of moderate depth, but flourish best in a deep sandy loam. A good depth of well-broken soil and effective drainage are essential, and these conditions should always be secured. Autumn planting is the best, but unless the summer growth has hardened, it is better to wait till early spring. If planted in orchard fashion the trees should stand about 24 feet apart, to allow ample space for development. Being an ever-green with handsome foliage, that contrasts well with other trees and shrubs, the loquat may also be planted for ornamental purposes in shrubberies. The trees also make very good breakwinds for orchards and gardens, when as a matter of course they should be planted thickly, say from ten to twelve feet apart. Pruning should be carefully attended to during the early years of growth, so as to obtain compact well-formed trees. Afterwards but little is required in the way of pruning. The fruit can be utilised in various ways, and where generally known is popular. When eaten ripe it is refreshing and grateful to the palate. Early Oval, Herd's Mammoth, Chatsworth Victory and Enormity are good sorts.

Some Good Plums.

The chief recommendation of the Cherry Plum is its early ripening and the beauty of its bloom. Clyman, which ripens about the same time is a dark skinned fruit of medium quality, a good market variety. Angelina Burdett is early, dark, and of good quality. Early New Orleans is not quite so large, of rather better quality, not usually so heavy a bearer as the former. Rivers' Early Prolific, not a large plum but handsome. and a good all round fruit. Washington is later, a large yellow plum. Greengage if of the true type is one of the very best for dessert and preserving. Jefferson is a very large handsome fruit of the very best quality. Grand Duke, one of the best of the later dark plums. Monarch is one of the latest to ripen and one of the very best. Japanese Plums—In Wickson, Burbank, Climax, Combination Kelsey's and October Purple you have about the pick of this splendid class. Satsuma, sometimes called the Blood Plum, is an exceedingly good fruit. It is dark red and carries the colour right down to the stone, keeps well after ripening and makes a fine preserve. For drying Prune d' Agen and Robe de Sergeant are standard Prunes. The former is said to be the better for cooler districts, the latter for the hot districts. Splendour which is very large, Sugar and Fellemberg also make excellent prunes.

Orchard Cover Crops.

A cover crop, according to Bailey, is one which is used for the particular purpose of securing its mulching and physical effect upon the land in the intervals between the regular crops in the normal seasons of tillage. A sowed crop in the orchard may be valuable in two ways: by affording a cover to the land and by improving the soil when it is ploughed in. As a cover, it may keep down weeds, and protect the land from the injurious effect of frost. As a green manure it may add fibre to the soil, and thus augment its power of holding fertility and moisture, and it may add directly to the fertility of the land. This late crop catches and holds the leaching nitrates which the tree roots utilise earlier in the season. Taken as a whole, the crop may be said to improve the soil in eight ways:—It directly improves the physical condition of the land; prevents hard soils from cementing or puddling; holds the rains until they have time to soak into the land; dries out the soil in spring, making early tillage possible; sometimes serves as a protection from frost; it improves the chemical conditions of the soil; catches and holds some of the leaching nitrates; adds humus; renders plant foods available; appropriates nitrogen if it is leguminous.

Design or "Lay-Out" of a Commercial Apple Orchard.

By R. G. Edgell, Bathurst.

— Importance of Systematic Lay-Out. —

Having decided upon the class of fruit he intends to grow, and after obtaining his land, the orchardist is confronted with the problem of making the best use of it. The choice of design or "lay-out" is one of the most important factors in solving that problem. It cannot be too strongly insisted that this is by no means a matter for individual taste or fancy.

Upon it very largely depends the economical use of the land by the trees and the economical cultivation and working of the orchard. It is fundamental, and is the one factor which, once adopted, can never be altered. If we plant wrong varieties we can later on work them over to better kinds; if our methods of pruning or cultivation are faulty we may mend our ways afterwards; but once the trees are established in place we must, for good or ill, adhere to the system adopted. This may mean far more than the difference between profit and loss.

Much of what follows is applicable to all or many of the various systems of lay-out, and each grower should carefully consider the subject from his own point of view and conditions before he plants. It is proposed to describe in outline the methods adopted by the writer in the design of commercial apple orchards of 10 acres or larger area. The arrangement of the trees in various patterns throughout the orchards is almost as old as the hills, but as far as the writer is aware, some of the methods he describes are novel.

— Analysis of the Principal Systems. —

A commercial orchardist will aim at obtaining the highest average returns from the lowest average expenditure. Rather than produce a few specially fancy specimens he will desire to raise the all-round excellence of his crops. In order to do this, each root and branch of each tree should be encouraged to bring forth its best. Where one branch or twig is seen to crowd or interfere with its neighbour the pruner will unhesitatingly cut it back; but the same man will be found to so arrange his orchard trees that some of their roots are almost sure to crowd out some of the other roots, and because this takes place underground and out of sight, it does not trouble the orchardist's mind, though his pocket has to suffer.

As the young tree grows to maturity its roots will radiate in all directions, and the ground it feeds and lives upon will approximate to the figure of a circle, with the stem of the tree at its centre. It is not claimed that every root of every tree is equal, so that each occupies a perfect circle of the same size; but this is the average, especially where the orchard growth is healthy and where the trees are pruned and cultivated with a view to equality and symmetry. As the average tree will naturally occupy a circle of land, the planter should so arrange that each tree is provided with its circle of the requisite area, and that there shall be as little as possible of "waste" land in between the circles. The author does not claim that all the land between the circles is absolutely wasted; he realises that some fortunate root may push out into a "waste" corner, and so make full use of it: but the average root will not do this, and it is absurd for the planter to provide fantastic shapes of land for his trees to grow into just because by lucky chance some of them may be filled. In all examinations of systematic planting the natural requirements of the tree should be borne in mind, even though special conditions may be paramount.

Before deciding on the spacing of the trees, local and all other conditions should always be well studied, but these hardly fall within the scope of the present article. For the sake of illustration it will be advantageous to assume some definite width of spacing, and the distance of 24 feet (which is suitable for most Bathurst conditions) has been adopted in this article.

On the assumption that our estimate of the tree's natural growth is correct, each tree at maturity will utilise a circle of ground 24 feet in diameter. If we provide less, the roots of adjacent trees will crowd each other; if more, some of the land will be wasted, and there will be fewer trees to earn the planter's income, while cost of working the "waste" land will have to be met year after year.

Clearly, then, the design which allows of the arrangement of the greatest number of circles of adequate area per acre will (other considerations being equal) be the most profitable.

— Types of Lay-Out. —

Only the five following systems of lay-out are considered here :—

No. 1.—"The Square System."

No. 2.—"Alternating Squares."

No. 3.—"The Quincunx."

No. 4.—"The Row System."

No. 5.—"Equilateral Triangles," or "The Hexagonal System."

The Square Lay-out consists in planting the trees at the intersections of equi-distant straight lines crossing each other at right angles. In other words, each of four adjacent trees will stand at one of the four corners of a square.

"Alternating Squares." — This system is a modification of No. 1, inasmuch as the trees in one row are not planted opposite those of the adjacent rows, but midway between them. This really results in planting in a series of triangles, but the triangles are not well proportioned.

The Quincunx is like No. 1, except that a centre tree is placed in the middle of each square. It is recommended only where the main orchard trees are likely to grow to great size and require very wide spacing. Under these conditions the centre space may profitably be filled by quick maturing varieties (such as peaches), which will have paid for themselves before the main trees demand their removal.

But planters should not fall into the error of thinking that because there is only one filler in the centre of four standards, the proportion is only one to four. The number of fillers and of standards is equal, and the real spacing is halved with many of the disadvantages of close planting. Only under exceptional conditions is Quincunx planting advisable.

The Row System consists in planting the trees in rows as grape vines are usually set, and for many reasons is only recommended where the trees are to be trellised like grape vines or are to act as windbreak.

The Triangular System disposes of the tree in equilateral triangles, and they also fall into truly straight lines, as in other systems. The method is recommended as being theoretically the most correct, both as regards equal disposition over the land, with least waste, and also for economical and convenient working and cultivation of the orchard. It should always be chosen unless some very strong local conditions forbid.

— Comparison of Systems. —

The only two systems of lay-out which need comparison here are "The Square," because it is so well known, and "The Triangular," because of its many merits.

Having decided that his trees will require a spacing of 24 feet apart, the planter will find that if he sets them in squares only seventy-five and a half can be planted per acre; but if in equilateral triangles, he gets nearly twelve more trees, or 15½ per cent. more per acre. This is illustrated by Diagram No. 1, which also shows a block of trees planted on the system of "Alternating Squares." In this diagram the "waste" land is shown in black, and inspection will prove that there is very much more "waste" with the lay-out in squares and alternating squares than in equilateral triangles. It is the saving of this waste which gives the triangular lay-out so many more trees in the area of orchard.

When planted on the "square," each tree is allotted a square of land 576 square feet in area, although it should only naturally fill a circle of 452½ square feet. It requires little more than three-quarters of the space we have given it.

If, however, we dispose of our trees on the "triangular" lay-out, each receives a block of land in the form of a regular hexagon, which so closely approximates to the form of a circle that there is very little "waste," and what there is can be filled by the tree's roots with very little crowding.

Nature appears to have taught [illegible] something of the advan- [illegible] the hexagon over the square. The honey cells of the bee comb are always hexagonal, and not square, in form.

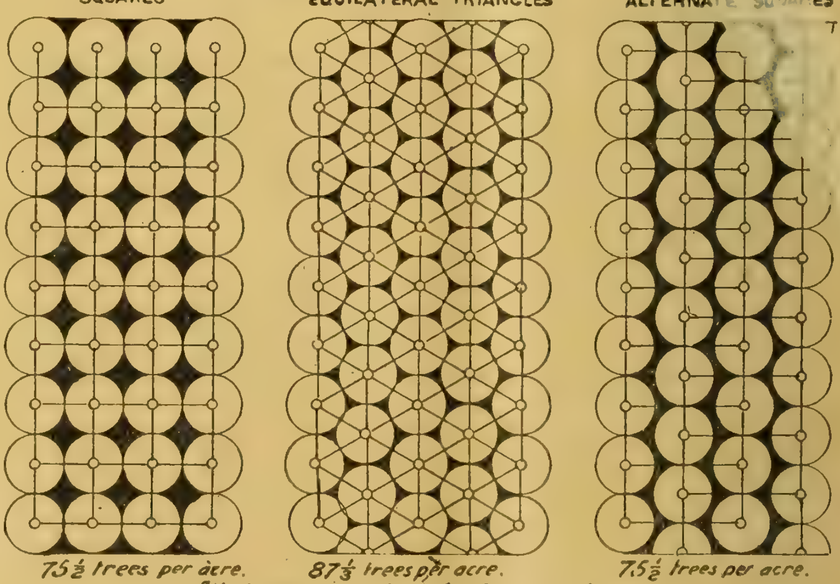
Instead of planting our trees 24 feet apart, we may decide to set a given number to the acre of orchard land. Suppose we decide to plant about seventy-five trees per acre (see Diagram No. 2), then if set "square" the spacing will be as before, but if we adopt the "triangle" we can give each tree an extra distance of almost exactly 2 feet greater spacing; it will live on a circle of 26 feet diameter, or 530½ square feet area, instead of one of 24 feet diameter, and only 452½ square feet.

The writer does not claim that an acre of land can be increased in area if triangles are drawn over it, nor reduced if marked out in squares. But if the trees are planted in triangles their roots will be more evenly distributed than if set in squares, and the

1

ORCHARD LAY-OUT

SQUARES EQUILATERAL TRIANGLES ALTERNATE SQUARES



75½ trees per acre. 87⅓ trees per acre. 75½ trees per acre.

All trees spaced 24 feet apart.

whole of the land can be made use of by the former method with very much less poking about of the roots to fill odd corners than if the latter lay-out had been chosen.

And many of the advantages which the trees derive from the triangular design are also felt by the men and teams which have to work the orchard. The triangles are formed by the intersections of three sets of straight lines, so that there are three main lines of roadway. But if the square method had been adopted, these main "lanes" would be reduced to sets of two instead of three. True, they are slightly narrower where the planting is triangular, but in driving through the orchard no two trees are passed at the same time: that on the right-hand will have been left behind before the vehicle comes abreast of the tree on the left, so that the man can watch both and damage neither. But probably traffic is more greatly facilitated by the ease of turning in the triangular orchard than by any other element of its design. An inspection of Diagram 2 will show how closely the hexagon fits round a circle; the path of a turning vehicle or plough is approximately circular, so that it is easily kept with the hexagonal space provided. When turning from one lane to another in the square orchard the turn must be through an angle of 90 degrees, but in the triangular orchard this angle is only one of 60 degrees. The latter orchard, with its eighty-seven trees per acre, appears to escape from damage at least as well as those planted with only seventy-five trees on the "square."

When comparing the various systems of lay-out, it is only the sets of main lanes, or widest passages between the trees, in each design which should be considered; it is to these that the traffic will eventually be confined, although the beautifully radiating, but narrower, lanes which are found in each system may be made use of while the trees are small.

In the square lay-out there are only two sets of main lanes crossing each other at right angles, but if the triangular design has been adopted, the number of these wide passages will have been increased by 50 per cent., so that the orchard traffic can almost always find a convenient short-cut in the direction it wishes to take, and this alone saves much knocking about of the trees, because there is less turning, and what there is is through an easier angle.

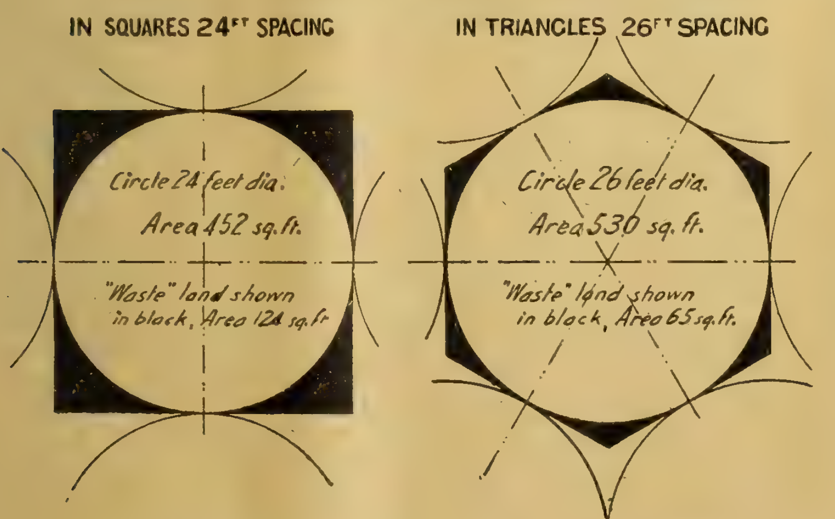
Apple orchards are usually established on undulating sites. It is very important that the furrows of cultivation shall be taken in nearly level contours rather than up and down the slopes. If the furrows are nearly level it will be found that storm water will be encouraged to soak in and promote the welfare of the trees; but if the plough has been taken up and down the slopes, each open furrow will form a miniature creek, and the best of the plant-food and surface soil will be scoured away, whereas the same furrow, if level, instead of steeply sloping, will form a trap to hold the water and catch the particles of plant-food with which it is charged. Now, all ordinary hills and the ends of ridges approximate to the circular form. Diagram No. 2 shows how very much better the lines of triangular planting fit round a circle (and consequently round a circular hill or point of ridge) than do the lines laid out on the square system. In practice the ploughman finds it easy to follow almost level lines, and when a change in the slope of the ground is reached he has only to turn through an easy angle of 60 degrees in order to follow it; but if the orchard had been planted on the square the angle of turn would be much more severe, and the new direction of furrow would not be level, but sloping as to encourage scour.

At those seasons of the year when thunderstorms are expected "up-and-down" ploughing is dangerous, but at other times cross cultivation can be followed with advantage. Either the square or the triangular lay-out permits of this work being done, but the balance is in favour of the triangle, because of the greatly reduced amount of expensive hand-work in keeping the orchard free of weeds.

From every point of view, both in practice as in theory, the triangular design is superior to the square: it is better for the trees and better for the men who work them, while its appearance is so pleasing that it has only to be seen to be appreciated. The writer recommends that it be adopted in all but very exceptional cases.

2

DETAIL SHOWING 75 TREES PER ACRE



— The Planting Wire. —

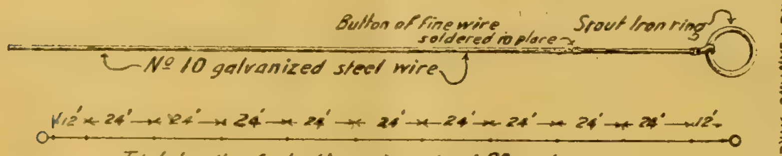
No matter what the type of de- [illegible] be, many measurements must be made in order that it be correctly laid down on the orchard ground. For this work there is nothing so handy as a planting-wire, and the small cost of making one will be more than repaid, even if only a very few acres have to be planted. It is made of No. 10 galvanized steel fencing wire, with an iron ring at each end, and soldered "buttons" to mark the graduations. These buttons are easily made by twisting a few coils of fine wire round the main wire wherever a graduation mark is required, and soldering it in exact position. Before any graduation is attempted the plain wire should be very tightly stretched over even ground, so that the measurements along it can be easily and accurately made. It will be found convenient to make the little coils which form the buttons, and slip them on to the main wire before its end rings are fastened on.

The length of the planting wire should be as great as can be conveniently used over the uneven orchard land which is to be planted. The longer (with reasonable limits) the wire is made, the less will be the work of setting out the positions of the trees, and the greater the accuracy attained. The length of wire found most useful in laying out large orchards whose land is fairly even has been about 120 yards, but for general purposes 80 yards will be found sufficient. If the land is very uneven the length may with advantage be still further reduced, but it should be kept as long as possible.

The details of the planting wire will be made clear by an examination of Diagram No. 3, which shows a wire graduated for planting the trees with a spacing of 24 feet. About two or three feet from the end-ring the first button is soldered, then comes a distance of exactly 12 feet (half the distance of the selected width of spacing) to the next button, and then regular spaces of 24 feet each, until the other end of the wire is approached, when the distance to the last button is 12 feet and a short length to the last end-ring.

to mark the tree's position is both confusing to the men and very wasteful of their time. The much better way is to plant the tree just beside the button of the wire, while the wire is still in position marking its exact place. If a planter once tries this method he will never bother with pegs and planting-boards again. There is no difficulty in digging the hole for the tree while the planting wire is in place; the button shows the exact position even after the soil has been removed in digging the hole, and it also indicates the original level of the ground, so that the man planting will know how deep to set the tree's roots, and be quite sure that when the hole is filled in the young tree will be found to be at the proper level.

After all the trees along the planting wire have been set, that is to say, after a tree is planted just beside each button, then the wire is lifted at each end and then carried up to the next set of marks on the two base-lines, where it is staked down and tightly stretched, and another cross row of trees is planted as before.



THE PLANTING WIRE 3

— The use of the Planting Wire, and Method of setting out the Orchard by means of Base-lines. —

Instead of pegging out on the ground the position of each tree, it is recommended that the orchard be marked out from end to end with a system of base lines. These should be parallel to each other, and spaced at such a distance apart that the two end buttons of the planting wire shall just reach from base-line to base-line when the wire is tightly stretched across between them at the angle required by the system of lay-out adopted. This angle will be one of 60 degrees if the planting is to be in equilateral triangles, and it will be a right-angle if the square system has been chosen. In either case the planting wire and the base-lines will be of equal value in accurately locating the positions of the trees. Each button on the planting wire (except the two end buttons, which are kept on the base-lines) will mark the position for a tree, and if desired a peg may be driven there, but the author believes that the use of a peg

— The Base-lines. —

The whole accuracy of the work depends on accurate setting out of the base lines. If the orchard were in the form of a long narrow strip of land, say only 100 yards wide, then a base-line should be carefully laid down parallel to one of the long fences, and near it, a second base-line parallel to the first is then laid down at the other side of the orchard, and as the planting wire is stretched from each pair of pegs on the two base-lines, the whole orchard will have been covered, and all the planting completed.

But usually the orchard is too wide to permit of a planting wire of convenient length being stretched from side to side, and in this case three or more base-lines will be required, and the orchard land will be covered by planting in successive long blocks, as wide as the planting wire will span.

— Setting out the Base-Lines. —

Unless special precautions are taken to prevent it, some inaccuracy is likely to be found in measurements taken over uneven ground. The simplest way for an untrained person to reduce these inaccuracies to within negligible limits is to begin his measurements near the centre of his orchard. The lengths of the measured lines are thus reduced, and the amount of error is also decreased; besides this, there is good chance of such errors as may creep in tending to counterbalance each other, and so disappear.

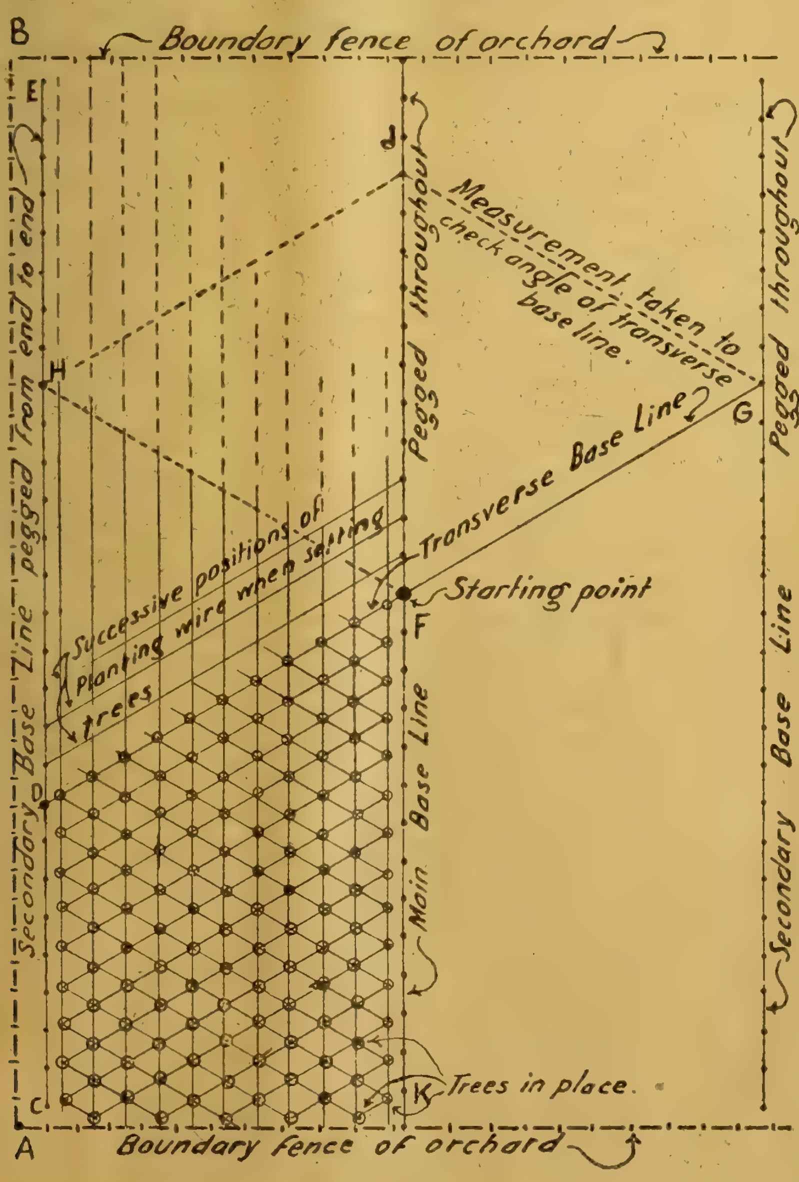
After having decided on the direction in which his lines of trees shall run, the planter will proceed to set out his base-lines in accordance therewith. Presuming that the planting is to be done in equilateral triangles, the method adopted by the writer is as follows (see Diagram No. 4):—Let AB represent the fence of the longest side of the orchard, and let it be understood that the longitudinal lines of trees are to be parallel with this fence, then the planter will stake out a line CDE, which must be quite straight and parallel with the fence. It will be used as a base-line, and should be located at such a distance from the fence that the nearest trees (which will be distant from it 12 feet along the planting wire) shall have the desired amount of clearance.

A stake should now be set up approximately at the point F, nearly in the centre of the orchard. The transverse base-line DFG will have to be marked out at an angle of 60 degrees with the line CDE, and its approximate direction is best found as follows:—Take a piece of binder twine or other cord about 50 yards long, tie the two ends together, and pass a large wire nail through the knot, so that it shall be firmly fixed; two other wire nails are then knotted into the twine so that there shall be exactly the same distance between all three. Now select a point D exactly in the line CDE, and drive one nail there, pull the cord tight between that nail and the next to it, and drive it in exactly on the line; now take the third nail and, pulling the cord tight between it and each of its two mates, mark the exact spot. This should give an equilateral triangle and mark the proper direction for the transverse base-line DFG. But it is probable that two or three trials will be required before the line is found to pass within, say, a few yards of F; when it does so, the point D can be finally fixed, although F is still to be definitely located. The exact position of F is found by stretching the planting wire from D in the direction of F, and then measuring its full length to H (exactly on line CDE), the distances between D—H, D—F, and H—F should be made exactly equal, we shall then know that the position F is correct, and the transverse base-line can be produced to the far side of the orchard. The distances F—G, F—J, H—J, and G—J should all be measured and found exactly equal to F—D. The line JFK can now be staked out perfectly straight, and, beginning at the point F, it must be marked out from end to end in spaces of exactly 24 feet; this is done with the same planting wire that has been used for all other measurements. The base-line CDE will be pegged as will all other base-lines, into 24-feet spaces, the measurements being started where the transverse base-line crosses the others.

In staking out a straight line, a plummet with a fine hard string should be used. If it is held steadily at arm's length and the sight taken along the string, it will be found that the work is very much more accurate than if an attempt is made to sight more or less crooked sticks into line without a plummet. The pegging of the longitudinal base-lines is done with pine pegs about as thick as a man's thumb, and 9 inches long; they should stand up 3 inches.

4

Method of Lay-out by means of Base Lines



Sometimes the whole of the land is ploughed and subsoiled before any marking out of the lines is done, but the writer prefers to mark out the orchard first, and after properly fixing the base-lines, the approximate positions of the long lines of trees can be easily staked, so that a strip of land say 12 feet wide may be ploughed and subsoiled for each line of trees. The base lines, of course, must not be ploughed out until the planting is done, but the remainder of the orchard can be ploughed, and, for that matter, subsoiled at once, though it appears better practice, and cheaper, to only subsoil strips about 12 feet wide during the first year, and to subsoil the remainder during the next year or two, so that the soil shall be freshly loosened up as the roots extend towards it. The unploughed land between the strips is of great advantage while the work of planting is in progress; men and horses can walk on them instead of plodding through the ploughed land. Of course, the entire surface will be ploughed as soon as the planting is finished, even though some strips of subsoiling may be left for another year.

After having carefully established the main base-line nearly down the centre of the orchard, the measurements with the planting wire when the trees are being set should always be taken from this base. The man in charge of the planting should take the end of the wire which is worked along the main base line, while another man will pull it taut to the next base-line. The first will then stake down his end, so that the button near the ring shall be just even with the peg in the base-line, then the man at the other end will firmly stake his end of the wire in place, so that it passes just beside the proper peg in the second base-line. All the trees can now be planted along the wire, which will be moved up to the next two pegs in the base-lines, and another row of trees planted as soon as the wire is set. Sometimes the button at one end of the wire will not quite tally with the peg in the secondary base-line. There may be a difference of an inch or so; this is due to uneven ground over which the wire is stretched, and may be neglected if the other end is kept strictly to its place on the main base-line.

Although this method of planting is somewhat difficult to describe, it is really simple in practice; once the base-lines are properly set there should be no trouble and no delay. Quite inexperienced men will be found to properly set 100 trees per day per man, digging all the holes and doing all the work, except the fixing of the base-lines, which is done, perhaps, weeks before. The lines of trees will be found so perfect that even if the trouble had been much greater, the result would have fully justified it. Men planting should always work in pairs; both will dig the hole together, throwing the surface soil on one side and the subsoil on the other; then a cone of surface soil having been formed in the bottom of the hole, one man takes the tree and plants it while his mate supplies him with soil sprinkled freely from the shovel until the roots are well covered. The planter then stamps the soil well round the tree, keeping it upright, and just touching the button of the planting wire, while the hole is completely filled by his mate. The two then go to the next tree.

When setting the last few trees in the corners of the orchard it will be found that the planting wire will have over-shot the end of one base-line, and that the positions of the remaining trees cannot be fixed as before. However, the trees which are set will line up so beautifully that the lines and positions of the few trees still to be planted are clearly shown; they can be easily measured, or even sighted in, with considerable accuracy.—Agricultural Gazette of N.S.W.

Minister—"So you've turned over a new leaf, Sandy? I was indeed glad to see you at our prayer meeting last night." Sandy (village reprobate)—"Is that whaur I wis? I didna ken whaur I had been efter I left McGlaston's pub."

Olives.

The olive is one of those trees that ranks in antiquity of cultivation with the fig and the grape vine. The time of man's first making use of the fruit and oil is lost in the dim vistas of the past. But we have unimpeachable evidence that it at least extended back 4000 years.

The olive, as well as having been cultivated for ages, is also a very long-lived tree. Individual trees are known to be in existence that were already ancient at the time of the birth of Christ, and there are groves some centuries old still bearing fruit.

The olive belongs to the genus Olea, of which there are sub-divisions and a great many varieties. Two forms of olive trees have always been distinguished — the "wild"—Olea europoea, Sylvestris (Linn.) or O. europoea oleaster of de Candolle—and the "cultivated" or domestic olive, known as O. europoea sativa. There are numerous varieties of both the wild and the cultivated tree.

The fruit of the olive tree is a drupe and is too well known to need description. It varies very much in shape; some varities are round, some oblong, some pyriform, and some again, such as "lucques," are convex on one side and concave on the other. In fact, the variations in shape are almost infinite.

Like other trees, the olive has a certain range of distribution, outside of which it does not thrive, or at any rate may not be profitably cultivated. Its natural habitat appears to be confined to an area at no great distance from the sea-board, 100 to 150 miles at most.

The greater part of the world's olives are grown round the shores of the Mediterranean Sea. This area is demarcated in Europe by a line running from the west coast of Portugal through Spain, into the south of France, including Italy, running along the east shores of the Adriatic, and taking in Turkey and Asia Minor. On the south of the Mediterranean it runs from the west coast of Northern Africa; starting at Morocco it follows a fairly consistent line, never getting very far from the shores of the Mediterranean, through Algeria, Tunis, Tripoli, part of Egypt, and on for a short distance into Arabia.

This may be called the old world's olive areas. Although there are large tracts, both in North and South America well suited for the growth of the olive, the only exploitation of any great extent has been in the State of California.

— Climate. —

The range of temperature at which the olive can be grown varies from a minimum that does not often sink to 20 degrees F. to a maximum that does not often rise to over 140 degrees F.; and the mean temperature of the coldest month should not fall much below 45 degrees F. to get good results.

This is a slightly more equable temperature than is required for the vine, as that plant will thrive in a more extended range of temperature than the olive. Some varieties of olives will stand more cold than others, and extra heat does not harm them as much as extremes of cold.

They do best at altitudes ranging from 150 to 3,000 feet. At lower altitudes, especially near the sea-board, where misty rains and fogs prevail and the weather is somewhat muggy, it is difficult to obtain good quality fruit, as these conditions tend to favour attacks of the fungoid diseases and insect pests to which the olive is subject.

— Soil. —

It is a somewhat mistaken, though general idea, that the olive can be profitable grown in poor soils where other fruit trees will not thrive. True, the olive requires less water than most fruit trees and may be grown over areas where the physical condition of the soil would make it impossible successfully to produce any other fruit, such as on hill-sides where the soil is very rocky. Their strong and penetrating root system finds its way to great depth down among the boulders, but there must be sufficient soil, having a fair amount of natural fertility, or it must be helped by consistent manuring, and the drainage must be good, as the olive will not stand "wet feet" any more than will the orange. An ideal soil would be a deep, well-drained, fairly rich, sandy loam containing a good percentage of lime, potash, and phosphoric oxide. Planting olives on heavy, ill-drained clay soil is not recommended.

(To be Continued).

Gabe: What is a bore?
Steve: A man who doesn't talk to us about ourselves.

Spraying.

The material must be of the proper strength. If it is too strong the tree will be damaged; if it is too weak the work will not be accomplished.

The work must be done thoroughly. If one limb or a few twigs of the tree are left untreated they spread infection to the treated parts a little later and a large share of the expense and labor of spraying is lost.

— Thinning. —

When thinning was first advocated it caused many to smile and a few to laugh, but now it is admitted that the labor of thinning is more than balanced by :—

(1) Labor saved at picking time.

(2) Labor saved in grading and packing.

(3) More uniform grade of fruit, and

(4) Higher percentage of Number Ones. Also it brings the tree to more regular yearly yields.

White Ants.

It is said that a good way to prevent these pests attacking flooring boards and other permanent wood work, is by saturating the wood with arsenic in solution, 1 lb. arsenic, 1 lb soda dissolved by boiling in 1 gallon of water. Use one part with 18 parts of hot water, and saturate the joints and paint on the underside, ends and edges of the flooring boards before putting them down. Have the boards quite dry, and the solution hot, and apply freely. It is also stated that giving the joints and underside and edges of the boards a coating of lime wash is a sure preventative.

Cherries.

Some useful information bearing upon cherry culture in the hills has been given by Mr. Hawke, of Uraidla, who stated that, unlike apples and pears, cherries would not do well in places other than the hills, and therefore he thought growers need have no apprehension regarding future markets for this fruit. They should plant more cherries, though it was never wise to put all one's eggs in one basket. Land for cherry-growing should be broken to a depth of not less than 18in., either by subsoiling with a plough or by grubbing. If the soil was not so broken the trees would commence to die back in a few years. Fifty trees properly planted would yield more cherries when, say, ten years old than would 100 trees put in under less favorable conditions. His advice was to plant some of each of the very best varieties. Some early sorts, and others to come on during the remainder of the season. The following selection would be found to be a good one:—Purple Guigne, Twyford, Early Lyon then, Knight's Black and Tartarian, followed by Biggareau Napoleon, Waterloo, Margaret, and Up-to-Date. These would supply fruit from the beginning to the end of the season. Other varieties had certain merits, but it was a pity that some, such as Droopers, were grown at all, as they only served to keep the price low. It would be noticed that the selection named included about equal numbers of dark and light varieties. When selling it was easy to obtain orders for about half of each, but if the grower had only the light cherries he would frequently experience difficulty in disposing of them. Buyers took the light fruit where they could get the dark. He would not advise anyone to plant only dark kinds as at some future time the taste of the public might call for the light varieties, and the boot would be on the other foot. The best stocks to work on were good seedlings. These grew larger trees, and would not be continually throwing up suckers, as the Kentish stocks did. On no account should trees be planted that were worked on Mohaleb stocks. He had about two dozen of these trees, 12 years old, and they were a failure. In a few years they would die out. The best way was to work on one's own trees, and have the satisfaction of knowing what one was planting. In regard to pruning, it was advisable to head the young trees, and for the first four or five years keep them well back, to encourage the formation of a good number of branches. These should be brought out as much as possible to produce a low tree. This class of tree would bear more fruit and it would be much easier to pick than would a high tree. After the first few years cherries did not require a great deal of pruning. Any that was necessary should be done in autumn or early winter. If left till the sap began to rise the trees were likely to gum. Manuring cherry trees, he said, was much neglected. It was essential to supply manure to the trees if good fruit was to be picked. Last year he had supplied 2 lb. of superphosphate, 1 lb. sulphate ammonia, and 1 lb. sulphate potash to each of certain trees as a test. The result was splendid fruit, both in size and color. Others manured with bonedust were good, but not equal to those mentioned. Those trees which had no manure produced very poor fruit indeed. Where trouble was ex-

perienced with shothole fungus in cherry trees he advised spraying with Bordeaux mixture just before they commenced to bloom. This would be found an effective preventitive.
—"Advertiser."

Preparing Orchard Land.

In preparing land for planting out—and this should be commenced right away, so as to allow the soil to sweeten—it should be subsoiled, so as to produce good results in after years. Subsoiling will add to the age and vigour of the trees, it will materially increase the crop, and it will considerably lessen the expense of fertilizers. Reference has previously been made in these notes to the success attained from growing fruit trees in subsoiled land; but the fact may be again pointed out that many growers are to-day reaping the benefit of increased crops without artificial feeding, where the soil was subsoiled before planting. Draining is another most important factor in successful fruit culture; but while, perhaps, drainage may be delayed for a few years, if the other initial expenses are extensive, it must again be emphasized that proper subsoiling cannot be carried out after the trees are planted.—Exchange.

Fruit Packing.

"Packing," says "Better Fruit," "is the classification of fruit in the proper sizes by placing fruit of the same size solidly into boxes in such a manner as to insure uniformity of appearance, neatness and protection from bruising. The purpose of careful packing is to make the box of fruit as attractive as possible to the purchaser and obtain thereby for it the highest possible price."

Have we yet attained that ideal?

Notice again the requirements:—

(a) classification into proper sizes,

(b) packing solidly,

(c) uniformity of appearance,

(d) neatnes, and

(e) as attractive as possible to the purchaser.

The answer is in some cases, Yes. In most cases, No.

The Farm

Milk Records and their Advantages.

From South African Journal of Agriculture.

For some years past most countries in which dairying has been carried on to any great extent have been making great efforts to improve the milking qualities—both quantity and quality — of their cattle. Many experiments indicate that if a cow is suitably fed and kept in fair condition, then any improvement in the ration does not permanently improve the quality. In other words, you cannot increase the fat percentage in milk by feeding, although you can increase—to a certain extent—the quantity. It has been found that the only method of raising the quality of milk, and the most advantageous way of increasing the quantity, is by the systematic use of milk records. A milk record is understood as a record kept of the quantity and quality of milk given by each animal in the herd during each lactation period. If the subject is carefully studied, no doubt will remain as to its importance, and when the value of these records becomes fully recognized, every dairy farmer will see that they are kept as a part of the general routine in the management of his herd. It is difficult to ascertain just when the use of milk records was discovered, but within recent years great strides have been made in Denmark, Canada, America, Australia, and New Zealand. Perhaps the greatest increase in the last ten years has taken place in the south and south-west of Scotland, where the number of cows undergoing the milk record test has risen in the last four years from 8,132 in 193 herds to 18,000 made up of 435 herds. This in itself proves that farmers realize their importance and value.

With properly kept milk records to refer to, the farmer will be able to tell exactly what each cow is capable of producing in milk and butter in the year, and can weed out the unprofitable milkers, or "boarders" as they are termed, as opportunity occurs.

— Unreliable Judgments. —

It is a common belief among farmers that the man who does the milking knows the best cows in the herd as well as the poorest; but numerous experiments have demonstrated clearly that this belief is unwarranted. Many factors show that this judgment is wrong. The cow which gives a generous flow of milk during the first few weeks of her period of lactation is usually regarded as the best. She may soon go down in her flow of milk, and perhaps goes dry for four or five months of the year, but this is not observed, and only the memory of the large flow she gave when fresh lingers in the mind of the owner. Another cow may give only a fair flow of milk after she calves, and may not be regarded highly by her owner; but she may continue at the same rate of yield for a long period, and will in the end prove a great deal more valuable than the other cow. No milker can tell, without weighing the milk regularly, whether a cow gives 600 gallons or 500 gallons of milk in a year; still, the difference may prove the difference between profit and loss on that particular cow. When the milk is valued according to its butter-fat content, unsupported estimates of the cow's performance are still more uncertain.

It requires frequent testing to ascertain the average percentage of fat in the milk of a cow's yield; the fat percentage as a rule varies from milking to milking, and from day to day. There may also be a great variation in the richness of the milk yielded by a cow when she is fresh as compared with a time later in the period of lactation. Also different cows consume different amounts of food, and it is impossible for the feeder to estimate accurately the difference in cost of feeding the various cows for a year, unless records of the food are kept systematically. If at any time the dairy herd has to be disposed of, the value of milk records will then become manifest. By being able to produce evidence that the herd has been systematically built up on sound lines, a much higher price can be obtained for their produce; while the bulls bred also command higher prices when evidence is forthcoming as to the milking properties of the dam. Unfortunately cows possessing the best outward appearance and showyard merit are very often the least profitable.

— Not Understood. —

Some farmers are of opinion that the keeping of milk records is more of a competition between different herds and individual cows but this is not so. What is wanted is not a record milk yield, but a record of the milk yield, for a succession of years. It is impracticable to keep milk records where calves are allowed to run with their mothers, and as soon as this undesirable practice is done away with in dairy herds the better it will be for the dairy farmer. Only the heifers bred from cows possessin good milk records should ultimately be introduced into the herd. If this be done constantly for a number of years the herd will reach an appreçiably higher standard of milk production. Apart from the benefits of breeding from milk-record cows, it is equally important to use a milk-record bull and to know that he is descended from a heavy milk strain.

Too often the big, fat, bony cow is pointed out as being a "grand cow from which to breed a bull." This, in spite of the fact that the person making the assertion knows that the animal is no milker whatever, but simply because it is a "very big animal," and a bull calf from it would be "just the thing." One should not forget that "like tends to beget like."

Another advantage of the record sheet is that it is a good index of the health of the cows from day to day. By this means cases of illness can be detected in their early stages, and prompt measures to deal with them. Further, it acts as a check on irregularity or carelessness in the feeding of cows. As a check on carelessness in milking alone, it is worth more than all the trouble involved.

There are one or two different methods of keeping milk records. In some cases it is the custom to weigh the milk every morning and evening, but in others it is weighed only once a week, once in two weeks, once in three weeks, or monthly, and sometimes, in America, once in every six months, and the aggregate in all but the first case is arrived at on the law of averages.

Naturally the daily weighings are the most correct, and as an example of this I give the result of an experiment recently carried out in England to determine the difference between the various ways of taking the recorvs. Twenty-eight cows were tested, and taking the aggregate—by daily weighings —it amounted to 21,339.4 gallons; by weekly, to 21,329.9 gallons; by fortnightly, to 21,143.8 gallons; and by tri-weekly to 20.803 gallons. From this one can see that the test carried out at different periods is not as reliable as when carried out daily.

It is possible for the farmer, by weighing, to ascertain the amount of milk that each cow in the herd produces, and ever since the invention of the Babcock test, or the Gerber test, he has had an easy means of knowing the fat content of the individual cow's milk. Very few farmers, however, take advantage of this opportunity ; not because it would not pay them to do so, but largely because the testing and totalling up at the end of the lactation period is tedious work, and requires care and regularity to make it correct. To be successful, a system for obtaining these data must be independent of other work on the farm.

With the daily method of testing, samples of milk will have to be taken at least once a fortnight and tested by either a Babcock or Gerber milk tester, to determine the percentage of fat present in the milk. The fortnightly test is the most frequently carried out, the evening and morning's milk being weighed once a fortnight and a sample taken to determine, the fat percentage, and the total calculated from this.

An example of this would be :—

Number of Cow.................. Date of calving...................

Date.	Milk. Even.	Milk. Morn.	Per Day.	Days.	Total	Fat per-centage.	Fat.	Remarks.
1st Jan.	10	15	25	14	350	3.4	11.9	
15th ,,	10	12	22	*14	308	3.0	9.2	

* 14 is the number of days since the last test was taken.

At the end of the lactation period the yield of milk is totalled up, also the number of pounds of fat, and from the two the average percentage of butter-fat for the year is also calculated.

A vast amount of information is placed before every farmer who keeps a milk record, if he knows how to use it. By persevering with his herd in this way it will gradually attain a higher standard of milk production without any additional expense in labour and food consumption.

It can be seen from the foregoing that a certain amount of labour is entailed in the keeping of milk records by the farmer, and to simplify matters, milk record associations have to a great extent taken the place of the periodical test as carried out by the farmer himself. The chief aim of a milk record association, or cow-testing association, as they are sometimes called, is to obtain records of the yearly production of milk and butter from each individual cow in the herds of the members, and with these data as a basis, by selection of the best producing cows for breeding purposes, to develop a strain of cows which would produce a large quantity of milk rich in butter fat.

The usual way of organizing an association is first to ascertain the extent of the interest in dairying in a community, and to call a meeting and explain the merits of the milk record association as an institution. If sufficient interest is exhibited to warrant going on with the work, the district is canvassed in search of farmers who wish to become members of the association. When enough have been secured, a second meeting is called, at which the organization is perfected, officers elected, and rules drawn up.

In order to support the milk record association it is necessary to have at least twelve members enrolled. This number would allow for the fourteen-day test being carried out. If the herds are conveniently located, eighteen members could be enrolled, and in this case the twenty-one day test carried out.

The method of operation is :—

The recorder arrives at the farm in the afternoon, weighs and samples the milk at the evening's milking, and the same at the morning's milking. The mixed sample of the two milkings of each cow is then tested for butter-fat, and the result, along with the weights of milk, entered in a book which the recorder carries with him—one copy of which is given to the farmer himself for future reference. When this has been accomplished the recorder packs up his outfit and goes on to the next farm, to be there in time for the evening's milking. The mode of conveyance from one farm to another may be accomplished in either two ways, arrived at between the members of the association, namely :—

The recorder is proved with a horse and trap, by which he travels between the farms, or each farmer is responsible for his delivery at the next farm after he has completed his testings.

The testing outfit carried by the recorder consists of a twelve-bottle Gerber tester and all necessary appliances, such as glassware, alcohol, acid, etc., along with a special spring balance and bucket for weighing the milk.

The milking at all the farms should be done at the usual time, in order that the average yield may be obtained as accurately as possible. The recorder has much to do with the successful working of an association. He should have had a special training for the work. Punctuality, regularity, and accuracy are necessary and of great importance, for unless he has these qualities the records may not be a true indication of the value of the respective cows. The recorder should also have the ability to advise farmers as regards the feeding of the cows, calves, etc. A milk record association depends largely for its success upon the reliability of the recorder, and also to a great extent on the members themselves. They should be willing to benefit by the lessons which the milk records teach, put into effect such changes in feed, etc., as the records show will be profitable.—J. B. Fisher in South African Agricultural Journal.

Crossing.

A rather striking result of crossing was recently recorded in the Live Stock Journal by a breeder who crossed his Jersey cows with an Angus bull. The 'first cross Jersey-Angus, he says, is a very fine cow without horns, very like an Angus, with a Jersey head and eyes, and an excellent milker. He bred her to a Jersey bull; her heifer calf was of a lighter colour—almost blue-black ; not so massive a cow, but an excellent milker giving very rich milk. He crossed her heifer calf again with a Jersey bull, and he bred the cow he was anxious to get—a dark, almost black, Jersey, with beautiful Jersey head and horns, rich milk, an excellent milker, and a very handsome animal, much more robust than a true Jersey, still retaining all the good qualities of the Jersey. Her breeder intends to continue breeding her with a Jersey bull. He adds : " The distant cross of the Angus is all I want to make the Jersey cow live and do well on any pasture. This last cow of mine has not been housed all the winter, and is in fine condition."

The Farmer and the Increased cost of Food.

Much attention has been given during the past two or three years to the matter of increased cost of living. Inasmuch as the farmer produces most of the food-stuffs used in the home he is given the credit, or rather the blame, for raising the cost of the family dinner. Let us look for a little at this much-discussed topic and find out, if we can, if the blame should be laid on the shoulders of the farmer, writes the Journal of Agriculture and Horticulture.

Before the days of centralized industrialism the towns and cities were almost wholly supplied with food-stuffs from their immediate surroundings, and the cost of transportation was practically nil. The number of persons who lived on the land and tilled it was, in comparison with those who lived in towns, proportionately large.

Moreover, in those days it was considered the fit and proper thing for workers on land to be content with small returns for their labors. Their superiors had taught them this lesson so well that both parties believed it to be of divine origin. Now and again lapses occurred when the poor working man so far forgot himself as to demand an improvement in his condition. Away back seven hundred years we hear of a peasant rebellion when the cry was:

"When Adam delved and Eve span
Who was then a gentleman?"

In France, too, this persistent demand for redress of grievances culminated in the Revolution when the cry was "Liberty, Equality and Fraternity."

Under modern industrialism, however, with crowded towns and cities and fewer workers on the land conditions have changed greatly. The surrounding country no longer supplies the city with most of its food materials. Great steamship and railway lines bring supplies from distant countries where large tracts of land have been brought under cultivation. For many years these new areas produced crops sufficient for the needs of the growing cities at a low price, so that the cost of food remained practically stationary and no pinch was felt by the working man. But we all know that these great crops from the new regions were the result of soil-mining and not the product of intelligent farming. The crops were sold at a price below the normal cost of production. When the land showed signs of impoverishment and the farmers adopted rational methods of cultivation, involving the maintenance of soil fertility, the price of wheat rose. It is unlikely that the price of wheat will ever again fall to that in the 70's and 80's when the new lands of America were exploited. No matter what the cost of transportation may be the farmer of to-day will demand a price that covers the cost of production and a little over.

While this is true of wheat it is equally true of other food-products such as vegetables, poultry, eggs, butter, cheese, beef, mutton and pork. For too long have the farmers sold these products at too low a price, often far below the actual cost of production. Farmers are now becoming book-keepers and are keeping account of every item of the cost of production. They are taking into account the value of their own time and that of their help, the rent of the land, the value of feeds and manures, etc. They are no longer content to work for a mere pittance or merely for their health's sake. They are demanding a fair profit on all they produce. The days of peasantry are past.

If, then, the consumer finds that the prices of provisions have gone up in recent years he should not harbor hard thoughts against the hard-working producer who is getting no more than that to which he is entitled. Rather let him examine into other causes of the great increase in cost, which are not hard to detect.

Wild Oats.

A correspondent, writing to "The Leader" on the eradication of wild oats, says, just as soon as the crop is harvested, and before the surface soil gets baked, we stir deeply with the scarifier, and at intervals again scarify, till the ground is stirred to a depth of about three inches, so as to give the wild oats a chance to germinate, and when sufficient growth has taken place feed off with stock. Repeat the operation, and the surface to a depth of three inches will be clear of wild oats, but underneath that depth they will be the same as when last ploughed down, and they will retain their vitality for any number of years till again brought to the surface.

Therefore, after the surface has been eaten off, plough the land to the depth it has been formerly ploughed, thus bringing up all the buried wild oats to the surface. Then, with occasional scarifying and seasonable rains, those oats that were buried, but now brought to light and encouraged to grow, can be fed off, and the land, if not perfectly clean, will be safe to crop with wheat for several years. The reason many fail to eradicate the pest is that they spell the land, feed off all wild oats, get the surface perfectly clean, but neglect to plough up the oats that are four or six inches under the surface. They are under the impression that they will rot or die, but this impression is an erroneous one.

Destroying Stumps with Acids.

There seems to have been some diversity of opinion as to whether dry and green stumps could be destroyed with acids, and with a view to determining the efficacy of this treatment, the Department of Agriculture of N. S. Wales, decided to experiment in this direction.

These experiments were carried out according to the following design, and included both dry and green stumps :—

1. Dry—1 pint sulphuric acid.
2. Dry—1 pint nitric acid.
3. Green—½ pint nitric acid, ½ pint sulphuric acid.
4. Dry—¼ pint nitric acid, ¾ pint sulphuric acid.
5. Green—¾ pint nitric acid, ¼ pint sulphuric acid.
6. Dry—¾ pint sulphuric acid, ¼ pint nitric acid.
7. Dry—1 pint nitric acid, 1 pint sulphuric acid.

The stumps treated were of the spotted gum, box, and ironbark variety, and were from 18 inches to 2 feet 6 inches in diameter.

Holes were bored with a 2-inch auger in the stumps about 18 inches from the earth-line at an angle of 45 degrees to a depth of 18 inches. Each stump was then dosed according to the design; the holes were then immediately plugged with green plugs.

Periodical notes were taken as to the action of the acids, and as six months have now elapsed, a sufficient time has been given to prove the experiment a success or otherwise.

It must be understood that the whole of these stumps were perfectly sound and solid, also that two out of the three varieties, viz., box and ironbark, are extremely hard wood, and if the acid would eat through these stumps then the majority of other timbers would be easy victims.

The final examination showed that, in the case of the dry stumps in every instance the action of the acids had no appreciable effect, and beyond a very slightly crumbling of the wood—in extent about 1 inch—in the immediate vicinity of the hole no other effect was noticeable.

As regards the green stumps, in both instances the effect seemed to be slightly better, the wood in the immediate vicinity of the holes had rotted to a depth of about 2½ inches, but beyond that sound wood was found; in addition both stumps had thrown out vigorous suckers.

The above result clearly proves that sound stumps cannot be destroyed with either sulphuric or nitric acid or both, and these two acids are of the strongest known.

The experiment has an additional value, inasmuch as it has provided the actual cost per stump as against other methods.

The average cost per stump worked out at 1/9, which includes cost of acids and labour paid at the rate of 7/ per pay; and it is an open question whether men could be found to work with two such dangerous acids at that figure.

In the event of the success of the acids, the great drawback to clearing land by this method would be the vast amount of valuable time wasted in waiting for the stumps to rot away, irrespective of the danger of handling the acids, and when time is taken into consideration—and in every instance time is money—cheaper and quicker methods may be adopted.

Mr. C. W. Brown (Jilliby), in the Gosford Times, recounts his experience in connection with the use of sulphuric and nitric acids for destroying stumps :—

I thought I would have a try myself, as I have some heart-breaking stumps here, and as I take out everything in front of me, regardless of size, I thought that the acids would prove a great labour saver. Having purchased 4 gallons of sulphuric and nitric acids (2 gallons each), I started operations on a green grey-gum stump 4 feet high, and diameter 4 feet 6 inches. In that stump I bored three holes with a 2-inch auger, going the full depth of the auger, and in those holes I poured equal quantities of the acids, then plugged up with a green spotted gum plug, having previously put same in paraffin, which I had melted, and then also poured some of the paraffin over the plug to make certain that it was air-tight. I next tried a dead blackbutt stump, 10 feet high and 4 feet 9 inches across it on the top, the giant at the butt being 24 feet 2 inches. I bored four holes with the 2-inch auger, going its full depth, and repeated the same process as I did with the grey-gum stump. After waiting patiently for six weeks, I knocked out the plugs and refilled up again both stumps. From the time of refilling to the present day is five and a half weeks, or in all eleven and a half weeks, using in all 2¼ gallons of acids on the two stumps, and the only difference in them is what I pulled out with the auger. Having given the acids a first-class trial, I have to turn round again and use what I have been using for the last five and a half years, gelignite, and it will be a hard job to find its superior. I find throughout the State that farmers in several districts have started clearing by this method, and in every instance it has been discarded in favour of more reliable and quicker methods.

Unmotherly Ewes.

When other things fail with the ewe which persists in disowning her own progeny try the dog, says The Farmers' Advocate. All dogs are not safe for this work, but if the dog is accustomed to driving or being around the sheep, and they are accustomed to him, he will not be likely to injure them. Of course, the attendant must watch proceedings, as it would be folly to ruin a good sheep or a good dog. Place the ewe and her lamb or lambs in a box-stall by themselves and take the dog in. Usually the ewe will object to the dog's presence, and will seek to shield the lambs. If so, this is all that is necessary. If she does not, set the dog on her gently. Do not allow or encourage him to bite her, and generally she will own the lambs immediately, and will seek to expel the dog from the stall. This is not an infallible cure, but where other means fail is well worth trying. It requires care, but when it works is a quick and efficient remedy. In milder cases, especially with young ewes, very often all that is necessary is to place the ewe and her charge in a pen by themselves until she becomes acquainted with and interested in her offspring, and the trouble ceases.—Elder's Review.

In 1875 an attempt was made to introduce the Humble Bee as a medium for fertilizing red clover in New Zealand. The first attempt failed, but another, made in 1884, proved more successful. These were followed by other consignments, with the result that clover seed was added to the products of the country, bringing many thousands of pounds annually into the farmers' pockets.

Ths Economic Value of our Birds.

By Professor F. Erasmus Wilson, R.A.O.U.

It is a well-known fact that Australia loses hundreds of thousands of pounds annually owing to the ravages of insect pests. These creatures attack our orchards, our cornfields, our forest reserves, and our pastoral areas, and for twenty-four hours out of every day are waging a deadly warfare against us. A competent judge calculated that the yearly loss to the United States, owing to damage caused by insects, amounted to £160,000,000 sterling.

In our papers we read of enormous plagues of locusts, of hordes of "take all" grubs devastating our grazing lands, of apple crops being ruined by the codlin moth, of valuable stock being killed by bot flies, and of the many other misfortunes that assail our primary producers, and are caused by insects pests.

Every year thousands of pounds are expended throughout the Commonwealth in buying costly machinery for spraying, etc., and vast quantities of poison are spread in an often futile attempt to keep in check this growing menace. Deadly maladies are carried about by the myriads of mosquitoes and flies that abound everywhere, while in some localities life is made almost unbearable owing to their presence.

Now Australia is extremely fortunate in that the majority of its birds live almost entirely upon an insect diet.

An insectivorous bird is by far the best weapon in creation with which to assail the insect world, both on account of the enormous quantity that it can despatch and also from the fact that it requires no payment for services rendered. All it asks for is the right of existence, and yet in a thoughtless and foolhardy manner we kill our birds which in reality are worth their weight in gold.

Mr. D. Le Souef, the well-known Director of the Melbourne Zoological gardens, some years ago visited an enormous rookery of the straw-necked ibis in the Riverina, and in an article published in the "Victorian Naturalist" he tells us that the birds in this rookery would, at a conservative estimate, number at least 240,000.

— Fair Gluttons. —

He procured a few specimens, and found that the stomach of each contained about 2,000 immature grasshoppers. A simple calculation will show that this vast flock would account for 480,000,000 grasshoppers per diem. Yet, in face of this, people visit the breeding haunts of the birds and collect their eggs by the cart load. One party last year, having gathered more than it required, drove away and left about 4,800 eggs to rot on the banks of the swamps. In Egypt in olden days the ibis was held to be sacred and was not molested in any way, and it is regrettable that it should not be so at the present time, as surely no bird is more worthy of veneration.

— Tiny Friends. —

The little tomtits and wrens that are so busy in your garden, searching almost everywhere amongst the plants, consume at least their own weight of insects every day, yet we permit our children to destroy them with their shanghais, and our would-be sportmen fire charges from a 12-bore shotgun at them.

The black and white fantail or willie wagtail, as it is perhaps more commonly known, is an exceptionally useful bird, and, being of a confiding nature, performs good deeds even at your very doorstep, capturing hosts of flies and mosquitoes, and from time to time enlivening you with dulcet notes, "Sweet pretty creature." A near relation, the white.shafted fantail, is another bird adept in the art of catching flying insects, and, although so small of stature, is a monument of usefulness.

Then, again, take our cuckoos, of which there are six kinds in Victoria, and consider the items of their menu. They are practically the only birds known to take and devour the familiar hairy caterpillars, and are, therefore, our only means of natural defence against these pests; also, they are very fond of the vine moth caterpillars; and a naturalist has removed from the stomach of a pallid cuckoo eighteen of these, each of which was about 2¼in. in length.

— The Sting of the Bull Ant. —

One of the best known and perhaps most beneficial of our birds is the harmonious shrike thrush, that silvery.throated songster that we all love to hear. Apart from its ordinary insect-eating proclivities, it should commend itself especially to campers, as it includes in its bill of fare the dreaded bull-dog ant. Campers please note; and when next you "draw a bead" upon a harmonious shrike thrush, stay your hand and remember the sting of the bull-dog ant.

Another well-known friend is that dainty little sprite, the welcome swallow, who so trustfully constructs its plastered nest beneath the verandahs. What a potent engine of destruction is this mite. From morning till night it may be seen busily skimming hither and thither, gathering in the harvest of noxious flying insects, especially mosquitoes.

Out in the fields, ground larks, chats, robins, plovers, magpies, and others too numerous to mention, are working hard in our interests, yet every day many are ruthlessly destroyed.

In the more thickly-wooded country we find tree-creepers and sitellas eagerly searching the bark of trees for insect foes that are lurking there. Lower down at the foot of the trees are scrub wrens, shrike robins and others also performing their quota of the work. Higher up, amongst the tree tops, are pardalotes, shrike tits, whistlers, cuckoos, etc., all eagerly bent on devastating the ranks of the enemy.

— Laughing Jacks. —

Near the edge of the wood our old friend the laughing jackass is busy devouring a fat juicy grub which later would have developed into a destructive beetle. Occasionally, when luck favours him, a meal is made of some dreaded reptile, and campers may have the pleasure of seeing a black snake being demolished by our jolly companion.

Near the pond gracefully walks the mudlark, which, besides destroying numerous insects, has a "sweet tooth" for the water snail which is known to be the intermediate host of the liver fluke, always a menace to our sheep industry.

In an orchard near by a flock of blabbers is usually hard at work in search of the codlin moth, which the birds consider to be a toothsome morsel. A little brown flycatcher sits upon the wire fence, from time to time darting into the air to capture some passing fly or moth, and lucky indeed is the insect that escapes it.

Suddenly a kestrel swoops into the field, and a farmer friend seeing that it is a hawk immediately shoots it. An examination of its stomach, however, reveals the fact that it is a valuable insectivorous bird.

— Eagles. —

A big nest placed high up in a large gum tree next attracts attention, and proves to be the home of a pair of wedge-tailed eagles (eaglehawks). A visit to this is well repaid, for underneath it is found a great heap of bones and pelts of rabbits. The noble old wedge-tailed eagle, the largest of its kind in the world, repays twenty-fold for any small amount of damage that it may occasionally do in partaking of a stray lamb at times—in fact, there are very few authenticated instances indeed of this bird killing lambs. Some western district squatters will not allow eagles to be killed upon their estates under any consideration, as they deem them to be their best natural protection against the rabbit.

Even at night time the birds are still working, as it is then that the owls, frogmouths, and nightjars sally forth. Till the break of day these birds will be busily employed in capturing those insects that are nocturnal in their habits. From the stomach of an owl have been taken four large caterpillars, two spiders, three cockchafer beetles, three large moths, and a quantity of other insect remains too much digested to be recognised.

The numerous honey-eating birds destroy quantities of insects at different seasons of the year, and feed the young entirely upon them, yet at present we afford them protection only during the breeding season.

It will thus be seen that all over the Commonwealth there is a vast army of birds working in our best interests, and demanding as payment only the right of existence. It behoves every Australian who has the welfare of his country at heart to do all in his power to afford protection to our native birds.

Wheat Silos.

A Wimmera wheat farmer writes to The Leader as follows:—It occurs to me that the farmers will have to do something that will bring immediate relief in the meantime, particularly from the evil of what is called "free storage." Under this system the growers are invited to bring their wheat into the mills, to be held free of storage charges, until such time as the growers choose to sell. Then the wheat is at once poured into the mill silo, along with other free storage consignmencs, and the emptied bags put away by the millers for sale, as their perquisite, with the added advantage that they begin at once to grind the wheat into flour, without having to purchase until some future date, when the farmer desires to sell. When that times comes the millers pay for the wheat which they have already used, and which has enabled them to keep prices down, by not requiring to go on the market. This illusory system is only "free" in that it gives a licence to the buyers to make free with the sellers' produce, very much in their own, and very much against, the farmers' interests.

The same system is carried out by the buyers for export. Here we have so called free storage in the form of immense wheat stacks at the railway stations, exposed to the weather, the depredations of vermin, leaky bags, and all the many sources of waste with which we are familiar. All this wheat is being used in a way that is grievously opposed to the growers' interests. If this wheat were off the market, the present operators, in order to get it, would have to buy it, and charge capital account with a very large sum of money every year to be paid to the bank in interest. Instead of this, the growers, under the delusive inducements of free storage, not only hand this sum over as a present to the buyers, but, worst of all, arm them in addition with a weapon to be used in hammering down the price in the market. The first thing the producers require to consider is to obtain control of their own wheat.

What I would suggest is farmers should own wheat silos at the railway stations pending the settlement of the bulk-handling question. Silo storing would provide a way to the handling of their own grain by the producers at once. Any grower can start anywhere. What is to prevent a grower from erecting his own silo at his own railway station, running the wheat into his silo by pneumatic elevator, loose, and taking the empty bags back to the farm for the next load? Not the least of the advantages of this expedient would be keeping off the bag market at the time when bags are forced up to a high price, because all the farmers are in the market for bags at the same time. Silo wheat need not be bagged till the fall in the bag market, which always takes place after harvest. A railway station receipt for the wheat in the silo would be found sufficient at the local bank for the moderate advances sometimes required after harvest, pending the time of selling. Thus secured in a silo, the wheat is ready when required to run down again into the bags ready for trucking, with the immense advantage that all the time it has been under the farmers' control, instead of being under the control of others who use it for bearing down the prices in the market.

The Choice of Manures.

The principles which guide the practical man in his choice of manures and fertilizers are simple and well known. In the first place the growing plant requires large quantities of water, if only to repair the inevitable and continuous loss of water vapour from the leaves. The plant itself contains an extraordinarily large percentage of water, and all the chemical operations which take place in it depend for their fulfilment on a larger or small quantity of water in the tissues of the plant. Hence if he is to obtain larger crops the gardener must see to it that an adequate supply of water is available to the plant. It is not enough for him—even where it is practicable—to add water: he must build up a soil of such constitution that it will both hold water and part with it readily to the plant. Since decaying organic matter, farmyard manure, imparts this property to the soil, this class of substance is looked upon as an ideal manure.

In the second place, the practice of manuring depends on the well-established fact that certain mineral substances, and particularly nitrogen compounds, potash and phosphoric acid, are essential plant foods. Hence the art of manuring consists in the amelioration of the water conditions of the soil and in supplying sufficiencies in what may be called the feeding capacity of the soil. There is, however, a third principle, which is no less important, but which is apt to be overlooked. That principle is an economic one. The gardener must secure the conditions which we have indicated at the minimum of cost.

By the addition of sufficient large quantities an adequate amount of essential food may be provided; but since dung contains relatively small quantities of such an essential as phosphoric acid it is evident that a more economical method of manuring consists in adding, together with a smaller amount of dung, some phosphatic fertilizer.

— Toxic Properties. —

In recent years these old-established principles have been challenged, and we have been asked to revise the articles which constitute this philosophy of manuring.

The new philosophy, which has been used by Messrs. Whitney and Cameron, of the Bureau of soils, hold that all soils contain large stores of the essential foods, phosphates and potash, that the water in the soil—the soil solution—contains enough of these substances for the purpose of plant growth, and that one soil is not more fertile than another because it is richer in such mineral substances as potash or phosphates, but primarily because it is in better case to supply the crop with all the water which it requires. A second cause of the inferior fertility of certain soils is found by Messrs. Whitney and Cameron to lie in the existence therein of toxic substances produced by the roots of previous crops, and left in the soil to the detriment of the growth of the plants which succeed these crops.

* U.S. Department of Agricultur?.

In order to meet the objection that artificial potash and phosphatic manures are known to increase soil fertility these investigators urge that the fertilizers act, not by supplying food to the plant, but by putting the toxic soil-substances out of action.

— Later Views. —

From the point of view of immediate practice the newer hypothesis is not important; but from that of the ultimate practice of manuring no less than from the point of view of scientific horticulture it is of very great importance indeed. Hence the investigations carried out by Mr. A. D. Hall and his colleagues at Rothamsted, and published recently by the Royal Society, are particularly opportune.

The net result of these investigations is to vindicate the older view, and to show that the revolutionary toxic hypothesis is without foundation. The conclusions reached by Mr. Hall, which are of gregtest interest, are, first, that the Rothamsted plots, which are to-day producing poor crops owing to the fact that essential foods —now potash, now phosphoric acid —have been withheld during the past 60 years, yield good crops when their particular deficiencies are made good. Thus a phosphorus-starved soil gives a normal good crop when phosphatic manures are added to it and similarly a potash starved soil recovers its fertility when its defect of potash is made good.

Second, although the soil of such plots has carried continuously for the past 60 years crops of one kind only—wheat in some cases, barley in others—water extracts from the soil are found to have no toxic action whatever on the roots of similar or different plants.

Hence the toxic theory of soil-fertility may be dismissed, or at most regarded as of very limited applicability.

Third, the Whitney-Cameron hypothesis that all soils contain enough potash and phosphates for plant-feeding purposes is shown to be improbable. For Hall demonstrates that, as we might expect on the old view, the feeding value of a soil-extract increases within the wide limits with its concentration. That is to say, a solution which contains more potash or phosphates produces bigger crops than one which contains less of the substances. Naturally, there is a limit to this law that concentration increases crop, and, as we all know, an excess of soluble fertilizer may result in no crop at all. The role, therefore, of the artificial fertilizer is to bring the "soil solution" up to the maximum beneficent concentration, and we may still hold the common sense view that fertilizers used as supplements to dung exert their beneficial effects by reason of the plentiful supplies of specific foods which they put at the disposal of the plant.—Gardeners' Chronicle.

Soil Treatment.

There is no simple way in which a soil can be tested for its content of the three most essential elements of fertility. It is possible, of course, to have the soil analysed and find out what its content of these plant foods is. But the trouble is that the chemist cannot differentiate between the available and unavailable forms of these elements. A chemical analysis of almost any reasonably good agricultural soil will reveal the presence of sufficient quantities of these plant foods to produce maximum crops for many years, and this fact has given rise to the theory which has been seriously held, even by scientists, that all that was needed to make a soil fertile for an indefinite period is to till it sufficiently well to assist nature in the unlocking of the inert plant food which it contai and reducing it to forms and com ıations that will be available for the use of growing plants. But the difficulty with the application of this theory is the fact that the mechanical condition of the soil is a most important factor in soil fertility as well of its actual content of plant food.

The soil must have an adequate supply of vegetable matter in the form of humus to grow good crops, and it is most important that the farmer recognize this fact, else the application of available plant food in the form of expensive fertilizers will not give him the results which he expects, to say nothing of releasing sufficient plant food by thorough tillage to grow maximum crops. An abundant supply of humus in the soil aids in the natural drainage of fine-grained soils, and holds the moisture in more open, coarse-grained soils, giving it up as needed for the fertility in the soils and also for the work of the beneficial soil bacteria which aid in making available the fertility stored in the soil in an unavailable form.

For these reasons, the most important thing for the average farmer to determine with regard to his soil is whether it is in a good mechanical condition, and if it is not to put it in that condition. Vegetable matter may be added to it in the form of stable manure, which will at the same time add available plant food for the growing of crops. As much manure should therefore be made as possible, and every ounce of this valuable agent in maintaining soil fertility should be carefully saved and applied to the soil as soon as practicable after it is made. But this will not supply the vegetable matter needed by the soil on able matter needed by the soil on the average farm, so green manure crops must be grown. The legumes are of course, best for this purpose, but even a non-leguminous crop will prove beneficial in the supplying of needed humus to a soil that has become so depleted in this necessary substance as to make the main crop a frequent failure.

Having secured a good mechanical condition of the soil the question of just what available plant foods it will pay to supply and in what quantities for the different crops grown can best be determined by putting the question directly to the soil itself, by trying out different forms of combinations and quantities of these plant foods on different parts of the field and comparing the results secured with a check plot or strip in the field on which no fertilizer was used. In the making of experiments of this kind, however, results should not be judged by general appearances alone, as the eye cannot measure the results with sufficient accuracy in many cases to determine whether the investment was a profitable one or not. There is yet a great deal to be learned about soil fertility, but in a general way we know that it pays to use supplementary fertilizers, and it remains for the individual farmer to make an individual solution of the problem so far as the details are concerned.—Michigan Farmer.

A certain millionaire did not approve of foreign missions. One Sunday at church, when the collection was being taken for these missions, the collection approached the millionaire and held out the collection bag.

The millionaire shook his head. "I never give to missions," he whispered.

"Then take something out of the bag, sir," whispered the collector. "The money is for the heathen."

Some Results in Fallowing Land.

By John W. Paterson, B.Sc., Ph. D., Experimentalist, and P. R. Scott, Chemist for Agriculture, Victoria.

The most pressing demands of an ordinary crop are for water, phosphates and nitrates. The importance of these arises from their comparative scarcity in the soil. The deficiency of phosphates is most easily made good by applying some phosphate manure along with the seed. The deficiency of water and nitrates can usually best be remedied by some system of fallowing the land.

— Fallowing and Soil Moisture. —

Table I gives the percentage of water in the top 18 inches of soil at each date of sampling. The results are calculated on the dry soil.

Table I.

	Worked Fallow. Per cent.	Neglected Fallow. Per cent.	Oat Crop Per cent.
Oct. 16	27.22	24.27	24.95
Nov. 28	19.62	15.95	16.25
Jan. 17	0.66	11.61	10.01
Feb.	21.67	12.38	10.06

In viewing the results the conditions regulating the loss of water on good fallow, bad fallow and on crop may be briefly recapitulated. Water rises in a moist soil somewhat rapidly by capillarity. In a good fallow, the upper layer of soil is kept loose and dry by cultivation, so that its capillary power is lost. This loose, dry layer protects the water within the capillary zone underneath from sun and wind. In a bad fallow, the surface is compact, and also damper, so that capillary action is continued right through to the top, which is unprotected from drying influences. A crop requires much water for its growth, which must come from the soil. Experiments bearing upon the water losses through plants were previously reported.

— The results by Weight. —

By weighing the earth from a measured hole, it was estimated that 1 acre of the soil to a depth of 18 inches equalled 2,270 tons in the dry condition. Employing this figure, the water percentages at the different dates may be converted into tons.

Table II.

	Worked Fallow Tons.	Neglected Fallow Tons.	Oat Crop Tons.
October 16	572	551	566
November 28	445	362	345
January 17	469	203	227
February 28	492	281	228

At the close of the experiments, the cropped soil contained 264 tons, and the neglected fallow 211 tons less of water per acre in the first 18 inches than the corresponding worked fallow. One ton of water to the acre equals almost exactly one point of rain.

— Relation of Fallowing to Nitrates. —

Leaving the effect of fallowing upon moisture, the nitrate contents of the plots next call for notice. Table III states the results obtained in lbs. per acre of nitrate nitrogen for each plot at the different dates of sampling. Depth, 18 inches.

Table III.

	Worked Fallow lbs.	Neglected Fallow lbs.	Oat Crop. lbs.
Oct. 16	14.04	17.58	trace
Nov. 28	43.20	44.36	3.31
Jan. 17	113.09	60.29	2[illegible].06
Feb. 28	148.91	58.63	3[illegible].9

Up to 16th October, the worked and the neglected fallow had received the same treatment, and the results show that the worked fallow had no original advantage. Nevertheless, at the end of February, the neglected fallow contained just 39 per cent. of the nitrate present in the worked plot. The latter was seen to be much moister during the latter half of the experiments, and the extra nitrates are probably due in large measure to this extra moisture encouraging nitrification. This is in accord with the results of experiments recently reported in this journal. Sufficient moisture will be of greatest benefit in aiding nitrification during the hot months of the year. In addition to the extra water present, the better aeration of the worked fallow would also encourage the production of nitrates.

— Nitrate Used by Crop. —

On the cropped plot the nitrate content was only a trace at the date of the first sampling. Comparing it with the fallow plots, this could not be due to lack of moisture, as at that date the moisture content of each plot was approximately identical. It appears that the nitrates of this plot had been absorbed to supply the wants of the growing crop. Apparently the crop in the early part of its growth was taking all the nitrates it could find. This fact indicates the importance of nitrates in the soil, and the probability that the supply often fails to meet the demand.

— Summary. —

1. A well-worked fallow prevents much loss of soil-moisture during dry weather.

2. A fallow may do little good if neglected.

3. A crop leaves the soil extremely dry in the autumn.

4. This lack of moisture must affect the succeeding crop unless the winter be exceptionally wet.

5. The Australian climate indicates in a special degree the need for fallowing.

6. Land growing a crop may contain only a trace of nitrates.

7. This deficiency may starve a crop.

8. Nitrate formation stops when the surface soil becomes too dry.

9. A growing crop dries up the surface soil.

10. It is desirable, therefore, that a crop should start with a ready formed nitrate supply in the soil and subsoil.

11. Such a nitrate supply will also favour a downward development of the roots.

12. A well-worked fallow meets the nitrate requirement of the succeeding crop.

13. Fallowing serves the double purpose of storing soil-moisture and supplying nitrates.

The amount of capital required to farm successfully with sheep is dependent upon several things: the district selected; the class of stock to be kept; and the ability of the farmer. It can, however, safely, be stated that a farmer who knows his business, with a moderate capital, will, in a suitable locality, obtain a good return for his money. If there is need for economy in the purchase of foundation stock, it is urged that it should be that true economy which is shown by the limited size of the flock rather than by a larger flock of low-priced animals.

The Corn Club Movement in America.

The following paper was read by Mr. F. C. Jackson at a recent meeting of the Calingford branch of the N.S.W. Agricultural Bureau:

It deals with a question which is of special interest to us, as showing the rapid development of a form of agricultural education which, though yet in its infancy in Australia, has great possibilities for the future. Western Australia has initiated a system of wheat growing for boys on very much the same lines, and so in lesser degree have some of the other States.

In 1909 agricultural education in America was greatly stimulated by the introduction of maize-growing competitions into the schools of the Southern States.

The objects of the movement were (1) to substitute modern methods of farming for obsolete ones, and (2) to stop the increasing exodus of rurals youths to cities, by making farming life pleasant, and demonstrating its enhanced profit under new conditions.

The following table shows the growth of the movement :—

Year.	No. of Members.
1909	10,543
1910	46,225
1911	56,840
1912	60,000

The system differs from the school gardens to which we are accustomed in Australia, chiefly in that each member of a corn club cultivates one acre of maize at home on his father's land or on rented ground, and keeps continuous records of his operations and expenditure, etc. At the end of the season his acre is inspected, and prizes are awarded on the following basis :—

	Maximum points.
(a) Greatest yield for acre	30
(b) Best exhibit of 10 ears	20
(c) Best written account, showing history of crop	20
(d) Best showing of profit on investment, based on the commercial price of corn	30
Total	100

The boy whose land and labour produce the greatest yield does not necessarily win a prize, as the cost of labour, fertilisers, etc., may have been so great as to make the farming unprofitable. Every boy in a corn club must exhibit at the local show; or if there be no show in his village or town, then a school show is held, which often proves the origin of an annual district show.

An essay must be submitted, describing the season's operations, since every boy should be able to express in good English the reasons for the various operations he performs, and he should be able to record his observations in a scientific manner and to discuss agriculture intelligently.

The competitor must furnish a financial statement of the season's operations. The market value of his crop represents his receipts, against which he has to charge £1 for rent of land (even if his father gives him the use of it free), 5d. for every hour he works, 2½d. for every hour he uses a horse, 4/2 for every load of manure (even if he gets it for nothing), and whatever commercial fertilisers he uses at market prices. Unless he can show that his method would pay in farming on a large scale, then he has little hope of obtaining a prize, no matter how high his yield may be.

No difficulty is experienced in America in obtaining valuable prizes from Chambers of Commerce, Boards of Trade, railroads, banks, and commercial men generally, who are only too anxious to increase the maize yield, knowing full well that by so doing they are stimulating commerce generally. The State Governors issue diplomas to all boys having a yield of at least 75 bushels to the acre, at a cost not exceeding 1/3 per bushel, and the first prize-winner of each State is sent, at the Government expense to Washington for one week, where he (in company with the champions of the other States), is the guest of the Federal Government. These boys are shown everything of interest in the Federal capital, especially that which pertains to agriculture.

Prizes to the value of £8,000 were awarded in 1910, and to the value of £10,000 in 1911.

These corn clubs are operated by various Government departments, which are correlated for the express purpose. The arrangements vary slightly in different States, but in all of them the Federal Department of Agriculture assists financially, allows its experts to give advice, and issues bulletins and circulars to every body in the movement, advising him how to treat his crop from time to time.

The best scheme I can find is that afforded by Virginia, where a board, created by legislation, correlates the College of Agriculture and Polytechnic Institute, the Agricultural Experiment Station, the Commissioner and State Board of Agriculture, and the Federal Department of Agriculture, for the management of these clubs.

The scheme is becoming very popular in America in the Southern (agricultural) States, and it is arousing great interest, as the boys are showing that the agricultural output of the State can be doubled by the adoption of modern methods. Many farmers who have stubbornly followed conservative methods have at last been converted to the new gospel of agriculture by seeing what their own boys can do on one acre.

The following statistics for 1912 show what is being accomplished by American boys :—

State.	Enrolment.	Number making final reports.	Average yield per acre on Boys' plots.	Yield on similar lands.	State Average for 1912.
			bus.	bus.	bus.
Alabama	10,000	600	57½	19¼	24.0
Arkansas	2,675	1,386	60¼	16½	17.2
Florida	1,200	364	47¾	21¼	20.4
Georgia	11,400	179	37¼	7¾	13.0
Louisiana ...	2,125	2,100	54½	13½	13.8
Mississippi ...	4,825	200	53½	19½	18.0
North Carolina ...	3,200	1,500	64¼	17¼	18.3
Oklahoma ...	6,200	635	60¾	19¼	18.2
South Carolina ...	2,200	325	46½	21¾	18.7
Tennessee ...	2,600	400	66½	17¾	17.9
Texas	10,375	731	88½	34¼	26.5
Virginia	2,256	289	36¾	23¼	21.0

How Horses are Spoiled.

There are a good many people who, either by reason of their bad or careless driving, succeed in spoiling a horse which came to them as free from vice or tricks as could be desired. A horse which by nature is not a shier can easily be transformed into something very like one by being unmercifully thrashed if he becomes startled at some unfamiliar sight. The next time he encounters anything of the kind he remembers his thrashing and associates the sight with suffering; then he shies again, and the punishment is repeated, with disastrous effects. The man who is careless about his harness, and who allows his horse to drive himself, will spoil any animal, and is as likely to end up by letting his horse down as not. But this observation must not be taken as suggesting that a driver should always be fidgeting and worrying his horse. His aim should be to get the animal to go right and to keep him at it; it is often the slovenly coachman who produces the ill-mannered horse. In frequent cases it is the driver's fault when a horse stumbles, but even when it is not so it is quite unnecessary to use the whip in nine cases out of ten. If the horse once begins to connect a stumble with a thrashing, he gets flurried when he puts a foot wrong, and is very likely to come down in consequence; but if he gets careless it is necessary to wake him up by a light stroke just to remind him that he must keep awake. Of course, the jagging at a horse's mouth is as certain a way to ruin the animal as anything can be; and it is very far removed from a good practice to shout at and rate a horse for no particular fault. A naturally timid animal is liable to lose its head on such occasions, whilst a bad-tempered one resents it; for horses are not fools, and are far more amenable to kindness combined with firmness than they are to ill-usage or violence of any kind. This being the case, it is unfortunate that their memories should be so good, for the recollection of chastisement has often transformed an ordinarily tempered horse to a perfect savage, and a good reliable worker into a useless brute. Of course horses can be spoiled in many other ways, but it is believed that the causes mentioned above are responsible for most of the losses incurred by owners through the deterioration of their animals.—Live Stock Journal.

Life in Soil.

The soil of a farm is not simply an inert mass of material containing certain mineral substances which plants utilise. It is full of living organisms. Besides the numerous insects, worms, etc., it contains myriads of low organisms, not visible to the naked eye but capable of examination by the aid of the microscope. They are known as bacteria or micro-organisms and are so minute that a grain of soil may contain many thousands, increasing and propagating under favourable conditions with incredible rapidity. They exist in soils chiefly in the upper layer. A pinch of soil may contain from several thousands to several millions; loamy soils and soils containing much organic matter contain most, sandy soils contain least. The number decreases gradually from the surface soil downwards till about 3 feet where few or none are present. Each different kind of bacterium performs its own useful purpose in nature, but in the interest of economical cultivation it would appear that the growth of some of them have to be encouraged and the development of others to be checked. The subject, however, is not at present clearly understood and has to be further investigated by scientific men; for us the practical knowledge is that organic matter, increasing the supply of humus to the soil, has been proved to favour the rapid growth of the kind of bacteria which convert organic ammonia into nitrates, suitable for assimilation by the crops. We have, therefore, to see that we keep up in the soil by application of farm-yard manure, the ploughing under of green crops, and other suitable means a sufficient supply of humus.—Mark Lane Express.

Potato Growing.

The necessity of working the land to conserve moisture and to keep down weeds whilst the crop is growing is appreciated by nearly every potato-farmer, and on the whole crops are fairly well looked after whilst they are growing. What is urgently needed is greater attention to the preparation of land before the crop is planted. Earlier ploughing is required, and systematic working of the fallow. In short, thorough fallowing should be practised invariably for the potato crops. Cultivators of the spring-tooth type for shallow surface working of the land should be largely used. It is impossible to overrate the benefit of such preparation. The subsoil is stored with moisture which promotes good sprouting of the seed and ensures a regular growth through even very dry spells.

Further, it renders active the agencies which increase the fertility of the soil.

The soil is sweetened, and the insoluble material is rendered available for plant use, and the soil is thus brought into better condition to support plant life.

Fertilisers are used only to a very limited extent, and yet the yield can be very largely increased by their use, especially when the soil is prepared to receive them by a system of fallowing. Fertilisers may fail to benefit the crop when the land has been roughly prepared and a dry season has ensued, but there is not the slightest doubt of their value to the good farmer. The yield may be increased by from 50 to 100 per cent. The profit accruing through the application of a few hundred pounds of fertiliser to a valuable crop, such as potatoes, is very evident. No farmer can afford when dealing with a crop such as potatoes, which costs so much for seed alone, to attempt to save a few shillings on manure.

Another matter which requires more attention is the selection of the seed. The present method leads to rapid deterioration. The practice is to save the small sound tubers. A small proportion of the seed picked up may, and indeed will produce strong, vigorous plants, but much of it gives only poor degenerated plants. Plants which have reverted or run out produce a large number of small tubers. These when planted produce the same class of plant. Such a plant may carry twenty such tubers. A good plant may carry half a dozen large table potatoes and only one or two small ones, which are suitable for seed. These small potatoes reproduce their kind faithfully, but it does not require much perception to see that when small potatoes are picked up indiscriminately for seed that very soon a great proportion of the seed will consist of run-out potatoes. Some expert growers follow the practice of going through their growing crops and pulling out any degenerated plants they detect. By this means they are able to eliminate the run-out plants to some extent, and a fairly vigorous strain is maintained.

It is with only some varieties, and then only by expert growers, that this system can be practised, as it is often very difficult to detect degenerated plants.—Agricultural Gazette of N.S.W.

Scab on Sheep.

To the Editor.

Can you tell me what is the cause of a scab trouble that affects sheep, more particularly weaners about the middle of summer. The scab affects the lips, both top and bottom, and in bad cases the nostrils almost close up with the scab, which renders breathing difficult; the trouble is frequently to be met with in the western districts of Victoria and nearly every sheep owner gives a different cause for it. Most owners say Scotch thistles is the cause. The trouble comes on quickly and the animal is unable to eat grass for some days, and consequently becomes very weak. The scab is black and becomes quite a quarter of an inch thick, as far back as the corner of the mouth. The trouble is not an annual occurrence.

The first attack I had in my sheep, I at once hit on a quick and simple remedy. I folded the sheep, caught all the affected ones and put their noses, right up to the corners of the mouth, into a vessel containing castor oil. The result was marvellous; in two days the scab fell off and a new red skin took its place. I can highly recommend this remedy to all your readers.

You may have the trouble in one paddock and not in the next. I am inclining to the opinion that the trouble is contagious. Would be glad to know if any of your readers can give the cause. I gladly give them this simple remedy. I am a subscriber of over 20 years. Yours, etc.,

Albert Schinckel.

Goroke, Victoria.

We are much obliged to our old friend. Perhaps, as Mr. Schinckel suggests, some of our readers may be able to reciprocate his kindness in making known a cure by helping to determine the cause. In a general way one would suppose it to be due to some bodily condition or perhaps one confined to the parts affected, peculiar to weaners. Possibly the thistle or other vegetable irritant is the culprit, on the other hand the fact that its appearance is intermittant would lead to the opinion that the cause is periodic in its visitation. One would like to know whether the trouble is common to all farms one year with the possibility of being absent from all farm the next, or is it always more or less present throughout a district. We rather gather the former to be the case. If there is any condition either of season, state of the natural grass, herbage, or sown crops which is common to all farms on which it appears it would probably be easy to determine the cause. On the facts as presented we should say that it is probably due to some plant irritant which is possibly of somewhat local occurrence, which is more marked in its effect under special conditions, such as an extra dry season or the reverse and which naturally shows its effect more readily on young animals. Thistles, burrs, etc., are said to be one of the causes of a certain amount of inflammation, usually known as sore mouth, possibly the case referred to is a form of this complaint aggravated by local conditions.

It is of the utmost importance that agriculture should have the means of recording its ascension or decline. We must not suppose, because it is an ancient art, and one that has been prosecuted in its simplest forms, it is therefore, otherwise than an art which, of all others, perhaps, affords the most varied scope and the largest sphere of development to the powers of the human mind; it is most essential that it should have the best and the most efficacious means of comparing its state in one year with its state in another; of recording for future encouragement the progress that has been achieved in the past.—W. E. Gladstone.

Poultry Notes

THE RULE AND THE NICK.

In the South Australian 1913 Poultry Report we find the question of heredity discussed as follows :—"As regards heredity in egg production, experience adds further proof to my original contention urged many years ago. Beyond all doubt, the capacity for high egg production can be fixed and is hereditary. That is to say, the character can be transmitted. Some writers believed that the character for laying depended upon the egg production of the mothers. I laid special stress upon the importance of the sire and eventually published my rule that in egg production, both fecundity and size of eggs are inherited as follows :—That the sire transmits these characters though his daughters, and the dam transmits her characters through her sons." Stripped of its usual humourously egotistical trimmings, "Hardshell," in a recent "Evening Journal," quotes the above and preaches from the same text, or perhaps it is only a case of great minds thinking alike. What our hardcased friend thinks and his reasons are always so interesting that we reprint the paragraph in full. To those who have not previously read it, the sermon will be helpful, and its re-reading will do no harm to those who have :—

— On Breeding. —

"That the capacity for high egg production can become fixed, and made hereditary, has been proved by breeders throughout the Australian States and New Zealand.

All the breeders who have become noted for big records in laying competitions owe their position to the fact that the bottom of their success has usually been one very fine layer, that was discovered by means of single testing, and, when found, was bred from.

In some instances the record layers have been pen bred (that is, they have come from a yard where there were several hens with the male bird) ; but, if you dig down a bit you will find that all of them were descended from a hen that put up big figures in a single pen. The big laying comes and goes, but it has been proved that the most successful men consistently breed from their best performers, which proves that the big laying habit may be fixed and become hereditary ; or, in other words, may be transmitted."

— The Right Way of it. —

"Now, how is it done ; how does it work out ? Well, you can't go wrong in proceeding on the lines that the sire transmits the laying character through his daughters, and the mother passes it on through her sons. Every experienced breeder knows that this is a fact.

This being so, it will be recognised as most important that the greatest care should be exercised when mating birds. The sire should come from a strain that has been noted for several generations for high egg production, and the hens should come from a strain where similar conditions have existed, and if there is some amount of blood relationship so much the better. As a matter of fact, if you produce big layers from an outcross—that is, from unrelated birds—it will be a fluke, because you should not get them this way. In breeding operations it is pedigree that tells, and if you produce pullets from parents that are related—and where the laying ability has been pronounced on both sides for several generations—you are fairly certain to maintain the egg-laying habit in the bulk of the progeny, for the reason that this fixed character is the same on both sides and the "nick" is in the mating—in other words, the breeding is in line."

— Words of Wisdom. —

When two such authorities—one the official head of the State poultry industry, the other a practically successful breeder and the most progressive and widely-read journalist on the subject of utility poultry in the Commonwealth — make so definite a statement, one which is so entirely admirable in its basic simplicity ; the ordinary individual is apt to take such words of wisdom for granted, or—look around for evidence. Undoubtedly they are words of wisdom—or the beginning of it. In passing and as the resurrection of long buried and forgotten rules seems to be in fashion, perhaps we may be permitted to quote our own recipe for breeding competition winners written at the time of the Magill competition. "Select your best hen by observation or the trap nest, mate her with a son of your next best layer, kill any weakly chicks, feed the survivors as much as they will eat, put your trust in luck for you will have done your share." There is, we know, nothing particularly brilliant about that, but we do not seem to have got much more forward in the years that have passed, as far as fundamental principles are concerned. Essentially it comprises, to quote the chastened modesty of the report, "The methods of breeding and feeding recommended by me, adopted by thousands of Australian breeders in this and other States," possibly a certain amount of common sense inherent in the poultry breeding community has had a great deal more to do with its adoption than any recommendation.

— More Interesting. —

To return to more interesting matters. How delightfully simple The Rule sounds. Boil it down and you get a "high" laying hen (she is unboiled by the way) and a male bred from a similar hen. Mate them together, and you get "high" laying pullets. Simple even to baldness. The only objection that we can see, is that during the last ten years, there have been in the competition pens of Australia, some thousands of living examples of the fact that you do not invariably, or even usually, get those "high" laying pullets. Now what can be said of a rule which requires some thousands of exceptions to prove it. One is generally considered sufficient.

— An Amendment. —

It appears to us that it misses half the question—the important half. Now let us first assume that "high" laying is a separate additional character, which may be added to "good" laying and amend the rule to read "The sire may transmit the character of "high" laying to and through some, all or none of his daughters, the dam cannot transmit the character of "high" laying to and through her sons or daughters but she can transmit the character of "good" laying to both. Does not this amendment, which it must be admitted knocks spots off The Rule, which, as "Hardshell" remarks is "known to be a fact," seem to explain the general situation in poultry breeding and many apparently otherwise inexplicable results in competition work. Even if it unfortunately, does not get us right on to what is after all the important point—its practical application, it does seem to get us a long way ahead of the rule and give the mysterious "Nick" points and a beating. No one reading Bulletin No. 205 of the Maine Experiment Station, can, we think, doubt that in the unequal though proportional transmition of the character of "high" laying by the males, lies one of the principal secrets of poultry breeding.

— The Hanbury Pen. —

It would be easy to quote many instances in which The Rule has had to lean pretty heavilly on The Nick, but there is one quoted in the same paper which appears to us to be a particularly fortunate or unfortunate illustration. It reads as follows :—

A Bendigo paper states that two McKenzie cockerels were each mated with eight hens, and the one lot of pullets went into the Bendigo competition and the other to Burnley. It is interesting to note the wide difference in the scores of the two pens. The birds at Bendigo look like getting 1,650 or 1,660, while those at Burnley, with 19 days to go only had 1,296 on the slate—a marked difference, which shows that in this latter mating the "nick" was not there.

— Deceptive Equality. —

On the face of it, we have here two sets of birds which are apparently equal, yet they give very different results. They were not therefore really equal. Where was the inequality ? It is reasonable to suppose that it was not in the mother hens, for we read elsewhere that they had been tested, it is not probable that it was in the pullets themselves, as far as could be observed, for Mr. Hanbury would, if anything, send the better pen to the more important competition. There is nothing to indicate that there was any apparent difference in the cocks, but — and this is the vital point—you cannot test a male bird, except by his pullets. By the light of these results these males were different in their powers of transmission. Read the above history of the "Hanbury" pens, on its face value, by the rule and you get nowhere, or the hump. Read it by the amendment, and you get a reasonable explanation. One male had the power to transmit the character—"high" laying, the other had not. All the hens had the power to transmit "good" laying. There are, of course, others, we merely suggest one on the facts as recorded. There is the mysterious "Nick" to which "Hardshell" pins his faith. To us this has always appeared like X, the unknown quantity in mathematics. Whist players will recognise its similarity to a small trump—when you don't know what to do, play it. It is surely a very handy thing to have about the house when you talk or write of stock breeding ; for it covers a multitude of perplexities.

(To be Continued).

HANBURY'S BENDIGO LEGHORNS.

These birds, together with Gill's Burnley dittos. are probably the most talked of fowl in the world to-day. European and American conferences of experts, etc., will discuss them as seriously and with quite as much practical good as if they were another Balkan war or Mexican trouble. What a great performance it is, yet how simple —on paper. No long experience, no extensive runs, no expensive stock, no mysterious methods, no rigid selection, no patent feeding, no anything unusual. You don't even have to go to a reliable breeder, you just buy 24 dozen eggs from a friend "who is always praising his Leghorns," and even the most friendless beginner has at least a dozen friends who fill that bill. We gather the foregoing from an interesting account of the "Hanbury" birds by "Hotspur," in a recent "Leader." Boiled down, Mr. Hanbury, a couple of years ago, bought 24 dozen eggs from a most obliging friend. He hatched them in an incubator, and reared 60 pullets, from which he selected 16, these he mated with two McKenzie cockerels. The resulting chicks were hatched on October 8th, 1912, and reared under cover (the whole area of Mr. Hanbury's poultry yard is apparently only 66 by 100) and six were sent to Bendigo with the amazing result that is now known all over Australia and foreign parts. Six pullets were also sent to Burnley, but that is another story. The lesson is plain and there certainly ought to be a great run on "friends who are are always praising their Leghorns." It should be mentioned that this particular friend appears to have had dealings with various "reliable" breeders so after all that often abused individual comes to his own and all ends happily.

NEW BURNLEY COMPETITION.

Mr. Hart evidently means to get as much good out of the competition under his charge as possible without losing any of its competitive value. On the question of wet and dry feed there is considerable difference of opinion. There is much to be said on both sides. Mr. Hart is doing what he can to decide which is best, at all events under Burnley conditions. In the present competition 50 pens of the light breeds have been entered on the Wet Mash ration and 19 pens on the Dry Mash ration. In the heavy breeds the figures are 20 Wet Mash against 11 Dry Mash. Messrs. Moritz in White Leghorns and W. P. Eckerman in the heavy breeds are the only two from S.A. This is something which should have been done five years ago and settled finally by now. Hawkesbury has done something but the results, as far as they went, were inconclusive. At Parafield it has got as far as a position on the list of "future" work as a possibility. This is a great performance on Mr. Pascoe's part, considering there have been hundreds of competition birds at Roseworthy for years past to whom the question might have been put. No harm could have been done and possibly great good.

THE HADLINGTON STANDARD

By his rejection recently of underweight entries at the Hawkesbury Competition, Mr. Hadlington caused considerable commotion in the N.S.W. poultry camp. Beyond the fact that breeders had not been given any special warning that this quite reasonable application of the not-fit-and-proper-representative-of-the-breed-rule, which has hitherto been more honoured in the breach than observance, at all competitions, they do not appear to have had any ground for complaint. When appealed to, probably for this reason, the Minister of Agriculture suggested to Mr. Hadlington that it might be better not to apply this rule for this year and this was agreed to. Mr. Ashton, however, made it clear that a standard of weight would be rigidly enforced at the next competition. The matter is one of importance to poultry men in N.S.W. and in other States, for what Hawkesbury does in competition work to-day, the other States will do to-morrow or when they wake up. Victoria, by the way, wakes up this year. Thanks to Mr. Hart. Mr. Hadlington's action brought to the front a question which certainly needs settlement and in doing this has accomplished his purpose. It should be remembered that Hawkesbury is not run as a go-as-you-please record scramble, but on "the greatest good for the greatest number" lines. Mr. Hadlington is, we think, to be congratulated on his firm handling of a prickly subject.

— The Weights. —

The weights adopted by Mr. Hadlington as the minimum for entry to the Hawkesbury pens are 3½ lbs. for Leghorns, 4 lbs. for Wyandottes, and 4½ for Orpingtons. Weight is admittedly a rather difficult and uncertain gauge, for to a certain extent a bird may be fed and fattened to pull the balance, and a long journey at the end of March might easily cause a bird starting well up to standard to be found below it at the journey's end. In this connection it is interesting to note that Mr. Padman's birds, which The Daily Telegraph considers the standard of the Leghorn world, averaged 3¾ lb. on arrival at the college It is possible, of course, that some enterprising competitor at future competitions may remember Mark Twain's yarn of the Jumping Frog and load up his pullets with buck shot. Should such a breeder be commended for ingenuity or warned off for dishonesty? It will be a ticklish point for the committee to decide.

— General Purpose Breeds. —

The Wyandotte and Orpington people will probably accept the weights alloted as a fair and reasonable standard for pullets in or coming into lay. With normal dedevelopment such birds will, on an average, weigh from 1 to 2½ lbs. more in fair condition. The cockerels will be a very useful general purpose type, quite big enough for ordinary home and market use. For purely top quality table poultry purpose there will remain the Dorking, Faverolle, and Game, and their crosses. A reasonable classification of the three types of poultry seems to us to be that for the laying type 75 of 100 points should be for eggs and 25 for meat. In the general purpose type 50 points for each, and in the table type 25 for eggs and 75 for meat. Mr. Hadlington's standard appears to be in general accordance with that. It may be objected that the weights are too low, though we doubt whether any practical breeder of those varieties will be found to do so. The records seem to show that not 10 per cent. of the heavier division of the various breeds, say 7 lb. in Orpingtons, make any showing in the laying pens. In fact with few exceptions, laying appears to decrease as weights increase above about a five and a half pound limit. There are, of course, brilliant exceptions, but the question is, is it not better to legislate for the average normal bird than to breed up to the exceptional standard.

— The Case of the Leghorn. —

The case of the Leghorn is somewhat different and difficult. Technically there may be no standard weight for the breed, but a good big one will beat a good little one according to the generally accepted unwritten law as exhibition birds but the utility Leghorn is a different proposition. The question appears to be—Is the 75 points for eggs and 25 points for meat standard, one which makes for the good of the breed and its breeders, or is the 100 points for eggs, the rest nowhere, the better ideal? Many people will tell you that if, in a normal season, they get back food and labour costs on Leghorn cockerels, they are satisfied. Others advocate killing as soon as sex is apparent whilst others again say that they make 1/- a lb. for them. The great majority of breeders and practically every farm and suburban poultry keeper regard their surplus cockerels as a necessary but not altogether unprofitable evil. After all a Leghorn cockerel is not by any means to be despised on the table, he may not be in the same street as a milk fed Faverolle but he is certainly better than none at all. The position seems to be, firstly, that for the straight out market egg man, who after all is about one in a hundred of poultry producers, cockerels are more or less unwelcome; secondly, that for the farm and suburban poultry keeper, they are more or less profitable; thirdly, that the great majority of purebred cockerels are White Leghorns; fourthly, that the chickens of standard weight parents are more likely to make up into reasonably good table poultry than the progeny of pullets, which "when old enough to lay weigh a trifle over two lbs. to 2½ lbs," which Mr. Hadlington rejected. Finally, there is no evidence to show that they would be any poorer layers.

— The Competition Breeder. —

"That's all very well," says the competition breeder and record hunter, "but what I want is the greatest possible number of 2oz. eggs, just eggs and nothing more. Is it not already difficult enough to breed a 1,500 pen, let alone a 1,600 wonder, without being harassed and hampered with rules and regulations? What do I care whether the bird that lays them is of canary-Leghorn type or the emu-Leghorn. What I want and what most people want is eggs, first, last, and all the time. There is a lot to be said for the competition breeder no doubt. The commercial egg plant man also has something to say. "I want good two ounce eggs. If I can get as many or more of them from a small bird as a big one, that suits me and they eat less and take up less room. One pound less weight probably means a 10 per cent. reduction in food cost and 10 per cent. less floor space. If in every one of my 50 hen pens I can put another 5 birds, it means that the profit of those extra birds will go a long way towards paying the interest on the money I put out to build that pen. The extra profit for size in the four months' cockerels won't make up for the other losses. As for vigour, well I never found that size and vigour were in any way co-related, in fact I should say that the small bird was, if anything, the more vigorous as far as one can judge, certainly it is more active."

— Summing Up. —

For competitors and competition work, judged only by first results, the 3½ standard is too high. Any rule which tends to restrict selection would be the same in its effect. Apparently, however, some competitors, like some sinners, want saving from themselves. If the 4 to 5 lb. average Leghorn pullet of a few years ago has been bred down to 3½ lb. to-day, it is not illogicial to assume that during the next five years it will be bred down to the proverbial grease spot or thereabouts. For the commercial man and expert breeder who compete, it is not necessary, for they know or think so, just how far they can go in loss of size and its effect on loss of size in egg and vigour of body. For the average poultry breeder, the farmer, and the public generally, who pay the competition bill, the standard is wholly good and its enforcement wise. More or less directly the competitions are the the fountain head of all utility poultry work. If the fountain head is tainted by the presence of underweight birds, by those which lay undersized, abnormal, not true to type eggs, by broody birds of non-broody breeds, by those in which inherited vitality is low, as shown by deaths in the pens and by those which are not in general characteristics reasonably representative of their breed, it is in some degree a source of weakness rather than of strength to the industry as a whole. Fortunately it is not difficult to purify the source. Mr. Hadlington's standard is a step in this direction.

TORTOISE v. HARE.

We have all read of the tortoise and the hare, without perhaps finding any particular applicability of the story to poultry breeding. We came across an interesting instance of the superior staying power of the former as applied to poultry in the New Zealand competition report in "The Hen." It will be remembered that Mr. Nixon's White Leghorns put up 1,632 for the first twelve months and everybody very properly said Well done. The birds were entered in the two year test and the figures at the 101st week read—

	Week.	Total.
Heretaunga P.C.	19	2,697
Nixon	8	2,607

Apparently the Heretaunga pen will win by rather over 100 eggs on the two years' run. All the credit has, however, gone to the hare in this case, for few people worry about two-year results. Yet the tortoise was after all the better bird on the above figures.

GETTING READY.

We all know that chickens should not be reared on the same ground two years running. It's a grand theory and its practice sounds fairly easy, if one has plenty of ground. Even where there is no shortage of this, as on a farm or orchard, the question of convenience has to be considered. Chickens don't want much food and attention, perhaps, but they want it pretty often, so the chicken coops go, year after year, to the same old spot, the one which is most convenient to the attendant, but least healthful for the chicks. Unless you have absolutely grown chicks of the same age and breeding on stale and fresh ground, probably you will not credit the difference which this may make. If new ground is not available, or too far away or too much trouble, try purifying the same old place. Dig over the space where the coops are to stand and as much of the area on which the young stock is to run as possible. Then scatter fresh lime thickly over it and just chip it in with a hoe. You don't want to bury the lime deeply; afterwards sow any quick growing crop you like, barit is a little late for the latter, ley, oats, rape, or Egyptian clover, but try it unless you have some of the others on hand, there seems to be no doubt that it is a particularly fine green food. A friend of ours is combining utility and beauty by sowing a few packets of winter-flowering sweet peas all over his spare pens.

SPROUTED OATS FOR HENS.

After you have used sprouted oats you may wonder how you managed to get eggs before, writes an American breeder. Hens are certainly very fond of this form of green food and it is a great egg producer. Oats can be easily sprouted. In the winter time time they are usually sprouted in the incubator cellar or in a fairly warm room where the temperature can be maintained at about 65 degrees. The room is kept dark, in fact this is the usual custom as more rapid growth will take place in a dark room. The oats should first be soaked over night in luke-warm water, then spread them out about two inches thick on the floor or put them in pans or boxes. If they are put in boxes, holes should be made in the bottoms or a fine mesh wire can be used for the bottoms. This allows all surplus water to drain away and will also provide some ventilation. Sometime the boxes are arranged to fit in drawers one above the other. The oats should be moistened with luke-warm water every day and when the sprouts are two or three inches long they should be fed to the laying hens. Avoid allowing the oats to get musty. Considerable care should be exercised in keeping all pans or the boxes or the floor of the room clean after each sprouting. The floor of the receptacle on which the oats are spread should be thoroughly scoured after the remains of sprouted oats have been taken out. Enough should be put down each time so that the supply of sprouted oats for the hens will be kept going. This is one of the cheapest forms in which to supply your laying hens with green food during the winter months.

HENS THAT DO NOT LAY.

A few days ago we were looking at some hens which, amongst other duties, have for the last two or three years, undertaken the responsibility of providing the writer with his usual breakfast. "A motley crowd," said a friend who was with us. We admitted the soft impeachment for some were moulting, some were broody, some were ancient, some were Leghorns and some were just trying to be. Not a pen to be proud of, perhaps, as far as appearance goes, but they lay. Undoubtedly they lay well. Remembering these "wrecks," we rather wonder at the complaints that one hears that fowls don't lay. What's the difference? It is not the housing, because the aforesaid "wrecks" have not even seen the inside of a house for two years at least. It is not the feeding, because that is just plain wheat, when it is remembered and what they can pick up in a decent sized run. Taken all round they have a worse time than the average suburban fowl, yet there are always some, sometimes many eggs. That's a somewhat indefinite statement we know, but in a general way it is a fair thing to say that they are very good layers. Why? As they are evidently not housed right or fed right, it must be that they are bred right. We have, of course, no doubt, that with more orthodox methods they would lay more eggs, possibly many more eggs. We certainly have no wish to depreciate the value of housing and feeding but we do want to emphasize the importance of breeding as a foundation. A well bred bird will stand a lot of knocking about, yet lay much better than one which lives on the fat of the land but does not possess the inherited capacity for egg production.

HAWKESBURY COMPETITION.

Some specially interesting comparative tests are arranged in connection with the Hawkesbury Competition this year. In thirteenth annual test we notice that Mr. Padman's pen got off the mark well, with 25, top score, for the first week. Mr. Padman's birds are in the single test section. In the shed test Mr. D. Kenway leads with 17. In the no-house test Mr. P. C. McDonnell started promptly with 31 for the first week. In the housing experiment, the 100 pullets (semi-intensive) house, open run and mixed feeding, got a bit of a start on the 100 pullets (intensive) housed, without run on dry feeding. Mr. S. Ellis has provided the birds for this experiment by arrangement with the Daily Telegraph and the Hawkesbury people.

TRAP NESTS.

The bedrock bottom of successful breeding is pedigree. Without a knowledge of pedigree plus performance, both of which can only be secured by testing, the poultryman is—like the boy who fell out of the balloon—not in it. Whatever opinions one may have of the relative value of the male and female in breeding for egg production, it must be quite evident that the more knowledge we have of each, the better we shall be fixed for making the best of whatever qualities both may possess. It does not need an oracle to know that a good hen is at the bottom of good laying, the trouble is that she often stops there. It may, however, take a wise man to recognise that it takes a good male to help her up. The record hen is the essential foundation of a "record" strain, the good male is the essential element of its continuation. The only way to tell a good hen is by trapping her, the only way to tell a good male is by trapping his pullets. The only way to trap is just to trap—not think about it. The simplest way to trap is by the trap nest. The best trap nest is the Chapman trap nest. Nuf sed!

BEING FAIR TO ALL.

Though South Australia is perhaps suffering a temporary eclipse in the competition world, it will not be the fault of her enthusiastic backers if her great deeds of the past and her more or less well authenticated interest in present day champions, are to be overlooked even in the smallest degree. We are getting a turn of the old stirring tune, "South Australia on top," but for present use, in view of passing events, the title is changed to "Being fair to all." Mr. J. H. Gill appears to be one of the most recent victims of the ancient ditty. Poor Mr. Gill, what between the toning up of the Victorian climate, Mr. Hart's extraordinary ability, birds purchased on indisputable authority, element of luck, etc., it appears from what we have read, that about the only thing he did quite off his own bat, was to pay the entrance fee. There is just one man qualified to ladle out the "being fair" soup, and that is Mr. Gill himself.

In this connection it is pleasing to remember how little claim, such breeders as Messrs. Padman, Brooks, Bertlesmeir, Kinnear, etc., have made on their own account to any credit, past, present, or future, which may have been due to them for eggs and birds supplied. Such reticence is honest, courteous and to be commended. It might with advantage be imitated. There is one side of the question overlooked by the puff brigade—naturally it is the other fellows. We have sold much stock, true, but how much have we bought? It is simply and utterly nobody's business. Surely it cuts both ways, yet any aspirant for the ladling out billet would need to be fully posted on this side. The best way, apparently, of tackling the job, is to leave it alone or to let Mr. Gill, who will, no doubt, when he has got through his "thanks for congratulations" correspondence, find time to allot their proper share of credit to The Clerk of the Weather, The Meteorologist, Mr. Hart, Brother Breeders, The attendants at Burnley, Dame Fortune, etc. We feel sure that nobody will grudge him any that may be left.

ON VELVET.

The average householder of moderate means who runs a good sized vegetable patch, a covered yard of well-bred layers and has a fair bunch of cockerels on hand, is, comparatively speaking, on velvet. At all events he can regard the providing of his daily bread with greater equinimity than his neighbour who is less prepared to withstand the slings and arrows of the outrageous butcher as somebody once remarked. The house poultry yard is a very attractive proposition these days. Look at it just from a beginner's point of view. Twenty well-bred pullets will cost from £5 to £10. In two years they should average 25 dozen eggs, £25. With house scraps and a garden they would not cost £10 to feed. In two years they would be worth £4 for home use. A suitable house to keep them always under cover would cost anything from £2 to £10.

BIDDY.

If you happen to have a broody hen don't discourage her well-meant if rather ill-timed intention, because you think it is going to rain or be cold during the next three months. There will be plenty of sun in between whiles to grow the chicks finely. Give her a clean, warm, dry, dark nest. If you have no suitable birds mated up, try one of the table crosses. Just as well to get the right thing whilst you are about it. You cannot afford to pay big prices for eggs to grow into table chickens. 3/- for eggs from a pen of any big framed hens running with a Game or Faverolle male is a fair thing. If you grow the chicks well they will pay big interest on Biddy's effort.

A GREAT OPPORTUNITY.

With the price of beef on the up grade, that of vegetables following suit, the uncertain prospects of the lambing, the continued objection of fish to being caught and the coyness of Jupiter Pluvius generally, the outlook for a hungry public is rather gloomy. It is, however, an ill wind which telescopes everybody's umbrella. This particular one seems to be the poultryman's opportunity. Any fear of the disposal of the large increase to the poultry stock of the State due to the record hatchings of the last two years, which was perhaps foreshadowed in the slightly lower price of eggs last year, is dispelled. Not only so but top prices for many months to come appear to be practically assured. The poultryman undoubtedly has the pull against his fellow caterers for the public hunger. It takes years to produce beef and fruit, months to produce lamb and vegetables, all eternity, apparently, to produce a reasonably adequate supply of fish, but the poultry man can start off his banking credit with the 8-weeks' duckling. This is the time when the often much abused autumn hatched cockerel, comes in for a reasonable share of recognition. Few people, we imagine, are inclined to quarrel with him just at present, and on the outlook of prices for the next few months it is probable that many more will develop a quite unusual appreciation for him and his sister.

There appears to be little doubt that for the commercial man, practically continuous hatching throughout the year will tend to become more and more the general practice. There are, of course, difficulties to be overcome, difficulties which, under some conditions perhaps, are likely to prove insuperable, but we believe that every man with money in the business should look into the possibilities presented. Competitions have led to the belief that the spring months are the only hatching months. They are undoubtedly the best, but there are others. The man who has capital invested in hatching plant does not want it idle at any time, certainly he does not want it idle when meat prices are likely to be as they are for some months to come. Poultrymen should take the present opportunity of getting the poultry idea well home, as economical for the public purse and desirable for the public stomach. You can't hit the dear public in any softer place.

KING GEORGE AND THE COMPETITIONS.

When the present King, as Prince of Wales, returned to England after his visit to the Commonwealth some years ago, about the first thing he said, addressing merchants, manufacturers, and producers generally, was, "Wake up," and he added, "You've been top dog so long that you've got swelled heads, you think you're Blondin, you've got in a rut, you're unprogressive and unscientific, you're letting your rivals get ahead and generally going down in the world. Get a move on. Forget your grandmothers. Don't be content with what is. Search for what is better. Learn from others. Shift yourselves. Get busy or bust." The above is of course a somewhat free translation, but it fairly represents His Majesty's advice. It occurs to us that something of the same sort applies to South Australian poultry people. We have all been told so often that South Australia leads the way, that Europe, Asia, and Africa, not forgetting Patagonia and the United States, look to us for light and leading, that we have come to believe it and be content to bask in this official glory.

Five years ago the position of South Australia was excellent. It is just as excellent to-day, really, though like that of the Britishers the King spoke to, its excellence is being somewhat overshadowed by its rivals. Excellent but unprogressive about sums it up. We had 1,500 pen birds in the State more than five years ago. Ought there not to be more of them about to-day, instead of less on public performances locally. Looks like being in a rut. Victoria bought some of those 1,500 pen birds and there seem to be quite a lot about now, let alone the 1,650 leaders. That's climate you say; right, let's leave it at that. Is it not, however, time to look the position in the face and ask ourselves if South Australian breeders are making progress, are we losing ground or are we just marking time. It is better to be sure of these things either one way or the other than to merely drift. Medicine is sometimes necessary, if nasty, but often stimulating and helpful. It would be difficult for any impartial observer of competition events to declare that we are making progress. It would certainly be unfair to say that we are losing ground except by comparison with other States. Are we marking time preparatory to a step forward or for one in the other direction, or is the stationary position of the past five years to become chronic. We do not of course forget that Messrs. Padman, Moritz, and Bertelsmeir have put up some excellent scores this year in Interstate competitions, we also remember that Mr. Padman, with occasional help from others, was doing precisely the same thing some years ago with precisely the same quality birds, but put aside everything but the Roseworthy test for the last five years of its existence. Some management, same housing, same yards, same climate. Look at the figures. It's medicine, perhaps, but taken in conjunction with a modified dose of the King's advice, it may be very helpful.

THE HEN AND THE SAUCEPAN.

The connection will, of course, be obvious to the most casual reader. In whatever written work on the keeping of poultry you may take up, you will find some reference to warm food as one of the things which count for much in the production of winter eggs. The hen does the job, but the saucepan as the medium of a warm, tasty, meaty mash certainly aids and abets her in the good work. Just try the advice. It is one which we must confess that we have not followed of late, but we know it to be good of old experience. Warm mash will not get many eggs out of a poor hen, but it will at least extract the last one she has secreted about her person, and with good hens, it will help to keep you pretty busy in gathering up the spoils. A warm mash of any sort is good, but the following prescription for the ordinary home poultry yard is simple, and your birds will find the result easy to take. Required—Three kerosene buckets with stout handles, one long handle spoon, one mincer (desirable but not essential). Method—Have all scraps collected during the day, dry in one bucket, moist in the other. Bar tea leaves, corks and kerosene wicks. When you get home, put the whole collection with any additional vegetable or meat wastes you can beg, borrow or steal, through the mincer into the third bucket (unless you can get someone to do it for you). Wash out the two used buckets and place ready for next day. This is most important, at least your wife will think it so. Put the third bucket on the fire, add sufficient water, season with salt and cook slowly. Before going to bed, add the quantity of bran which you would be using for the mash in the morning, stir, and leave it on the stove, or cover it tightly with a sack. In the morning dry off with about as much pollard as you used of bran. Serve warm, not hot.

STRAWS.

Straws show which way the wind blows, the mammoth incubator mentioned last month is a pretty solid straw, and it emphasizes the intention of the Parafield people to run their show as a commercial proposition, and thus come into direct competition with the private breeder who has had to pay for his own experience, his own plant, and his own mistakes. The aforesaid straw was, by the way, quite unnecessary as a straw for in the last official poultry report it was stated that large numbers (thousands) of laying stock were to be kept to provide revenue for experimental work. Judging by past results the financial basis of the experimental work does not appear altogether rosy. However, fortunately that's nobody's trouble. The intention is perhaps to be commended but we must remember that whilst the funds and the experimental work are, to say the least, problematical, and for an indefinite future, the competition is actual and for to-day. South Australia is not so poor that it cannot provide £500 or £1,000 a year for practical and scientific experimental work, without harassing its poultry officials in first providing the necessary cash.

— What the Mammoth May do. —

Give the Goliath four runs, that is 20,000 eggs, and he, she, or it ought to turn out 6,000 chicks, add this 6,000 to the 4,000 which it was stated were hatched last season and we have a hatching probability of at least 10,000 chicks at Parafield for this season. There are three possibilities before them—first they can die, which would save trouble; secondly, they could be sold as day-old chicks, and thus take £500 from the pocket of the private breeder; and thirdly, they can live and thrive. Five thousand cockerels on the open market at two shillings per head would be £500—not much, perhaps, but it is ten per cent. on £5,000, or in other words, catering for the present volume of trade it represents a 10 per cent. tax on the first £100 of table poultry business, done every week of the year by the private breeder. This may of course be a perfectly equitable and usual arrangement, or it may not. Five thousand pullets may be expected to lay eggs to the value of 15/ per annum each; that sounds very little, but still it means that Parafield may take out of the market a sum which divided amongst ten private concerns, would represent a gross revenue of £375 each, or knock twopence per dozen off the price of half million dozen on the market at present ratio of supply and demand. This also may be a perfectly equitable arrangement.

— The Way Out. —

However you put the figures, it seems reasonable to say, that you cannot get rid of even such items as 5,000 cockerels and 5,000 pullets, on what is after all not an unlimited market, without somebody getting hurt—not seriously perhaps, but noticeably, though the somebody may not know what hit him; it must show in his cash account, and even if it did not the principle of the thing is the same. There is one outlet—London. Not only would they then be sent from the place where they are not particularly wanted, but they might be made the means of doing real good work for the industry, now and for the future. Some years ago, when local prices were fifty per cent. lower than at present, we were all officially told that the London market was the solution of all difficulties, and local producers were blamed for not jumping at the facilities and advantages the Government then offered for export. Had they done so, it would have been very much a leap in the dark, but the turn of the tide came about that time, and the undoubtedly serious situation, from the poultry producer's point of view, was eased. The 50 per cent. rise may be followed by a corresponding drop—naturally everyone hopes not; but it is well to be prepared; what better preparation can there be, or what better avenue for profitable pioneering work than to find out just what London has to offer to our producers of poultry products. Ten thousand birds and their products won't worry London; and what

Editorial Notices.

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she will pay for them, she will pay for 100,000 or a million for that matter. The point is that, if ever a slump comes, poultry people will know just exactly where they are. If the government can show that poultry keeping is profitable at London prices, they will have a sure foundation to work on, and something solid to back up against, if Australian prices go against them. With W.A. closing down on our exports, and Messrs. Hart and Hadlington, two strong men in the Australian poultry world, working up local production for all they are worth, in Victoria and New South Wales, it is just possible that we may once more come "up against it."

— Not To-day. —

Not this year or next perhaps will this slump come, but it is not a remote contingency for the not far future. It seems to us that the Government have a really good opportunity of doing good work in this direction. It is not necessary to talk about it, so much energy in the past has sometimes been lost in this way, that not enough has remained to carry on the contemplated effort. Just do your job, and say nothing till the numbers go up, is not a bad motto. If at the end of one, two, or three years they can show on an audited balance sheet that London will pay prices which will allow of a reasonable interest on capital invested in poultry keeping in South Australia, they will have deserved well of their country. Should the figures go the other way they will have deserved equally well. South Australians don't want to know how to grow chickens or feed hens or fatten cockerels, they know it already, but they do want to know if they can make better money at any time of the year in London than in Adelaide for eggs or meat at present prices; and also, and this is much more important, whether, as an all-the-year-round proposition, London will take our surplus at profitable rates should supply exceed the demand at some future time.

Breeding for Heavy Egg Production.

Paper by Raymond Pearl, read before the American Poultry Association.

(Continued from last Issue.)

— How shall we apply our Knowledge? —

But what is the good of all this? How is it going to help John Smith to win the first prize in an egg-laying competition? It must be said at the outstart that much to my regret, neither the facts nor their Mendelian interpretations, will furnish any neat little Rule-of-three whereby all John Smiths can will all first prizes. Successful poultry breeding will continue in the future, as it has in the past, to demand a lot of intelligence, thought, skill and rationally directed effort. I hope and believe, however, that the results discussed above may be of some help in efforts to improve egg production by breeding. It is farthest from my desire to claim too much for them, but I do think they help us a little in certain general directions.

In the first place these results by showing that the inheritance of egg producing ability is not a simple, uncomplicated transmission of something from dam to daughter without change, make it somewhat easier to bear the disappointments which attend devotion to the gospel of the trap-nest, in its original inspirational form. In the second place, they help us to make a more just and adequate distribution of emphasis on the different basic elements of a systematic plan for the improvement of poultry in egg production. Finally, by furnishing a generalized mode of interpretation of observed results, or in other words, by giving a clearer and broader understanding of how egg production is inherited, these results help us to interpret and profit in our own breeding operations by the experience of others.

It would be very easily possible to make out a system of matings on the basis of the results of Bulletin No. 205, showing in great detail how to proceed towards building up a laying strain. Indeed such specific plans have been worked out by a number of my friends, I have refrained from doing this, however, because it seems to me to be of doubtful practical utility. Lest I should seem to be repudiating both my results and my friends, let me hasten to give my reasons for this doubt. The reasons are general in character and are found in the fact that such schemes of mating are essentially mechanical, whereas, both the things to be bred in accordance with the scheme (the fowls), and those who are to carry out the plan (the poultryman) are essentially living. The basis of life may be mechanistic, but certainly living things do not in practical, every day life behave with that precision and definiteness which we expect from a machine. Being a little acquainted with the frailties of both poultry and poultrymen, I am not too optimistic as to the outcome of trying to breed chickens by formula.

It seems to me that possibly it may be more helpful to try to draw out from these results some general principles in breeding for egg production, which every poultryman can apply. What, then, are the basic elements in a well directed effort towards the improvement of poultry in egg production by breeding? I should put them in this way—

1. Selection of all breeding birds, first on the basis of constitutional vigor and vitality, making the judgment of this so far objective as possible. In particular the scales should be called on to furnish evidence. (a) There ought to exist, for all standard breeds of fowls, normal growth curves, from which could be read off the standard weight which should be attained by a sound, vigorous bird, not specially fed for fattening, at each particular age, from hatching to the adult condition. These curves we shall sometime have. (b) Let all deaths in shell and chick mortality be charged against the dam, and only those females used as breeders a second time which show a high record of performance in respect to the vitality of their chicks, whether in the egg or out of it. This constitutes one of the most valuable measures of constitutional vigor and vitality which we have, if for no other reason than to measure this breeding performance, a portion of the breeding females each year should be pullets. In this way one can in time build up an elite stock with references to hatching quality of eggs and viability of chicks. (c) Let no bird be used as a breeder which is known ever to have been ill in however slight a degree. In order to know something about this, why not put an extra legband on every bird, chicks or adult, when it shows the first sign of indisposition. This, then, becomes a permanent brand, which marks this individual as one which failed, to a greater or less degree, to stand up under its environmental measures of constitutional vigor. (d) Many of the bodily stigments by which the poultryman during the last few years has been taught to recognize constitutional vigor or its absence, have, in my experience, little, if any, real significance.

Longevity is a real and valuable objective test of vigor and vitality, but it is of only limited practical usefulness, because of the increasing difficulty with advancing age of breeding successfully on any large scale from old birds of the American and other heavy types.

2. The use as breeders of such females only as have shown themselves by trap-nest records to be high producers, since it is only from such females that there can be any hope of getting males cap-

able of transmitting high laying qualities.

3. The use as breeders of such males only as are known to be the sons of high producing dams, since only from such males can we expect to get high producing daughters.

4. The use of a pedigree system whereby it will be possible at least to tell what individual male bird was the sire of any particular female. This amounts, in ordinary parlance, to a pen pedigree system. Such a system is not difficult to operate. Indeed, many poultrymen, especially fanciers, now make use of pen pedigree records.

5. The making at first of as many different matings as possible. This means the use of as many different male birds as possible, which will further imply small matings with only comparatively few females to a single male.

6. Continued, though not too narrow, inbreeding (or line-breeding) of those lines which the trap-nest records show a preponderant number of daughters to be high producers. One should not discard all but the single, best line, but should keep a half a dozen at least of the lines which throw the highest proportion of high layers, breeding each line within itself.

Items 4, 5, and 6 imply the carrying over of a considerable number of cockerels until some judgment has been formed of the worth of their lines, through the performance at the trap-nest of their sisters. Item 6 assumes, as an absolutely necessary pre-requisite, that item 1 will be faithfully and unfailingly observed.

The whole system of breeding here outlined is an application, in the simplest form possible, of two principles, one general and the other special to the present case.

The first is the general principle of the progeny test in breeding for performance. This is the principle which has led the plant breeders to such notable triumphs during the last 15 years. In my judgment, no system of breeding for performance in animals not fundamentally based upon it will ever achieve any permanent success. The second principle is the recognition of the significance of the male in breeding for egg production. It has been the custom in trap nesting work to reckon pedigrees in the female line only. This we can now see to be an essentially futile procedure, so far as concerns the daughters. To say that "this pullet is the daughter of Lady Splendissima (with a tremendous record)" is perhaps good advertising. It, however, conveys no information of any special value to the breeder, until he knows who was the Lady's consort in this particular reproductive venture.

In closing, let me express my conviction that the plan of breeding for egg production set forth, which involves nothing in principle or practice which any poultry man cannot put into operation, will not fail, if consistently and intelligently followed for a period of years, to bring about a material increase in the productiveness of the flock. The evidence which leads me to this conviction is the best of all evidence—I have tried it.

Tools in the Poultry Yard.

Some tools that are very necessary in the poultry yard at present. (1st) an axe, to take the heads off all useless culls, thus saving the food bill and butcher's bill. (2) a spade, to dig over a portion of that run that has been in use all the summer, and if wisely worked just now will be of considerable benefit in the spring. A very good plan is to purchase a few extra yards of wire-netting, divide and dig up half the run, leave a few days, turning your busy laying hens and pullets in, which will "kill two birds with one stone," viz., give them a good supply of animal food and rake the the ground for you. Then scatter a mixture of barley, rape, or oats. This will ensure a good supply of fresh green food for spring chicks. (3) a hammer, saw and nails, which should have been at work a month ago, putting houses and fences in repair for winter, and making the quarters of your breeding stock comfortable. Although most fowls can rough it when forced to, there is not a human being who likes comfort more than our feathered pets do.—Exchange.

Home Notes.

Are You a Brute?

A fair definition of the word brute as applied to humanity may be said to be "One who causes needless suffering to anything which is helpless to defend itself." It occurs to us that if members of the "gentle" sex, who, with perhaps unconscious irony, parade the streets of Australia adorned with "scalps" somewhat after the manner of Indian braves, were to consider that definition as applied to their treatment of "God's Beautiful Winged Creatures," referred to Mr. M. T. N. Stephens in a letter to the Press of 7th April, they might find food for serious if sorrowful thought. The "gentle" North American Indian usually has the danger and discomfort of doing his own killing and confines it to his enemies, the "gentle" woman pays someone else to do her dirty work of killing our feathered friends. The "gentle" Indian is, of course, a savage, the "gentle" lady is a Christian, or supposed to be. Perhaps that makes a difference.

Mr. Stephens very kindly forwards us a copy of his letter from which we extract the following:—

GOD'S BEAUTIFUL WINGED CREATURES.

Allow me to direct attention to two articles in the "Nineteenth Century" for February last on which these remarks are based, but every sentence of both articles is well worth reading.

Nothing more striking can show the necessity for immediate Federal action following the bold and humane precedent established by our American cousins (who have freed the United States for ever from the shame and the horrors of the millinery trade in wild birds' plumage), for not only is the slaughter world-wide, but Australia will probably be among the countries deluged with this plumage obtained for the adornment of nature's already "fair sex." But let us hope, as Lord Lilford said, the day will soon dawn when no women in civilised and law-abiding countries will be allowed to disfigure their heads with the plumage of wild birds, for when that day does come this horrible traffic will cease.

Give women the right to vote by all means! The world would be no worse, probably better if they had it everywhere, but it is not too much to ask that they in turn will help to give God's beautiful winged creatures the right simply to live and continue to charm us by their form and plumage and delight us with their grace and freedom. It is largely a woman's question, and could be quickly decided if only women would decline to wear pieces of dead birds in their hats. The comparatively few men who get their living by the vile massacre are not worth considering. It would be an insult to women even to suggest that their remarkable ingenuity in personal adornment cannot devise something to take the place of wild birds which, alive, appeal to us all if only by their mere helplessness.

A large and increasing quantity of feathers, other than those prohibited, is received into South Australia; £4,000, £7,00, and £10,000 worth of dressed feathers during the past three years respectively, and this does not include either feathers used in imported millinery or undressed feathers of which latter, however, there are few.

The imports into the whole Commonwealth are also heavy, and show a remarkable increase. The value of dressed feathers rose from £45,619 in 1911 to £85,983 in 1912, and those undressed from £5,096 £6,281; that is £92,000 worth in one year. Think for one moment what merciless destruction of beautiful, free wild birds this alone represents and then say whether you as an individual intend to do your little best to continue it or to prevent it.

Bacon.

Whether you like your bacon fat or lean, you always want it sliced very thin; you want the rind and bits of bone removed; and you want it cooked enough, crisp and tender, but not too dry. It takes a little care to cook it just enough; the frying-pan should be hot, the slices of bacon laid in flat, and turned as soon as they are seared; when grease collects in the pan, it should at once be poured off into a cup ready at hand for the purpose, else the bacon will not be crisp and tender. Bacon should be turned often and watched closely; scorched bacon is even more horrid than other scorched things; and, finally, bacon should be eaten as soon as it is cooked.

The last point means that with a bacon meal, you must have everything else ready before you cook the bacon. If there are eggs to be cooked with it, and you cannot do them simultaneously, it is better to do your eggs first, and before they are quite done put them into the oven and let them finish themselves there, while you attend to the bacon.

Frying is the common way of cooking bacon. The best way requires a hot oven and a fine wire broiler. If you have never eaten bacon cooked so, you have a treat in store. Place the strips of bacon on the broiler over a dripping-pan, and leave it in the oven eight or ten minutes, or less if you have a very hot oven. The dripping-pan saves your valuable grease to use in making delicious any fried thing, and the bacon cooked on the broiler is much better than fried bacon.

The oven secret about bacon may be applied in other ways. Escalloped things, potatoes, oysters, beans, or tomatoes, covered with a layer of thin slices of bacon make the most deliciously complete luncheon. Indeed, it may be used so on rice, or squash, or almost any sort of left-over that your larder suggests to you. Moreover bacon which has already been fried may be made appetizing in this way, if you are careful not to cook it too long.

Bacon sandwiches, made by putting cold, lean bacon through the grinder, mixing it carefully with bacon grease, without butter, are a delightful change to the children who carry lunches. And bacon, next to butter and cream, is the most easily assimilable of the fatty foods. Therefore it is the fat to give children who need fat. Butter their bread thick; pour cream on their porridge; make their dessert tempting with whipped cream and give them bacon. This is better than making them miserable with cod liver oil, and is more likely to keep their little frames round and lovely with the firm flesh that resists disease better than anything else.

A Mother's Influence.

God gives to the mother supremacy in her family. It belongs to her to maintain it. This cannot be done without exertion. The temptation to come down from her throne and become a mere hewer of wood and drawer of water is very strong. It is so much easier to work with the hands than with the head. One can chop sticks all serenely unperplexed. But to govern demands observation, knowledge, judgment, and patience. In both cases there must be sacrifice. If the mother stands on high ground she brings her children up to her own level; if she sinks, they sink with her.

To maintain her rank no exertion is too great, no means too small. Dress is one of the most obvious things to a child. If the mother wears cheap or shabby or ill-assorted clothes, while the children's are fine and harmonious, it is impossible that they should not receive the impression that they are of more consequence than their mother. Therefore, for her children's sake, if not for her own, the mother should always try to be well dressed. Her baby, so far as it is concerned in the matter, instead of being an excuse for a faded bonnet, should be an inducement for a fresh one. It is not a question of riches or poverty; it is a thing of relation. It is simply that the mother's dress should be quite as good as, and, if there's any difference, better than her child's. It is of no manner of consequence how a child is clad, provided only its health be not injured or its self-respect wounded. Children look prettier in the cheapest and simplest materials than in the richest and most elaborate. But how common is it to see the children clothed in silk and feathers and flounces, while the mother is enveloped in an atmosphere of cottony fadiness! One would take the child to be a mistress and the mother a servant. "But," the mother says, "I do not care for dress, and Caroline does. She, poor child, would be hurt not to be dressed like the other children." Then do you teach her better. Plant in her mind a higher standard of self-respect. Don't tell her you cannot afford to do for her thus and thus; that will scatter premature thorns along her path; but say you do not approve of it; it is proper for her to dress in such and such a way. And be so true a woman that she shall have faith in you.

It is essential also that the mother have sense, intelligence, comprehension. As much as she can add of education and accomplishments will increase her stock in trade. Her reading and intellectual life, instead of being neglected for her children's sake, should for their sake be scrupulously cultivated. Of the two things, it is a thousand times better that they should be attended by a nursery maid in their infancy than by a feeble, timid, inefficient matron in their youth. The mother can oversee half a dozen children with a nurse; but she needs all her strength, all her mind, her own eyes, and ears, and quick perceptions, and delicate intuition, and calm self-possession when her sturdy boys and wild young girls are leaping and bounding and careering into their lusty life. They want then a mother able to curb, and guide, and rule them; and only a mother who commands their respect can do this. Let them see that she is familiar with all the conditions of their life—that her vision is at once broader and keener than theirs—that she knows all the phases alike of strength and the weakness—and her influence over them is unbounded. Let them see her uncertain, uncomfortable, hesitating, fearful without discrimination, leaning where she ought to support, interfering without power of suggesting, counselling but not controlling, with no presence, no bearing, no experience, and they will carry matters with a high hand. They will overrule her decisions, and their love will not be unmingled with contempt. It will be strong enough to vex them when they have done wrong, but not strong enough to keep them from doing wrong.

Nothing gives a young girl such vantage ground in social life as a mother—a sensible, amiable, and gently commanding woman. Under the shelter of such a mother's wing the child is safe.

WOULDN'T MIND THAT.

An Italian who kept a fruit stand in Sydney was much annoyed by possible customers who make a practice of handling the fruit and pinching it, thereby leaving it softened and often spoiled. Exasperated beyond endurance he finally put up a sign which read:

If you must pincha da fruit—
pincha da cocoanut!

Tried Recipes

— Making Bread with German Yeast. —

Take one cake of Hansa brand or other good brand, dissolve it in a little warm water an hour before using. Then take a bowl and put about four cups of warm water (of course, the water must be varied according to temperature, but on no account must the yeast be scalded); then put the yeast already dissolved in with the water and add sufficient flour to make a good batter, then set to rise; when it has come up and fallen (and here a great deal of the success or failure ol all bread-making lies), than add a little salt and make up with flour into dough of good size; then let it come again in the bowl, and when well risen, but not falling again, work up into loaves, and let stand an hour before putting into a sound oven to bake. The dough must not get cold during any part of the process of making.

— Dorset Plum Pudding. —

Flour 1 lb., minced meat 1 lb., stoned raisins 1 lb., picked, washed and dried currants 1 lb., candied lemon 2oz., candied orange 1 oz., candied citron 1oz., sugar ½lb., four eggs, and half a pint of whisky. Work the flour and suet together, then add the chopped peel, the flour, and currants, lastly working in the eggs beaten up with the sugar, and the whisky. Butter a basin, turn in the mixture, scald a cloth, flour it, stretch it over the top, tie a string tightly round the basin, and boil for six hours.

— Rich Old-Fashioned Plum Pudding. —

Fine flour 3 lb., currants 3 lb., stoned raisins 3 lb., finely shredded beef suet 3 lb., candied orange peel 3 oz., sugar 1 lb., candied citron peel 3 oz., blanched almonds 4 oz., nutmeg half a teasponnnful, powdered ginger half a teaspoonful, brandy half a tumblerful, 16 eggs. Work the suet into the flour, adding in turn the other dry ingredients, and working in the eggs before the spirits. Stir very thoroughly before adding each ingredient. If not sufficiently moist to mix easily, a very little milk may be added. Then butter the basins, turn in the mixture, scald new cloths, sprinkle them with flour, stretched them over the rims of the bowls, tie down firmly, knot the ends of the cloths over the top, and boil the puddings for five or six hours. The water must be boiling the whole time.

— Taffy. —

Butter taffy, which is delicious, is made with two cups of light brown sugar, one-fourth cup molasses, two tablespoons of vinegar, two tablespoons of water, seven-eighths teaspoon of salt, one-fourth cup of butter and two teaspoons of vanilla. Boil first five ingredients until, when tried in cold water, mixture will become brittle. When nearly done add butter and just before turning into pans, add vanilla. Cool and mark in squares.

— Sea Foam Candy. —

Put three cups of light brown sugar, a cup of water, and a tablespoonful of vinegar into a saucepan. Heat to boiling point. Then boil without stirring until the mixture forms a hard ball when tested in cold water. Pour the mixture into the stiffly beaten whites of two eggs, beaten constantly until it becomes quite stiff, then add a cup of chopped nut meats. Drop from a spoon on buttered tins. A whiter appearing candy may be made by adding one-half cup of syrup to two cups of granulated sugar and one half cup of boiling water. Proceed as with the above.

— Mincemeat Without Meat. —

Opinions differ in the cookery world as to whether mincemeat is correct with or without meat. Recipes are given below for both kinds :—

To make the mincemeat without meat, take 6 lb. of apples, 3 lb. of suet, 3 lb. of stoned raisins, 4 oz. of chopped candied peel, a quarter of an ounce each of powdered mace and cinnamon, eight cloves crushed in a mortar, 3 lb. of sugar, ¾ oz. of salt, the rinds of four lemons, the juice of two lemons, a pint of port, and a pint of brandy. This is not such an extravagant recipe as it at first sight appears. Only a small spoonful is required for each pie, and the quantities may be halved or quartered if less mincemeat is needed. Before mixing the ingredients one by one, the suet must be finely chopped, the raisins stones and minced, the apples peeled, cored, quartered, and minced, the candied peel minced finely, and the rinds of the lemons pared very thinly and then chopped.

— Mincemeat With Meat. —

Mincemeat with meat may be made as follows :—Free some lean beef of skin and sinews, and mince it. To a couple of pounds allow 4 lb. of minced suet, 6 lb. of currants, 3 lb. of peeled, cored, and minced apples, ½ lb. of minced candied peel, the juice and chopped peel of two lemons, ¼ oz. of powdered mace, ¼ oz. of powdered cloves, and the same quantity of powdered pimento. To this should be added a little under a pint of sherry, and the whole mixed thoroughly together and turned into small jars. These must be covered with a round of paper soaked in brandy or whisky if the mincemeat is not for immediate use, and kept covered in a cool and well-ventilated larder.

— Chartreuse. —

Boil 1 teacup rice in 1 quart milk until soft. Pare and core 8 apples. Put them in a buttered pudding dish, and place some red currant jelly and coarsely-chopped English walnut meats in the centre of each apple. Fill the spaces between the apples with the cooked rice, and put a layer of it over the top. Brush with the whipped white of an egg, and sprinkle with powdered sugar. Bake in a moderate oven for three quarters of an hour. Delicious with plain or whipped cream and sugar.

— Apple Catsup. —

Pare and core ½ bushel ripe sour apples. Cook in sufficient water to prevent burning, using porcelain or granite vessels. When cooked, rub through a colander and return to the fire, adding 4 oz. salt, 3 oz. black papper, 1 oz. cinnamon, ½ oz. ground cloves, 1 drachm cayenne pepper, 1 teacup sugar, ½ gallon vinegar. Let boil five minutes, and seal or bottle in stone or glass. The flavoring may be varied.

— Brown Apple Sauce. —

Pare and quarter 8 large tart apples or equal amount. Boil until soft, but do not stir. When the liquid turns a clear amber, as it will do if boiled a little longer without stirring, add 1¼ teacups brown sugar and boil slowly, stirring well. In about five minutes add butter the size of an egg and 1 small teaspoon grated nutmeg or powdered cinnamon as desired. Cook a while longer, stirring constantly, pass through a sieve, and serve either warm or cold. Some prefer a little boiled cider, omitting the butter and spice. This is relished with cold meats, especially cold roast pork.

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