ANNUAL RATES OF SUBSCRIPTION.

Farmers, Graziers, Horticulturists, and Schools of Arts, **One Shilling.** Members of Agricultural Societies, **Five Shillings,** including postage. General Public, **Ten Shillings,** including postage.

VOL. XXXIX. 1 JUNE, 1933. PART 6.

Seed Maize for Sale.

EARLY APPLICATION ADVISED.

Specially propagated and selected seed maize will be available, as usual, for distribution from the Department of Agriculture and Stock for the coming season's sowing. Growers are requested to place their orders immediately in order to avoid disappointment. If necessary, the seed will be held in store until required by the purchaser, when it will be railed on the date indicated by him.

A flat rate of nine shillings (9s.) a bushel is being charged. This price includes carriage to the nearest railway station; but where steamer freight is necessary, this and all other consequential charges must be paid by the purchaser and the total cost added to the remittance.

Applications for seed, with accompanying remittance (exchange added), should be sent to the Under Secretary, Department of Agriculture and Stock, Brisbane. Postal address and name of railway station to which the seed has to be consigned should be clearly stated; also the desired date of despatch from Brisbane.

Full particulars of conditions of sale, prices, and description of varieties will be published in the July issue of the "Queensland Agricultural Journal."

Bureau of Sugar Experiment Stations.

CANE PEST COMBAT AND CONTROL.

JUNE NOTES BY EDMUND JARVIS.

It is proposed to publish each month a short paper describing the movements of this insect, either above or below ground, according to the time of the year; together with descriptive details of a nature calculated to assist canegrowers in the study of this pest in every stage of its life cycle. Mr. Jarvis's entomological notes are always interesting, and this additional monthly contribution will be welcomed by our readers who are engaged in the sugar industry.—EDITOR.

GRUBS UNDERGROUND.

BY referring to the accompanying plate it will be noted that during this month a few grubs—derived from eggs laid by beetles belonging to secondary broods (which occurred during late December or in January) still linger in the surface soil subsisting on cane butts. By June, however, most of the damage has been done, 80 per cent. or more of the grubs having ceased feeding and gone below to transform to the pupa or chrysalis condition.

The full extent of devastation caused by grey-back cockchafer grubs has now become only too evident, and one is confronted on all sides by demonstration of the economic importance of this formidable pest, which has been universally accorded pre-eminence among the various insects known to attack sugar-cane in Queensland.

Behaviour of Grubs while Preparing to Pupate.

Shortly before tunnelling downwards to change into the next life-cycle stage, the mature grub, which by this time has become quite opaque, assumes a brownish-yellow colour.

Having formed a pupal or resting cell and ejected all extraneous earthy matter from its body the entire grub, as it lies in the ground awaiting transformation, is of uniform colour and presents a somewhat shrunken appearance, the body having now lost its characteristic U-shaped form. When this transformation finally takes place its dry-looking yellow skin suddenly splits lengthwise near the head and is gradually pushed or worked off by the reddish-yellow underlying pupa; this is accomplished by certain wriggling movements which are continued until the skin becomes slowly detached and is passed backwards by the pupa to lie as a small crumpled up pellet at one end of the cell.

It should be remembered that grubs of our grey-back beetle usually pupate directly beneath the line of damaged stools, where the ground has remained practically undisturbed for one or more growing seasons. The care exercised by Nature for the preservation of this particular cane-beetle is well shown by the complete isolation of its pupa, which inhabits a specially-prepared subterranean chamber, the smooth puddled walls of which effectually exclude small insect enemies, and while serving to maintain uniform body moisture also prevent possible injury to the pupa by heavy flood rains.

The depth at which pupæ of the grey-back are found to occur may vary from 6 to 15 or more inches, depending largely on the mechanical composition of the soil, its porosity, the degree of moisture present at time of pupation, natural drainage, and the presence or otherwise of aggressive soil-frequenting insect enemies of the grub. The average depth of the cell in light land with a clay or stony subsoil is about 12 inches; while on certain volcanic soils of great uniformity and depth these pupæ have been found 2 feet or more below the surface. On the other hand, they have been collected from sandy loams at depths varying from

4 to 6 inches. When some of the abovementioned agencies chance to combine with favourable climatic conditions, this insect pest experiences a severe natural check, the effects of which are felt for a couple of years or more.

Subterranean Parasites of Grubs.

From April to June a varying percentage of mature grey-back grubs is likely to succumb to the attacks of the well known vegetable parasite "Green Muscardine Fungus." When invaded by this parasite the body of a grub, instead of decomposing in the usual manner after death, retains its ordinary shape, and gradually hardening turns at first white and then an olive-green colour. At this stage the body, being filled with the "roots" of the fungus, becomes mummified and can be broken into pieces as though made of dry cheese. The green

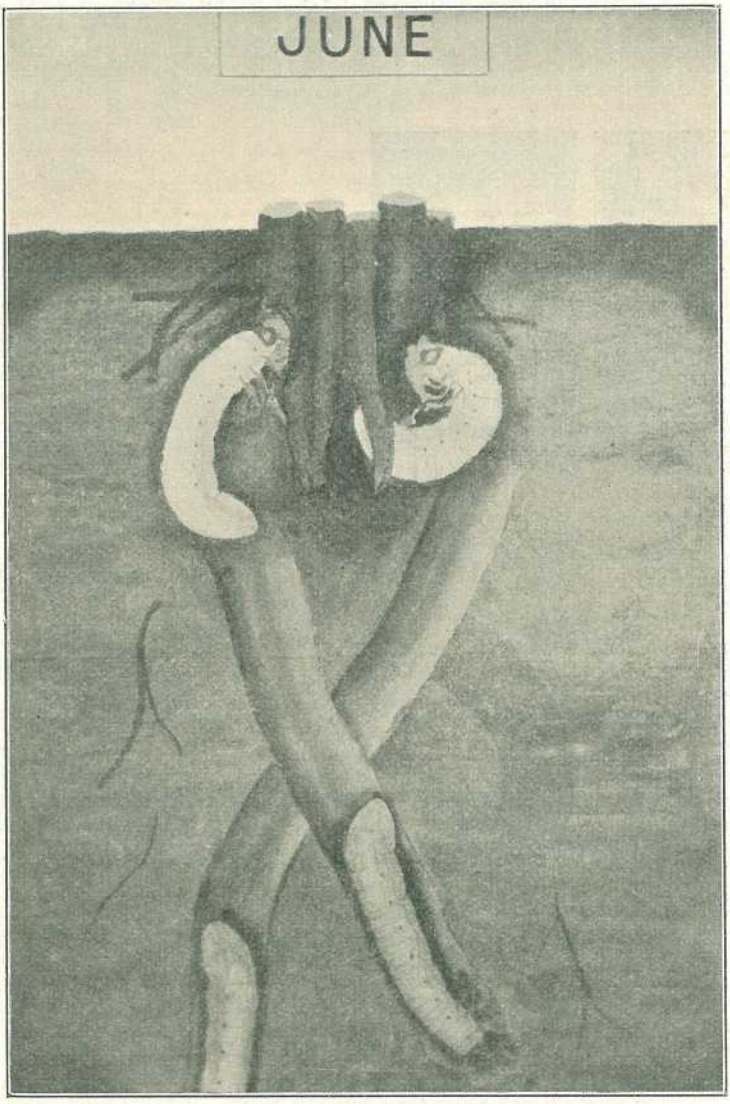

PLATE 46.—Grubs of the Grey-back Cane Beetle tunnelling into the ground to transform into the pupal condition. Other grubs still feeding on basal portions of cane sticks.

appearance of these grubs is due to the presence of microscopic chains of spores arranged in prismatic masses incrusting the body, and being in reality the fruit or seed of this parasite. (See illustration.) If wishing to make the best use of such spore-laden grubs, they should be collected by the grower when noticed in plough-furrows, crushed into powder, and thoroughly mixed with about one-thousand times the quantity of moist finely-sifted soil, rich in organic matter. This should be sieved and then placed in a tightly-closed tin canister until used, to keep the soil from becoming too dry. When planting any area of land known to be liable to grub-infestation a little of this spore-laden soil may be sprinkled at intervals of 2 or 3 feet as thinly as possible in the furrows just ahead of the planter.

Another parasite which usually causes heavy mortality during seasons when these grubs chance to occur in great numbers is a species of bacterium. Grubs invaded by this bacterium exhibit black blotches on the sides, especially around the spiracles, which are quickly followed by rotting off of one or more of the joints of the legs. A day or so later the entire body blackens and liquefies internally, quickly decomposing into an evil-smelling mass. Abnormally wet conditions prove highly favourable to development of this bacterial disease, which generally destroys its victim about five days after infection.

PLATE 47.—Grubs of Grey-back Cockchafer killed by Green Muscardine Fungus; showing *mid* and *final* stages of development. (Natural size.)

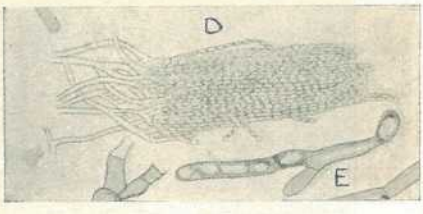

PLATE 48.

D. A prismatic mass of spores. X 160.

E. Spores germinating, X about 700.

Influence of Moisture on Depth of Pupae.

When the period of transition from grub to pupa chances to commence just after heavy rain has fallen (at the end of June or early in July), many of these grubs are induced to pupate unusually near the surface. In such years, therefore, when sufficiently moist conditions are encountered by them at a depth of about 8 inches, pupation in certain classes of land is liable to take place at levels in the soil varying from 7 to 9 inches below the ground. Common-sense control methods can be profitably undertaken during such seasons, and growers are advised in such favourable years to plough up their grub-infested blocks of cane to a depth of from 9 to 12 inches in August or September, and so combine with ordinary farm cultivation the destruction also of thousands of grey-back pupæ.

Similar work when carried out in October in such seasons will unearth and bring into the plough-furrows numerous adult specimens of this cockchafer beetle, which being immature generally succumb to the untimely exposure to the light and hot sunshine. In addition, however, to this control exercised by man, prolonged dry weather may be experienced in such years during July and August, in which case pupæ lying at depths of 6 or 8 inches in light, porous soils are likely to suffer from lack of sufficient moisture. Should drought conditions continue until the middle of December these unfortunately situated pupæ would naturally be the first to perish.

A full description of the pupa will be given in the July notes on this beetle, together with a discussion of the possibilities of its control by means of artificial methods. The downward journey of grubs into the soil in order to construct pupal cells is illustrated in the plate given this month. The small remnant still feeding will follow them a few days later.

Diseases of Vegetables.*

By J. H. SIMMONDS, M.Sc., Plant Pathologist.

PATHOLOGICAL problems for discussion in this chapter include the following:—Downy mildew, powdery mildew, anthracnose, and wilt of cucurbitaceous plants, i.e., melons, cucumbers, pumpkins, etc. Bacterial black rot, blackleg, and downy mildew of cabbages and cauliflowers also require consideration, and anthracnose of the bean will be discussed.

Downy Mildew of Cucurbits.

Downy mildew is probably the most serious disease affecting cucurbits in this State. Rock-melons and cucumbers suffer most severely while marrows are also occasionally attacked. In moist warm weather favourable to the spread of the fungus, little more than a week is needed for a field to be practically wiped out.

SYMPTOMS.

The disease commences first on the older leaves of a vine near the centre of a plant and gradually works out from these along the runners. In its early stages downy mildew shows up as small diffuse and somewhat indistinct greenish-yellow spots. These enlarge until they become delimited by some of the veins of the leaf to more or less definite angular areas of about $\frac{1}{8}$ to $\frac{1}{4}$ inch across. (Plate 49.) The colour of the invaded area turns to a more distinct yellow or light yellowish brown. If the spots are numerous they may coalesce to form larger discoloured areas which give, especially in the case of cucumbers, a yellow appearance to the plant as a whole. The affected portions gradually turn brown and dry out, and the leaf contracts upwards about the main veins giving a characteristic claw-like effect. The wilting of the leaves extends out along the runners, leaving a small number of the younger leaves at the end unaffected or showing only early symptoms.

When once a vine becomes badly affected the development of any fruit present comes to a standstill, nor are any more produced. Sunscald may result from the loss of leaves.

CAUSE.

The disease is brought about by a fungus parasite (*Pseudoperonospora cubensis*) allied to those fungi producing downy mildew of the grape vine, cabbage, &c. Often there is no external indication of the fungus causing the disease spots, but during moist weather the fruiting stage appears on their under surface as a very delicate whitish down which changes to a light purple brown as the spores mature. When infection is heavy the whole of the under surface of the leaf may have a downy coat of this colour. The fructification consists of delicate conidiophores branched in a somewhat tree-like manner which project two or three together from the stomata. From the tip of each of the branches is produced a thin-walled oval spore which easily becomes detached and blown about, thus serving to disseminate the fungus.

* Reprinted from "Pests and Diseases of Queensland Fruits and Vegetables," by Robert Veitch, B.Sc., F.E.S., and J. H. Simmonds, M.Sc. Published by the Department of Agriculture and Stock, Brisbane, 1929.

CONTROL.

The disease may be checked by systematic spraying with Bordeaux mixture. This spray applied at the usual strength is found to cause burning of some cucurbits, and it is therefore advisable to use instead a 3-4-40 formula. Care must be taken that both upper and under surfaces of the leaves are covered.

It will be noted that the disease makes its first appearance on the older leaves towards the centre of the plant. Spraying should therefore commence when the plants are small, in order to prevent infection starting in this region. By this means spread of the disease may be retarded sufficiently to enable the crop to be harvested. Once downy mildew has got a firm hold in well-advanced vines little can be done to save them.

Any diseased material should be burnt, and a field on which a mildewed crop has grown should not be planted again to cucurbits for a year or two.

Some varieties appear to show resistance to downy mildew, but there is not yet available satisfactory data in this connection so far as Queensland is concerned.

Powdery Mildew of Cucurbits.

Powdery mildew is a disease to which all cucurbit crops are subject, though the cucumber, marrow, and pumpkin probably suffer most. The disease is caused by a fungus (*Oidium erysiphoides*) which is one of the ectoparasitic type, living as it does on the exterior of the host plant. The interlaced mycelial threads, together with the fructification, form diffuse white patches on both the upper and lower surfaces of the leaves. These patches spread and merge into one another until the whole leaf may become covered with a white floury coat. (Plate 50.) The lesions are not of the definite restricted area seen in the case of downy mildew. The affected leaf turns a greenish yellow and then yellow usually over fairly large areas, and finally dries out. As in the case of downy mildew, the older leaves are attacked first, the infection proceeding from the centre out along the runners.

The fructification of the fungus consists of straight unbranched conidiophores developed direct from the surface mycelium. Transverse septa laid down in these cut off successive cells which become constricted off to form thin-walled oval spores. These may remain loosely attached for a time, forming a chain.

CONTROL.

Owing to the superficial growth habit of the fungus causing this disease, spraying with lime sulphur or dusting with sulphur will provide control. Te be effective, both sides of the leaves must be covered.

Water-melon Anthracnose.

Anthracnose is a disease which may attack water-melons, cucumbers, and rock-melons. The amount of loss sustained depends largely on weather conditions. During a hot dry season the disease may not obtain a firm hold until after the vine has ceased to be productive. In a wet season considerable loss may be experienced through fruit disfigurement and reduction in yield from loss of foliage. The disease is caused by one of the anthracnose group of fungi (*Colletotrichum lagenarium*).

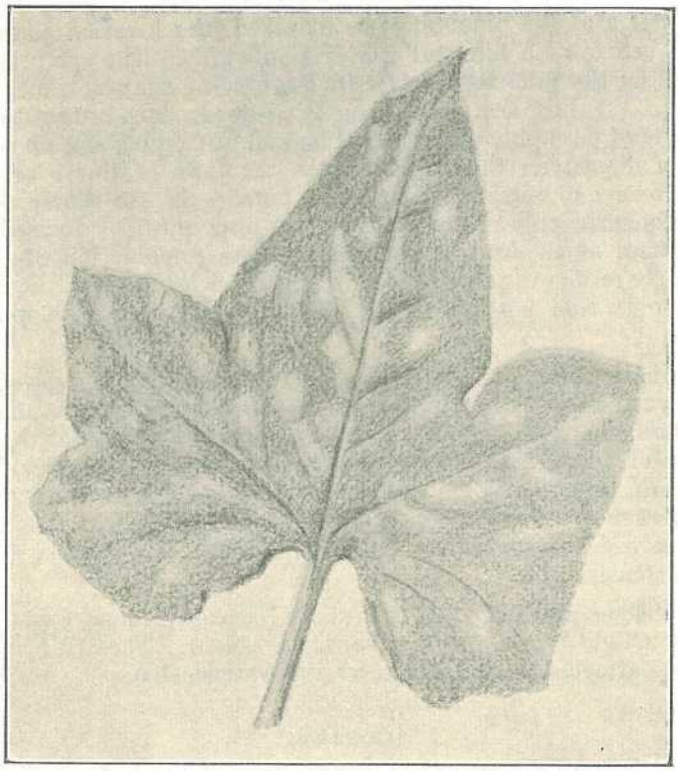

PLATE 49.—CUCUMBER LEAF AFFECTED WITH DOWNY MILDEW.

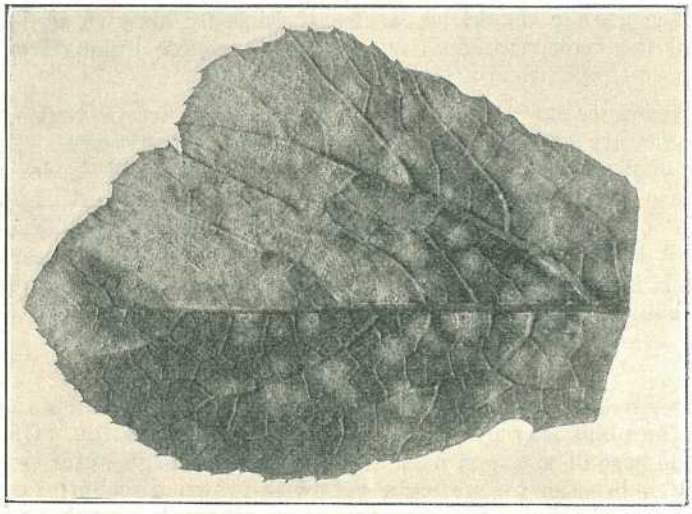

PLATE 50.—POWDERY MILDEW ON THE MARROW.

SYMPTOMS.

All parts of the plant may be attacked, the invasion commencing from the centre of a hill and working outwards. The symptoms vary somewhat on the different hosts. In the case of the water-melon there appear on the leaf scattered, sharply defined, dark-brown to almost black spots of a roughly circular outline and of varying size up to nearly ½ inch in diameter. Stem lesions take the form of linear or broadly linear brown and somewhat shrunken patches in the centre of which there frequently appear clusters of light-pink pustules formed by the spore masses of the fungus concerned. The combination of leaf and stem injury results in the withering of the older leaves from the centre of the vine outwards, possibly at the same time exposing developing fruit to sunscald.

On the fruit small light-brown slightly raised spots appear. These enlarge, turn dark brown, and become somewhat sunken. At the base of the depression appear the pink spore masses characteristic of the disease. Infection of young fruit may lead to malformation. On older fruit the anthracnose lesions may be sufficiently numerous to coalesce and form large irregular disfiguring patches. (Plate 52.) Often other organisms are able to invade the fruit through anthracnose spots and set up extensive rot.

On the cucumber the leaf lesions are less conspicuous, owing to their being of a light-brown rather than black colour. The fruit are not so commonly attacked as in the case of the water-melon.

CONTROL.

1. Infection of a crop often results from the use of a field in which there remains refuse from a diseased crop of the previous year. Cucurbits should therefore not be planted on the same land for two years in succession.

2. The grower should be careful if selecting his own seed to make sure that the fruit used does not bear anthracnose lesions from which spores may chance to contaminate the seed.

3. Spraying cannot be relied on to act as a sure prevention, owing to the difficulty of covering the under surface of all leaves. Bordeaux mixture of 3-4-40 strength if systematically applied will, however, check the disease sufficiently to enable a crop to be taken off. An application should be made as soon as the vines begin to run, and another when the first fruit have formed. Further applications will be necessary if the weather is at all wet especially should the disease makes its appearance in the field.

Water-melon Wilt.

Water-melon vines will sometimes wilt off suddenly for no apparent reason; the plant may previously appear perfectly healthy. On cutting across the base of the stem of a wilted plant the large water-conducting vessels will be seen to exhibit a yellowish-brown discolouration. This is due to invasion by a fungus (*Fusarium niveum*), a parasite allied to the one causing Fusarium wilt of tomatoes. This fungus can live for long periods on vegetable mould in the soil, and from there will invade

the melon plant per medium of injured roots. The fungus then travels up through the vessels of the stem, causing sufficient damage to these to eventually bring about the wilting of the vine.

Fungi with the same habits sometimes cause trouble of a similar nature in other cucurbitaceous crops.

CONTROL.

Owing to the soil-frequenting habits of the fungus, little can be done beyond rotating an infested field for several years to crops other than those belonging to the cucurbit family.

Black Rot of Cabbage and Cauliflower.

Black rot is probably Queensland's commonest cabbage disease. The plant may be attacked at all stages of growth, and when the disease becomes well established heavy loss is the result. The disease is favoured by warm weather, and is therefore most serious on a crop grown during the summer months.

CAUSE.

Black rot is caused by a bacterial parasite (*Pseudomonas campestris*). This is a minute rod-shaped organism with a single vibratile flagellum developed from one end, by means of which progress through the plant tissue becomes possible. The bacteria enter the plant through the minute water-pores which are to be found situated round the margin of the cabbage leaf. On a cool night small drops of surplus water will be seen exuding from these openings. The bacteria reaching these drops quickly multiply and find their way through the pores into the leaf. The injuries caused by the various leaf-eating insects will also serve as a point of entry.

SYMPTOMS.

As a result of this method of invasion there is seen, as a first symptom of attack, light-brown areas of dying tissue extending in from the margin of the leaf or surrounding insect wounds. The affected region gradually advances along the direction of the main veins towards the midrib, and the brown invaded tissue dries out to a thin papery consistency. The bacteria travel chiefly within the water-conducting vessels of the veins, which they discolour to such an extent that the latter stand out as black lines over the brown areas. (Plate 53.) Eventually the whole leaf may dry up. The bacteria meanwhile travel down the midrib and leaf-stalk into the main stem of the plant, and from this can invade other parts. In this manner they may pass up the stem into younger leaves, and so produce dark blotches in the white centre of leaves of an apparently sound head. The organisms may multiply in the water-conducting vessels of the stem to such an extent that the normal function of these can no longer be performed, with the result that affected plants are usually markedly stunted.

Although the black rot bacteria only produce a dry rot, they may open the way for the invasion of various soft rot organisms which finally bring about a rapid, foul-smelling, wet rot.

On cutting across the base of an affected leaf or through the crown of the plant, the black ring of bacteria-filled vessels usually stands out plainly, and constitutes for diagnostic purposes perhaps the most characteristic symptom of the disease. (Plate 55.)

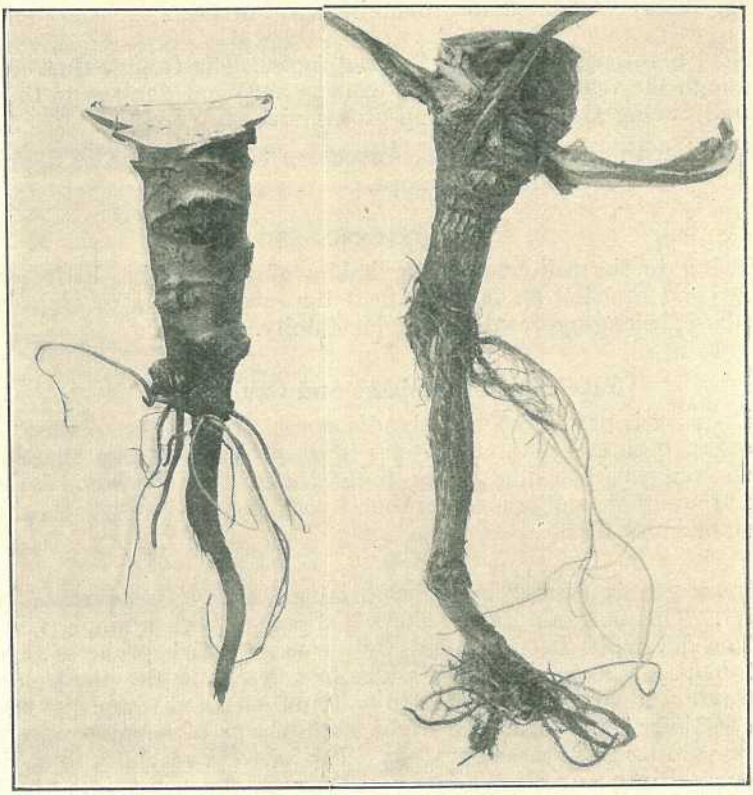

PLATE 51.—CABBAGE BLACKLEG.

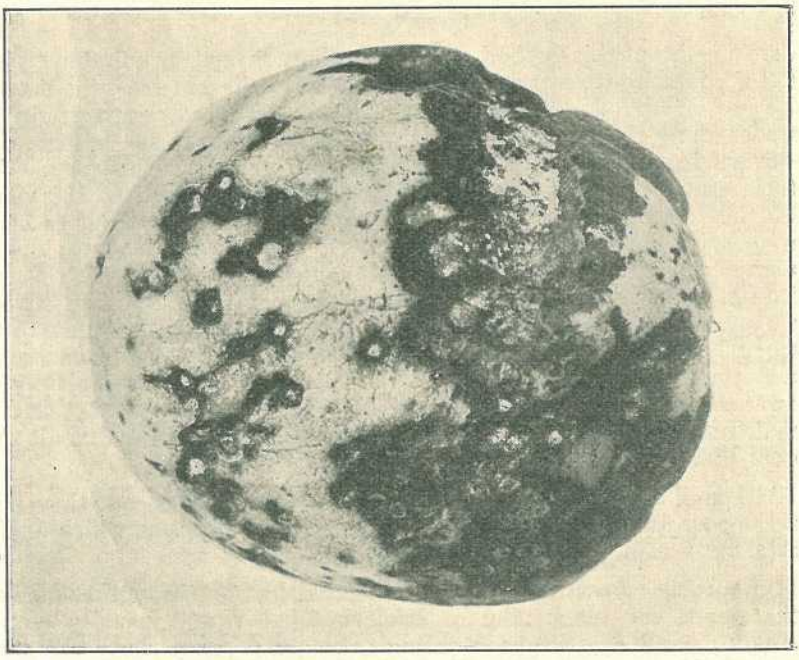

PLATE 52.—WATER-MELON ANTHRACNOSE.

Almost all cruciferous plants are subject to black rot, though the cabbage and cauliflower are the ones seriously affected. In the cauliflower there is a tendency for the affected areas of the leaf to be restricted in extent, and they may eventually dry up and drop out.

CONTROL.

In this connection it may be pointed out that the bacteria causing black rot may contaminate the seed, where they can remain unaffected by desiccation for many months. They can also live in the soil for a year or two in the absence of a living host. The field and seed-bed can therefore easily become infested by contact with refuse from a diseased crop.

The following control measures should be practised:—

1. Obtain seed from a district in which seed-borne diseases are not known to exist. If the origin is doubtful, the seed should be disinfected by soaking for thirty minutes in a 1 to 1,000 solution of corrosive sublimate. The seed is then rinsed thoroughly in clean water and spread out to dry. Care must be exercised when using corrosive sublimate, as this chemical is a deadly poison.

2. Select a site for the seed-bed some distance removed from land that has previously grown cabbage or other cruciferous crops. Be sure that manure used in the bed is free from any chance of contamination. If a suitable site cannot be obtained the bed should be disinfected as described in the chapter on fungicides and disease control.

3. Practise crop rotation. After producing a cruciferous crop the land should be kept free from cabbage, cauliflower, or related plants for two or if possible three years.

4. Insects may be the cause of an increase of the disease, by creating means of entrance and also by directly carrying the bacteria from plant to plant. These should therefore be kept in check by suitable spraying or dusting.

Blackleg of Cabbage.

This disease is caused by a fungus (*Phoma lingam*) which, like the black rot organism, may attack the plant at any period of its growth from the seedling stage to maturity. Cabbages and cauliflowers are both liable to serious infection, while the fungus may attack to a less extent other related crops such as turnip, radish, and several cruciferous weeds.

SYMPTOMS.

The disease commonly appears first in the seed-bed, where its presence is manifested by a stunting and yellowing of the plants, and frequently by damping off. In an affected plant an area of rot appears on the stem below the seed-leaves. This usually becomes sunken and of a dark colour. The fungus may advance rapidly through the tissue until the stem is cinctured and the seedling wilts.

In other cases infection may take place in the bed, but the disease does not develop sufficiently to prevent the seedling from being planted in the field. Here the fungus will develop further and destroy the tissue of the stalk below the leaves, gradually extending its attack down the rootstock. The affected region becomes shrunken and black, giving the

appearance from which the name is derived. (Plate 51.) Later there will appear numerous minute black specks scattered over the affected area. These are the rounded fruiting bodies or pycnidia of the fungus causing the disease, and their appearance serves to distinguish blackleg from other diseases of the cabbage producing somewhat similar symptoms. The root system may be entirely destroyed, leaving only a tapering stump. Sometimes a tuft of lateral roots will be developed above the affected region, and these for a time lend some support to the plant.

The fungus may also attack the leaf-stalks and leaves, forming on the latter irregular light-brown areas speckled over with the black pycnidia. Spores from these leaf lesions may be splashed or blown on to the growing seed-head, and there develop and cause infection of the seed-pods and seeds. Seed contaminated in this way is a frequent cause of the introduction of blackleg into clean areas.

The effect on the plant as a whole is to cause a yellowing and dying of the outside leaves, which shrivel up and remain attached to the stem. (Plate 51.) The diseased plant is usually markedly stunted as compared with healthy individuals, and may eventually wilt off completely during a spell of dry weather.

CONTROL.

The chief means by which infection of a new crop takes place are—(*a*) By the use of infected seed; (*b*) by sowing in an infected seed-bed; (*c*) by planting in an infected field. Spores may remain capable of germination associated with old diseased cabbage refuse in the soil until this has completely rotted away.

In the matter of the source of primary infection, there is then close correspondence between blackleg and the bacterial disease previously described. As would be expected from this, the control measures for the two diseases are very similar.

1. Obtain seed from a district in which seed-borne disease is not known to exist, or else treat the seed to destroy the fungus with which it may be contaminated. Sterilisation of the seed with corrosive sublimate as for black rot may be practised, but, owing to the fact that the fungus mycelium may actually penetrate the internal tissues of the seed, this method does not always give satisfactory control. A better plan is to adopt a hot-water treatment, in which the seed is immersed for 25 minutes in water held at 122 deg. F. At this temperature the spores and mycelium of the fungus are killed while germination of the seed is scarcely interfered with. The operation necessitates the employment of considerable care to ensure an even temperature.

2. Use only fresh or sterilised soil for the seed-bed, and let this be situated as far as possible from the location of previously diseased plants. Watering the seed-bed by carefully flooding the surface rather than by overhead spraying will help to prevent the distribution of the fungus throughout the bed.

3. Spraying the seedlings with weak Bordeaux mixture (4-4-40), combined if desired with arsenate of lead, will help to keep this and other seed-bed diseases in check.

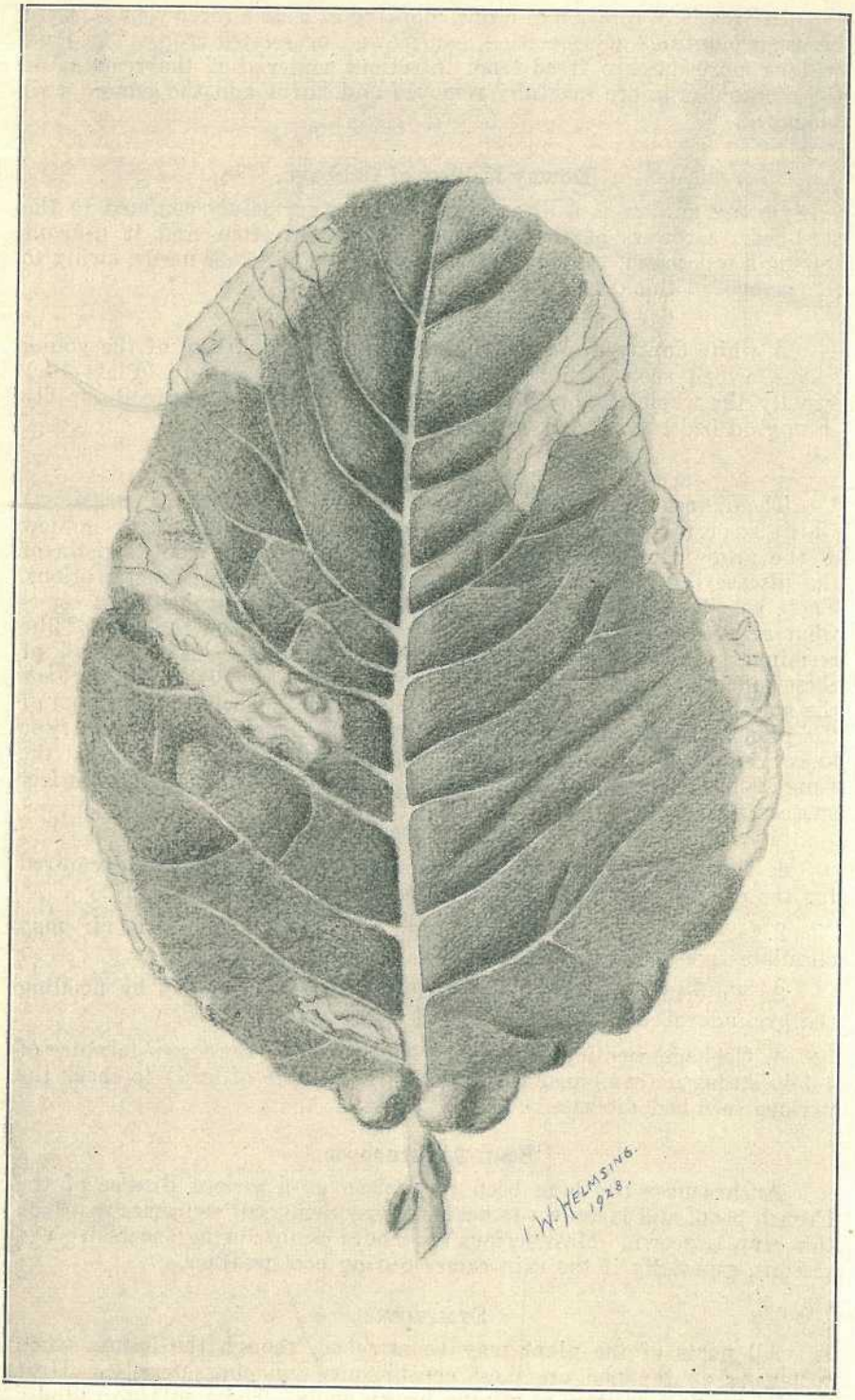

PLATE 53.—BLACK ROT OF CABBAGE.

4. Practise a rotation of crops, allowing at least a three-year interval between plantings of a cabbage, cauliflower, or related crop. The land will be more quickly freed from infectious material if the remains of the diseased crop are carefully removed and burnt and the ground well ploughed.

Downy Mildew of Cabbage.

Downy mildew is a disease in this country mainly confined to the seed-bed. Growers of cabbage and cauliflower often find it difficult during a wet season to raise sufficient seedlings for their needs, owing to the ravages of this disease.

SYMPTOMS.

A white downy growth appears on the under surface of the young leaves, which soon turn a dark colour and shrivel up. (Plate 54.) Finally the whole seedling dies down. The trouble will spread rapidly through a bed leaving few or no healthy plants.

CAUSE.

The disease is due to the attack of a fungus (*Peronospora parasitica*) which is of a similar type to those organisms causing downy mildew of the grape vine, cucumber, &c. The white mildew characteristic of the disease is produced by numerous clusters of fungal fructifications. These consist of short, upright conidiophores which branch in a somewhat arborescent manner at the top, and develop from the tips of the terminal branches delicate, oval, thin-walled spores. The spread of these spores by wind and rain serves to distribute the disease throughout the seed-bed. Another form of spore may be found within the tissue of the plant. This is of a rounded, thick-walled, sexually produced type known as an oospore. This serves as a resting spore, and enables the fungus to live through adverse conditions of environment and infect succeeding crops.

CONTROL.

1. The seed-bed should be located on new ground, as is required for the control of other cabbage diseases.

2. Avoid a thick growth by thin sowing in order that air may circulate freely among the plants.

3. Watering should not be excessive, and is best done by flooding the ground rather than by overhead spraying.

4. Cabbage seedlings should be sprayed with Bordeaux mixture of 4-4-40 strength (combined if desired with arsenate of lead) to check the various seed-bed diseases.

Bean Anthracnose.

Anthracnose has long been recognised as a serious disease of the French bean, and is known to occur in practically all countries in which this crop is grown. Most serious epidemics occur during successive wet seasons, especially if the rain comes during cool weather.

SYMPTOMS.

All parts of the plant may be attacked, though the lesions when occurring on the pod are most conspicuous and characteristic. Here the disease first appears as minute brown spots. These enlarge radially

as the fungus producing them advances through the tissue until they are ¼ inch or more in diameter. As the cells of the pod tissue are invaded they die and collapse, and the spot becomes in consequence more or less depressed. The central sunken portion is usually dark-brown almost black in colour, and is surrounded by a margin of lighter brown. Under moist conditions the centre of the spot will be covered with clusters of pinkish pustules representing the fruiting stage of the fungus concerned in the injury. (Plate 56.) The leaves may exhibit brown irregular patches chiefly in connection with the veins of the under surface. Dark-brown cankerous areas are formed on the seedling leaves and lower portions of the stem as a result of seed infection. The spotting on the pod may spread in storage when beans are subjected to long-distance consignment.

CAUSE.

Bean anthracnose is caused by the attack of a fungus parasite (*Colletotrichum lindemuthianum*). The fruiting bodies of this fungus are very readily produced on the affected areas during moist weather. Mycelial threads become massed together at certain points just below the dead epidermis, forming the bed or stroma characteristic of the anthracnose fungi. From the stroma, short, closely growing, peg-like conidiophores are developed which cut off at their apex single clear oval spores. The production of numbers of these spores finally ruptures the overlying layer of plant tissue. The individual spores are held together in a mass by a mucilaginous secretion, and these form the pinkish coloured pustules mentioned above. A shower of rain will free the spores and transfer them to healthy plants.

When the pods are attacked the fungus is frequently able to penetrate through to the seed, which becomes invaded by the mycelial threads. Seed infested in this manner may be somewhat malformed, and usually bears brown or black patches of varying size and shape. The fungus may remain within the dry seed in a dormant state until the latter is subjected to moist conditions suitable for germination. It will then commence to develop further and soon proceeds to the formation of the fruiting stage. Affected seed is frequently too much injured to permit of germination, but should this take place the spores formed on the primary point of invasion may be washed on to the young growth or base of the stem, causing further lesions which may result in the stunting or death of the young plant.

EFFECT.

The grower often reckons his loss from anthracnose only on the basis of the amount of discard necessary on account of pod disfigurement. In addition to this there have usually been losses due to poor germination of infected seed, death of affected seedlings, and general reduction in productiveness of diseased plants.

CONTROL.

1. Anthracnose has received the attention of many workers, and it has been clearly shown that the chief danger of an attack of this disease lies in the use of infected seed. The grower should therefore obtain his seed from a crop in which anthracnose has not appeared. Failing this, a selection should be made of seeds from pods which show no sign of any blemish which might be attributed to the presence of this disease.

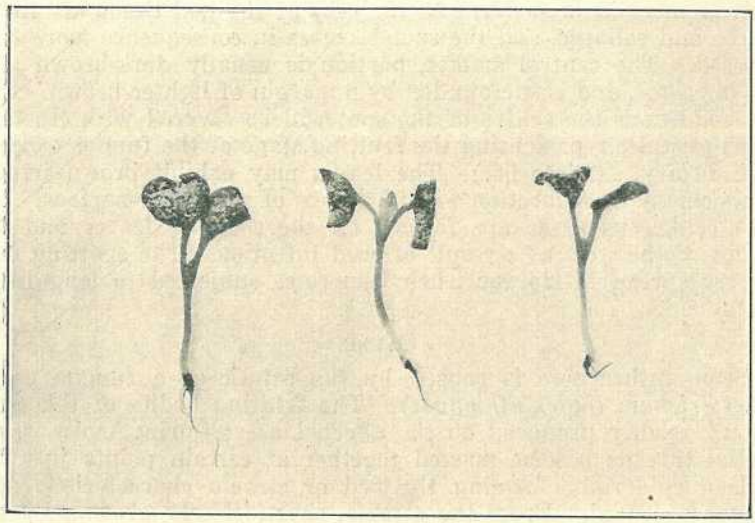

PLATE 54.—DOWNY MILDEW ON CABBAGE SEEDLINGS.

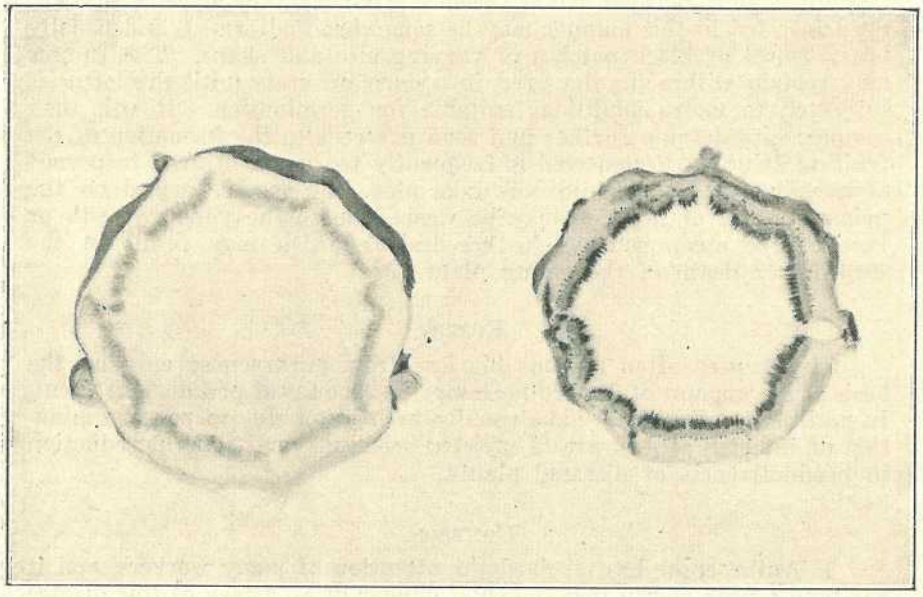

PLATE 55.—Transverse section of the stem of a healthy Cabbage (left), and a Black Rot infected Cabbage (right), to show characteristic blackening of the vascular tissue by the bacteria.

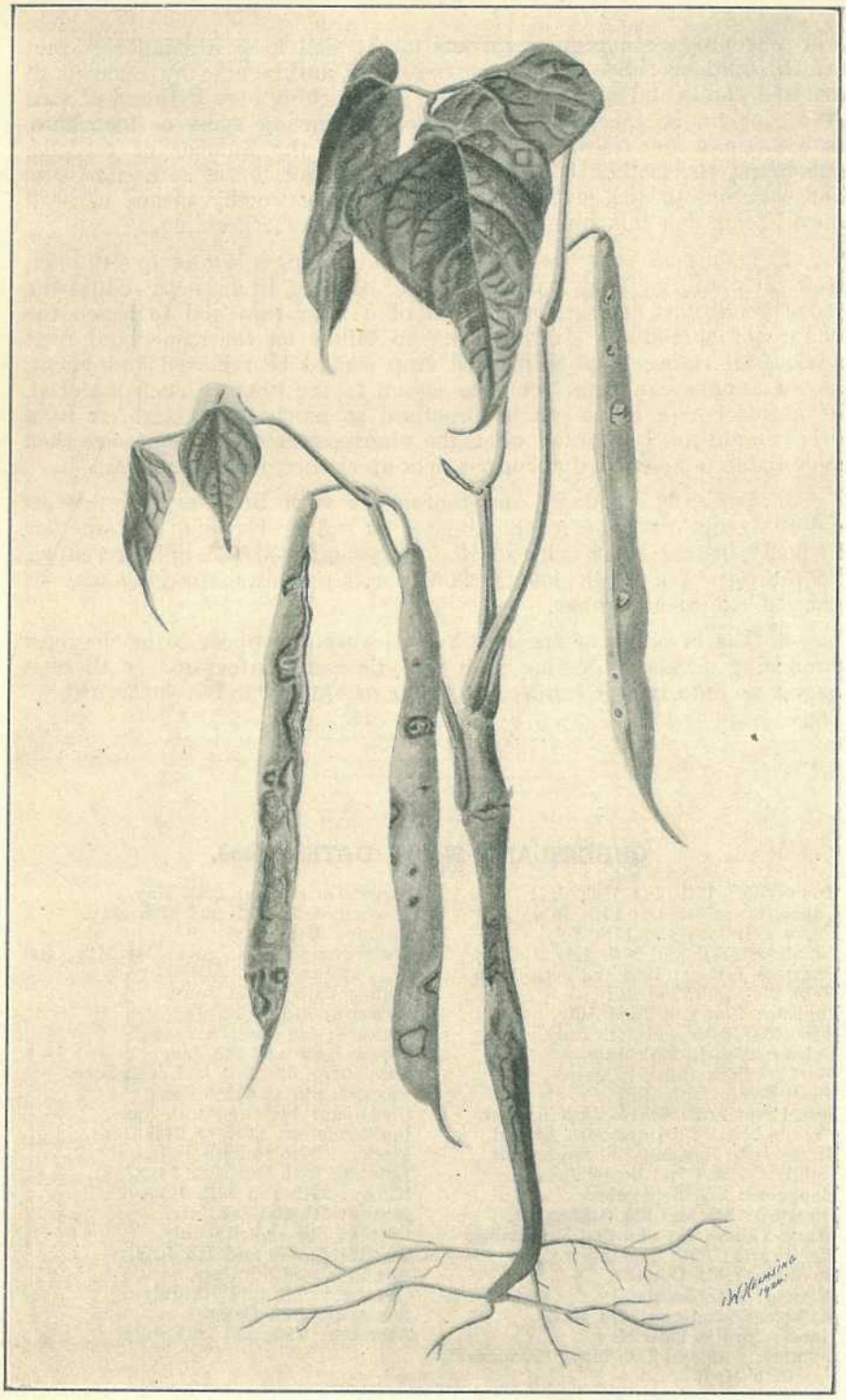

PLATE 56.—BEAN ANTHRACNOSE.

For this purpose a regular grower might well keep a small seed-plot which could be more easily kept free from anthracnose by removal of affected plants and regular spraying. The picking over by hand of seed whose origin is uncertain, removing any showing spots or blemishes, is sometimes practised. While this lessens the number of seedling infections, the method is not sufficiently efficient to act as a substitute for selection in the pod. A simple and trustworthy means of seed sterilisation for this disease has not yet been forthcoming.

2. Do not select for bean-growing land having a low damp situation. Sow the plants as thinly as economically possible, in order to reduce the moist conditions arising from a fall of dew or rain and to lessen the chance of spreading. If beans are to follow on the same land next season, all refuse from a diseased crop should be removed and burnt, as the fungus can pass from one season to the next on such material. If a rotation of crops can be practised so much the better. A bean crop should not be worked when the plants are wet, as spores are then very liable to be carried about the field on clothes, implements, &c.

3. Spraying regularly and thoroughly with Bordeaux mixture of 4-4-40 strength will control the disease. It is, however, doubtful whether in many instances the value of the crop would warrant this procedure. In the case of a small plot grown for seed purposes, spraying may be carried out to advantage.

4. The breeding of resistant varieties would appear to be the most promising means of dealing with this disease. Unfortunately there is as yet no data in this connection so far as Queensland is concerned.

QUEENSLAND SHOW DATES, 1933.

Townsville: 11th and 12th July.
Caboolture: 13th and 14th July.
Rosewood: 14th and 15th July.
Nambour: 19th and 20th July.
Charters Towers: 19th and 20th July.
Esk: 21st and 22nd July.
Ingham: 21st and 22nd July.
Atherton: 25th and 26th July.
Cairns: 25th to 27th July.
Maleny: 26th and 27th July.
Pine River: 29th July.
Royal National: 7th to 12th August.
Crow's Nest: 23rd and 24th August.
Home Hill: 1st and 2nd September.
Imbil: 1st and 2nd September.
Enoggera: 2nd September.
Innisfail: 8th and 9th September.
Mary Valley: 1st and 2nd September.
Kenilworth: 30th September.
Southport: 6th October.
Nerang: 13th October.
Kilkivan: 22nd and 23rd May.
Roma: 23rd to 25th May.
Gympie: 24th and 25th May; Campdraft, 27th May.
Biggenden Sports: 26th May.
Toogoolawah: 26th and 27th May.
Kalbar: 27th May.
Maryborough: 30th and 31st May, and 1st June.
Callide Valley: 2nd June.
Marburg: 3rd to 5th June.
Childers: 5th and 6th June.
Wowan: 8th and 9th June.
Bundaberg, 8th, 9th, and 10th June.
Lowood: 9th and 10th June.
Gladstone: 14th and 15th June.
Rockhampton: 20th to 24th June.
Mackay: 27th to 29th June.
Laidley: 28th and 29th June.
Kilcoy: 29th and 30th June.
Bowen: 5th and 6th July.
Gatton: 5th and 6th July.
Woodford: 6th and 7th July.
Ayr: 7th and 8th July.
Cleveland: 7th and 8th July.
Southport: 6th October.
Atherton: 25th and 26th July.

THE JAVA WONDER CANE.

A WARNING TO CANEGROWERS.

P.O.J.2878, or the "Java Wonder Cane," was bred at the East Java Sugar Experiment Station some ten years ago, and owes its name to the decided superiority in yielding capacity which it showed in comparison with all other standard varieties in that country. Under a wide range of soil and other environmental conditions, its consistent superiority was maintained; and in the course of five years 95 per cent. of the cane lands of Java were planted to the variety. On the better soils it outyielded E.K.28 to the extent of only 1 or 2 tons of cane per acre; but on the heavy wet lands yield trials showed that the new cane could produce crops 50 per cent. heavier than those under the old standard varieties. The influence which this new cane exerted on the crop returns of Java is an excellent illustration of what may be effected in the breeding of new varieties by a sustained effort along carefully-planned lines.

It was not until 1928 that the Bureau was able to obtain three sets of this cane; and when it had passed through its period of quarantine, steps were taken to propagate the variety as rapidly as possible, with a view to determining its value under Queensland conditions. Naturally, high hopes were entertained for this cane, which had shown such excellent results in the land of its origin. Although it has made a promising start in certain of our districts, it has been found to possess a number of unfavourable characteristics, particularly with regard to disease susceptibility. It is with the object of stressing these features, and urging growers generally to refrain from wholesale plantings of the cane, that these remarks are presented.

The cane gives, in general, a quick strike and a good stool, and is a good ratooner. Though it is rather a slow grower in its early stages, it later develops at a rapid rate, and under favourable conditions heavy tonnages have been recorded on trial plots. The variety is, unfortunately, a late maturer; and this is a serious drawback in areas where a succession of dry months during the winter and early spring may result in a collapse of the crop before it has attained maturity. Such conditions have been experienced in Mackay in the past three seasons with a sister cane, P.O.J.2714.

As regards C.C.S. content, the variety is inferior to our better class canes.

It is from the point of view of disease susceptibility that the "wonder" cane is particularly disappointing. In areas where downy mildew is prevalent, practically all of our propagation plots have been condemned as sources of plants, owing to the contraction of this disease. It is the opinion of our pathologist that this cane and P.O.J.2714 are the varieties most susceptible to this disease, at present grown in Queensland. When it is remembered that further plantings of this cane in proximity to B.208 will probably intensify the proportion of disease in the latter cane, it is felt that it would be suicidal to jeopardise the future of this valuable early maturing cane for one whose true worth has not been established, and which cannot be expected to show any superior features under these conditions.

In the far northern areas, where top rot disease makes its appearance under favourable climatic conditions, P.O.J.2878 is certain to suffer considerable damage. Again, this has proven to be one of the most susceptible varieties known, and heavy losses may be expected with spring plant cane or late ratoons. Under these conditions, April planting is practically essential if serious damage is to be obviated, should the following early summer conditions prove favourable for the development of the disease.

Fiji disease is sure to take very heavy toll of this cane in those areas where this malady is present. In certain areas of the Fiji Islands where the disease occurs the variety has been practically wiped out.

As regards Pokkah Boeng, the "wonder" cane exhibits the same susceptibility as its sister cane, P.O.J.2714. Although this disease is of rather minor importance with the majority of our standard varieties, it is liable to become serious with this cane. The entry of fungus diseases through the "knife cuts" in the stem, often brought about by Pokkah Boeng, results in the development of rots which effect a serious reduction in sugar content of the cane at harvest time.

It is only in the case of mosaic, and particularly gumming disease control, that P.O.J.2878 provides us with a very useful variety. In all of the resistance trials conducted to date, it stands at the head of the list of canes highly resistant to gumming. It is for this reason that we are attempting to effect a rapid propagation of the variety in the southern areas of the State, and the results to date are very encouraging. This year yield trials on a fairly extensive scale will give us a definite

indication of its superiority or otherwise, and much is hoped for. Of course, its success is not to be regarded as a solution of the gumming disease problem. The short-comings of the variety with respect to its lateness of maturity is a serious drawback, and it is absolutely essential that a resistant early maturer be found of satisfactory yielding capacity before it may be concluded that the disease is effectively under control.

From the above comments it must be concluded that the new cane does not measure up to the earlier anticipations of its merit. It is agreed that the cane is worthy of a thorough try-out, and except for those areas where the abovementioned serious diseases are prevalent, plantings on a modest scale will be made this year. As a result of a further season's observations, it is hoped that sufficient specific data will be available to warrant a definite statement as to its suitability or otherwise over the wide range of Queensland growing conditions.

NOTICE TO SUBSCRIBERS.
SPECIAL AND IMPORTANT.

Under the Commonwealth Postal Regulations it is NO LONGER PERMISSIBLE to indicate the expiry of subscriptions with a BLUE CROSS on the first page of the Journal. So in the future that reminder will NOT appear.

The need for the strictest economy makes any other form of reminder at present impracticable. THE ONUS OF REMEMBERING THE DATE OF EXPIRY OF, AND RENEWING THE SUBSCRIPTION PROMPTLY IS, THEREFORE, PLACED ON EACH SUBSCRIBER.

As about 1,000 subscriptions expire each month, the cost of a postal reminder is, in present circumstances, prohibitive. Readers will, therefore, appreciate that fact, and will, no doubt, help us to retain their names on our mailing list by kindly noting the date of payment of their subscriptions and, on expiry, sending in their renewals at once.

Instead of just sending the annual subscription—one shilling—along, it is suggested that, when renewing, they do so for two or three years, or even a longer term. For instance, FIVE SHILLINGS would keep a name on our subscribers' register for FIVE YEARS.

By doing this subscribers would help greatly in reducing clerical labour, as well as avoid the inconvenience to themselves of posting annually the very small sum necessary for their registration.

Readers renewing their subscriptions should USE THE ORDER FORM on another page, which should be filled in FULLY and CORRECTLY. Renewals by letter do not as a rule give the essential information, thereby causing unnecessary waste of time and much inconvenience. The Form is also our record, and orders which come by letter require special handling to adapt them to our card recording system.

When an address on the Order Form is not that to which the Journal has hitherto been sent, attention should be called to the new address, and the former address given. This assists us to identify subscribers, of whom we have many of the same name, often in the same district, as well as in different parts of the State.

Women subscribers should add to their names the word "Mrs." or "Miss," as the case may be. This is a constantly recurring omission, and its correction causes a lot of unnecessary labour in checking electoral rolls and other references. Wives and children of subscribers should apply in the subscriber's name, and so facilitate registration.

Answers to Correspondents.

BOTANY.

Yellow Plum

H.A.S. (Clermont)—

The specimen is *Ximenia americana*, sometimes called Yellow Plum. This is a fairly widely distributed plant and seems to be fairly common at Clermont. It has been noted that the aborigines ate the fruit, but we have no definite information as to the suitability or otherwise of the flesh or kernel for the white races. The green parts of the plant have been found to contain a prussic-acid-yielding glucoside.

Hairy Indigo.

O.L.H. (Mareeba, N.Q.)—

The specimen is the Hairy Indigo, *Indigofera hirsuta*, a native of Queensland, also found through the Malayan region to India. The plant is not known to possess any harmful properties, but we do not know that it has any particular economic value.

Wheat Grass.

D.Y. (Kingaroy)—

The specimen is *Agropyron scabrum*, sometimes known as Wheat Grass, fairly common in parts of Queensland, particularly on the Darling Downs. In New South Wales and the cooler parts of this State it is generally looked upon as a valuable stock food, but in the hotter parts, and particularly on infertile or barren soils, it becomes unpalatable and not of much value.

Rattle Pod.

W.R.S. (Rockhampton)—

The specimen is *Crotalaria trifoliastrum*, a small species of Rattle Pod. This plant is very common in various parts of Queensland, and has been suspected of poisoning stock on one or two occasions. No feeding tests have been carried out with the plant, but in view of the known poisonous nature of several members of the genus *Crotalaria*, both in Australia and abroad, it is as well to regard the plant with suspicion.

J.J. (Glass House Mountain)—

The specimen is *Crotalaria striata*, a species of Rattle Pod widely spread over the tropical regions of the world. It is very common in parts of coastal Queensland. It has been definitely proved by feeding tests to be poisonous to live stock, though, as a general rule, stock seem to leave it untouched, or at least they only eat the plant to a limited extent unless forced to it by absence of other feed. In Ceylon and some other tropical countries the plant is much utilised as a green manure.

Prickly Poppy.

INQUIRER (Longreach)—

The specimen is not Saffron or Star Thistle, but the Prickly Poppy (*Argemone mexicana*), a gazetted noxious weed. The plant has been accused of poisoning stock on several occasions, but is rarely eaten by them. The only cases of poisoning that have come under our notice have been where the plants have been cut and allowed to wilt and where calves have eaten the wilted, and consequently softened, plants.

PRODUCTION RECORDING.

List of cows and heifers officially tested by officers of the Department of Agriculture and Stock, which have qualified for entry into the Advanced Register of the Herd Book of the Australian Illawarra Shorthorn Society, the Jersey Cattle Society, and the Friesian Cattle Society, production charts for which were completed during the month of February, 1933 (273 days period unless otherwise stated).

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
	JERSEY.			
	MATURE COWS (OVER 5 YEARS), STANDARD 350 LB.			
Shamrock Farm Jean	J. Hunter and Sons, Borallon	8,532·37	537,072	Shamrock Farm Palatine
Prospect Dewdrop 13th	J. McInally, Brassall	9,179·73	508·827	Oxford Valentine
Oxford Golden Spray	E. Burton and Sons, Wanora	7,680·71	488·477	Oxford Palatine
Pine View Rosina	J. Hunter and Sons, Borallon	6,103·81	394·969	Oxford Renown
	SENIOR, 4 YEARS (OVER 4½ YEARS), STANDARD 330 LB.			
Oxford Rose Marie	E. Burton and Sons, Wanora	8,363·47	556·287	Oxford Buttercups King
Oxford Joyful	ditto	7,493·01	452·756	ditto
	JUNIOR, 4 YEARS OLD (UNDER 4½ YEARS), STANDARD 310 LB.			
Lyndhurst Molly	J. B. Keys, Gowrie Little Plain	10,165·39	480·188	Noble King of Ogilvie
	JUNIOR, 3 YEARS OLD (UNDER 3½ YEARS), STANDARD 270 LB.			
Poppy of Calton	C. Burrow, Goomeri	7,084·43	388	Retford Meteor
	SENIOR, 2 YEARS OLD (OVER 2½ YEARS), STANDARD, 250 LB.			
Princess Mary of Inverlaw	R. J. Crawford, Inverlaw	6,120·65	298·918	Masterpiece Yeribee of Bruce Vale
	JUNIOR, 2½ YEARS (UNDER 2½ YEARS), STANDAKD, 230 LB.			
Dewdrop 4th of Golden Hill	C. Klaus, Mundubbera	6,881	376·929	Lily's Triumph of Golden Hill
Eldon Olga	J. B. Keys, Gowrie Little Plain	5,424·76	301·608	Retford Raleigh Chief
Langside Golden Buttercup	R. J. Crawford, Inverlaw	5,960·6	299·399	Masterpiece Yerrabee of Bruce Vale
Glenview Alfriston Dora	F. P. Fowler and Sons, Coalstoun Lakes	4,880·45	286·712	Glenview Alfriston Duke
Wyreene Trixie	J. B. Keys, Gowrie Little Plain	6,096·13	279·506	Lyndhurst Victor
Trinity Jolly Mayoress	E. J. O'Keefe, Nambour	4,455·55	277·243	Trinity Perfection
Mae of Karoola	N. Alcorn, Maleny	4,570·6	265·654	Carnation Buttercup's Raleigh
Night Shade II. of Rosedale	Wakefield Bros., Upper Barron	4,601·25	262·373	Carnation Lad

AUSTRALIAN ILLAWARRA SHORTHORNS.

MATURE COWS (OVER 5 YEARS), STANDARD, 350 LB.

Pearlie of Hillingdon	J. Phillips, Wondai	17,146·47	642·323	Rufus of Sunnyview
Fancy 9th of Rosemount	A. J. Bryce, Maleny	12,071·8	487·021	Bright Star of Cosey Camp
Favourite of Norden	R. Mears, Toogoolawah	12,096·75	476·589	George of Nestles
Model 11th of Springdale	F. G. Lankin, Kaimkillenbun	10,018·56	356·17	Mascot of Springdale

SENIOR, 3 YEARS OLD (OVER 3½ YEARS), STANDARD 290 LB.

Blossom II. of Oakvilla	H. Marquardt, Wondai	13,880·73	533·217	Victory of Greyleigh
Duchess 10th of Oakvilla	ditto	11,851·99	420·854	ditto

JUNIOR, 2 YEARS OLD (UNDER 2½ YEARS), STANDARD 230 LB.

Princess 11th of Oakvilla	H. Marquardt, Wondai	8,248·04	353·922	Gordon of Swanlea
Lady Jean 5th of Blacklands	A. Pickels, Wondai	8,729·65	313·854	Fussy's Monarch of Blacklands
Fairy 6th of Blacklands	ditto	7,878·8	292·287	ditto
Verresdale Beauty	J. L. Lyndon, Worongary	5,956·51	238·283	Emperor of Blacklands

FRIESIAN.

MATURE COW (OVER 5 YEARS), STANDARD 350 LB.

College Pontiac Princess	Hickey and Sons, Wilston	19,314·6	657·465	Pabst Pontiac Blue Star

JUNIOR, 2 YEARS OLD (UNDER 2½ YEARS), STANDARD 230 LB.

Oaklands Beauty Rock 4th	W. Richters, Tingoora	7,368·52	268·846	Pied Rock

PRODUCTION RECORDING.

List of cows and heifers officially tested by officers of the Department of Agriculture and Stock, which have qualified for entry into the Advanced Register of the Herd Book of the Australian Illawarra Shorthorn Society, the Jersey Cattle Society, and the Guernsey Cattle Society, production charts for which were completed during the month of April, 1933 (273 days period unless otherwise stated).

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORNS.				
MATURE COWS (OVER 5 YEARS), STANDARD, 350 LB.				
Kilbirnie Bella 12th	Macfarlane Bros., Radford	12,603	530·135	Darbalara of Kilbirnie
Evelyn of Corunna	C. O Sullivan, Greenmount	10,269·25	443·647	Exchange of Balmoral
Charm II. of Wilga Vale	ditto	11,890·5	431·539	Reliance of Blacklands
Rosenthal Handsome 3rd	S. Mitchell, Warwick	8,624·5	365·89	Admiration II.
SENIOR, 4 YEARS OLD (OVER 4½ YEARS), STANDARD 330 LB.				
Blacklands Gentle III.	N. V. Slaughter, Harrisville	11,031·12	428·527	Fussys Monarch of Blacklands
JUNIOR, 4 YEARS OLD (UNDER 4½ YEARS), STANDARD 310 LB.				
Rosenthal Fuchsia 6th	S. Mitchell, Warwick	9,371·5	372·361	Model's Emblem
SENIOR, 3 YEARS OLD (OVER 3½ YEARS), STANDARD 290 LB.				
Bracelet of Morden	R. Mears, Toogoolawah	11,074·65	454·336	George of Nestles
Fairlie's Beauty 17th	C. B. Mitchell, Fairlie	8,438·5	355·544	Dividend
JUNIOR, 3 YEARS OLD (UNDER 3½ YEARS), STANDARD 270 LB.				
Meadowvale Daisybelle III.	C. O'Sullivan, Greenmount	9,740·25	447·422	Plumstone of Meadowvale
Blacklands Truetype V.	D. Logan, Booval	9,238·96	426·316	Red Prince of Blacklands
Fairlie Favourite 15th	C. B. Mitchell, Warwick	8,312·25	345·477	Dividend of Rosenthal
SENIOR, 2 YEARS OLD (OVER 2½ YEARS), STANDARD 250 LB.				
Little Dot of Trevlac	W. J. Freeman, Rosewood	7,840·5	346·121	Butter Boy
Rosina II. of Applegarth	J. A. Reading, Cloyna	7,956·65	314·443	Ainslie of Burradale
JUNIOR, 2 YEARS OLD (UNDER 2½ YEARS), STANDARD 230 LB.				
Model 3rd of Alfavale	W. H. Thompson, Nanango	9,788·3	411·280	Reward of Fairfield
Lovely 3rd of Alfavale	ditto	8,602·15	359·661	ditto
Model 27th of Springdale	F. G. Lamkin, Kaimkillenbun	8,026·28	322·928	Young Commodore of Springdale
Maggie 9th of Rosenthal (272 days)	ditto	8,114·03	296·667	Surplus of Rosenthal
College Queen	Queensland Agricultural High School and College, Gatton	6,858·63	259·028	Fussys Kitchener
Wandegong Red Rose	G. D. Lindenmeyer, Mundubbera	5,972·45	238·296	Emperior of Spurfield

JERSEY.

MATURE (OVER 4½ YEARS), STANDARD 350 LB.

Oxford Ginger Girl	E. Burton and Sons, Wanora	8,284·23	547·721	Oxford Renown
Pineview Star	J Hunter and Sons, Borallon	8,839·9	498·477	Carnation Lad
Gentle 3rd of Oakview	F. H. Denning, Kandanga	7,720	431·7	Grasmere's Merryboy
Lady Crocus	J. Nicol Robinson, Maleny	7,313·25	365·259	Retford Statesman

JUNIOR, 4 YEARS OLD (UNDER 4½ YEARS), STANDARD 310 LB.

Oxford Snowdrop	E. Burton and Sons, Wanora	7,227·71	394·383	Trinity Ambassador

SENIOR, 3 YEARS OLD (OVER 3½ YEARS), STANDARD 290 LB.

Pineview Model	J. Hunter and Sons, Borallon	8,381·37	585·947	Pineview Noble Lad
Oxford Sirius	E. Burton and Sons, Wanora	7,799·23	498·115	Trinity Ambassador
Oxford Aster	ditto	7,348·64	481·01	ditto

JUNIOR, 3 YEARS OLD (UNDER 3½ YEARS), STANDARD 270 LB.

Oxford Bluebird	E. Burton and Sons, Wanora	7,972·11	468·117	Trinity Ambassador

SENIOR, 2 YEARS OLD (OVER 2½ YEARS), STANDARD 250 LB.

Trinity Hazeldale	J. Sinnamon and Sons, Moggill	4,928·83	314·413	Trinity Governor

JUNIOR, 2 YEARS OLD (UNDER 2½ YEARS), STANDARD 230 LB.

Oxford Aster Daisy	E. Burton and Sons, Wanora	5,801·49	386·876	Trinity Ambassador
Pineview Noble Buttercup	J. Hunter and Sons, Borallon	6,149·17	359·226	Pineview Noble Lad
Diana of Karoola (365 days)	N. Alcorn, Maleny	6,263·45	355·541	Carnation Buttercups Raleigh
Golden Fern of Inverlaw	R. J. Crawford, Inverlaw	5,055·1	300·727	Langside Claribells Masterpiece
Trinity Poppy	J. Sinnamon and Sons, Moggill	5,209·78	274·444	Trinity Perfection
Carnation Gentle	W. Spresser and Sons, Brassall	5,402·97	277·177	Carnation Daisy's Hero
Carnation Princess	ditto	4,909·5	276·382	Carnation Renown
Carnation Fairy's Hope	ditto	4,484·25	265·368	Carnation Daisy's Hero
Daphne of Burnleigh (251 days)	W. Mallet, Nambour	4,976·95	251·644	Trinity Darby

GUERNSEY.

SENIOR, 2 YEARS OLD (OVER 2½ YEARS), STANDARD 250 LB.

Linwood Gloria	A. S. Cooke, Maleny	5,394·8	262·225	Moongi Sylph Show Boy

The Home and the Garden.

OUR BABIES.

Under this heading a series of short articles by the Medical and Nursing Staff of the Queensland Baby Clinics, dealing with the welfare and care of babies, has been planned in the hope of maintaining their health, increasing their happiness, and decreasing the number of avoidable cases of infant mortality.

HEALTH AND CHILDBIRTH.

CHILDBIRTH should, with very rare exceptions, be compatible with perfect health. At present it is often not so, and the responsibility for this rests largely with the women themselves. In Great Britain, where the mortality from childbirth is lower than in Queensland, this mortality and the still more frequent cases of invalidism from childbirth is causing very serious concern, as will be seen from the following extract:—

"A conference under the auspices of the Edinburgh Branch of the National Council of Women and of the Edinburgh Women Citizens' Association was held in the Scottish House of the B.M.A. in Edinburgh on 13th February, Mrs. Chalmers Watson, M.D., presiding. Dr. James Young, President of the Edinburgh Obstetrical Society, in an address to the conference, said that each year in Great Britain about 4,000 women lost their lives and 70,000 incurred impairment of health through childbirth. For many years this amount of death and damage had been practically stationary, despite efforts involving the expenditure of much public money. It was important to recognise that this was not due to lack of knowledge regarding the medical and obstetric conditions that endangered women. It was due rather to a failure to bring to women throughout the country the knowledge which was available; this was convincingly demonstrated by the fact that where women were adequately cared for the risk of maternity was very small. In the lying-in hospital of a poor London district, where some 26,000 women had attended, the mortality was only 1.3 per 1,000, as compared with the general English rate of 3.3 per 1,000. In another hospital, 21,500 women had been attended with a mortality rate of 0.8 per 1,000. When these results were examined, it was found that care had been taken of the women during pregnancy, and if any serious abnormality had developed the women were treated early and safely in hospital. Normal and healthy cases had been attended at home by midwives and pupil midwives under supervision. Further, the willing and understanding co-operation of the women themselves had been obtained. When the failure to reduce mortality over the country was examined, two chief considerations were found—first, that most of the women in the community were attended by midwives and doctors engaged in independent practice, and many of these had not been adequately trained in the methods of ante-natal care; and, secondly, that the local authorities had not sufficiently realised the need for linking up their ante-natal clinics with midwives, doctors, and hospitals, and much expensive effort had consequently been wasted.

"There was need for improved education of the midwife and the student, and for improvement in administration. Lady Cynthia Colville, addressing the conference, said that, since a national maternity service was still far off, everything should be done to encourage women to attend ante-natal and post-natal clinics. Many women had no ante-natal care at all; attention to this matter would help to make motherhood the safe things it ought to be."

FLOWER GARDEN.

Winter work ought to be in an advanced state. The roses will not want looking after. They should already have been pruned, and now any shoots which have a tendency to grow in wrong directions should be rubbed off. Overhaul the ferneries, and top-dress with a mixture of sandy loam and leaf mould, staking up some plants and thinning out others. Treat all classes of plants in the same manner as the roses where undesirable shoots appear. All such work as trimming lawns, digging beds,

pruning, and planting should now be got well in hand. Plant out antirrhinums, pansies, hollyhocks, verbenas, petunias, &c., which were lately sown. Sow zinnias, amaranthus, balsam, chrysanthemum tricolour, marigold, cosmos, cockscombs, phloxes, sweet peas, lupins, &c. Plant gladiolus, tuberoses, amaryllis, pancratium, ismene, crinums, belladonna lily, and other bulbs. Put away dahlia roots in some warm moist spot, where they will start gently and be ready for planting out in August and September.

No time is now to be lost, for many kinds of plants need to be planted out early to have the opportunity of rooting and gathering strength in the cool, moist spring-time to prepare them for the trial of heat they must endure later on. Do not put your labour on poor soil. Raise only the best varieties of plants in the garden; it costs no more to raise good varieties than poor ones. Prune closely all the hybrid perpetual roses; and tie up, without pruning, to trellis or stakes the climbing and tea-scented varieties, if not already done. These and other shrubs may still be planted. See where a new tree or shrub can be planted; get these in position; then they will give you abundance of spring bloom. Renovate and make lawns, and plant all kinds of edging. Finish all pruning. Divide the roots of chrysanthemums, perennial phlox, and all other hardy clumps; and cuttings of all the summer bedding plants may be propagated.

Sow first lots, in small quantities, of hardy and half-hardy annuals, biennials, and perennials, some of which are better raised in boxes and transplanted into the open ground. Many of this class can, however, be successfully raised in the open if the weather is favourable. Antirrhinum, carnation, picotees, dianthus, hollyhock, larkspur, pansy, petunia, *Phlox Drummondi*, stocks, wallflower, and zinnias, &c., may be sown either in boxes or open beds. Mignonette is best sown where it is intended to remain. Dahlia roots may be taken up and placed in a shady situation out of doors; plant bulbs such as anemones, ranunculus, fresias, snowflakes, ixias, watsonias, iris, narcissus, daffodil, &c. The Queensland climate is not suitable for tulips.

To grow these plants successfully it is only necessary to thoroughly dig the ground over to a depth of not less than 12 inches, and incorporate with it a good dressing of well-decayed manure, which is most effectively done by a second digging; the surface should be raked over smoothly so as to remove all stones and clods, thus reducing it to a fine tilth. The seed can then be sown in lines or patches as desired, the greatest care being taken not to cover deeply; a covering of not more than three times the diameter of larger seeds, and a light sprinkling of fine soil over small seeds, being all that is necessary. A slight mulching of well-decayed manure and a watering with a fine-rosed can will complete the operation. If the weather prove favourable, the young seedlings will usually make their appearance in a week or ten days; thin out so as to leave the plants (if in the border) at least 4 to 6 inches apart.

KITCHEN GARDEN.

Should showery weather be frequent during July, do not attempt to sow seeds on heavy land, as the latter will be liable to clog, and hence be injurious to the young plants as they come up. The soil should not be reworked until fine weather has lasted sufficiently long to make it friable. In fine weather get the ground ploughed or dug, and let it lie in the rough until required. If harrowed and pulverised before that time, the soil is deprived of the sweetening influences of the sun, rain, air, and frost. When the ground has been properly prepared, make full sowings of cabbage, carrot, broad beans, lettuce, parsnips, beans, radishes, leeks, spring onions, beetroot, eschalots, salsify, &c. As westerly winds may be expected, plenty of hoeing and watering will be required to ensure good crops. Pinch the tops of broad beans which are in flower and take up peas which require support. Plant out rhubarb, asparagus, and artichokes. In warm districts it will be quite safe to sow cucumbers, marrows, squashes, and melons during the last week of the month. In colder localities it is better to wait till the middle or end of August. Get the ground ready for sowing French beans and other spring crops.

The continued production of rhubarb may be greatly assisted by giving a heavy mulching of manure and hoeing it well into the soil. Keep the beds well watered, and give regularly a dressing of liquid manure, say, once a week.

It is not necessary to use forcing manures on the young stock, as plants are ruined if forced in the early stages of growth.

The rhubarb makes rapid growth during the autumn and spring, and when stalk cutting has been started liquid manuring and manuring may be given.

Farm Notes for July.

FIELD.—Practically the whole of the work on the land for this month will be confined to the cultivation of winter crops, which should be now making good growth, and to the preparation of land for the large variety of crops which can be sown next month. Early-maturing varieties of wheat may be sown this month. The harvesting of late-sown maize will be nearing completion, and all old stalks should be ploughed in and allowed to rot. Clean up all headlands of weeds and rubbish, and for this purpose nothing equals a good fire. Mangels, swedes, and other root crops should be now well away, and should be ready for thinning out. Frosts, which can be expected almost for a certainty this month, will do much towards ridding the land of insect pests and checking weed growth. Cotton-picking should be now practically finished and the land under preparation for the next crop. The young lucerne should be becoming well established; the first cutting should be made before the plants flower—in fact, as soon as they are strong enough to stand the mowing machine—and the cutting of subsequent crops should be as frequent as the growth and development of the lucerne plants permit. Ordinarily cutting should be regulated to fit in with the early-flowering period—i.e., when about one-third of the plants in the crop are in flower.

Orchard Notes for July.

THE COASTAL DISTRICTS.

THE marketing of citrus fruits will continue to occupy the attention of growers. The same care in the handling, grading, and packing of the fruit that has been so strongly insisted upon in these monthly notes must be continued if satisfactory returns are to be expected. Despite the advice that has been given over and over again, some growers still fail to grasp the importance of placing their fruit on the market in the best possible condition, and persist in marketing it ungraded; good, blemished, and inferior fruit being met with in the same case. This, to say the least, is very bad business, and as some growers will not take the necessary trouble to grade and pack properly, there is only one thing to do, and that is to insist on the observance of standards of quality and see that the fruit offered for sale complies with the standards prescribed, and that cases are marked accordingly.

Where the crop has been gathered, the trees may be given such winter pruning as may be necessary, such as the removal of broken or diseased limbs or branches, and the pruning of any superfluous wood from the centre of the tree. Where gumming of any kind is seen it should be at once attended to. If at the collar of the tree and attacking the main roots, the earth should be removed from around the trunk and main roots—all diseased wood, bark, and roots should be cut away, and the whole of the exposed parts painted with Bordeaux paste.

When treated, do not fill in the soil around the main roots, but allow them to be exposed to the air for some time, as this tends to check any further gumming. When the gum is on the trunk or main limbs of the tree cut away all diseased bark and wood till a healthy growth is met with, and cover the wounds with Bordeaux paste.

If the main limbs are infested with scale insects or attacked by any kind of moss, lichen, or fungus growth, they should be sprayed with lime sulphur.

Towards the end of the month all young trees should be carefully examined for the presence of elephant beetles, which, in addition to eating the leaves and young bark, lay their eggs in the fork of the tree. When the young hatch out they eat their way through to the wood and then work between the wood and the bark, eventually ringbarking one or more of the main limbs, or even the trunk. A dressing of strong lime sulphur to the trunk and fork of the tree, if applied before the beetles lay their eggs, will act as a preventive. In the warmer localities a careful watch should also be kept for the first appearance of any sucking bugs, and to destroy any that may be found. If this is done systematically by all growers the damage done by this pest will be very much reduced.

Citrus trees may be planted throughout the month. Take care to see that the work is done in accordance with the instructions given in the June notes. All worn-out trees should be taken out, provided the root system is too far gone to be

renovated; but when the root system is still good the top of the tree should be removed till sound, healthy wood is met with, and the portion left should be painted with a strong solution of lime sulphur. If this is done the tree will make a clean, healthy growth in spring.

The inclusion of a wide range of varieties in citrus orchards—and which has been the general practice—is to be deprecated. Even in new plantations there is a tendency to follow the same unprofitable lines. Far too much consideration is given to the vendor's description or the purchaser's appreciation of a particular variety or varieties. Individual tastes must be subordinated to market requirements, and the selection of varieties to the best available kind of early, medium, and late fruits. Amongst oranges Joppa should be placed first, Sabina for early fruit, and Valencia or Loon Giru Gong for late markets.

In mandarins local conditions influence several varieties, and since the introduction of the fungus known as "scab" the inclusion, particularly on volcanic soil, of the Glen Retreat and Emperor types is risky. In alluvial lands, Emperor and Sovereign (an improved Glen Retreat) are the most profitable, though Scarlet in many places is worth including, with King of Siam as a late fruit.

Land intended for bananas and pineapples may be got ready, and existing plantations should be kept in a well-cultivated condition so as to retain moisture in the soil.

Bananas intended for Southern markets may be allowed to become fully developed, but not coloured, as they carry well during the colder months of the year, unless they meet with a very cold spell when passing through the New England district of New South Wales.

The winter crop of smoothleaf pines will commence to ripen towards the end of the month, and when free from blackheart (the result of a cold winter) or from fruitlet core rot, they are good for canning, as they are of firm texture and stand handling. Where there is any danger of frost or even of cold winds, it pays to cover pines and also the bunches of bananas. Bush hay is used for the former and sacking for the latter.

Strawberries should be plentiful during the month, provided the weather is suitable to their development, but if there is an insufficient rainfall, then irrigation is required to produce a crop. Strawberries, like all other fruits, pay well for careful handling, grading, and packing; well-packed boxes always realising a much higher price than indifferently packed ones on the local market. Where strawberries show signs of leaf blight or mildew, spray with Bordeaux mixture for the former and with sulphide of soda for the latter.

When custard apples fail to ripen when gathered, try the effect of placing them in the banana-ripening rooms, and they will soon soften instead of turning black.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

JULY is a busy month for the growers of deciduous fruits, as the important work of winter pruning should, if possible, be completed before the end of the month, so as to give plenty of time for spraying and getting the orchard into proper trim before the spring growth starts.

In pruning, follow the advice given in the May number; and if you are not thoroughly conversant with the work, get the advice of one of the Departmental officers stationed in the district.

Pruning is one of the most important orchard operations, as the following and succeeding seasons' crops depend very largely on the manner in which it is carried out. It regulates the growth as well as the number and size of the fruit, as if too much bearing wood is left there is a chance of the tree setting many more fruits than it can properly mature, with a result that unless it is rigorously thinned out it is under-sized and unsaleable. On the other hand, it is not advisable to unduly reduce the quantity of bearing wood, or a small crop of overgrown fruit may be the result.

Apples, pears, and European varieties of plums produce their fruits on spurs that are formed on wood of two years' growth or more; apricots and Japanese plums on new growth and on spurs; but peaches and nectarines always on wood of the previous season's growth. Once peachwood has fruited it will not produce any more from the same season's wood, though it may develop spurs having a new growth or new laterals which will produce fruit.

The pruning of the peaches and nectarines, therefore, necessitates the leaving of sufficient new wood on the tree each season to carry a full crop, as well as the leaving of buds from which to grow new wood for the succeeding year's crop. In other words, one not only prunes for the immediately succeeding crop, but also for that of the following season.

All prunings should be gathered and burnt, as any disease that may be on the wood is thoroughly destroyed. When pruned, the trees are ready for their winter spraying with lime sulphur.

All kinds of deciduous trees may be planted during the month provided the ground is in a proper state to plant them. If not, it is better to delay planting until August, and carry out the necessary work in the interval. The preparation of new land for planting may be continued, although it is somewhat late in the season, as new land is always the better for being given a chance to mellow and sweeten before being planted. Do not prune vines yet on the Granite Belt; they can, however, be pruned on the Downs and in the western districts.

Trees of all kinds, including citrus, can also be planted in suitable situations on the Downs and western districts, and the pruning of deciduous trees should be concluded there. If the winter has been very dry, and the soil is badly in need of moisture, all orchards in the western districts, after being pruned and ploughed, should receive a thorough irrigation (where water is available) about the end of the month, so as to provide moisture for the use of the trees when they start growth. Irrigation should be followed by a thorough cultivation of the land to conserve the water so applied. As frequently mentioned in these notes, irrigation and cultivation must go hand in hand if the best results are to be obtained, especially in our hot and dry districts.

WORK IN THE CITRUS ORCHARD.

The low returns received by citrus growers during the past two seasons has forced upon them a realisation of the fact that the utmost economy must be practised in production methods. There is at least one direction in which improved production can be achieved without increasing expenditure, and that is by producing fruit of a better commercial size (write officers of the Fruit Branch of the New South Wales Department of Agriculture in current notes). In coastal areas too great a proportion of citrus fruits is on the small size. Satisfactory size in fruit is mainly dependent on sufficient soil moisture and a thrifty tree condition.

Increasing the soil's capacity to retain moisture in established groves is possible only by increasing the organic content of the soil. In soil so improved the trees are enabled to send their roots down to a deeper feeding zone. In this connection the value of green manure crops should not be overlooked.

In green manuring trials carried out over several years and in many different types of soils purple vetch has proved a very consistent and heavy producer. During wet seasons on the coast it is much more reliable than field peas. A sowing of from 10 to 20 lb. purple vetch seed per acre is economical, especially if drilled in with 1 cwt. of superphosphate. Under inland conditions the tick bean is the most satisfactory green crop. Many orchardists rely on weed growth for the supply of organic matter, but this is not sufficient, as is evidenced by the fact that many trees growing under such conditions are difficult to maintain in a thrifty state.

Another factor that assists in the satisfactory development of citrus fruits is the maintenance of the leaf-bearing area of the trees. In this relation timeliness of spraying may have a not unimportant influence. When spraying operations are delayed, heavier applications than would otherwise be necessary have to be used. Particularly is this the case where white wax scale has to be combated, where if control measures are so delayed that it becomes necessary to use larger amounts of soda or to have recourse to the use of certain spray oils, defoliation in some degree may result.

CLIMATOLOGICAL TABLE—APRIL, 1933.

COMPILED FROM TELEGRAPHIC REPORTS.

Districts and Stations.	Atmospheric Pressure. Mean at 9 a.m.	Shade Temperature.						Rainfall.	
		Means.		Extremes.				Total.	Wet Days.
		Max.	Min.	Max.	Date.	Min.	Date.		
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cooktown	29·91	85	74	90	1	71	27	1,686	15
Herberton	..	75	62	85	1	57	8,13,20	698	20
Rockhampton	30·02	85	66	94	6	58	22	157	4
Brisbane	30·11	78	62	90	12	56	25	894	9
Darling Downs.									
Dalby	30·08	81	54	94	12	42	14	124	4
Stanthorpe	..	72	47	82	11, 12	33	14	157	6
Toowoomba	..	73	53	85	12	42	14	368	7
Mid-interior.									
Georgetown	29·88	93	69	98	8, 9, 12	60	7, 8, 9	Nil	
Longreach	29·97	91	63	99	3	55	15	Nil	
Mitchell	30·07	83	54	91	3	41	14	98	2
Western.									
Burketown	29·89	92	71	99	8	63	3	52	3
Boulia	29·97	91	64	99	9,10,11	51	15	Nil	
Thargomindah	30·05	85	61	97	9, 11	52	15	9	2

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF APRIL, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING APRIL, 1933 AND 1932, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	April.	No. of Years' Records.	April., 1933.	April., 1932.		April.	No. of Years' Records.	April., 1933.	April., 1932.
North Coast.	In.		In.	In.	*South Coast*—continued—	In.		In.	In.
Atherton	4·07	32	11·35	0·83	Nambour	6·15	37	11·98	7·92
Cairns	11·38	51	18·63	1·16	Nanango	1·98	51	2·24	6·19
Cardwell	8·86	61	9·09	3·01	Rockhampton ..	2·62	62	1·57	3·02
Cooktown	8·61	57	16·86	1·60	Woodford	4·50	46	14·32	7·17
Herberton	3·82	47	6·98	1·55					
Ingham	7·94	41	3·01	2·32					
Innisfail	19·86	52	24·19	6·92					
Mossman Mill ..	8·10	20	22·19	1·26	*Darling Downs.*				
Townsville	3·44	62	5·61	1·24					
					Dalby	1·40	63	1·24	4·55
					Emu Vale	1·37	37	2·00	4·63
Central Coast.					Jimbour	1·38	45	1·07	4·22
					Miles	1·48	48	1·87	4·28
Ayr	2·55	46	2·76	0·50	Stanthorpe ..	1·76	60	1·57	4·76
Bowen	2·78	62	2·74	1·08	Toowoomba ..	2·59	61	3·68	4·88
Charters Towers ..	1·56	51	0·55	0·48	Warwick	1·67	68	1·81	4·25
Mackay	6·39	62	4·61	1·93					
Proserpine	5·90	30	5·95	2·89					
St. Lawrence ..	2·86	62	1·97	0·62					
					Maranoa.				
South Coast.									
					Roma	1·37	59	0·87	2·28
Biggenden	2·15	34	3·69	1·88					
Bundaberg	3·07	50	5·83	2·15					
Brisbane	3·83	82	8·94	5·36	*State Farms, &c.*				
Caboolture	4·32	46	8·85	6·85					
Childers	2·83	38	3·50	2·73	Bungeworgorai ..	1·29	19	1·15	1·36
Crohamhurst ..	6·59	40	12·61	10·91	Gatton College ..	1·89	34	1·91	4·56
Esk	3·06	46	4·98	6·19	Gindie	1·20	34	..	1·24
Gayndah	1·46	62	2·92	4·37	Hermitage ..	1·45	27	1·82	4·87
Gympie	3·43	63	3·47	7·25	Kairi	3·76	19	..	0·70
Kilkivan	2·28	54	2·42	5·31	Mackay Sugar Experiment Station	4·96	36	4·40	2.75
Maryborough ..	3·80	61	3·65	7·73					

GEORGE E. BOND, Divisional Meteorologist.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S., AND A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	June, 1933.		July. 1933.		MOONRISE. June, 1933.	July. 1933.
	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					p.m.	a.m.
1	6·37	5·1	6·45	5·7	12·3	11·38
						p.m.
2	6·37	5·1	6·45	5·7	12·35	12·10
3	6·38	5·1	6·45	5·7	1·6	12·47
4	6·38	5·1	6·45	5·7	1·37	1·33
5	6·38	5·1	6·45	5·7	2·15	2·31
6	6·39	5·1	6·45	5·7	2·47	3·35
7	6·39	5·1	6·45	5·8	3·50	4·46
8	6·40	5·2	6·45	5·8	4·53	5·58
9	6·40	5·2	6·45	5·9	6·0	7·5
10	6·40	5·2	6·44	5·9	7·10	8·13
11	6·41	5·2	6·44	5·10	8·19	9·17
12	6·41	5·2	6·44	5·11	9·27	10·14
13	6·41	5·2	6·44	5·11	10·33	11·11
14	6·41	5·2	6·43	5·12	11·30	..
						a.m.
15	6·42	5·3	6·43	5·12	..	12·8
					a.m.	
16	6·42	5·3	6·43	5·13	12·25	1·4
17	6·42	5·3	6·42	5·13	1·19	2·0
18	6·42	5·3	6·42	5·14	2·15	2·53
19	6·42	5·3	6·42	5·14	3·10	3·49
20	6·43	5·4	6·41	5·15	4·7	4·42
21	6·43	5·4	6·41	5·15	5·0	5·33
22	6·43	5·4	6·41	5·15	5·54	6·19
23	6·43	5·4	6·40	5·16	6·46	7·0
24	6·43	5·5	6·40	5·16	7·35	7·38
25	6·44	5·5	6·39	5·17	8·20	8·7
26	6·44	5·5	6·39	5·17	9·0	8·39
27	6·44	5·5	6·38	5·18	9·34	9·9
28	6·44	5·6	6·38	5·18	10·6	9·39
29	6·44	5·6	6·37	5·19	10·36	10·12
30	6·44	5·6	6·37	5·19	11·6	10·48
31	..	..	6·36	5·20	..	11·30

Phases of the Moon, Occultations, &c.

1 June	☾ First Quarter	9	53 p.m.
8 ,,	○ Full Moon	3	5 p.m.
15 ,,	☽ Last Quarter	9	25 a.m.
23 ,,	● New Moon	11	22 a.m.

Perigee, 8th June, at 1.24 p.m.
Apogee, 22nd June, at 12.18 a.m.

It will be noticed during the first week in June how close Mars and Jupiter seem to one another, especially on the night of the 4th. Mars will then be only about a third of a degree above Jupiter when they come into view after sunset.

On the 8th after sunset Venus and Mercury will be sufficiently high above the western horizon to form an interesting spectacle, the full Moon being well removed, on the opposite side of the sky.

The occultation of Antares which will occur before 4 a.m. on the 8th will be an interesting occurrence, even without a telescope, though binoculars will be useful to see Antares near the full Moon, both before and after the occultation.

On the 10th Sigma Sagittarii will be occulted, but sunrise will interfere with this as a popular spectacle.

On the 12th at 3 p.m. the Moon will be passing from west to east of Saturn, which will be about the Moon's diameter to the north of it. With a pair of binoculars this will form an interesting daylight spectacle, the Moon being rather more than half full.

On the 22nd of June, at 7 a.m., the Australian Winter Solstice will occur. The Sun, having reached its utmost limit northward seems to stand still before turning to the south.

The Moon will pass Neptune on the 28th at midnight. The planet will then be 2 degrees north of the Moon, amongst the small stars of Leo, where it will be somewhat difficult to distinguish it.

The occultation of Regulus on the 28th will take place some hours before the Moon and star have risen.

At 6 p.m. on the 29th the Moon will be passing Jupiter which will be 3 degrees northward of it, and both will be high up in the north-west. On the next day the Moon will pass Mars, 3 degrees to the south of it, at midday. Binoculars will be necessary to see Mars as the Moon will be half full.

Mercury sets only about 12 minutes after the Sun on the 1st, and 1 hour 18 minutes after it on the 15th.

Venus sets 43 minutes after the Sun on the 1st, and 1 hour 2 minutes after it on the 15th.

The Southern Cross will be perpendicular about 2 a.m. on the 1st and at midnight on the 30th June.

7 July	○ Full Moon	9	50 p.m.
14 ,,	☽ Last Quarter	10	23 p.m.
23 ,,	● New Moon	2	3 a.m.
30 ,,	☾ First Quarter	2	43 p.m.

Perigee, 6th July, at 10·24 p.m.
Apogee, 19th July, at 9·20 a.m.

For places west of Warwick and nearly in the same latitude, 28 degrees 23 minutes S. add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhat about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.