:gistered at the General Post Office, Hobart,
for transmission by Post as a Periodical]

Vol. IX—No. 1 (New Series) 1st February, 1938

The Tasmanian Department of Agriculture

THE TASMANIAN JOURNAL OF AGRICULTURE

Published by Direction of
The Hon. the Minister for Agriculture

Vol 9
1938

Edited by
A. H. WOODFORDE

Published Quarterly Price, 6d.

J. Walch & Sons Pty. Ltd., Hobart

The Tasmanian Journal of Agriculture

CONTENTS

For Index to Advertisements, see end of Book

INDEX

TO

The Tasmanian

Journal of Agriculture

Vol. IX — February to November, 1938

IN FOUR QUARTERLY ISSUES

The Tasmanian

Journal of Agriculture

Vol. IX Tasmania, 1st February, 1938 No. 1

Editorial

THE DEPARTMENTAL RESEARCH FARM

FOR a number of years a need has existed for a Central Research Farm on which investigations into crop, stock and pasture problems could be carried out under properly controlled conditions and where supplies of superior seed could be produced. Such a farm has now been acquired by the Department and work has been in progress there since last March. The property is eminently suitable for the purpose for which it was chosen. It is situated some three miles outside the township of Cressy, and consists of 475 acres of land of a fairly good second-class type representative of considerable tracts of country in the Cressy-Formosa district and other parts of the North Midlands.

The acquisition of this farm will make it possible for research work, plant breeding, and the growing of elite seed crops to proceed without the limitations which have previously been imposed on such work by the need for dependence on the goodwill and generosity of private individuals. The amount of assistance and co-operation which has been forthcoming from such sources in the past has been considerable, and has been greatly appreciated; moreover, it has been productive of important results. Nevertheless, it has had numerous disadvantages, not the least of which have been a lack of absolute personal control by the officers doing the work and the inconvenience involved in decentralised operations. The carrying out of certain district trials will, of necessity, be continued in order to provide information which can only be determined by such means, but such work as can be applied to problems of a State-wide nature can be carried out more economically, more efficiently, and with a greater concentration of effort within the boundary fences of the Cressy property.

It is desirable to emphasise the fact that the farm has not been acquired with the object of teaching the farmer how to farm.

Some misconception has existed on this point and has provided grounds for a certain amount of dissatisfaction and misgiving on the part of producers. While the general methods of farm management will be along the lines of sound agricultural practice, the main purpose is to provide the land and equipment to investigate the problems which arise out of farming operations and are essentially the concern of the technically trained officer.

In recent years much progress has been made in agriculture in this State, and it is not too much to affirm that, in many respects, Tasmania now stands in a position but little inferior to that of countries which enjoy the most advanced standards of farm husbandry. Such a position has not, however, been built up purely on a foundation of Tasmanian research. It depends to a very large extent on the adoption of practices which have proved successful in other countries. So far as the Department has been concerned in this development, its work, until recently, was of a comparatively straightforward nature. The time, however, is now approaching when we must expect to be confronted with a certain number of purely local problems. It seems almost inevitable that soil and climatic conditions will bring about a series of events which have no exact parallel in other countries, and which will depend for their solution on local investigation. Indeed, evidence is not lacking that such is already taking place. The failure of subterranean clover on certain soils and the occurrence of nutritional and deficiency diseases in livestock are cases in point. Obviously, the place where such problems can best be tackled is the Departmental Farm, where every phase of research work can be under complete control and where observations can be made as and when required.

Reference has frequently been made to the need for systematic plant improvement work and the production of superior seed lines in this State. In many instances our domestic seed stocks are in a deplorable condition as a result of contamination with foreign varieties and other impurities. Such is particularly the case with our wheat, oat and pea varieties. The position with pasture species has become less acute since the various seed certification schemes came into operation, but many grass and clover species are still susceptible of a considerable measure of improvement. On the mainland and elsewhere plant improvement work, together with measures to maintain a high standard of purity in standard seed lines, have been carried out for very many years with practically all the leading crops, and such activities have exerted a highly important influence on Australian agriculture. The chances of securing a large degree of improvement in this State within a comparatively short time (relatively speaking) are particularly favourable in view of the fact that the field is practically untouched. With the facilities that existed previously it was not possible to do more than produce a small nucleus of material with which to extend operations when the opportunity was forthcoming. The acquisition of the Cressy property has provided such an opportunity, and this class of work will in future constitute one of its most important activities. Already a number of selected lines of wheat, oats and peas are undergoing advanced trials and a large number of lines of new crossbred wheats are under observation. In addition, an extensive series of pasture trials has been laid out and, with single plant selection work on grass and clover species, provides a full programme of work for the personnel concerned.

The wide and relatively unexplored field of research into animal diseases is one which will be afforded ample scope on the farm. Throughout the world to-day veterinarians are grappling with the problems which beset the stockowner, and it is being generally recognised that many of our stock troubles are largely conditioned by local circumstances so that they must be tackled on the ground where they occur. In Tasmania we have animal health problems which are capable of solution only within the State, and the close association of the veterinary staff with the farming community and their appreciation of the stockowners' needs should pave the way to much valuable research work.

At this juncture there is a need to appreciate the fact that much of the work now in hand on the farm and later to be undertaken there is and will be of a long-term nature. Agricultural research is necessarily slow in producing results, and any attempts to hurry them along unduly can only result in unsound work. This is particularly the case where plant improvement is concerned. Only one generation of plants can be produced each year, and in most cases it is necessary to grow bred material on for several generations before the work can culminate in a superior stabilised line. In the sphere of animal health research, too, the time factor needs to be given due recognition. Many of the problems are full of complexities and only to be solved by patient and unhurried work frequently involving a period of years.

With the Departmental Farm now an established institution it is desirable to point to the need for a general appreciation of certain facts. At present the property is almost entirely undeveloped and something of a novelty in our midst. There are no local precedents by which results and the extent of its influence can be gauged. There is a need to take a long and broad view of the future of the venture. It should be remembered that the other States have had their experimental and research farms, some of them for upwards of fifty years, and on them new projects are still being planned whose impact will only be felt in future years. The field of improvement work which lies ahead of the Cressy property is so far practically untouched and a generous measure of success may reasonably be expected within the next five years or so. The fullest measure of its influence will, however, only be apparent with the passing of time, and it will be largely for the generation now still at school or just taking its place in the sphere of farming to reap the maximum of benefit from the work to be done there in the years that lie ahead.

EXPORT PIGS

By J. T. ARMSTRONG, Chief Dairy Officer

WITH the increase in the pig population of this State over the past two years, and the establishment of the Somerset Freezers as a meat export premises, indications are that next year there will be a considerable number of pigs exported from the North-West Coast.

At this time, therefore, the information contained in a recent report from the Australian Meat Board should be of considerable interest to producers.

For some time now the Board has been making enquiries as to the requirements of the export market and has come to the conclusion that the best results will be obtained if exports from Australia consist either of frozen baconer carcases or of pieces suitable for curing.

The Board strongly recommends producers to concentrate on pigs of baconer type and weight rather than those of porker type.

A description of the type of pig which is in greatest demand by English curers was abstracted from a report of the Imperial Economic Committee and published in this journal some time ago, but the necessity of shipping to England just exactly what the trade requires is so essential to the establishment of a successful export trade that a reprint of this description may not be out of place.

Type of Carcase

The type, conformation and general quality of carcases suited to the requirements of the pork, bacon and ham trades are uniform.

The type of carcase which meets the requirements of Wiltshire side and Midland curers also meets those of the pork trade, and vice versa. There is no need to introduce further complications into pig production by requiring farmers to produce two distinct types of pigs accordingly as they prefer to supply the pork or the bacon market. The farmer producing the type of carcase in greatest demand by the pork trade can, if that trade does not appear to be remunerative, grow his pigs on to bacon weights and provide the type of carcase required by the curing industry.

In so far as any variations exist in carcases demanded by those three sections of the industry such variations are, given proper feeding, variations only of weight and not of type. In this connection the basis of weight classification as scheduled in the Ministry of Agriculture's Report on the Marketing of Pigs is acceptable to the distributive trades.

Carcases for the pork, bacon and ham trade should conform to the following specifications:—

The carcase must be that of a properly fed castrated male or virgin female pig, the predominating colour being white. The middle portion from the first rib to the aitch bone must be long.

The fore-end must be light with a light head, neck and collar, and the gammon end well developed. The ribs must be well sprung; that is to say, they must not slope rapidly from the backbone, but clearly indicate where the back leaves off and the side begins. The line of the back must be slightly arched from head to tail, and not dished or humped over the shoulder. The neck must be of medium length and devoid of crest. The shoulders must be smooth, slightly rounded from side to side over the top and very compact. The back fat should be even, without pronounced thickening over the shoulder, and it should taper slightly from the shoulder to the gammon.

The underline must be straight and thick throughout its whole length and entirely free from flabbiness or distension of the flank. Thick lines or streaks of fat should be absent from the visible portion of the lean, and indications of leanness must be visible between the ribs.

The shanks must be short, bone fine, and the fore hock and ham free from wrinkles. The flesh must be carried well round the bone, leaving no bareness inside the thigh, and well down to the knee and hock joints.

The vertebræ must be of a flesh pinky colour and flinty in texture. The proportion of lean to fat must be good. The fat must be perfectly white and firm to the touch; when pressed with the thumb, an indentation should be formed which remains visible for a few minutes after pressure has been removed.

The texture of the lean must be fine grained and not rough or fibrous; there must be no excess of internal fat—the kidneys should have a thin covering of fat. The rind must be thin, flesh coloured, perfectly smooth, pliable and free from deeply rooted bristles, and must be devoid of any skin pigmentation. There must be no indication of black bristles and no sign of seedy cut.

Carcases conforming to this specification produce a high proportion of the best cuts whether as pork, bacon or hams, and are the product of selective breeding and proper feeding.

This extract provides a very fair picture of the general type of pig required, but does not deal with exact details such as the optimum weight, length of carcase, thickness of back fat, etc., and with the idea of drafting a more detailed description of the type of pig most in demand Messrs. Davidson, Hammond, Swain and Wright have drawn up scales of points and photographs for use in advising on the suitability of carcases for market requirements or for use in judging pork and bacon carcases.

The allocation of points demonstrates in what detail a particular carcase departs from the ideal and gives a far more accurate picture of a carcase than can any mere description.

The report of these workers was published in the Pig Breeders' Annual, 1936, and was reprinted from that Annual by the National Pig Breeders' Association, which has adopted the standard set as a standard of excellence for pork and bacon carcases.

The authors of the publication had been requested to report on the suitability of New Zealand pigs for the requirements of the

English market and found that a word description of the carcase meant little unless it could be supported by details of weights, measurements, etc., combined with notes on quality.

After a considerable amount of investigation they conceived the idea of allocating so many points for each part of the carcase, for condition, dressing, etc.; the ideal carcase to obtain full points and deductions to be made for any variation from that ideal. The bulk of the points were to be allotted according to weight and measurement, but in certain particulars such as hams, shoulders and streak, where detailed measurements were not practicable, points were to be allocated in accordance with visual examination and comparison with photographs of ideal, medium and inferior types.

All reports could therefore be set out in standard form and the human element in judging was practically superseded by scale and measure.

The writers recommend that for the Wiltshire side trade the optimum carcase weight will vary slightly with the different breeds of pigs.

With breeds such as the Large White or Large White crosses a weight approximating 150 lbs. is more or less ideal, but with Berkshire or similar breeds a rather lower weight is advisable since such types have a tendency to put on too much fat in proportion to lean at weights approaching 150 lbs.

The investigators suggest that in adjudging the suitability of a carcase to market requirements the following points be considered:

(1) Marketing points, which consist in defects which may be caused in the handling, dressing and transport of carcases.

(2) Breeder's points, which consist of defects attributable to the breeding, feeding and general management of the stock. The breeder's points are further divided into—

(a) Those which are based on visual judgment, and points are allotted on inspection and comparison with photographs of standard types.

(b) Those which are based on measurement.

Marketing Points

The authors divide these as follows:—

Colour (5 marks): The colour should be clean, fresh white, and deductions are made for any dark colouration due to skin pigmentation, sunburn before slaughter, blotching due to faulty scalding or scraping, excessive drying in storage, or the dead white blebs which are common with faulty cold storage.

Skin (5 marks): The skin should be smooth and mellow, and neither coarse nor thick.

Dressing (5 marks): Deductions are made for bruises or weals due to fighting, or prodding or beating with a whip or stick during droving or loading. Points are also deducted for the presence of hair or bristles or scraper cuts in the skin. It is preferred that the forelegs be permitted to hang naturally, since tying them back has a tendency to make the shoulders appear heavy.

Breeder's Points

(a) By Inspection

Hams (8 points): The bone should be fine and the ham well filled out with lean meat. The space between the legs should be U rather than V shaped. Photographs of ideal, fair and inferior hams have been prepared as a standard for comparison (Fig. I).

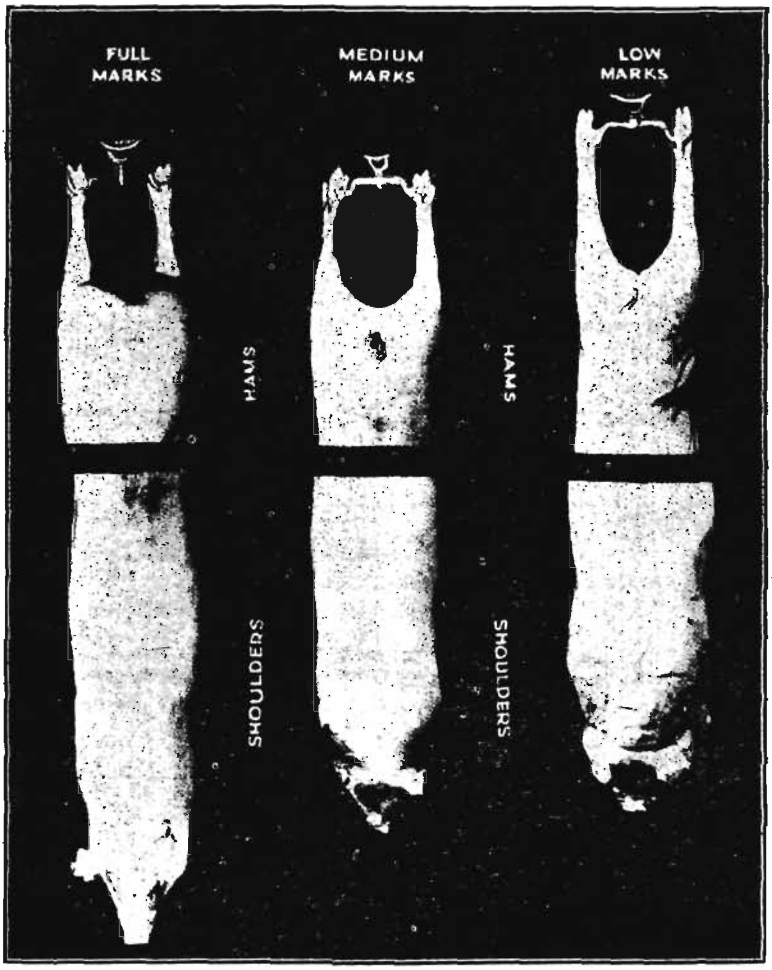


FIG. I

Shoulders (7 marks): These should be light in proportion to the rest of the carcase, and points are allotted in accordance with the agreement of the shoulders with standard photographs (Fig. I).

Streak (12 marks): The belly should be thick and should contain a high proportion of lean to fat. Maximum marks are awarded to a carcase in which the streak is both thick and full of lean meat. Minimum marks are allotted to a carcase in which the streak is either too thin or one which contains a high proportion of fat to lean. Photographs of good, medium and inferior streaks have been prepared for comparative purposes (Fig. II). The photographs included in the publication are reproduced with this article, and will illustrate the points mentioned above.

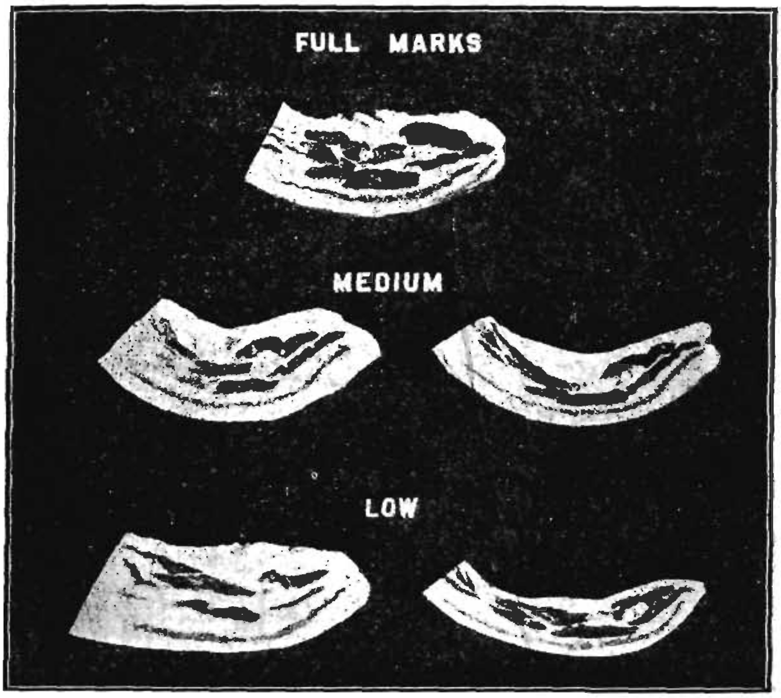


FIG. II

(b) By Measurement

Eye Muscle of Loin (28 marks): The thickness of the eye is measured half-way along its width and a scale was prepared allotting points for thickness of "eye" in comparison to carcase weight. For example, with a carcase of 120-139 lbs. weight maximum points would be allotted if the thickness of the eye is 53 millimetres (or 2 3/25 ins.), whereas with a carcase weight of 140-149 lbs. the eye muscle should be at least another millimetre thicker.

Back Fat Thickness (20 marks): The thickness of the layer of fat on the back is an important factor with either a porker or baconer carcase and is measured over the loin 1½ inches in from the middle line.

One point of the calipers is placed at the edge of the eye muscle and the other just on the inner layer of the skin.

For each weight group there is an optimum depth of back fat, and the layer may be either too thick or too thin. In the table prepared the scale was extended on both sides of the optimum.

As an example, for a carcase of 140-149 lbs. weight the maximum of 20 marks was allowed for a pig with a back fat 20 millimetres (4/5in.) deep, whilst only half marks (10) would be allotted to one which had a back fat thickness of 12 millimetres, or to one which had a layer of fat 27 millimetres or just over one inch thick.

For a lighter carcase of 130-139 lbs. weight the optimum layer would be 19 millimetres in thickness, and half marks only would be given were the layer either 11 *millimetres* or 26 *millimetres thick.*

Body Length (20 marks): Length of carcase is essential in a good baconer, and the length is measured from the edge of the symphysis pelvis bone to the junction of the sternum and first rib (Fig. III).

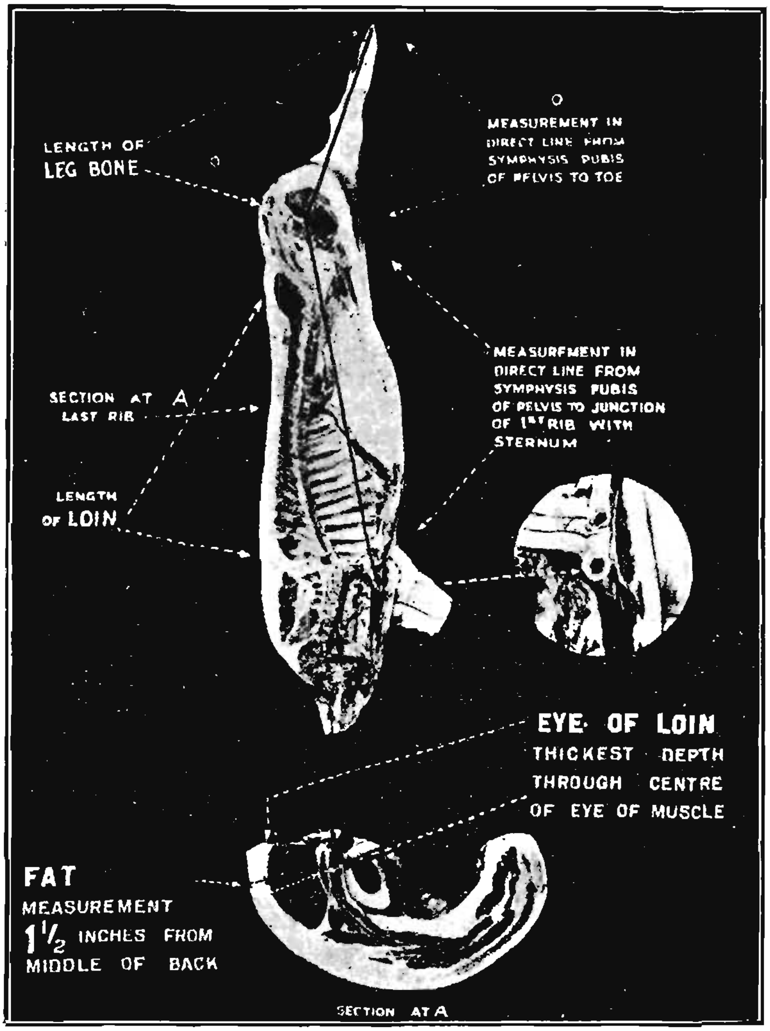


FIG. III

A scale of points was prepared giving optimum body length measurements for various weight groups.

With a carcase weight of 140-149 lbs. maximum points would be allotted to a carcase with a body length of 815 mm. (32 3/5 ins.) or over, whereas for a lighter carcase of 130-139 lbs. weight a length of 795 millimetres would be sufficient to gain the full 20 marks.

Leg Length (5 marks): This factor is not of the same relative importance as body length, but must be considered to a certain extent.

The length is measured with a tape measure in a straight line from the edge of the symphisis pelvis bone to the tip of the toe and points are allotted in accordance with the chart.

A pig of 140-149 lbs. dead weight should have a leg length between 554 millimetres (22 4/25 ins.) and 564 millimetres (22 14/25 ins.). A leg either too long or too short in proportion to body weight would cause points to be deducted in the score.

Carcase Weight (15 marks): Carcase weight is an important factor in determining the suitability of the carcase for a particular market, and for baconers the investigators suggest with bacon breeds an optimum of 150 lbs. or a range from 135-154 lbs. dead weight. With breeds such as Berkshires, where the tendency is for body shortness and undue fatness, a lighter range may be better.

A scale according to which a pig may be scored for carcase weight has also been prepared.

According to the authorities which have been quoted, the ideal pig is one which has a carcase weight of from 135-154 lbs., has a smooth, fine skin of a clean, fresh, white colour, and with complete absence from hairs, bristles, bruises, weals, scratches and skin pigmentation. The shoulders should be fine in proportion to the weight of the pig, and the body length should exceed 31 inches; the eye muscle should be not less than 53 millimetres (2 3/25 ins.) for pigs at the lighter end of the scale, and 54 millimetres for pigs at the heavier end of the range; the back fat should be between 20 and 21 millimetres thick.

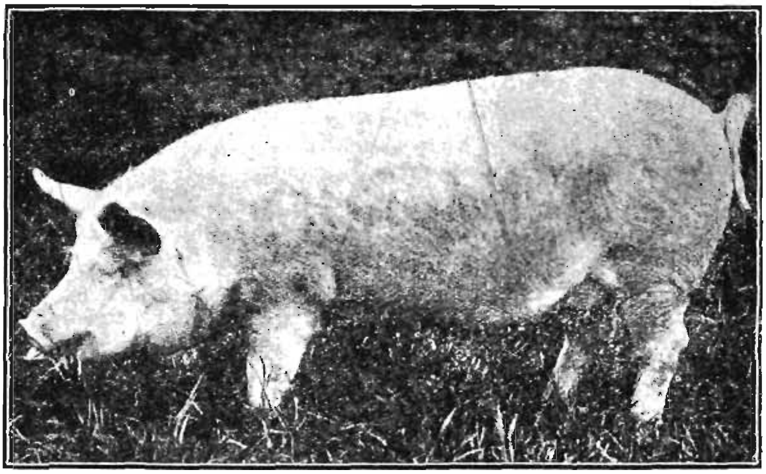


FIG. IV

A GOOD TYPE OF BACON PIG

The hams should be well filled out with lean meat, the space between the legs being U shaped rather than V shaped, and the leg length should be between 22⅛ ins. and 22 3/5 ins.

The bone should be fine and the meat should be carried well down to the hock without bulging or wrinkling. The streak should be thick and carry a high proportion of lean to fat.

The producer's problem is how to achieve this ideal. It can only be done by very careful selection for type of the breeding stock, by proper feeding of the growing pigs, and by sound management. The three factors are inter-related, and failure in any particular will adversely affect the type of the carcase.

The work done by Messrs. Davidson, Hammond, Swain and Wright which has been quoted in this article gives a very concise and clear picture of the type of carcase required, and the standard set out by these investigators has been accepted by the Australian Meat Board as the standard of excellence for Australian pigs. All producers are strongly recommended to so mould their feeding and breeding policies that the majority of pigs consigned for export will approximate to this standard.

BOOKS OF AGRICULTURAL INTEREST

"Potash Deficiency Systems," by Professor O. Eckstein, Dr. A. Bruno and Dr. J. W. Turrentine, is a new publication from abroad which deals with the signs by which deficiencies of potash may be recognised in practically all the main agricultural plants of temperate and sub-tropical regions. The text of the book appears in English, French and German, and full indices are given in each language.

The question of potash deficiencies in Tasmanian soils is largely undetermined, but the lands on which our main farm crops are produced do not manifest any obvious signs of deficiency. Departmental trials which have been carried out from time to time with potash fertilisers have given more or less negative results with the exception of some recent work with tobacco, which indicates that potash gives increased yield and improved leaf quality. While the position in general is as indicated, it is possible that deficiencies may exist in certain areas, or that existing supplies may not be adequate to the needs of special crops which require large quantities of potash. For those who are interested in the question of available potash supplies in the soil, the book should prove of great interest.

The authors have dealt thoroughly with external symptoms and modifications of the internal structures of plants, and with the influence of potash deficiency on resistance to disease, pests and climatic factors. There is a short but admirable treatise on the pathology of potash deficiency. Two contributed essays complete the text; the first, by Dr. G. N. Hoffer, dealing with maize, and the second by G. W. Cowie, M.A., B.Sc., with fruit trees in relation to the main subject. The book is profusely and admirably illustrated, and many of the plates are in colour. The latter show the characteristic external symptoms by which a potash deficiency may be recognised in any of the main crops; 45 crops are represented, all but two or three of which are to be found in the Commonwealth.

The work should prove of value to practical agriculturists, fruitgrowers and market gardeners, as well as technical workers in all branches of agriculture. Our copy from Pacific Potash Ltd., Chatsworth House, Bent Street, Sydney.

ROTATIONAL GRAZING OF PASTURES

By R. W. WILSON, Senior Agricultural Officer

UNTIL recently the areas of improved permanent pasture on the majority of properties have been so limited as to restrict their use to special purposes such as flushing stock, lambing and fattening. With the establishment of greater areas over the last few years, the question of the most efficient method of management of what are fast becoming wholly grassland farms, is becoming one of prime importance in Tasmanian agriculture. It is not sufficient that permanent pasture be used merely to replace native pasture. It differs considerably in many respects and consequently requires specialised treatment if the most economic results are to be obtained.

Practically every farmer and grazier is aware of the desirability —in fact, the necessity—of regularly topdressing and harrowing improved pastures. But proper management goes much further than this. It requires a study and comprehension of the effects of differential methods of grazing, not only on the pasture itself but also on the stock which are grazed upon it. The growth of pastures varies according to the season of the year. So also does the nutritive content and value of the grasses and clovers vary according to their stage of growth. The composition of the pasture can actually be altered by the mode of grazing practised. Further, it is now recognised that animal health and certain parasitic infection can be influenced to a degree by grazing management.

The pasture year can be reckoned as commencing with the autumn rains. If these are normal as regards quantity and time of precipitation, the perennial plants in the pasture commence their fresh growth from the crowns and roots, and annuals such as subterranean clover re-establish themselves from seed. With the advent of the winter conditions of cold weather and frosts, the rate of growth slackens until the spring, when normal seasonal conditions give rise to a flush of growth culminating in the summer in the production of seed heads and the ripening of the seed, together with the dying off of the leafage of perennials and the death of annual plants.

In its younger stages grass has a high protein content and a low percentage of indigestible fibre. As it matures the amount of protein decreases until, in the seed stage, the protein is almost wholly concentrated in the seed, while the stalk and leaves contain a high percentage of indigestible fibre with a low food value and a wide nutritive ratio. There is a medium stage where the fibre content is lower and the nutritive ratio is more satisfactory. With permanent pastures containing a mixture of grasses and clovers this is reached when the herbage attains a growth of two to four inches.

Experiments have clearly shown that the species composition of mixed pastures can be varied according to the time of grazing inasmuch as hard grazing in the early spring tends to check and temporarily extinguish the earlier maturing grasses such as rye-grass, while hard later spring grazing similarly affects the later maturing grasses such as cocksfoot. Heavy spring grazing and light summer grazing reduces the grasses and increases the clovers while overgrazing in the winter and undergrazing in the summer tends towards a depreciation of the pasture and the invasion of weeds mainly of the prostrate type.

In addition to the digestible nutrients contained in their food both sheep and cattle require a certain amount of indigestible fibre in order to maintain their digestive systems in a healthy condition. For body maintenance only carbohydrates are mainly required, thus giving a ration with a wide nutritive ratio, but the development of the embryonic young, the production of milk and the growth of wool call for an abundance of proteins, i.e., for a ration with a narrower ratio. A shortage of these requirements in the food supplied tends towards their withdrawal from the animal's own body, which if carried to excess leads to a complete breakdown. From birth until maturity is attained, young stock require succulent foodstuffs rich in those nutrients necessary for the development of their growing bodies. A shortage of these produces stunted, poorly developed animals whose future wool, milk and body returns are reduced, as is their resistance to disease.

A comprehensive survey of all these factors shows that not only is it possible under normal seasonal conditions to graze to a definite programme, but also that a controlled grazing is absolutely necessary for the well-being of both the stock and pasture. It must be recognised that the amount of feed available from pasture varies according to the seasons of the year, and accordingly the average optimum rate of stocking to obviate the mismanagement of overgrazing in winter and undergrazing in spring is that which allows a surplus, in the flush period, for conservation in the form of meadow hay or silage to balance the deficiency in the slower growing periods. To give the best results a green growing crop is required with hay, and so the practice of providing a root crop such as soft turnips to feed in conjunction with meadow hay has everything to commend it.

Following the autumn rains stock should be concentrated in a limited number of paddocks, even if such necessitates the feeding of supplementary foodstuffs of meadow hay or silage and turnips to provide them with a full ration. The availability of run country on a sheep property is of special value at this period as it can be used as a withdrawal area for the stock to relieve temporarily the better class pastures. It may be necessary to supplement the feed obtained from the run with fodder crops of turnips, and even meadow hay, but the important thing is to give the improved pasture every chance while at the same time ensuring that the stock are adequately fed. With this spelling the pastures should in a few weeks attain a growth of up to two or three inches when they can be used to initiate the year's rotational grazing. In each series of paddocks used as a rotational unit, only one paddock is grazed at a time. When it is eaten out and the next paddock has attained the requisite growth the stock are moved from the one to the other, and so on through the whole series. As the cold weather approaches it will be found that the growth of the pastures slackens and one paddock is eaten out before the next is sufficiently advanced for grazing. It is here that the conserved surplus of the flush period together with root crops prove their value as their utilisation as a supplement to the pasture allows of the slowing up of the rotation to balance the decreased rate of pasture growth.

The spring freshening again speeds up the rate of rotation and obviates the necessity of supplementary feeding, while with the approach of the flush period, in spite of the greater call on the pastures by cows freshly in full milk or sheep with lambs at foot, the growth shows a tendency to get out of hand. The rotation may then be quickened by excluding a proportion of the paddocks from the rotation and shutting them up to be cut later for hay or silage. Herbage set apart for the latter purposes should be cut before the growing period reaches its climax to permit a fresh aftermath growth which is invaluable for the summer milk production or lamb weaning. The persistent throwing up of flower heads proclaims the approach of summer, and from then until the coming of the autumn rains the rotation must attain its maximum speed in order to keep this tendency in check. Should the stock be unable to keep pace with the tendency of the growth to run to seed the mower can advantageously be brought into play for this purpose.

The subdivision of a property will depend largely on its size and the number of stock carried, but the total area of each rotational unit should be that which at the optimum rate of stocking will carry a conveniently sized mob or herd. Large properties will, of course, require more than one unit. It must be recognised that the rate of rotation is determined by the frequency of the grazing of each paddock, and not by the time taken in its grazing. The latter factor is governed by the number of paddocks in each unit, and the more intensive the rotational grazing the greater the number required. While admitting that the maximum results are obtained by having the paddocks as small in relation to the number of stock as will allow of their being fed out in a few days, the cost of the necessary fencing and watering facilities is likely to be more than is warranted. In practice it is found that for ordinary rotational grazing the subdivision of each unit into four allows of its reasonably efficient handling with sheep. A greater number of paddocks would, however, be advisable for dairy herds.

A recent demonstration showed an increase of 20 per cent. in wool production and 25 per cent. in sheep body weights from an area rotationally grazed, as compared with a similar area grazed without rotation. These figures in themselves prove that rotational grazing is not based merely on theory, but that it is a demonstrably sound and economic phase of practical management.

FOOT-ROT IN SHEEP

By L. N. THORNTON, Government Veterinary Officer

THIS disease, which affects the feet of sheep and occasionally those of cattle, is both infectious and contagious, and there is no doubt that in many flocks it causes considerable loss each season. The pain associated with it and the inability of the animals to move about freely greatly reduce their capacity to produce flesh and wool.

The disease is characterised by lameness of the animal in one or more feet, and this is generally the first symptom noticed by the owner.

Frequently, examination of the feet when lameness is first apparent reveals nothing more than a reddening of the skin between the toes. As the disease progresses the redness becomes more intense and the part hot and swollen. Later a watery fluid oozes from the skin and the foot develops a very offensive odour. Finally, the skin over the area breaks down and a fœtid discharge of pus is formed. At this stage the trouble spreads rapidly and the horny structures of the hoof are affected. These become underrun with pus, the soft structures which join the horny layer of the hoof to the foot itself are destroyed and the hoof is partially or totally shed. This causes intense pain and the animal walks around on its knees.

The horny structures tend to grow more than is usual and become very long and turn outwards and upwards. This condition of the hoof in severe cases may occur within about two weeks of the onset of the disease, but usually it takes much longer. Thus, when sheep with long toes associated with lameness are seen in the flock, the disease has most likly been present for some time.

The causes of the trouble, i.e., the particular germ which causes the disease, and the factors which produce the necessary condition in sheep's feet for its entry and growth, have been the subject of extensive investigation by workers in all parts of the world, as this disease is not confined to Australia. It is found in practically every country where there are sheep, and was first described in England as early as 1791.

At present the exact cause has not been determined, but there are numerous predisposing causes which all help to produce in the hoof a suitable condition for the commencement of the disease.

Predisposing Causes

Any conditions which tend to soften or cause injury to tissues of the feet are liable to set up foot rot. Continual depasturing of sheep in damp places and on heavy growths of pastures (particularly clovers) has been found to favour the incidence of the disease. Under these conditions the structures of the feet are not only softened, but the excess growth of hoof is not worn away, with the result that it curls under the sole, allowing dirt and other material to collect under it. Thus ideal conditions are created for the growth of bacteria.

Prevention

The first consideration in dealing with any disease should be in the direction of eliminating the cause or causes.

In wet and damp country or on heavy pastures some dry and sparsely grassed part should be provided for the animals to camp in. In flocks where the disease is known to exist the feet of the sheep should be carefully watched and periodically examined and all overgrown feet should be trimmed. An excellent precautionary measure for keeping the feet trimmed and hardened when the sheep are depastured on damp ground or heavy pastures is to drive them along on a hard road.

It is known that sheep which have apparently recovered from the disease can harbour the germ in their feet. If these sheep are introduced to a property that is free from the trouble, but on which conditions exist which are suitable for its development, an outbreak may occur.

Foot rot has been rather prevalent this season, and in order to prevent its introduction care should be taken when purchasing sheep to adopt precautionary measures in the case of any animal showing the effects of the disease.

Treatment

The effective control of foot rot, as of all other diseases, depends on early treatment. As soon as any lameness is noticed the flock should be gathered, the affected animals taken out and isolated, and the remainder given a foot bath to minimise the spread of infection.

All the affected animals should be treated as soon as possible in order to prevent the disease from extending to the deeper structures of the foot, a development which must inevitably lead to permanent damage of the hoof.

The affected feet should be thoroughly cleaned and trimmed to the natural shape, but all damaged and underrun horn must be removed so as to expose the affected underlying structure. All discharge and dirt which has collected under the affected horn must be removed. This operation should not be done hurriedly, but care should be taken that the foot is properly prepared. All the trimmings and pieces of hoof should be gathered and burnt as these are an effective means of spreading the disease if neglected.

The sheep should then be given prolonged treatment in a foot bath, being kept standing in the solution for at least half-an-hour. The longer the treatment the more effective is it likely to be, as long immersion affords the antiseptic time to penetrate the tissues and be brought in contact with all deeply seated organisms.

The foot treatment should be repeated several times at intervals of two or three days.

Where only a few sheep are affected in a small flock and the numbers do not warrant the expense of putting in a foot bath, hand treatment may be carried out.

Numerous mixtures have been tried in the foot bath and the following solutions have given the best results:—

> Copper Sulphate (Bluestone), 5% = ½ lb. to 1 gallon water
> or
> Formalin, 2% = 1 pint to 6 gallons water.

Both these solutions are quite cheap and effective, but bluestone has the disadvantage that it stains the wool. Formalin has a slight effect, apart from disinfecting the foot, in hardening the tissues.

The solution should be cleansed after each draft of affected animals has been through the bath, as it becomes heavily contaminated with droppings after the sheep have stood in it for any length of time. If this accumulation is removed whenever necessary one bathful of the solution should last for four or five applications at three-day intervals.

The Foot Bath

A trough 8 inches wide at the bottom, sloping out to 12 inches wide at the top and 6 inches deep, makes a suitable bath. The length of the trough would depend on the size of the flock, 15 feet being a suitable length for one of small to average size.

The bath should be fenced to form a race about 20 to 24 inches wide, and boarding up the sides to a height of 12 to 18 inches will prevent the loss of a considerable amount of fluid by splashing.

An excellent position for the bath, if it can be so arranged, is one in which the sheep can pass through it into the draining pens of the dip. Here they can be held and their feet allowed to dry before they are drafted into the paddocks. An arrangement of this kind will prevent a considerable amount of fouling of the feet.

If the flock is a large one and a small bath would be inconvenient, one of the pens in the yard can be concreted with a raised edge of about 6 inches. The most suitable pen for the purpose is the one which gives entry to the shed. By arranging the bath here the sheep can be driven from it directly into the shed where thy can remain until their feet are dry.

Hand dressings for foot rot should be in a more concentrated form owing to the shorter time the parts are in contact with the antiseptics. The following mixtures have proved fairly satisfactory and any one of them can be used:—

(1) Picric Acid, 4 ounces; Methylated Spirits, 1 gallon.

(2) Dissolve 2½ lbs. Powderel Resin in 1 gallon of Turpentine and add ½ pint Lysol. Shake or stir vigorously until a uniform mixture is obtained.

(3) Formalin, 1 part; Glycerine, 9 parts.

(4) Stir into 1 quart of warm Stockholm Tar 2 ounces of finely ground Bluestone and add 1 tablespoonful of Lysol.

The use of very powerful acids such as pure Carbolic Acid or Hydrochloric Acid, or of pure Formalin, should be strictly avoided as these substances will cause extensive damage to the healthy tissues.

There is another type of foot rot which affects the joints above the foot rather than the foot itself. This form of the disease produces swelling and abcesses in the tissues above the hoof.

The treatment in these cases consists of hot fomentation of the part, where this is practicable, and careful opening of the abcesses. The cavity is then syringed out with a mild disinfectant (Lysol, 1 teaspoonful to 1 pint of warm water is quite suitable).

IMPORTATION OF STOCK

The Stock Act prescribes that previous notice of intention to import stock into the State from the Mainland must be given by the importer to the Chief Inspector of Stock.

Failure to observe this requirement has not only given considerable trouble to veterinary officers and port inspectors, but also made the importer liable to a fine of £100.

In regard to swine, precedent authority must be obtained for their importation into the State, and they must be accompanied by certificates of health.

Notification of intention to import cattle must be given to the Chief Inspector of Stock, giving particulars of cattle, the boat on which they are being imported, and the date and time of arrival.

They must be accompanied by a certificate from the owner that the cattle are from herds immune from disease for a period of three years. Certificates must also be furnished from a Government Veterinary Officer of the place of export that such cattle were free from all infectious and contagious diseases at the time of shipment, and that the cattle had been subjected to the (a) Tuberculin Test, (b) Johnin Test, (c) Contagious Abortion Agglutination Test, and (d) the Complement Fixation Test for Contagious Pleuro-Pneumonia.

All necessary certificates can be obtained from the Chief Veterinary Officer of the exporting State. The tests are conducted by veterinary officers of the exporting State or by veterinarians approved by the Chief Veterinary Officer.

Completed certificates must be handed to the Veterinary Officer or Port Inspectors at the port of landing, or to the caretaker of the Quarantine Station.

All imported animals are released subject to inspection by a Veterinary Officer or Port Inspector, with the exception of cattle, which have to undergo a period of ninety days quarantine.

Chief Veterinary Officer

APHIDES AND THEIR CONTROL

By J. W. EVANS, Entomologist

APHIDES, "Plant Lice," or "Green Fly," are possibly the best known insect pests with which those who grow plants have to contend. Although small soft-bodied insects which are easily destroyed by insecticides, their amazing powers of reproduction render them difficult to control. There are no indigenous aphides in Tasmania, and it is not known how many species have been introduced into and established in this State. The life-history of many species is complicated, and in the present article only such facts are given as are necessary for an understanding of control measures.

Aphides are sucking insects, hence cannot be killed by stomach poisons such as lead arsenate. They have many natural enemies which exert a considerable degree of control; amongst these are ladybird beetles, lacewings, the maggots of hover flies, and parasitic wasps.

Green Peach Aphis (Myzus persicae)

The Green Peach Aphis occurs on peach trees during the spring and early summer months, frequently in such numbers as to cause the leaves to curl, and to retard the development of the twigs and fruit. During the winter months small shining black aphis eggs may be found on the twigs, clustered principally around the axils of the buds. These hatch either in late winter or in early spring and give rise to wingless females, which are known as "stem mothers" and which produce living young without previous fertilisation. The subsequent generation develops wings and some of the insects fly off and infest other plants, such as potatoes, garden flowers and weeds. On these secondary host plants several generations are produced of both winged and wingless females, until in the autumn, in addition to females, male insects appear. Late in the season some of the females fly to peach trees, are fertilised by males and lay eggs; these overwintering eggs are the only ones laid during the whole year.

Most efficient control of this pest is secured if the trees are sprayed early in July, when they are completely dormant, with tar distillate emulsion at a strength of 1:35 or 1:40. Miscible red oil, at a strength of 1:20 is also recommended.

The purpose of these sprays is to destroy the overwintering eggs. If winter treatment has not been carried out a watch should be kept early in the spring for aphides on the opening buds and leaves, and as soon as they are noticed the trees should be sprayed with nicotine sulphate and white oil, or any contact insecticide. Once the aphides have become so numerous as to cause the leaves to curl, control is well-nigh impossible.

Black Peach Aphis (Anuraphis persicae-niger)

This aphis is seldom such a serious pest of peach trees as the Green Peach Aphis, and is controlled by the same measures as are recommended for the latter. In addition to attacking the leaves it feeds on the roots of peach trees, and in mild winters will reproduce during the whole season.

Black Cherry Aphis (Myzus cerasi)

The Black Cherry Aphis passes the winter in the egg stage on cherry trees and frequently causes them serious injury during the early summer months. Control measures are the same as for Green Peach Aphis.

Woolly Aphis (Eriosoma lanigerum)

It is probable that the Woolly Aphis occurs in every apple orchard in Tasmania, and the large galls that occur on old trees testify to its having been at one time a pest of major importance.

FIG. I

PARASITISED WOOLLY APHIDES
after the emergence of the parasites.

Since the introduction and establishment of the parasite *Aphelinus mali,* little injury is now caused to apple trees, although in occasional seasons the activities of the parasite lag behind those of its host. If any uncertainty exists as to the presence of *A. mali* in an orchard, a search should be made for parasitised aphides. These have lost their waxy covering and are black in colour, and after the emergence of the parasites have round holes in the empty skins (Fig. I). In cases where additional control measures are needed, trees may be sprayed during August with miscible red oil, at a strength of 1:20. The oil should be applied at a high pressure.

Pear Root Aphis (Eriosoma languinosa)

The Pear Root Aphis passes the winter in the egg stage on elm trees. The eggs hatch in the spring and the feeding of the aphides on the leaves causes the formation of large reddish galls, known as "cockscomb galls," inside which the insects feed. In midsummer they migrate to pear roots, where they feed until the autumn. Well established pear trees suffer little injury, but a heavy infestation on young trees may result in the death of the trees.

This pest has not yet been recorded on pear trees in Tasmania, but the cockscomb galls occur on elm trees in Hobart parks and gardens.

Oak Aphis (Myzocallis annulata)

Oak trees in Tasmania suffer severely from the attacks of two insect pests, the Oak Aphis and the Golden Oak Scale *(Asterolecanium variolosum)*. A parasite of the scale *(Habrolepis dalmannii)*, which was introduced into the State in 1932 by the Division of Entomology of the Council for Scientific and Industrial Research, is now established in Hobart and Launceston, and should in time reduce the scale infestation. In the accompanying figure of an

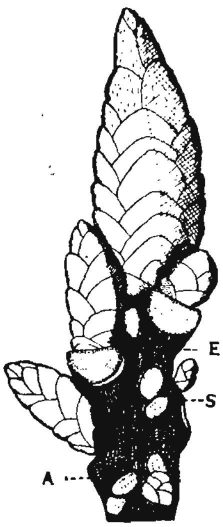


FIG. II

THE TIP OF AN OAK TWIG showing scale insects (s), aphis eggs (a) and red-spider eggs (e).

oak twig (Fig. II) may be seen the scale (s), overwintering aphis eggs (a) and eggs of a "red spider" *(Paratetranychus pilosus)* (e). Oak trees infested by these insects become blackened on the branches and twigs, the discolouration being caused by a sooty mould fungus which develops on their excreta. It is seldom practical to spray oak trees, but small or especially valued trees would undoubtedly benefit greatly if treated with tar distillate or red oil (as recommended for the Green Peach Aphis) when dormant, during midwinter.

Vegetable and Flower Aphides

The aphides mentioned in the previous paragraphs are principally pests of trees. There are others that cause serious injury to market and cereal crops, and to plants grown for ornamental purposes. Amongst them the following are of importance in Tasmania: The Cabbage Aphis *(Brevicoryne brassicae)*. the Carrot and Parsnip Aphides *(Cavariella aegopodii* and *C. capreae)*, the Rose Aphis *(Macrosiphium rosae)* and an unidentified species that damages oat crops. None of these can be controlled by sprays directed against the egg-stage, but all are readily killed by contact sprays or dusts, of which those containing nicotine-sulphate are most generally used. All aphides reproduce rapidly, hence for control to be successful, applications of insecticides must be made early in the season and at frequent intervals. Dusting is recommended rather than spraying, because of the ease and rapidity with which dusts can be applied. When sprays are used soap or some other wetting preparation should be incorporated in the mixture.

BLIGHT IN POTATOES

Conditions in December and early January were such as to indicate the possibility of severe blight infection occurring in potato crops. Prolonged continuance of weather such as that experienced from Christmas until the end of December might result in serious loss. Sporadic outbreaks of Blight **(Phytophthora infestans)** which there has been little attempt to control, have during recent years been sufficient to perpetuate the disease and a combination of circumstances now appears to have arisen sufficient to cause an epidemic unless conditions take a definite change.

Many of us still clearly remember the disastrous series of moisture-laden years commencing at 1908 and which reached the peak in 1911 when blight, sweeping the whole of the State, was responsible for the destruction of two-thirds of the entire crop. Spraying with Bordeaux mixture was then eagerly taken up as a control until experience proved that under our normally bright Tasmanian weather the disease could not make any appreciable headway. Spraying was abandoned in 1914-15, and since then farmers generally have taken no precautions against the disease.

While practically all growers are familiar with the appearance of blight, it is not generally known how infection of the tuber occurs. If the weather is moist and warm after the "tops" have been attacked there is a rapid spread of infection through the foliage. A smart shower at any time will then wash released spores down through the soil to the potatoes. A rapid spread of the disease breaks down the flesh tissue, and in most cases a soil-borne rotting agency completes the process of destruction.

A porous, granular soil—such as the basalt of the North-West Coast—thus offers very little protection to the tubers. In the absence of spray controls much can be done through the maintenance of full width between the rows which enables a generous "mould" to be raised against the growing plants, thus giving protection to the tubers.

Agronomy Division

FAT LAMB PRODUCTION

By N. KJAR, *District Agricultural Officer*

THE production of fat lambs is increasing in Tasmania, and the next few years are likely to see still further increases. Eventually it is expected that this activity will become one of the main sources of regular income for farmers on the North-West Coast. Where the land and climate are suitable and provision has been made for fencing, pastures, water supply and fodder crops, the production of export lambs is probably one of the soundest and best paying propositions on the farm.

The different factors affecting the production of fat lambs can be divided into those which are within the control of the individual farmer and those which are not. Some of the factors not subject to control are climatic conditions such as rain or drought, prices received in London, exchange, the type of lamb in demand, and costs of goods used by the farmer in production.

On the other hand, the farmer has within his control the actual type of lamb produced, and by due attention to this side of his operations can help to make the reputation of the Tasmanian product on the home market. Every farmer should appreciate this aspect and endeavour to produce lambs which approximate as closely as possible the type required in England, namely, a low-set full-quartered lamb giving fine-grained, high quality meat and cutting up into the small joints required by the English housewife. The weights in demand are those varying from 28 to 36 lbs. dressed; although there is a limited enquiry for lighter and heavier lambs at reduced prices.

By devoting keen attention to trade requirements New Zealand farmers have built up an enviable reputation for "Canterbury" lamb. Tasmanian farmers can help to put their own product on a sound footing by having an equal regard for this factor.

The main factors which are farmer is able to control in the production of fat lambs are as follows:—

1. Type of ram used.
2. Type of ewe used.
3. Time and duration of lambing.
4. Selection of farm.
5. Farm management.

The following remarks on these points are necessarily given in a general sense, but apply particularly to the basaltic soils of the North-West Coast. Even in this area conditions are not uniform and due allowance should be made for special circumstances such as climatic conditions and other types of farming being carried on by the farmer concerned.

For the successful establishment of the fat lamb industry it is considered that farmers in suitable areas should concentrate on producing the type of lamb required by the export trade. This type differs from the bigger, coarser and generally older lamb or hogget that has in the past been produced for the local market and also from the early lamb produced to meet the demand for spring lamb. This means that the other methods will have to be superceded by more modern ones that have proved themselves in other countries with similar climatic conditions.

The Ram

The type of ram used will have a considerable bearing on the product. It appears definite that the English market prefers a lamb of the Down breed type which, with its small joints, compact carcase and high quality flesh, obtains the highest favour amongst the consuming public. The more common breeds in this State are the South Down, Ryeland, Shropshire, Suffolk and Dorset Horn.

Tasmania has a splendid opportunity of producing a quality article of standard type by using the South Down ram of which we have so many high-class studs. New Zealand experience indicates also that the South Down ram has distinct advantages over other breeds, although the Ryeland, which is of much the same type, appears to be gaining in popularity in New Zealand and on the Mainland.

The Dorset Horn, by virtue of its prolificacy to an old age and its ability to breed at practically any period of the year, has given good results in the production of early local lambs. It does not, however, appear so satisfactory in other circumstances. Similarly, the Shropshire and Suffolk have advocates in special circumstances.

The fact is stressed that only pure-bred rams of the best quality should be used. There have been instances of cross-bred animals giving individually good results, but these instances are rare and the use of a pure-bred sire is recommended whichever breed is selected. The pure-bred ram from a high-class stud is more dominant than a scrub animal and is thus able to impress his desirable characteristics on his lambs.

The Ewe

The type of ewe used will also have a considerable influence on the economy of fat lamb production. As a first essential she should be of a type that is capable of fattening one or more lambs of the desired weight and quality in a short period of 10 to 14 weeks during the spring flush of growth. While wool should be only a secondary consideration, the ewe should be capable of producing a reasonably heavy fleece which, however, will probably be only of medium quality. She should, in addition, possess such a frame that at the end of her profitable use as a breeding ewe she can be fattened for disposal as export mutton. Some difference of opinion exists as to the best breeds and types. It is not intended to dogmatise on this point, but merely to offer the following comments regarding the main breeds which are available.

In New Zealand a big proportion of the flocks are composed to a large extent of Romney Marsh blood, and it is noteworthy that the export lamb trade has been moulded chiefly around the Romney Marsh crossbred ewe. This type of sheep when crossed with the South Down ram has been very successful in producing the desired type of lamb, and by virtue of its strong constitution has been resistant to foot rot and internal parasites. This is especially valuable on moist, heavy land and in districts of heavy rainfall and dense pastures, and will become of more economic importance as the carrying capacity and the density of the Coastal pastures are increased. The ewe is a good forager, a good mother, has given comparatively little trouble at the lambing period, and in addition is capable of producing a heavy fleece of medium quality wool.

The Border Leicester and English Leicester crossbred ewes are considered by some authorities superior for high, dry land, and in some of the trials carried out in other States appeared more prolific, which is an economic factor worthy of consideration. However, the lamb produced from the Leicester cross ewe is generally leggier than that derived from the Romney Marsh cross ewe.

South Down cross ewe lambs are sometimes retained by farmers and mated with a South Down ram, but although a high quality, shapely carcase is thus produced the high proportion of Down blood in the ewe is regarded as a disadvantage. The fleece of such a ewe is not so valuable as that of a longwool type, and the general results obtained are less satisfactory than those which attend the use of the longwooled crossbred ewe. The practice of retaining ewe lambs of this type is not recommended.

The Corriedale has been suggested as a dual purpose sheep suitable for producing export lambs on small-sized farms, but the bigger-framed plain-bodied types with strong constitutions would probably be more suitable. The Corriedale fleece is a valuable one, but the main point in the selection of a ewe for fat lamb raising is her ability to produce and rear the desired type of lamb, and from this point of view it is likely that the Corriedale would be less satisfactory than the larger-framed breeds.

In back-country districts where climatic conditions are more severe and a heavier rainfall is experienced than on the Coast, the large-framed crossbred ewe with relatively coarse wool has a distinct advantage in that she is able to produce a better class of lamb under the relatively harsh conditions prevailing.

Time of Lambing

Before freezing facilities were available, farmers were restricted to the local market for an outlet for their lambs, and each year endeavoured to produce earlier and earlier lambs in order to secure the advantages of the short season early market. The result was that the lambs were dropped at all periods of the year, and in some cases during the winter months were very costly to fatten owing to the necessity for hand-feeding and the more extensive use of fodder crops for both ewes and lambs. The position has been materially altered now that freezing facilities are available at Somerset and Hobart, and, while the early local market will continue for a time to command high prices, this position will gradually recede and the production of early lambs might then best be restricted to farmers in the very early localities. The lamb produced on the spring flush of feed will be the cheapest to fatten and generally of the best quality, and the average producer would be well advised to adjust his programme so as to take advantage of this fact.

Mating should take place so that the lamb is dropped a little before this period of seasonal flush, thus enabling it to be marketed as a milk lamb. The lamb commences to eat grass at an early age, and it is suggested that lambing might take place four to five weeks before the spring flush is fully developed. On the sea front this flush commences in mid-September and the lamb could be dropped in mid-August, while in the back country at an elevation of, say, 1,500 feet, where the flush is not experienced till mid or late October, the drop need not take place till mid or late September, or even later.

In this way the ewes and lambs are carried at the time of greatest feed supply and the majority of lambs should be marketed at ten to fourteen weeks of age before the dry summer period brings about a reduction of succulent feed. Permanent pastures should be the main source of food for ewe and lamb, supplemented where necessary by such fodder crops as spring-sown rape and turnips.

Suitability of the Farm

The farmer who has not yet selected his farm should pay due attention to soil and climatic conditions, water supply, distance from rail, etc., before making his final selection. The farmer already in occupation, having decided that fat lamb raising is an economic proposition under his conditions, may find it necessary to make the farm more suitable. Factors such as shelter belts, drainage, fencing, water supply, buildings, pastures and fodder crops have a considerable influence on returns, and any necessary and practicable improvements in any of these aspects will be well warranted.

Farm Management

Although mentioned last, this aspect is of major importance. Even though all the other factors are ideal, the degree of perfection attained with farm management will be reflected by the financial returns obtained.

Major considerations under this heading will include—

(a) Type and proportion of permanent pastures, fodder crops and other forms of supplementary feeding.

(b) A system of rotational grazing enabling full use to be made of all pasture growth.

(c) Animal health precautions such as prompt attention to foot rot, drenching, and other measures. Provision of salt licks is also another point that should be given consideration.

(d) Business side of the work. A system of records and a diary are very helpful in any business, and the average farmer has not in the past paid sufficient attention to this aspect of the work. Good methods of buying and selling are as important in this type of farming as in any other business.

If attention is paid to the above mentioned points there is a reasonable prospect of making the fat lamb industry a success even if some factors outside the control of the farmer are unfavourable. If, however, attention is not paid to the production side it is quite possible that some outside influence over which the farmer has no control may become the deciding factor between profit and loss.

CROWN PACKS IN CANADIAN TYPE FRUIT CASES

By P. H. THOMAS, Chief Horticulturist, and T. D. RAPHAEL, Horticulturist

DURING the 1937 overseas fruit export season a series of experiments was carried out with a view to determining the carrying qualities of Canadian Standard cases constructed of local and imported timbers. All containers were packed on the "crown" system, and extensive notes were taken in regard to the packs, sizes, total bulge and net weights of the different varieties of apples.

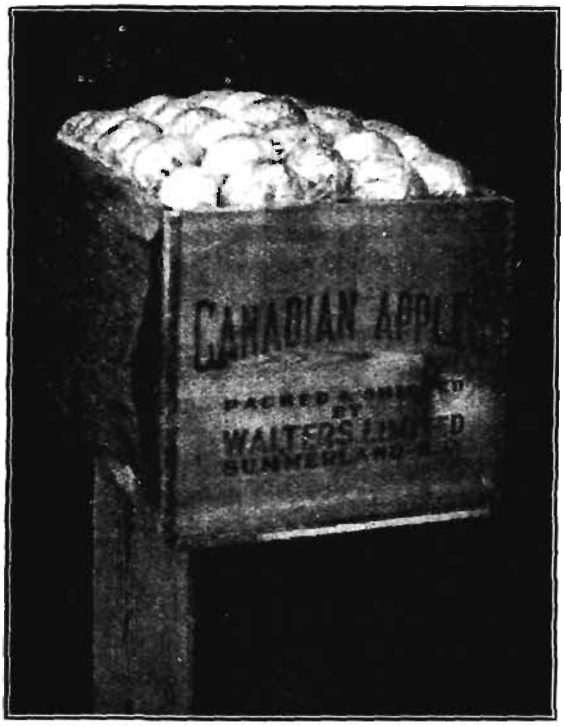


FIG. I
TYPICAL CANADIAN STANDARD CASE AS PACKED FOR MARKETING FROM A SUMMERLAND PACKING HOUSE, CANADA

Briefly, the experiments were mapped out on the following lines: Five consignments of 40 cases each were forwarded overseas in four differently constructed containers—

(1) Standard softwood case.

(2) Standard case constructed with hardwood ends and sides and softwood tops and bottoms.

(3) Standard case constructed entirely of hardwood, the timber being of selected quality, seasoned, and with thinly-cut tops and bottoms.

WOOL BROKERS
STOCK AND STATION AGENTS

PRODUCE
MERCHANTS

Wool, Skins, Hides
(E. H. Webster)

SHEEP SKINS, HIDES
RABBIT AND ALL FUR
SKINS

Sold on Consignment at Full Market Rates

Fat Stock
(D. E. Hopkins)

SALES at

ABATTOIR—
Cattle, Sheep—Every Wednesday
Carcase Pork—Thursday

BRIDGEWATER, SORELL—
Store and Fat Stock—
Alternate Tuesdays

Correct Market Information Supplied
'Phone 9280 (after 6 p.m.)

CAM
ROS
RIVI
COL
HUO
BOT
BUC
Have
Stoc
Priv

Land
(H. C. Nickolls)

If you wish to purchase City or Country Property, or wish to sell—

We have Clients requiring Properties of all description.

Our Representatives would be glad to call on you.

Salesmen:
R. H. STANFIELD
M. H. SWAN

Shipping
(E. H. Webster and H. R. Neilson)

REPRESENTING—
Oceanic S.S. Coy. (Matson Line)
P. & O. Royal Mail S.N. Coy.
North Pacific-Australia Line
P. & O. Branch Service
British India S.N. Coy.
Clan Line of Steamers
Roosevelt S.S. Inc.

Booklets on Application

Telephone No.

A. G. WEBST

Telegrams: "WEBSTERS, HOBART"
Head Office, Wool Showroom, Show Rooms: LIVERPOOL STREET
New W

Fertilisers, Sp
&c.

COOPER'S ARS/NETT cause of its extraordinary ness, even covering power. tenacious sticking quality, is World's Best Arsenate of Lead. economical because no spreader is req

COOPER'S NICOTINE SULPHATE is a tact Spray for the control of all sucking in and pests. It can be used with safety on all cl of fruit.

ALL FERTILISERS STOCKED

COLLOIDAL SULPHUR, for the control of Powdery dew and Black Spot. It prevents Leaf Sco-ch, elimi Rust, and ensures the maximum results at the lowest

ALL OTHER SPRAYS STOCKED

CONSIGN YOUR PRODUCE TO OUR DAIL

Chief Agents
. ROYAL INSURANCE COMPANY

Established 1831

R & SONS LTD.

Branches and Agencies: LAUNCESTON, BURNIE, STANLEY

Stores: MOONAH

tore Stock

(H. C. Nickolls)

REGULAR SALES
at
ELL TOWN OATLANDS
RLAND CAMPANIA
DALE TUNNACK
OOK NUBEENA
LLE KOONYA
ELL MELTON
ND

classes Store
Hand for
ale

Engineering

(Hugh Cruickshank)

Manufacturers of Automatic Pumping Plants, Case - Planing Machines, etc.

Repair Work of all Description, including Oxy and Electric Welding

Agents for Ball-Bearing Coy. of Aust.—
Ball Rollers, Timken Bearings

"LISTER" Diesel Engines

(H. M. Cane)

Amazing Economy — Low Consumption of Cheap Grade Fuel Oils. Easy Starting, done by hand without any starting device whatever, due to new unique "LISTER" Patented Combustion Head.

Operated on 4-stroke principle.

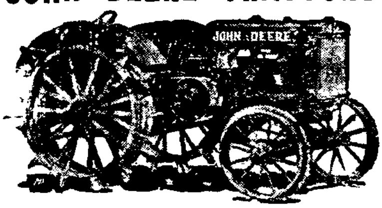
Automatic Lubrication.

SHEEP DRENCHES, GRASS AND CLOVER SEEDS, BAGS, &c., &c.

(G. E. Mather)

WE CAN SUPPLY—
SAYERS' BLU-NIK for control of all worms.
SAYERS' FLUKE REMEDY—Use this and have healthy stock.
SPECIAL DOSING SYRINGES.
ALL VARIETIES of GRASS and CLOVER SEEDS of the HIGHEST GERMINATION and PURITY.
Tested Seeds will bring you Success, Profits and Prosperity.
Our Seeds grow Good Will as well as Good Crops.
NEW & SECOND-HAND CHAFF BAGS. SECOND-HAND CORN SACKS, SUGAR SACKS and POTATO BAGS of Good Quality.
WIRE, WIRE NETTING, RINGLOCK, etc., etc. (full stocks on hand).

"JOHN DEERE TRACTORS"



For Farming, Orchard or Power Purposes.

ECONOMY—Burns Diesel Fuel Oil at 8d. per gallon, cutting working costs 33 per cent.
SIMPLICITY — Only 2 cylinders — few moving parts.
The most power — for the longest time — at the lowest cost.

UCTION SALES at the Railway Yards. Correspondence Invited.

Chief Agents
. ROYAL INSURANCE COMPANY

Store Stock
(H. C. Nickolls)

REGULAR SALES
at

ELL TOWN	OATLANDS
ARLAND	CAMPANIA
SDALE	TUNNACK
ROOK	NUBEENA
/ILLE	KOONYA
VELL	MELTON
.AND	

l classes Store
n Hand for
Sale

Established 1831

R & SONS LTD.

Branches and Agencies: LAUNCESTON, BURNIE, STANLEY

Stores: MOONAH

Engineering
(Hugh Cruickshank)

Manufacturers of Automatic Pumping Plants, Case - Planing Machines, etc.

Repair Work of all Description, including Oxy and Electric Welding

Agents for Ball-Bearing Coy. of Aust.—
Ball Rollers, Timken Bearings

"LISTER"
Diesel Engines
(H. M. Cane)

Amazing Economy — Low Consumption of Cheap Grade Fuel Oils. Easy Starting, done by hand without any starting device whatever, due to new unique "LISTER" Patented Combustion Head.

Operated on 4-stroke principle.

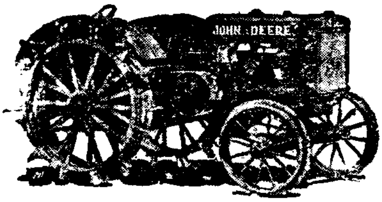
Automatic Lubrication.

/S

SHEEP DRENCHES, GRASS AND CLOVER SEEDS, BAGS, &c., &c.
(G. E. Mather)

WE CAN SUPPLY—
SAYERS' BLU-NIK for control of all worms.
SAYERS' FLUKE REMEDY—Use this and have healthy stock.
SPECIAL DOSING SYRINGES.
ALL VARIETIES of GRASS and CLOVER SEEDS of the HIGHEST GERMINATION and PURITY.
Tested Seeds will bring you Success, Profits and Prosperity.
Our Seeds grow Good Will as well as Good Crops.
NEW & SECOND-HAND CHAFF BAGS. SECOND-HAND CORN SACKS, SUGAR SACKS and POTATO BAGS of Good Quality.
WIRE, WIRE NETTING, RINGLOCK, etc., etc. (full stocks on hand).

"JOHN DEERE TRACTORS"



For Farming, Orchard or Power Purposes.

ECONOMY—Burns Diesel Fuel Oil at 8d. per gallon, cutting working costs 33 per cent.
SIMPLICITY — Only 2 cylinders — few moving parts.
The most power — for the longest time — at the lowest cost.

UCTION SALES at the Railway Yards. Correspondence Invited.

(4) Standard case constructed of hardwood as above, but with slotted, peeled, tops and bottoms.

Prior to packing each case was carefully weighed and numbered. After nailing down the cases were re-weighed and measurements of the top and bottom bulges were taken at marked points. Similar weights and measurements were taken on several of the consignments in England and a thorough examination of the cases and contents was made by officers of the Agent-General's Department and the Commonwealth Department of Commerce. Representatives of the trade were also encouraged to give their opinions on certain aspects.

The following were the main points on which it was desired to obtain first-hand information:—

(a) Net weights of the fruit packed on the "crown" system at time of export, and on arrival in London.

(b) Total bulge (top and bottom) at time of export, and on arrival in London.

(c) Carrying qualities of the different cases and packs used.

Each of these phases will be dealt with in the order detailed.

(a) Net Weights

As already mentioned, the net weight content of each case was ascertained prior to export, and a fairly wide range of fruit types was covered by Cox's Orange Pippin, Sturmer Pippin, Jonathan, Cleopatra and Duke of Clarence.

The following were the extreme and average net weights recorded for these varieties in all sizes ranging between 2 and 3 inches:—

Variety	Maximum	Minimum	Average
Cox's Orange Pippin	50	44	48.11
Sturmer Pippin	49	44	47.30
Jonathan	46.5	42.5	44.16
Cleopatra	48.5	44.5	46.85
Duke of Clarence	46.5	43.5	44.75

From these figures it will immediately be seen that there was no difficulty in obtaining a 40 lb. net weight at shipment (even with Jonathan), and provided the loss in weight during transit does not exceed 2 or 3 lbs. this could be guaranteed at time of marketing in England.

It was naturally impracticable to obtain complete net weight records of the consignments in England, but four cases in each shipment were emptied and weighed, with the following average losses in weights:

Cox's Orange Pippin	1.75 lbs. per bushel
Sturmer Pippin	2.18 ,, ,,
Jonathan	1.7 ,, ,,
Duke of Clarence	1.2 ,, ,,

(Unfortunately, no figures were made available for Cleopatra)

Needless to say, the units are too small for accurate practical deductions, but they nevertheless provide an interesting indication of possible losses.

With regard to the weights recorded for the containers used, some interesting data were obtained. Particulars are as follows:—

Pine case, average weight, Hobart	7 lbs.
Selected seasoned hardwood, average weight, Hobart	$9\frac{3}{4}$ „
Slotted hardwood cases, average weight, Hobart	$10\frac{3}{4}$ „
"Shandy" cases, average weight, Hobart	10 „

The weights of the cases when emptied in London showed an average increase of $\frac{3}{4}$ lb. each, no significant difference being apparent between the different woods.

The comparison between the two complete sets of gross weights in Hobart and London provided unexpected fluctuations. In consignments Nos. 1 and 3 a loss in weight of approximately $\frac{1}{2}$ lb. per case was registered, whilst consignments Nos. 4 and 5 showed an average loss in weight of approximately 1 lb. and 2 lbs. respectively. Reference to the figures relating to the net loss in weight of the fruit show that this is not consistent with expectations; the

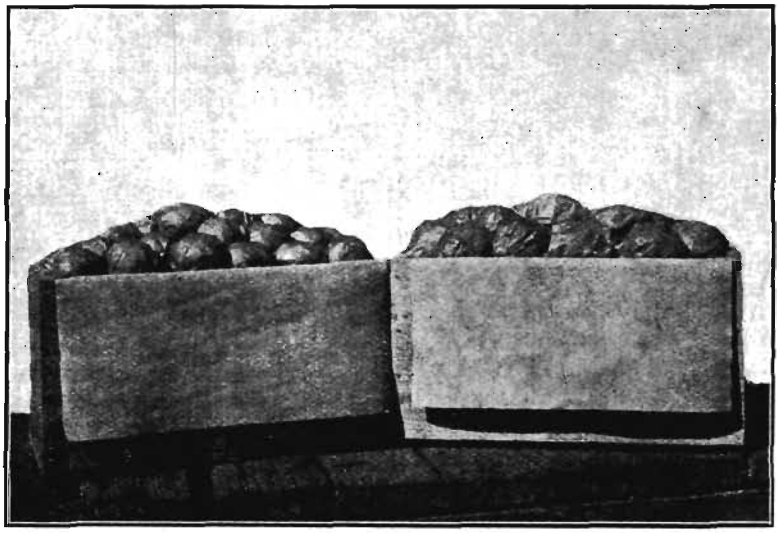


FIG. II
TWO CANADIAN STANDARD CASES AS PACKED FOR EXPORT FROM THE VALLEY FRUIT PACKING COY., WASHINGTON, U.S.A.

reasonable assumption, therefore, appears to be that the loss in weight in fruit has been offset to a substantial degree by an increased weight in case. The variation between the different consignments in the matter of loss in gross weight may possibly be accounted for by different factors operating in the ships' holds during transit.

(b) Bulge Measurements

A variety of different packs was employed in the present series of consignments, and consequently the total bulge varied to a considerable degree. An average of 200 cases employed, however, worked out at 2.02 inches after nailing down in Hobart. On arrival in London the average dropped to 1.11 inches, or a decrease in total bulge of approximately 55 per cent., due to shrinkage and settlement. Naturally, any decrease in bulge will be strictly in accordance with the pack used, but as the above results are in close agreement with those obtained recently in a British Columbian consignment after travelling to New Zealand, the figure appears to provide a fairly accurate indication.

(c) Carrying Qualities and Packs

It was hoped that these trials in "crown" packing would prove of practical benefit in the future reorganisation of the Tasmanian apple pack; therefore, every effort was made to cover a wide field and to obtain a maximum amount of first-hand information.

Altogether, fifteen counts were tried between the sizes of 2 and 3 inches, and "foreign" as well as recognised American packs were included. It was thought desirable that those carrying out the examination in England should be requested to provide the fullest observations, but that no indication should be given them as to which were trial packs and which constituted, in the estimation of the writers, satisfactory counts. This course proved highly satisfactory, and as a result of these and other trial packs tested a packing chart, which is here reproduced, has been prepared for the guidance of growers.

Larger side strawboards are undoubtedly essential; where those of the smaller type were used and not pulled up above the sides of the case after inserting the first layer of apples, a certain amount of injury from bruising was reported. No injury of any commercial importance resulted from "crown" packs, even when these were brought up to what might be considered excessive heights.

In the course of packing operations at this end, several points are worthy of note. If a good standard "crown" pack is to be maintained, variation in case size must be eliminated. Frequently during packing it was found necessary to measure up the case (although all were supposed to be identical) before commencing, and in some instances actually to alter the pack accordingly. Hardwood cases with pine tops and bottoms proved quite satisfactory, and the all-hardwood container turned out much better than anticipated, though wiring was essential for best results. Cases with slotted tops and bottoms were unsatisfactory owing to lack of rigidity under normal handling conditions. Peeled lids appear to have possibilities owing to the wrapping effect produced, and it seems likely that three-piece unitised forms might do well. Bevelling of the sides and ends of the case where they contact with the fruit would help to reduce any chance of injury should the strawboards prove insufficient.

Summary

(1) The "crown" pack proved eminently satisfactory as regards carriage, freedom from bruising and acceptance by the trade.

(2) No difficulty was experienced in ensuring a net weight of from 43 to 50 lbs. of fruit, according to size and variety.

(3) The bulge recedes more than 50 per cent. during transit.

(4) The loss in net weight of fruit recorded during transit did not exceed 2¼ lbs. per case in the present experiment.

(5) Cases increased in weight during transit.

(6) With the exception of cases with slotted tops and bottoms, carriage was uniformly satisfactory in the types used.

It is desired to acknowledge the assistance and co-operation rendered in Hobart by Messrs. E. R. Cottier Pty. Ltd., and that of Mr. M. G. Large, of the Department of Agriculture, who was responsible for arrangements regarding packing.

Acknowledgment is also accorded to Messrs. Ed. Bevington and officers of the Agent-General's Department and the Commonwealth Department of Commerce, London.

APPLE-PACKING GUIDE FOR THE STANDARD CASE

"CROWN SYSTEM"

(Internal Measurements, 18in. x 11¾in. x 10½in.)

Pack Count	Pack	Row	No. of Layers	Democrat, London Pippin, Geeveston Fanny, Yates, and Other Flat-shaped Varieties	Cox's Orange Pippin, Scarlet, and Other Round-shaped Varieties	Jonathan, French Crabs, Crofton, and Other Round-conic Varieties	Sturmer Pippin, Worcester Pearmain, and Other Conical Varieties	Cleopatra, Granny Smith, Tasman's Pride, Delicious, and Other Oblong Varieties
88	2 x 2	6 x 5	4	3¼ L	......	......	......	......
96	2 x 2	6 x 6	4	3¼	......	......	......	......
100	3 x 2	4 x 4	5	3⅛ L	......	......	......	3
113	3 x 2	5 x 4	5	3 L	......	3 L	3	2⅞
125	3 x 2	5 x 5	5	3	......	2⅞	2⅞	2¾ L
138	3 x 2	6 x 5	5	2⅞	......	2¾ L	2¾ L	2¾
150	3 x 2	6 x 6	5	2¾	......	2¾	2¾	2⅝
163	3 x 2	7 x 6	5	2⅝ L	2⅝ L	2⅝ L	2⅝	2½ L
175	3 x 2	7 x 7	5	2⅝	2⅝	2⅝	......	......
180	3 x 3	5 x 5	6	......	2½ L	2½	2½	2½
188	3 x 2	8 x 7	5	2½ L	2½	......	......	......
198	3 x 3	6 x 5	6	2½	2½	2½	2⅜ L	2⅜
216	3 x 3	6 x 6	6	2⅜ L	2⅜ L	2⅜	2⅜	2¼ L
234	3 x 3	7 x 6	6	2⅜	2⅜	2¼ L	2¼ L	2¼
252	3 x 3	7 x 7	6	......	2¼ L	2¼	2¼	......
270	3 x 3	8 x 7	6	......	2¼	2⅛ L	......	......
288	3 x 3	8 x 8	6	......	2⅛ L	2⅛	......	......
306	3 x 3	9 x 8	6	......	2⅛	......	......	......
324	3 x 3	9 x 9	6	......	2	......	......	......
Range of Average Net Weights Obtained =				43-46 lb.	46-50 lb.	43-46 lb.	44-48 lb.	45-48 lb.

The 188 pack is only advisable with noticeably flat-shaped varieties of fruits, and the 3 x 3 pack should be adhered to when possible, so that side slackness may be avoided.

"L" means approximately 1/16th of an inch over the size indicated, and, where 2¼in. fruit is concerned, it has been found necessary to detail several alternative packs to make allowances for grading and the variation in shape of varieties from different districts.

FARM BUILDING CONSTRUCTION

By J. TILT, Agronomist

THE occasion frequently arises when a knowledge of simple building construction is of considerable assistance to the farmer who is planning the erection of new buildings or alterations and/or additions to existing ones. Even if he is not able or inclined to undertake the constructional work himself such a knowledge places him in the position of being able to plan the work, estimate its cost and exercise any necessary personal supervision over the work of the builder. In the case of small jobs, such as the erection of a dairy or implement shed, which could be done during the slack portion of the year, it is quite likely that the possession of a little knowledge plus the requisite skill would persuade many a farmer to undertake the work himself rather than employ a builder or carpenter at rates considerably higher than those at which he would be likely to value his own labour.

In order to give assistance in the direction indicated above, a series of popular articles dealing with Farm Building Construction in more or less general terms has been prepared and will appear in several parts in this and succeeding issues of the Journal.

PART 1: CONCRETE

It is unlikely that the farmer will consider the erection of actual buildings in concrete except to a very limited extent. As a material for foundations, paths, floors and yards, however, it is unexcelled on account of its durability and for the ease with which it can be adapted to these uses. It is, together with stone, the most durable of all building materials, and its great strength can be demonstrated if it becomes necessary to demolish a concrete wall.

The life of a timber building is usually determined by the durability of its foundations, so that by having all timber resting on a concrete foundation it is possible to ensure the maximum of life for the building. Further points in favour of concrete construction are that the work can be carried out by men with little experience in building work, and that the gravel and sand can be obtained locally and carted by farm labour if desired.

Materials

Two different concrete mixtures are in common use. The first consists of cement, sand and crushed stone, and the second of cement and a sandy gravel.

The first type is largely used in town and city construction where supplies of crushed stone are readily available. The proportions usually are 1 part of cement, 2 of sand and 4 of stone measured by volume. The advantages of the crushed stone and sand are that the exact proportion of stone and sand can be used and that the broken surfaces of the stone are quite clean and of a rough nature which combines well with the cement and sand.

Gravel is more easily obtained in country districts than stone, so the second type of concrete mixture is the usual one for farm work. The gravel must be free from earth and organic matter such as roots and leaves. It must also contain a fair proportion of sand, the amount depending on the size of the stones. There should be sufficient sand present to fill up completely all the spaces around the stones so that the finished job will be solid. If sufficient sand is not present additional gravel will have to be screened and the fine material which it yields can be used to make up the deficiency. It is preferable that the gravel should not contain stones over 2½in. in diameter. If such are numerous it would be advisable to screen them out and set them apart for use in preparing the foundations. The proportions for general concrete work are 1 of cement to 6 of gravel measured by volume.

Cement slowly loses its strength with storage and must, of course, be kept perfectly dry.

Mixing

When a quantity of concrete mixing has to be done, a well-constructed mixing board amply repays the time spent on its making. Twenty hardwood boards 4 inches by 2 inches and 10 to 12 feet long make a good mixing board. Lay the boards parallel on their flat with the two outside boards on their edge and nail to three bearers underneath. This will give a board 6 feet by 10 or 12 feet and is a convenient size for two men to mix on.

The standard paper bag of cement contains one cubic foot, so that if six cubic feet of gravel are measured on to the board one bag of cement will be required to prepare a mixture of the correct proportions. It is useful to remember that a kerosene tin holds three-quarters of a cubic foot, so that eight kerosene tins would give the required six cubic feet of gravel. Turn the gravel and cement over, working from one side of the board to the other till the materials are well mixed. Then add the water and mix again. Do not allow excess water to run off the board, as by this means some of the cement will be carried away and lost. The concrete should have as much water as it will carry in order to facilitate packing into the moulds.

Reinforcement

It should be remembered that while the strength in compression of concrete is very high, its tensile strength, although much greater than that of brick, is still only moderate. On the other hand, iron has a high tensile strength, and when used as reinforcement, makes up for the deficiencies of the concrete. Reinforcement is therefore necessary where the concrete is to be subjected to tensile strain. For instance, a concrete block cast for a window head rests near its ends on the wall and carries the weight of the wall above evenly distributed over its whole length. Consequently, the tendency is for it to bend downwards in the middle, and in doing so the top half is compressed while the lower portion tends to stretch. It is in this lower portion that the reinforcing must be placed. With concrete fence posts or verandah posts the concrete can carry the actual weight likely to be placed upon it, but reinforcing is necessary to strengthen the post against sideways pressure and knocks. As it is not usually known from what direction the pressure is likely to come the reinforcing is spaced evenly around the post and near the outside. If it were known from what direction the pressure was to come the correct place for the reinforcing would be near the opposite side.

The round iron used for reinforcing concrete is sold by weight, and the length of iron per cwt. for reinforcing of various thicknesses is as follows:—

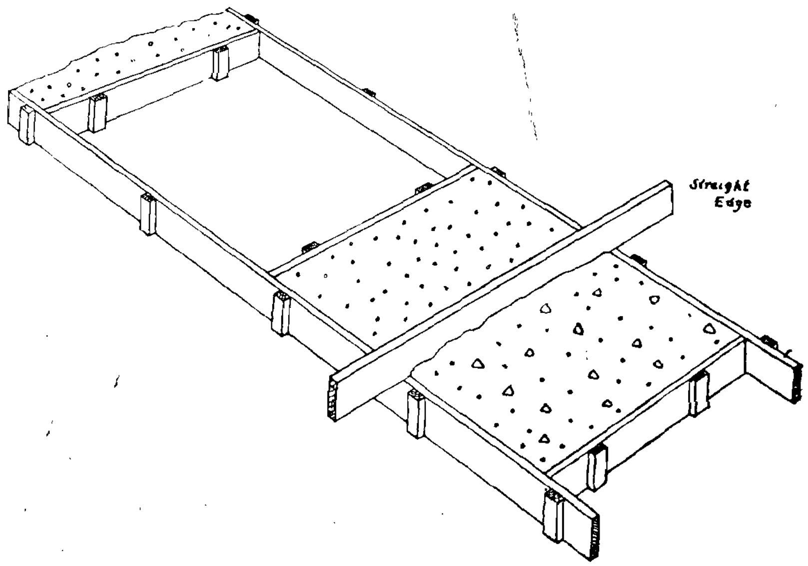
¼ in. diameter	688 feet
⅜ in. ,, ...	304 ,,
½ in. ,, ...	171 ,,

For reinforcing floors, posts, etc., ¼in. round iron is generally used, but where greater strength is required a heavier size is necessary.

Having dealt with concrete in a general way, we may now consider the specific uses to which concrete may be put.

Paths

Good paths around the house and farm buildings are a great convenience, especially in wet weather, and the construction of concrete paths is well within the capabilities of the farmer, even if he has not had any previous experience in concrete work. A footpath 3 feet wide and 3 inches thick is a convenient size. Such a path would require a paper bag of cement for every eight feet and a cubic yard of gravel for every thirty-six feet of its length.



CONCRETE PATH — MOULDING ALTERNATE SECTIONS

First peg out the path and remove any turf present as this would rot under the concrete. If the soil is sandy and well drained an adequate foundation can be prepared by ramming the soil thoroughly. However, if the soil is of a clay type a sufficient quantity should be excavated and three inches of gravel, stone or sand laid as a foundation. If the land is wet provision will have to be made for drainage. The level of the finished path should be slightly higher than the ground surface. Before commencing the actual construction of the path place a border of 3 in. x 1 in. timber along the outer edges of the site with the top edge of the timber flush with the proposed surface line of the path. Fix this timber in place with pegs at intervals outside the path.

If the concrete were put down in one piece any soil movements due to expansion and contraction would cause it to crack. To prevent this the path should be put down in six-foot sections with a definite break between each. Any soil movements will then be taken up by the joint. In laying out the sections cross pieces of 3 in. x 1 in. hardwood are put down across the path at six-foot intervals and fastened in such a way that alternate sections can be put down without obstruction from the pegs. Alternate sections are then filled in, the concrete being well rammed, especially in the corners. The surface is then levelled by working a board held on its edge backwards and forwards along the section. The surface can finally be smoothed over with a wooden float. It is not advisable to use a steel float for this purpose as such an implement leaves a smooth surface which is apt to be slippery in wet weather. When the first laid sections have set the cross strips of timber are taken up and strips of tarred paper or heavy brown paper put in their place. The intervening sections are then laid out in a similar manner. It is a good idea to leave the 3 x 1 timber in position along the edge of the path for several months as the concrete is liable to a certain amount of damage for some time after completion, unless protected from knocks. In hot weather the completed section should be covered with wet bags as soon as they are firm enough, and the bags should be kept damp for a week. This makes a much harder path.

Wall Foundations and Floors

In erecting a building with concrete floors and wall foundations the floor can either be laid at the same time as the foundations are put in or after the building is erected. The latter is the best method for the following reasons:—

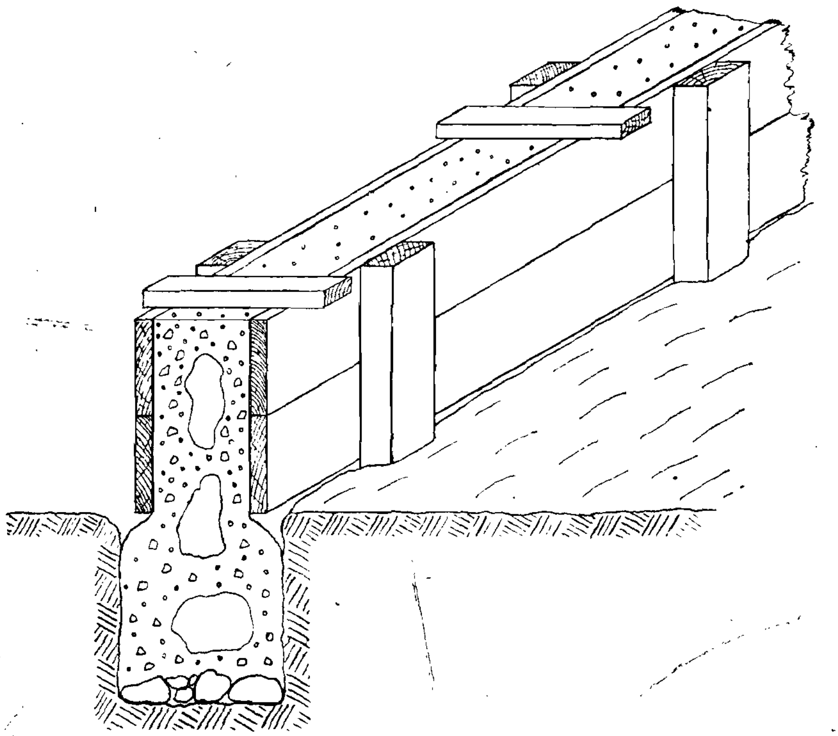
(1) The wall positions are easier to peg out.

(2) Trampling of the floor area is avoided during the erection of the building.

(3) The floor receives protection from the weather during its construction.

(4) The shade afforded by the roof prevents too rapid drying of the floor.

For most farm buildings six inches is a suitable thickness for wall foundations. If the floor is to be in concrete its height is first decided upon and the wall foundations are made to project six inches above the floor level. This ensures that the base plate and the ends of the studs will be kept dry and thus tends to lengthen the life of the building. If a timber floor is to be put in, the concrete wall foundations will finish 8 in. below the floor level, allowing 1 in. for the flooring boards, 5 in. for the floor joists, and 2 in. for the base plate. In this case the concrete should be 6 in. or more above the ground, giving a floor height of 1ft. 2in. If the floor is closer to the ground than this there is a danger of the bearers and floor joists rotting.



CROSS-SECTION OF A CONCRETE FOUNDATION WALL

The position of the walls is then pegged out, the required amount of soil removed and some filling of stone or gravel put in. A boxing is then erected to form a mould for the concrete. 6in. x 1in. hardwood is most suitable for the purpose, but almost any straight timber will suffice. The boxing is held in place by pegs driven into the ground on the outside and by small pieces of wood nailed across the top to keep both sides parallel. Do not drive any nails right home, as to do so will make it difficult to dismantle the boxing without damage to the green concrete. It is a good plan to dig the trench a few inches wider than the required thickness of the wall and to erect the boxing from the ground level up; thus, when the concrete is poured the trench fills first and the wall is wider below the ground than above, which gives added strength and a broader surface in contact with the soil. As the concrete is being poured, large flat and clean stones can be placed in it. They must not come within half-an-inch of the boxing or be in contact with each other. The stones do not reduce the strength of the wall in any way, but they do reduce the amount of cement required and thus make for economy. Ram the concrete as it is being poured, especially at the edges. A clean spade worked up and down with the blade close to the boxing is a very effective implement for this purpose. If this operation is neglected air spaces will be left around the stones or against the boxing, which are unsightly and reduce the strength of the structure. To hold the wall plate in position dowels of ½in. round iron are placed around the wall at six-foot intervals. These, of course, are set in the concrete while the boxing is being filled. They project several inches above the foundation and are let into holes in the base plate and bent over. They should also be bent over at right angles at the foot to ensure a good hold on the concrete. An alternative method is to use coach bolts 8 in. x ½ in., projecting them sufficiently to allow a washer and nut to go on top on the base plate.

Concrete flooring is constructed in a similar manner to a concrete path. The thickness depends on the use which is to be made of the floor. For light use, such as a cowshed floor, three inches of concrete on a suitable foundation is sufficient. For horse traffic another inch is desirable, and for heavy loads such as loaded waggons or lorries four inches of concrete and reinforcing is necessary. The reinforcing consists of ¼in. mild steel rods placed in both directions, 9 in. apart and tied at all intersections with tying wire. When reinforcing is used the best procedure is to pour slightly less than half the thickness of concrete, put down the reinforcing and complete the floor.

A large concrete floor should always be laid in sections, the size of the sections depending on the thickness of the floor and the size of the building. The thicker the floor, the larger the sections can be made. For a floor 3 in. thick, 6 ft. square is a suitable size of section, but this could be increased if necessary. Floors that are likely to be wet should be built with a slope of ¼ in. per foot in order to provide for drainage.

Fencing Posts

Concrete fencing posts are suitable for use around the homestead and anywhere where a neat appearance is desirable. They are easy to make and last almost indefinitely. A convenient size for a line post is 6ft. 6in. long, 4in. square at the top and 6in. x 4in. at the base. The usual procedure is to mould in batches of six in a composite mould which is made of lengths of 4in. x 1in. timber on its edge, the boards being six inches apart at one end and four at the other. They are housed half-an-inch into a piece of 4in. timber at each end and so held in position without nailing. The end boards are kept in position by cleats nailed to the floor. As few nails as possible should be used, so that the moulds come to pieces easily without damaging the green concrete. Before use coat the mould with grease or thick oil to prevent the concrete sticking. Used engine oil is quite suitable for this purpose.

The reinforcing consists of four lengths of $\frac{1}{4}$in. round iron placed 1 inch in from each corner. Wherever holes are needed in the posts iron rods are put through the moulds and removed before the latter are taken to pieces.

For this work all coarse stone must be screened out of the gravel. In filling the moulds the easiest method is to put in about 1 inch of mixed concrete, making sure it has gone well into the corners; next, place in two pieces of reinforcing and fill up with concrete to within an inch of the top. Finally, place the other two pieces of reinforcing, put in the remainder of the concrete and float off level.

The time which it is necessary to leave the posts in the mould depends on the amount of water used in the mixing, but two hours is about the average time. The posts will still be very green and are best left for a time on the floor after removing the mould. The posts should be kept damp for seven days and are ready for use in a month, although by that time they will not have reached their maximum strength.

The cost of materials for a post of this type with cement at 4/- per bag, gravel 5/- per cubic yard, and round iron at 9/- per cwt., would be 1/2$\frac{1}{2}$d. Labour costs would depend largely on the number of posts to be made.

Gate and Corner Posts

Concrete gate posts are widely used for hanging entrance gates and other heavy gates near the homestead. Their neat appearance does much to enhance the appearance of such entrances and they possess great strength. Their construction is quite different from that of line posts as they are built into their site. Sizes vary from 10 to 18 inches square. The easiest method of construction is as follows:—Dig the hole to the required depth and construct the boxing to fit the hole. Have three sides of the boxing made of vertical boards and the fourth side of horizontal boards which are nailed on as the concrete is put in, thus making for convenience in placing the reinforcing and ramming the concrete. Four $\frac{1}{2}$in. round iron rods placed near the corners and running right through to the bottom of the post would be sufficient reinforcing. With gate posts the bolts for holding the hinges or the butts of the hinges themselves will have to be put in position in the boxing before the concrete is poured. The boxing must be constructed in such a way that although it is strong it will come to pieces easily. If projecting caps are desired on the posts they are best moulded separately and fixed on with a little cement plaster.

The materials required for an average sized post, 12 inches square and 7 feet long, would be—

Cement	1 1/6th bags
Gravel	7 cubic feet
$\frac{1}{2}$ in. Round Iron	28 feet

At the same prices as used in calculating the cost of a line fence post the materials would cost 7/6.

[To be Continued]

DAIRY HERD PRODUCTION FACTORS

By R. W. WILSON, Senior Agricultural Officer

THE report on Tasmanian Grade Herd Recording operations for 1936-37 shows a marked variation in the figures returned for the various herds. The highest production of butterfat per cow was 403.6 lbs., while the lowest was 101.25 lbs., and the average for all grade cows tested 227.54 lbs. This disparity between the various herds prompted an investigation into the responsible factors with the object of ascertaining to what extent, if any, they were due to faulty herd management and how far they might be amenable to control by improved methods.

A study of the dairy cow as a milk and butterfat producing machine reveals that there are many factors which influence its efficiency and returns. It is proposed in this article to enumerate the principal factors so concerned and to discuss possible ways in which they might be controlled in order to obtain the most remunerative results.

It must be recognised that there is a distinct variation in the productive capacity of different animals. Originally the cow was only constituted by nature to produce sufficient milk to meet the requirements of its offspring, but as the result of long years of adaptation to man's economic needs and to systematic breeding and selection, the dairy cow of modern times secretes a quantity of milk considerably in excess of this requirement. It is not to be expected that every animal will have the same capacity in this respect, and it is only by a comparative study of the production figures of each animal in the herd that the herdmaster can decide which are the high producers and which the poor. The soundness of the principle of culling animals which are revealed as low producers can hardly be disputed, yet examples are all too common of such animals being retained and their progeny brought into the herd in due course to perpetuate the weaknesses of their parents. The fullest measure of success can only be attained by considering carefully the production figures of every cow in the herd and rigorously culling those whose retention is uneconomic, replacing them with the progeny of the better cows sired by a proved pure-bred bull. In many cases a farmer is compelled by circumstances when getting a herd together, to make use of a certain number of more or less inferior cows, but there is no reason why he cannot improve the position gradually and progressively by giving the necessary attention to breeding and culling.

Having decided on a policy of improving the herd, consideration may next be turned to matters of general management.

Clean, healthy surroundings are essential, for in order to resist disease and give the best returns the dairy cow must live under hygienic and sanitary conditions.

The provision of fresh, clean drinking water is a primary necessity, for milk contains approximately 87 per cent. water, and in addition the animal requires a considerable amount for its own body functions.

A considerable amount of lime is found in milk, and the cow must be provided with a ration containing an adequate supply of this mineral, otherwise she will draw upon her own bodily resources to supply the deficiency, and the consequent drain upon her system will eventually lead to a breakdown. Lime occurs abundantly in the herbage of pastures and in other foodstuffs commonly used for milk production, and as long as adequate attention is given to the matter of proper feeding there should be little difficulty experienced in this direction.

Salt is a further necessity in the cow's ration, and the provision of salt licks or salt should also receive consideration.

Weather and climatic conditions have an important bearing on the well-being of the herd, though the farmer, of course, has little to say in this and can only mitigate any harmful effects by the provision of shade in hot weather and by utilising sheds, windbreaks or rugs in winter.

Though the dairy cow performs no kind of physical labour, the production of large quantities of milk imposes as great a drain on her vitality as does hard work on that of the horse. Moreover, her digestive and assimilative powers are taxed severely. Though gentle exercise is desirable to maintain tone to her system, heavy climbing over rough, hilly country in search of food, or long trips to water, can only be carried out at the expense of milk production. The milking herd should therefore be confined to the flats and lighter slopes of the property.

Though investigation showed all the foregoing factors to have an important bearing on the production of the different herds, the strongest influence causing variation was undoubtedly the feeding methods followed on the various farms.

The food of the dairy cow is utilised for two different purposes —the maintenance of the body and the performance of bodily functions, and milk production. Until the animal's bodily requirements are met there is nothing available for milk production. Admittedly the highly bred milker with her urge to produce will tend to withdraw the requirements for milk production from her own body, but as this cannot last indefinitely without a complete breakdown its consideration does not enter the realms of practical management. Yet, in spite of this recognised fact, many cases were found of cows being partially starved during the non-productive period apparently without realisation of the effects of running them through the winter months on bush runs or paddocks almost bare and with no adequate provision for supplementary feeding. It should be remembered that the capacity of the digestive system is limited as regards the quantity of food that can be handled at one time. After the period of winter starvation the first call on the food is towards restoring wasted tissues, and while this restoration of body wastage is slowly proceeding little of the food supply is available for milk production. Under these conditions the spring flush of feed, which should be utilised to produce the greatest possible amount of milk, is being largely wasted in repairing ravages due to neglect. Efficient management necessitates the provision of an ample supply of foodstuffs all the year round to maintain the body and the body functions of the cow quite apart from the additional amount required for milk production.

Not only does the dairy cow require an abundance of feed, but the foodstuffs provided must comprise a balanced ration which is both succulent and palatable. Every dairy farmer recognises that his herd normally reaches its maximum production during the spring and early summer months when there is a luxuriant growth of pasture. It must follow, then, that to get the best results these conditions must be imitated as closely as possible for the whole year, by artificial means when necessary.

The structure of the cow's digestive organs is such as to make necessary the provision of bulk in the ration, and where hand-feeding is resorted to this is supplied in the form of roughage such as hay or silage. While bulk is necessary the ration must contain an adequate quantity of digestible nutrients in correct ratio. Two particular nutrients are required — proteins and carbohydrates — and these should exist in the proportion of about one of the former to six of the latter. A flush spring pasture will provide this ratio, but as the herbage matures the ratio widens and the feed loses its succulence. It is when the pastures reach this stage that provision must be made for supplementary feeding to prevent the cows falling back in their production.

Many foodstuffs can be grown on the farm which fulfil the requirements of bulk, digestive nutrients, succulence and palatability, and which can be mixed and utilised to give the required results. Of these, silage is worthy of first consideration. Silage made from oats, maize or grass is generally rather wider in ratio than is desirable, but by feeding it with a leguminous hay, such as clover or lucerne, a good balance can be obtained, and this makes a very suitable ration.

A second method of approaching the problem is to grow green fodder crops as a supplement to good quality oaten and clover hay or meadow hay. Many different crops can be used for this purpose, and the choice must be guided to a certain extent by a consideration of the reaction of the various crops to the conditions existing on any particular property. It is usually found that chou moullier, rape and kale are very suitable to our better class basaltic soils for autumn use, while soft turnips, swedes and mangolds are best for the winter. In soils or localities unsuited for chou moullier and its allied crops, soft turnips are most helpful for the autumn, together with swedes and mangolds in the winter. Oaten and meadow hays, which are commonly used alone, are lacking not only in succulence, but also in concentrated nutrients, and though they may maintain the body functions of the cow, are not adapted to heavy milk production. The objection is often raised that green fodder crops taint the milk. If fed properly, however—i.e., for only an hour or so and immediately after milking—no trouble need be anticipated. It must be remembered, however, that these fodder crops are themselves only useful as supplements to other feed and to feed them without roughage may give rise to trouble.

Experiments have proved conclusively that under some conditions and up to certain limits the feeding of concentrates is payable. Three main factors govern this limit—firstly, the quantity and the quality of the roughages supplied; secondly, the productive capacity of the particular cow; and thirdly, the cost of the concentrates. When the prices of bran, linseed meals, bean meals and similar concentrates are high, the general rule for the average herd would be to confine the foodstuffs to good quality silage, legume hays and fodder crops. For a high producing herd, however, the addition to the ration of from 6 to 8 lbs. of concentrates daily will be found profitable, the common rule being one pound of concentrate per day for each pound of butterfat produced per week.

FOOT-ROT IN SHEEP

The attention of sheepowners is drawn to the article on Foot-rot in this Journal and to the fact that this disease in sheep is proclaimed under the Stock Act.

All stockowners having affected sheep, or sheep which they suspect of being affected, must isolate such animals and report immediately to an inspector. This step has been taken in the interests of the sheepowner and in order to control and limit the spread of the disease, which has a very serious effect on the condition of the sheep and interferes with successful sheep husbandry.

The conditions obtaining under improved pastures and the climatic influences in Tasmania tend to the spread and perpetuation of foot-rot, which is an expensive and difficult disease to eradicate once it has obtained a hold.

The travelling of affected sheep and their exposure for sale is now an offence under the Act, rendering an owner liable to a fine of £50. Sheepowners will be acting in their own interests and those of their neighbours by promptly reporting and treating all cases.

Information as to treatment will be supplied by the Veterinary Officers.

Chief Veterinary Officer

APPLES AND PEARS FOR EXPORT

At the recent Annual Conference of the Australian Apple and Pear Export Council, held at Sydney, it was decided that the following varieties of pears be placed on the recommended export list: Beurre Hardy, Beurre d'Anjou, Beurre Bosc, Doyenne du Comice, Josephine, Packham's Triumph, Winter Cole, Winter Nelis, Madam Cole, Glout Morceau, Easter Beurre, Duchesse d'Angouleme.

That the following varieties be permitted export in 1938 only, and then to come up for review: Black Achan, Howell, Marie Louise, Doyenne Bossuch, Lemon Bergamot, Vicar of Winkfield, Williams Bon Cretian, Winter Bartlett, Giblin's Seedling, Beurre Brettoneau, Middleton, Kieffer's Hybrid.

All other varieties to be excluded from export.

Growers are asked to note the foregoing, so that the necessary reworking can be undertaken.

Regarding varieties of apples for export, growers are advised to re-work with early red varieties.

Horticultural Division

GRADE HERD RECORDING

ANNUAL REPORT for 1936-37

By J. T. ARMSTRONG, Chief Dairy Officer

DURING the year 1936-37 Grade Herd Recording was continued in the same 16 units which were operating during the previous year, and 7,319 cows from 329 herds were recorded as compared with 6,847 cows from 365 herds during the previous year.

The average production per cow was 4,969 lbs. of milk and 227.54 lbs. of fat, the average test being 4.5 per cent. Yields for the year showed an increase of 27 lbs. of butter per cow, which represents a rise of 13.5 per cent. in fat yield.

In the following table unit averages and the State average are set out, and it will be noted that, although unit averages vary from 155 lbs. of fat per cow to 257 lbs., the majority of unit figures aproximated fairly closely to the State average.

Unit	No. of Herds	No. of Cows Completed	Average Production		
			Milk	Test	Butterfat
South Leven	22	311	5,502	4.6	257.2
Flinders Island	25	597	5,687	4.4	253.2
King Island No. 1	12	562	5,525	4.6	243.8
Kentish	22	271	5,102	4.7	240.9
Scottsdale	22	381	4,757	5.0	238.1
Deloraine	30	471	5,249	4.5	236.9
Table Cape	18	295	4,928	4.6	232.1
Riana	21	264	4,636	4.9	231.5
Latrobe	20	256	5,187	4.4	229.7
Ridgley	28	306	4,653	4.8	227.1
Yolla	19	282	4,858	4.5	223.1
Smithton	27	529	4,654	4.7	221.5
Marrawah	21	372	4,549	4.6	211.8
King Island No. 2	16	740	5,164	4.1	210.8
Forest	19	301	4,508	4.4	201.6
Ringarooma	7	330	3,003	5.1	155.2*

Some herd averages were particularly good and the average production of the five leading herds is set out below.

Unit	Name	No. of Cows Completed	Average Fat Production per Cow
Kentish	R. F. Chisholm	6	403.6
Yolla	F. Milburn	10	364.03
Riana	V. C. Bonney	12	346.2
Table Cape	J. F. Williams	11	346.08
Ridgley	H. S. McNab	7	345.41

In addition to these five, four other herds averaged over 340 lbs. of fat per cow.

The production of the leading cows in the state is shown in the following table, and these records are very creditable.

Unit	Owner	Fat Production
Yolla	F. Milburn	534.6 lbs.
Flinders Island	Estate J. E. Blundstone (Nalinga)	519.8 lbs.
Deloraine	Ashley Home	491.04 lbs.
Ridgley	E. Revell	485.09 lbs.
King Island	E. Johnstone	476.1 lbs.

It is interesting to note how herd averages approximate round the mean, and the following table setting out herd averages between various ranges will illustrate the wide variation between the averages of different herds.

Year		AVERAGE BUTTERFAT PRODUCTION (per Herd)													
		Under 100 lbs.	100 to 119 lbs.	120 to 139 lbs.	140 to 159 lbs.	160 to 179 lbs.	180 to 199 lbs.	200 to 219 lbs.	220 to 239 lbs.	240 to 259 lbs.	260 to 279 lbs.	280 to 299 lbs.	300 to 319 lbs.	320 to 339 lbs.	Over 340 lbs.
1935-36	No. of Herds	4	16	24	36	58	57	49	41	31	20	13	6	8	2
1936-37	No. of Herds	2	7	10	18	20	43	44	44	43	34	24	18	11	9

The table indicates a general improvement in yield throughout all herds, not only amongst the better herds; in 1935-36, 195 herds averaged 200 lbs. of butterfat or less per cow, and only two averaged over 339 lbs. of fat, whereas in 1936-37 only 100 herds averaged 200 lbs. or less of butterfat, and nine averaged over 339 lbs.

As a general rule the number of cows per herd is not high, as will be seen from the table given below, but an improvement over the previous year is recorded.

Year		NO. OF COWS PER HERD								
		Under 10	11 to 15	16 to 20	21 to 25	26 to 30	31 to 35	36 to 40	Over 40	Average
1935-36	No. of Herds	103	72	73	41	28	18	5	25	18
1936-37	No. of Herds	102	73	56	32	12	13	12	27	22

NOTES ON APRICOT "DIEBACK"

CIRCUMVENTION BY PROPAGATIVE METHODS

By P. H. THOMAS, Chief Horticulturist, and T. D. RAPHAEL, Horticulturist

THROUGHOUT the main apricot areas of this State and in districts on the Mainland, considerable loss is caused to growers annually by the dying off of spurs, branches, and not infrequently whole trees. This trouble is generally known by the name of "Dieback," and the research already done on the subject has, until recently, yielded rather meagre and frequently contradictory data. Both bacterial and fungal organisms are reported to have been isolated, whilst support has also been forthcoming for physiological relationships and causes of a contributory nature. The remedy is still lacking, however, and horticulturists and growers alike have been looking elsewhere for some means of ameliorating the position.

FIG. I

Young apricot worked on a cherry plum sucker arising from an apricot stump originally killed by "Dieback." This was budded on to the sucker at a height of three feet.

In this respect the results obtained from a series of grafting experiments conducted with a view to re-working inferior varieties along similar lines to those adopted for apples, may be of interest, and have indicated rather unexpectedly another possible avenue for research.

Extensive field observations over a wide area in Tasmania have shown that whilst apricot trees on apricot stock were generally completely killed out when affected with "Dieback," in those worked on plum stock the disease appeared to stop at the union and large numbers of strong young plum suckers were produced below; in several abandoned areas it has been noticed that such regrowth has resulted in thickets frequently over 20 feet in height.

FIG. II

A branched cherry plum sucker budded with apricot. The old diseased butt has not been removed. Another cherry plum sucker is seen in the background.

This immediately suggests the possibility of immunity or a degree of resistance in cherry plum stocks to "Dieback"; accordingly, a number of trials were inaugurated in which selected suckers arising from the roots of diseased trees were worked with apricot grafts and buds at a height of three feet. The results have been most encouraging and vigorous productive re-worked trees of five and six years standing may be seen in Mr. Newman's orchard at Bagdad at the present time. So far such rejuvenated trees are completely free from the original trouble, though, as may be seen from Fig. I, the old diseased butts were left untouched. It is unnecessary to point out that the time and financial gain resulting from this system compared with the alternative—grubbing and re-planting—is considerable, and apart from other considerations appears, upon present observations, to be worthy of general application.

The system indicated has been carried a step further this year at the Kettering Experimental Plot, where a batch of young plum seedlings have been budded with apricots in both single stemmed and branched two-year trees. These will be planted out in a test plot at Cambridge during the winter.

From the foregoing it will be realised that development along the lines indicated rests on the assumption that any "Dieback" which may arise in the course of time will merely cause the loss of one portion of the tree, a loss easily offset by inserting another apricot scion or bud on the parent plum framework. If such a theory is sound, the smaller and more numerous the apricot units inserted on the plum framework, the more insignificant the loss should "Dieback" commence.

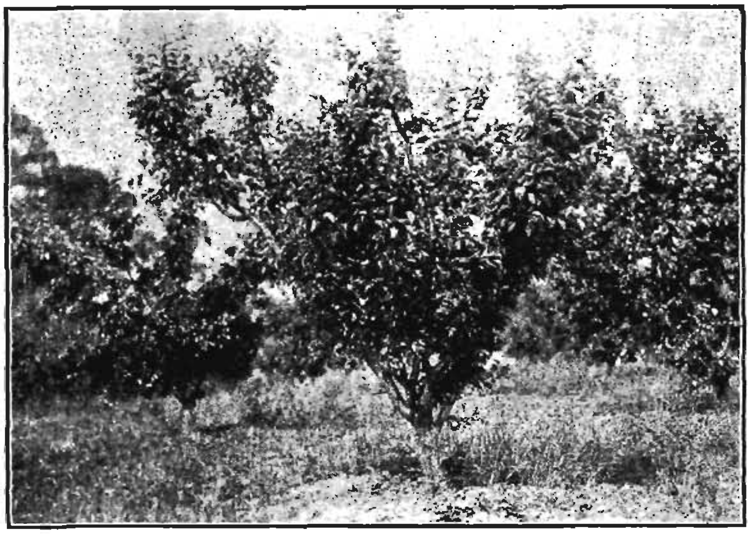


FIG. III

A Blenheim apricot completely refurnished by the "V bark graft" with Moorpark.

As mentioned earlier in this brief note, refurnishing methods along the lines adopted for apples have already been tried and very good "takes" obtained by the use of the "V bark graft" on stripped cherry plum trees. These trees, though not worked for this purpose, may serve as useful units for inoculation experiments to test out the theories formulated. Until such time as these can be successfully put into operation the number of refurnished trees will be increased and field observations continued.

With regard to the particular occurrence of the "Dieback" experienced in Tasmanian apricots, there seems a possibility that Moorpark is more susceptible than other varieties grown in the State, and the fact that occasional apricot stocks escape death when the grafted tree succumbs, also gives food for thought. Such aspects, however, are only tentatively put forward here, but may prove useful lines of research at a later date.

PERENNIAL RYEGRASS SEED CERTIFICATION

Registration of Areas Sown with Certified Permanent Pasture Seed

Pastures seeded with either New Zealand or Tasmanian Certified *Permanent Pasture* ryegrass seed are not immediately acceptable as Certified Seed producing areas. They may, however, be submitted for provisional registration as soon as sown and are eligible for seed production under the Certification Scheme when they are three years old.

Farmers who desire to have such areas registered should forward the certificates taken from the seed sown on the area to the Chief Agronomist, Department of Agriculture, Launceston, with particulars of the area. In the case of Tasmanian-grown seed these particulars can be filled in on the back of the form and no other information is required. It is important that a plan of the area should be forwarded.

A record of the area will be kept by the Department, and the grower will be notified when it is eligible for harvesting. Should the grower then decide to proceed with registration, the area will be inspected by an officer of the Department and thereafter procedure will be as with areas sown with Mother Seed.

Failure to supply the required documentary evidence regarding the seed sown on the area will disqualify the grower from registration. Registration can only be approved if the area is over five chains distant from any other ryegrass pasture, except for that sown with Certified Seed. If registration is desired no other *Ryegrass* seed should be mixed with the Certified Seed to be sown on the area, and there should be no self-sown ryegrass in the paddock. Should such be the case cross-fertilisation is likely to occur and spoil the seed crop for certification.

Agronomy Division

CHILD WELFARE NOTES

BREAST FEEDING BABY, AND DIFFICULTIES OCCASIONALLY MET

By OLIVE M. GREEN, Sister-in-Charge, Baby Health Clinic, Launceston

THE laws of health are like building laws in that the foundations must be soundly laid and that the material must be of the best if a sound constitution is to be built up.

Working on this principle, then, we find that the mother's natural milk is the best food and that breast feeding is the way that nature intended the child to be fed. The foundations of good health are assuredly laid firmly if every baby has his own birthright—MOTHER'S MILK—for the first eight or nine months of life. It must then follow that every mother should be trained to meet any dangers or difficulties that may beset her whilst undertaking this grand work of building up the health of the nation.

To Ensure a Good Milk Supply

Confidence and faith in her own power and ability, coupled with peace of mind and freedom from worry, are as essential as an urgent desire on the mother's own part to feed her baby. This desire must not lead to that over-anxiety that frequently defeats its own ends.

The diet should be simple, but nourishing and laxative. Take three wholesome meals daily with plenty of fruit, vegetables and wholemeal bread. Apples, pears and oranges are excellent fruits, as are also the dried fruits (raisins, dates, figs, prunes, etc.)., and the daily menu should include a sufficiency of dairy produce—milk, eggs, butter, cream, etc. The nursing mother needs an abundance of water to drink, sufficient rest and sleep, and as far as possible should lead a normal, active, healthy life.

Wrong Handling of Baby

Habitual putting up of food soon after feeding is often due to injudicious handling or jolting of baby after meals, or to over-stimulation caused by talking and attention.

Posture during feeding, and handling afterwards, is important. The mother should be comfortable and at ease, both mentally and physically, when nursing her baby. A low chair with a footstool for the nursing mother, and retirement to a quiet room where there will be freedom from interruption, is especially essential when dealing with a nervous, over-alert baby. Talking on the part of the mother will interfere with the flow of the milk, and baby may in this way not get his full quota. Regularity of meals is essential, and most babies thrive wonderfully well with the five meals daily, given at four hourly intervals during the day. Absolute regularity establishes a rhythm which stimulates the breasts to function at their best and will definitely help to prevent over-feeding.

Baby must not be allowed to suckle so strongly that the milk rushes down his throat and nearly chokes him, so that he will refuse the breast altogether. In this case it is wise to hold the breast with thumb and finger and control the flow, also to give baby frequent rests during the suckling. Allow baby, say, three sucks and then a breath, until the supply comes slower, when he may be allowed to suck at will for the remainder of his feed. Feeding baby on a pillow on the lap, and pushing the breasts up so that the milk has to flow uphill, will also prevent baby getting his food so quickly. Be sure and get baby's wind up once during and immediately after feeding.

Reasons Why Baby May Refuse the Breasts

1—Baby's Nostrils may be Blocked

If this is so, he may not be able to breathe properly whilst feeding. Cleanse his nostrils with a small twist of old linen, or wrap a piece of cotton wool tightly round a used wooden match, dip into olive oil and carefully swab each nostril before he feeds. Hold the breasts away from baby s nose whilst feeding him.

2—Thrush

Baby may have the "Thrush" or a sore mouth, and these will cause much pain while sucking and may account for the refusal of the breast. To treat this condition, swab the mouth and tongue with a soda solution, using 1 teaspoonful of soda bicarbonate to 1 pint of boiled water. To swab the mouth, wrap a small piece of clean, boiled linen or a little cotton wool around your finger and gently swab the tongue, roof of the mouth, between the lips, etc. For obstinate cases, swab with a solution of glycerine and borax (glycerine, ½ oz., boracic acid, 1 teaspoonful, and boiling water, 5 ozs.). The mouth should be cleansed before and after feeding.

3—Tongue-Tie

Tongue-tie is really rare, but if present it may intefere with baby's suction at the breasts, and a slight operation will be necessary. See your doctor if this condition is present.

4—The Breasts may be Empty

or the milk supply insufficient for baby. The chief signs of a young baby not getting enough breast milk from his mother are failure to gain weight, infrequent and lack of bowel actions, sunken abdomen, and refusal to suck at the breast. An underfed baby may be quite drowsy and sleep very well during the first month or so of life, or he may suck weakly and go to sleep at the breast, apparently satisfied, only to wake and cry later. The child may seem ravenous and cry vigorously before, during and after feeding, seeming to be in pain or temper.

If everything is not going satisfactorily, it is wise to test-weigh baby, before and after feeding, for 24 hours to estimate the amount of mother's milk he is receiving. There are simple methods of increasing the milk supply, such as drinking more water, giving stimulation to the breasts by hot and cold sponging, and massage. If necessary, a complement of humanised milk can be given after the breast feeds, to make up baby's daily quota.

5—Over-Feeding

Many cases of premature weaning or failure to breast feed can be traced to the two common causes, over and under-feeding, but of the two over-feeding is much more serious, as the results are so far-reaching and may gravely undermine baby's digestion. It may take weeks, or even months, to correct a digestive upset of this kind, and baby's weight and growth will certainly be hampered thereby. Also, sleeplessness in young babies is more often caused by over-feeding than under-feeding. Here are some of the signs that baby is being overfed:

(1) Restlessness and disturbed sleep.

(2) Vomitting, or the putting up of food after meals.

(3) Rapid gain in weight, followed by stationary weight.

(4) Green, curdy, frequent motions, sometimes followed by constipation.

(5) Rash on face and body.

(6) There may be a sucking of the fists and thumbs.

Cracked Nipples

The tendency to sore and cracked nipples is greatly lessened when proper care is given to the breasts before the baby is born. During the later months of pregnancy, bathe the breasts daily with hot and cold water alternately, finished with cold water. Rub nipples and their bases vigorously with a perfectly clean knitted cloth. Later, brush well with a soft tooth or nail brush kept for this purpose. The nipples should be pulled out gently and formed by manipulating between finger and thumb.

During suckling, every precaution should be taken to prevent cracking. Bathe the nipples before and after each feed, with cotton wool dipped in boiled water, and dry well.

If the nipples are sore and cracked apply equal parts of Friar's Balsam and methylated spirits after feeding, and some lanoline. Cover with a small piece of boiled soft linen. Remove the balsam before the next feed.

ABORTION-FREE HERDS

As at 31st December, 1937

HE following herds have been declared free of Contagious bortion in accordance with the requirements of the scheme for ertifying herds.

Northern District and Flinders Island

Owner	Address
Ashley Home for Boys	Deloraine
Badcock, B. M.	"Willow Vale," Whitemore
Badcock, F. R., and Sons	Whitemore
Badcock, L. A.	Whitemore
Barker, A. C.	Lemana Junction
Barker, F. T.	Ravenswood
Beardwood, T. J.	Peel Street, Prospect
Blundstone, Estate J. E.	(Whitemark Herd) Flinders Is.
Davie, J. L.	Blue Rocks, Flinders Island
Foster, R. J. L.	"Pleasant Banks," Evandale
Gardner, H. R., and Sons	Relbia
Gladman Bros.	Carrick
Gowans, W. C.	Glengarry
Green, S. G.	Penquite
Hall, E. G.	"Alanvale," Launceston
Hamilton, R. W. L.	Ranga, Flinders Island
Hammond, G.	Blue Rocks, Flinders Island
Harley, C. D.	Whitemark, Flinders Island
Haworth, H.	Ranga, Flinders Island
Heazlewood, H. R.	Whitemore
Heazlewood, Roy K.	Whitemore
Heazlewood, Tas. A.	Hagley
Hingston, S. J.	"Rosaville," Whitemore
Iles, Mrs. E. T.	Whitemark, Flinders Island
Lansdell, Mrs. Elsie	Bracknell
Mackenzie, E. E.	Ranga, Flinders Island
Martin, W.	Ranga, Flinders Island
Mathews, S.	Whitemark, Flinders Island
Morton, R.	Emita, Flinders Island
Paterson, J. W.	Longford
Relbia Farm and Dairy Co.	Relbia
Reynolds, H. B.	Relbia
Scott, H. Barclay, and Sons	Whitemore
Stuart, L. A.	"Valmont," Whitemore
Thompson's Estate	"Wingaroo," Emita, Flinders Island
Walker, J.	Whitemark, Flinders Island
Wells, H. Lucadou	"The Moat," Carrick
Welsh, W.	Whitemark, Flinders Island
Willis, V.	Whitemark, Flinders Island

North-Eastern District

Beswick, R. D.	Derby
Briggs, A. H.	"The Grange," Scottsdale
Briggs, C. H.	"Cloverlea," Scottsdale
Dilger, A. C.	Herrick
District School Farm	Scottsdale
Edwards, J. C.	Derby
Geale, G. B.	Jetsonville
Goss, L. V.	West Scottsdale
Haines, H. C.	"Cranleigh," Ringarooma
Hookway, H. H.	Scottsdale
Jessup, A. V.	Springfield
Johnson, J. F. and G. M. L.	"Queechy," St. Helens
Loosmore, T. C.	Scottsdale
McKenzie, F. R.	Winnaleah

Owner	Address
Mervyn Bræ Stud	Scottsdale
Priestley, Tas. R.	North Scottsdale
North-Eastern Soldiers' Memorial Hospital	Scottsdale
Ranson, F. W.	Derby
Ranson, J. S.	Branxholm
Robinson, H. A.	New River, via Ringarooma
Smith, Eric J.	Springfield
Steel, L. J.	Falmouth
Treloggen, D.	St. Helens
Treloggen, J. W., and Sons	St. Helens
Wadley, R. J.	Springfield
Williams, J. H.	Springfield

Circular Head District

Mackay, Prof. J. H.	Roger River
Malley, E. R.	Roger River
March, Mrs. A.	Lileah
Ollington, W. L.	Forest
Spinks, L. K.	Lileah

North-Western District

Archer, C. A.	Calder
Beveridge, H. C., and Sons	New Ground
Bovill, H. Y.	"Thornhill," East Devonport
Briggs, G. H.	Glance Creek
Cannon, S. L.	Gunn's Plains
Coombe and Bedlington	Forth
Dicker, W. T.	Yolla
Gladwell Bros.	Elliott
Harding, W. T.	Somerset
Hiscutt, J. T.	Howth
Kuipers, Capt. D.	Wynyard
Lakin, G. M.	Gawler
Lambert, J. D.	Latrobe
Lambert, K. T.	Merseylea
Loane, N. E.	Wesley Vale
Mackenzie, R. G.	Somerset
Morse, R. V.	Yolla
Parsons, G. H.	Thirlstane
Perkins, V.	"Calthorpe," Latrobe
Robotham, H. V.	"Rothstock," Ridgley
Roebuck, Newcombe	"Alfriston," Native Plains
Rockliff, H. V.	Riana
Sadler, B. T.	"Rannoch," East Devonport
Townsend, A. W.	Ridgley
Travers, J. A.	Sulphur Creek
Trethewie, F. E.	Lower Mt. Hicks
Wells, J. L.	Upper Mt. Hicks
Wing, S. E.	Preston

Southern District

Allanby, C.	Bream Creek
Alomes, Mrs. V.	Bream Creek
Bryan, J. R.	Copping
Calvert, A. D.	Granton
Calvert, M. M.	Cambridge
Clifford, Frank G.	Kellevie
Cooley, H. S.	Bream Creek
Corney, G.	Campania
Dodridge, S.	Cambridge
Dransfield, W.	Copping
Eyles, E.	Waterworks Road, Hobart
Featherstone, F.	Sorell

Owner		Address
Featherstone, G. J.	......	"Belmont," Sorell
Fergusson, F. C.	......	"Brooklyn," Penna
Fisher, James E.	......	Oatlands
Hanslow, G. T.	......	"Green Fields," Cambridge
Hills, G. and F.	......	"Braeside," Cambridge
Lachlan Park Hospital	......	New Norfolk
Lewis, N.	......	Cambridge
Mays, L.	......	Waterworks Road, Hobart
Meredith, D. O.	......	Plenty (Box 634B, G.P.O., Hobart)
McLeod, T. B.	......	Richmond
Reed, G. E.	......	Berriedale
Rumney, B. L.	......	Lower Sandy Bay, Hobart
Shoobridge, H. W. and A. G.		Bushy Park
Smith, W. J.	......	Copping
Steele, R.	......	West Hobart
Tatnell, T.	......	Bream Creek
Taylor, M. K.	......	Brighton
Watchorn, J. B.	......	Kingston
Wilson, F.	......	Waterworks Road, Hobart

A PAGE FOR THE COOK

By A. C. IRVINE, Mistress Domestic Science, Education Department

PASTRY

PORK PIES

1 lb. pork	1 small onion
Sage or marjoram (2 leaves)	Pepper and salt
½ pint water	1 apple

(1) Cut up pork, onion and apple and mix with the other ingredients.

PASTRY FOR PORK PIES

½ lb. flour	4 ozs. lard
½ cup milk	½ teaspoon salt

(1) Sift flour and salt. (2) Boil lard and milk and stir it into the flour and mix to a fairly stiff dough. (2) Cut off a piece for the cover and mould the rest into a greased tin or jar, and put in the ingredients. (3) Roll out lid and fit on top. (4) Take any scraps and decorate top with leaves and a rose, and bake for two hours in a moderate oven. (5) Turn out of jar and serve cold.

SCONES

PLAIN SCONES (Foundation Recipe)

½ lb. plain flour	1 teaspoon cream of tartar
½ teaspoon salt	1 oz. butter
1 teaspoon sugar	8 tablespoons (full) milk
½ teaspoon soda	

(1) Get oven hot and warm scone tray (2) Sift flour, salt, soda and cream of tartar. (3) Rub in butter with fingers and add sugar. (4) Mix in milk all at once with knife to a soft dough. (5) Turn on to floured board and knead into shape and roll out not too thinly. (6) Cut out and put on floured, warm tray. (7) Glaze with milk and bake in a hot oven for 10 minutes. (8) Stand on cooler when cooked.

SWEET SCONES

½ lb. flour	2 ozs. sultanas, currants, raisins or dates
½ teaspoon salt	1½ ozs. butter
2 ozs. sugar	Vanilla
Little nutmeg	½ teaspoon soda
1 gill milk	
1 teaspoon cream of tartar	

Make the same way as Plain Scones.

PUFFTALOONS

Plain Scone recipe	Jam
Blue, smoking, hot fat	

Instead of cooking scones in oven, drop them into hot fat and cook them slowly in a frying pan for 8 or 10 minutes, and eat with jam.

DROP SCONES

6 ozs. flour	Small half-teaspoon soda
¼ teaspoon salt	Small teaspoon cream of tartar
1 egg	Essence of lemon (6 drops)
2 ozs. sugar	1½ gills milk
Dripping	Golden Syrup

(1) Sift flour, etc. (2) Beat egg with the sugar and essence. (3) Add milk and stir in the sifted flour. (4) Drop in dessertspoonfuls into hot, smoking fat in a frying pan and cook till brown, then turn and cook till brown the other side. (5) Serve with Golden Syrup at once.

[Registered at the General Post Office, Hobart,
for transmission by Post as a Periodical]

Vol. IX—No. 2
(New Series)

1st May, 1938

The Tasmanian Department of Agriculture

THE TASMANIAN JOURNAL OF AGRICULTURE

Published by Direction of
The Hon. the Minister for Agriculture

Edited by
A. H. WOODFORDE

Published Quarterly

Price, 6d.

The Tasmanian Journal of Agriculture

CONTENTS

The Tasmanian
Journal of Agriculture

Vol. IX Tasmania, 1st May, 1938 No. 2

Editorial

THE PEA CROP

THE Pea Industry holds an important place in Tasmanian Agriculture. During the past ten years it is estimated to have averaged an annual monetary return of approximately £145,000 from some 25,000 acres. These figures indicate that the crop is a lucrative unit of our production and one that is worthy of every reasonable effort that might be calculated to foster its well-being The industry is at present on a very sound footing. Nevertheless it is desirable that we should maintain a close check on every aspect of production and marketing that is likely to influence the quality of the product and its reception by the trade.

Our peas are sold mainly on the markets of Great Britain, in competition with those of several other countries who are large exporters. Tasmanian greys are in strong demand and with those shipped from New Zealand share the preference of the trade for quality. Our blue peas also find favour in the market but meet with considerable competition, mainly from Japan, Roumania and Holland. The production of export peas in these countries is largely confined to the marrowfat type which is particularly well adapted for culinary purposes and commands a recognised preference in the market. Moreover our competitors are, in the majority of instances, meticulous in the care which they observe in preparing the product for shipment. Their consignments generally exhibit every evidence of thorough cleaning and grading, these operations frequently being supported by hand-picking to ensure the removal of every undesirable component. As a result of this thoroughness, consignments present a high degree of uniformity and excellence.

The Prussian Blue type of pea grown in this State, though second in preference to the marrowfat type, has been amply proved a better commercial proposition for the Tasmanian grower on account of its higher yielding capacity. Our consignments find ready buyers and we are in a position to hold and even extend the market. Nevertheless it is desirable that we should not underestimate the importance of meeting, to the best of our ability, every essential requirement of the trade. In this respect few considerations are more important than those of cleanliness and uniformity in size and quality. To equal the standard reached by certain of our foreign competitors in this regard would involve increased costs. In these countries such a standard is probably made possible largely by comparatively cheap labour and in this respect we can hardly compete on equal terms. There is reason to believe, however, that a considerable measure of improvement in uniformity could be achieved without extra cost by the exercise of greater care in the threshing of the crop.

Our system of fixing standards and inspection of consignments at the ports is probably the most effective measure that could be devised as a check on quality and definitely precludes the shipment of inferior lines. It is well to remember, however, that the majority of consignments are composite parcels made up of a number of different growers' lots and that the uniformity of such consignments depends to a great extent on the degree of uniformity that has been applied in the cleaning and grading operations on the farm. It is rarely that a consignment is recleaned and graded prior to shipment unless it has been rejected, or is likely to be rejected for export. Were bulking and reconditioning the standard procedure, the treatment of the crop at the stack would assume little significance; but while it remains the key operation in the preparation of the product for market, there is justification for keeping a close check on the position. There is a certain scope for non-uniformity of procedure in the fact that threshing is entirely at the discretion of the individual grower. It is, moreover, often left to the judgement of the threshing contractor, or his operative, to determine the grades, with only a minimum of supervision by the farmer. This, no doubt is due, in the majority of cases, to a certain deference on the latters' part to the contractor's experience in handling the crop and there is unquestionably a basis of sound reasoning in such a policy. Threshing contractors, however, are relatively numerous and their methods individually are likely to vary no less than the judgment and inclination of the individual grower. In view of these facts it would seem that a more complete understanding among growers and contractors to attain greater uniformity of action would be desirable.

There is a rather widespread though natural reluctance on the part of many growers to grade out undersized and inferior peas for which it is feared there will otherwise be no available market.

It would be well to consider to what extent their removal actually does affect economy. It should be remembered that peas are an excellent article of diet for many kinds of livestock, particularly pigs. For this purpose small and damaged peas are but little inferior to the best grades and thus they can be utilised economically on the farm. Under such circumstances their removal cannot be said to involve waste. On the contrary, it is likely that the price obtained for them as pork or bacon would at least equal that which could be secured from their sale on the home market, while the resulting improvement in the export grades would be likely to ensure enhanced prices for them.

It would appear that some expansion of the area sown with peas is both possible and desirable. The average annual area of 25,000 acres planted during the past ten years represents approximately one-eighth of the total area sown to all cash crops. These figures, however, apply to the whole of the State and do not indicate the position as it exists on the average farm. It is probable that the ratio is much wider on many properties while others on which peas could successfully be grown rarely produce the crop.

The attribute common to all leguminous plants which enables them to extract nitrogen from the air and store it in the soil, where it is available as a plant food for succeeding crops, is widely recognised. In Tasmania the majority of farmers have become accustomed to associate this phenomenon with the clover plant. Peas, however, as well as beans of all types, perform a precisely similar function and for this reason, as well as that associated with the profitable nature of the crop, it is desirable that most farms on which they can successfully be grown should produce their quota.

The wisdom of attempting any large-scale increase in production for export is questionable. Nevertheless, some expansion in this direction might justifiably be contemplated. Scope for some further expansion could also be found in an extension of the practice of growing peas for stock food. This is a project which might well be considered, especially by farmers located in districts remote from markets and transport. The marketing of grain "on the hoof" is a project which is somewhat neglected in Tasmania and could well be included, to a greater or lesser extent, in most farming policies. It provides an outlet for unmarketable grain of all kinds and, in seasons when prices are low, might well prove a more profitable avenue for the disposal of at least a proportion of the crops than the grain markets.

ITALIAN RYEGRASS AND ALLIED STRAINS

By E. F. FRICKE, Agronomist

THE temporary pasture is part of the crop program on a large number of Tasmanian farms. As a general rule we may say that the more often the soil is turned over and worked, the more vegetable matter will be produced from it. The working of the soil promotes the weathering of the soil particles and the decomposition of the soil organic matter by allowing free access of air and moisture. A worked soil is thus richer in available plant food than an unworked soil. We can therefore expect to obtain a greater total yield of herbage from a series of short rotation pastures than from one long-term pasture.

In practice the decision as to whether a long-term pasture or short rotation pasture will be grown depends on whether the extra yield is worth the extra costs, viz., the working of the soil, the seed and the rental value of the land while under course of preparation.

The most important of these costs is that of working the soil. On a heavy soil the cost of ploughing, cultivating, harrowing and rolling to form a fine seed-bed would usually be in excess of a pound per acre. On an easily worked soil a seed bed can be prepared for half that cost. It is largely for this reason that we find the temporary pasture firmly established in the farming practice of the northern red soil areas of the State.

The rainfall of these areas, moreover, is such that land does not need to be left in fallow for more than two or three months to obtain the necessary conservation of moisture and accumulation of plant nutriments. The land is thus not out of production for any length of time and the rental value of the unused land is relatively low. In the drier part of the State, even where a friable, easily worked soil is available, a longer fallow period is necessary and the rental value of the land out of production may assume serious proportions. This is particularly the case on the more fertile soils, and these are best sown to perennial species or self-regenerating annuals.

The third factor—the cost of seed, is one requiring more detailed consideration. To obtain an adequate return for the total cost of sowing the crop, we must choose a species that will convert the accumulated soil fertility into nutritive forage during the limited period available. The outstanding species fulfilling these requirements is Italian Ryegrass and the closely allied Westernwolths Ryegrass and Wimmera Ryegass.

Some confusion has existed in the past between Italian Ryegass and Westernwolths Ryegrass, as to which is the longer lived. Part of this confusion is due to the fact that when ordering seed the grower is not sure which will be supplied, as there is no apparent difference in the seed.

The position was clarified by the work of Bruce Levy (1), who classified the Italian Ryegrass types according to their growth period. This has led to a more strict differentiation between the true biennial Italian Ryegrass and the annual Westerwolths type. Seed merchants now usually list these two ryegrasses separately and there is a growing appreciation of the special value of each type.

Tests carried out by the Department of Agriculture have shown that true Westernwolths is shorter lived but quicker growing than true Italian Ryegrass. Wimmera Ryegrass has a still shorter growing period.

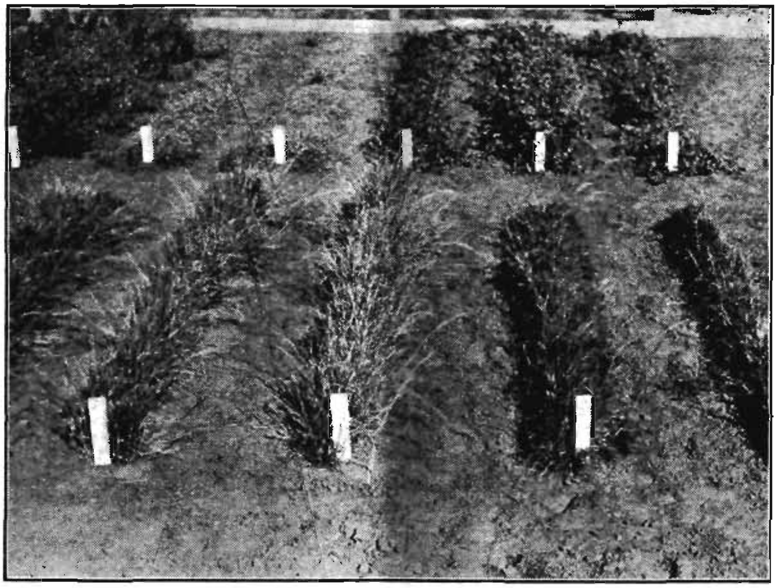


FIG. I
ITALIAN RYEGRASS STRAIN TESTS, AT CRESSY RESEARCH FARM.
Left Foreground—Two Local Strains Right Foreground—Two Certified Strains.

A comparison between these short-lived strains cannot be made in the same way as between strains of perennial ryegrass. In the latter the value of a strain increases with its longevity The value of a temporary ryegrass strain depends on the purpose we have in view. For some purposes the shorter lived, quicker growing Westerwolths is to be preferred, for others the truly biennial Italian Ryegrass should be chosen. The recent appearance on the market of New Zealand Certified Italian makes it possible to be certain of obtaining the true biennial type.

Those who sow Italian Ryegrass in Autumn for Winter feed followed by Spring grazing or hay can be sure of obtaining a leafy growth right through the season and into the second year by sowing this certified strain. Where a Spring sowing is made with the object of providing grazing through the Summer and into the Autumn, the certified Italian should also be chosen.

Experience in other districts with certified seed leaves no doubt that when sown in Autumn it will produce both Winter feed and a good crop of hay or seed for the following Spring. Local seed on the other hand, if sown in early Autumn, tends to run to ear before the Spring.

It is thus apparent that to get the best results from each strain certified Italian Ryegrass should be sown in the Autumn and local Italian and Westernwolth in the Spring.

The use of Italian Ryegrass in Subterranean Clover Paddocks, as demonstrated by Mr. Reg R. Taylor, at Stewarton, should stimulate the demand for Italian Ryegrass. The Italian Ryegrass is drilled into the Subterranean Clover in the Autumn. An excellent opportunity is provided after a Subterranean Clover paddock has been harvested for seed. The Italian Ryegrass provides Winter feed, a crop of hay and feed the following Autumn. The Ryegrass then disappears and the paddock can again be used for Subterranean Clover seed. Successful application of this practice depends on the use of a leafy Winter-growing strain of Italian Ryegrass, such as New Zealand Certified.

The use of Westernwolths Ryegrass seems likely to become restricted to Spring sowing, with Crimson Clover, for a short term pasture, or for early hay. A second and even a third season may be obtained from this mixture by allowing re-seeding in the Autumn, but the proportion of weeds usually increases from year to year under this system of management. Where a second season of grazing is required, it is generally safer to sow true Italian Ryegrass. A further place for Westernwolths Ryegrass is when Autumn sowing for Winter feed is followed by Spring ploughing for Summer fallow. Oats are commonly sown for this purpose, but a more nutritive feed is provided by Westernwolths Ryegrass.

Growers of the local Westerwolths strain desiring to change to the New Zealand Certified Italian can be sure of obtaining payable seed crops from the latter strain by sowing in Autumn. By arranging for registration with the Department of Agriculture, such seed can be certified as true Italian Ryegrass.

The growing of certified Italian Ryegrass for seed need not be restricted to late districts, as the Autumn sowing ensures ample time for the growth of a heavy crop and the ripening of the seed.

REFERENCE:

1. Levy E. B. & Saxby S. H. "Strain Investigation of Grasses and Clovers." N. Z. Jour. Agr., Vol. 47, P. 336.

GRASSLAND ESTABLISHMENT ON THE HEAVY SOILS OF THE NORTH-WEST

By L. H. RADEL, District Agricultural Officer, Devonport

General Considerations

TYPICAL heavy soils of the North-West are situated generally in the 40 to 50 inch rainfall area. They are subject to severe Winter conditions and owing to the thorough soaking which they receive at this season are able to retain moisture until comparatively late in Summer. Drainage is generally rather poor and cultural work is difficult. Fertility varies according to soil type and previous treatment, but on the average is higher than that of the lighter soils. Usually these heavy lands are not suited to cash cropping except for such special crops as Horse Beans, White Oats and Peas, but they are capable of carrying a good sward of permanent grass. In order to exploit their possibilities effectively, it is obvious that this area of good pasture must be extended. Thousands of acres are carrying only one sheep or less per acre on native grass (Agrostis species mainly), when by efficient management and the sowing of proper permanent pasture the stocking could be at least doubled.

Under present conditions it is doubtful if these areas could be devoted economically to cash cropping as many of the holdings are not of sufficient size to warrant the employment of permanent labour. Moreover casual workers are difficult to obtain and returns from cash crops are too uncertain. Offering, as it does, a safer return with less labour requirements, stock farming suggests itself logically as the main activity.

The basis of any sound scheme of stocking is to provide food combining the maximum of cheapness and efficiency and to stock to capacity. The first of these requirements is met admirably by good permanent pasture. Supplementary foods will need to be available to fill in periods of shortage and to allow of maximum stocking. These usually will consist of turnips and/or mangels, plus oat chaff and meadow hay for Winter feeding, with Chou Moellier for Autumn. Rape is an excellent supplementary fodder, ideal for the finishing of lambs which are not sold as milk lambs and few properties where the above mentioned difficulties are experienced can dispense with a fodder such as this.

The Permanent Pasture

Soil Preparation

The succesful establishment of the young pasture is dependent mainly on the condition of the seed-bed at planting and on the time of sowing. This statement of course is based on the assumption that seed of satisfactory quality is used. Insufficient and hasty preparation of the land and late planting are responsible for the greater proportion of the failures which occur.

The essentials required for successful establishment are:—

1. Adequate drainage.
2. Eradication of twitch.
3. A firm and fine seed-bed, ready in sufficient time for early planting.
4. Good seeds—certified if obtainable.

Drainage

It is necessary that even hillsides should be effectively drained, and for most slopes drainage furrows about a rod apart will usually be adequate. Underground drains are usually not necessary except to drain depressions.

On flatter paddocks the first necessity is to intercept as far as practicable, by means of cross drains, all water being shed on to them from the hill slopes. The water should then be led off the flats either by surface channels or underground drains (stone or mole drains). An endeavour should be made to lower the water table as far as possible, bearing in mind that in these heavy soils there is comparatively little movement of water owing to the high clay content, and that drains will therefore need to be fairly close together.

When ploughing, it is advisable to make the lands one rod wide with a high crown so that the water will run off. After planting, numerous water furrows will be required and usually at least one should run across the slope at the headland to catch water from outside the paddock, with the remainder parallel to each other throughout the length of the paddock at about one rod apart. If the lands are properly formed with a high crown, as suggested above, the water furrows will be automatically in their correct positions. It is important that all channels where furrows cross be properly opened to ensure that all the water gets away.

Eradication of Twitch

Frequently it is necessary to break up an old grass paddock for re-seeding, and this involves the following procedure. First give a shallow ploughing as early as practicable in the Spring (October). This should be a little less than three inches deep. The land should then be left in the rough for a few weeks and, as the weather becomes drier, worked with the disc and the spring tooth to the full depth of the ploughing. The aim should be to get this surface layer thoroughly dried out. The chain harrows can then be used to bring the twitch to the top, and, if there is a heavy layer of this, as much as possible should be burned. A small amount is not a matter of serious moment provided it is dead; dry sheep will help to clean it up, but ewes and lambs should not be employed for the purpose as they will certainly lose condition on such feed. Consolidation is not the aim at this stage, but working should be carried out constantly until, say, the middle of December, when it is time to give consideration to the second ploughing. At this stage, if any large proportion of unkilled twitch is apparent, cultivation should be continued and the second ploughing only carried out when a satisfactory degree of eradication has been attained. The commonest errors in twitch eradication are usually that the initial ploughing is too deep and that live twitch is buried to re-infest the area—the two faults usually go together. If, by the first week in January there is still a large amount of twitch unkilled, every effort will need to be concentrated on the problem to ensure that the land will be ready for sowing within the next few weeks. If Onion Twitch is the main pest to be contended with, the shallow working should be continued for a little longer; but if Long Twitch or Water Twitch (Agropyron and Agrostis species, respectively) are the objectionable species, deeper cultivation is required to deal with growth taking place from the bottom of the furrow. Here a disc plough has much to commend it, provided it does not interfere with the drainage scheme by flattening out the lands as it may have a tendency to do. A mouldboard is recommended for flat paddocks if they are at all badly drained, as it allows of "banking" the lands.

After ploughing, the paddock should be left in the rough for ten days or longer and spring-toothed at discretion. The process of getting it fine by using the harrow should not be undertaken too soon; but the work will have to be done by the first week in February to bring the paddock down in time for sowing. From then on to seeding time the harrows need to be used as required, and the more often the better, within reason.

The primary aim here has been the eradication of twitch, and the working, if done in the above manner, is obviously a compromise and not altogether ideal in that the fallow will probably lack consolidation to an extent at seeding time and be drier than is desirable. Normally the two operations should be done separately, but economic necessity frequently makes it imperative that as many acres as possible be sown without delay. Although in other cases deep working of the fallow close to seeding time is not to be advised, the action is warranted where the above conditions prevail. The Cambridge type of roller can do much towards soil compaction; but lack of moisture may make it necessary to wait for the first Autumn rains before planting. Usually these arrive in sufficient time, but in any case there is normally little risk in planting the first week in March or the last week in February.

The Stone Problem

Stones are often numerous on the darker chocolate soils and interfere with efficient soil preparation, chiefly in regard to the shallow working. Quite often the initial shallow ploughing is impossible, and if it is, there is no alternative to giving one deep ploughing in December, leaving the land in the rough for a month or so and then working it down with the springtooth, discs or harrows when and as possible. A second ploughing is apt to bring so many stones to the top again that they cannot be removed. After being reasonably well worked down, as many stones as possible should be carted off and the same done just before seeding. Once the pasture has become established the paddock can be gone over and after harrowing all loose stones picked or raked up. Just how far this is proceeded with depends often on the financial standing of the owner, because to rid a paddock thoroughly of stones—

if that is possible—is frequently outside the realm of sound economics. The soundest procedure is to sow to permanent pasture and leave the paddock in that state, this being good practice because stony ground is usually capable of holding a dense sward.

The Ideal Fallow and Seed-Bed

Preferably, a breaking-in crop of turnips should precede laying down to grass. In cases where only the control of annual weeds has to be considered, an endeavour should be made to carry out the fallowing with only one ploughing, which should be given in October. This will only be satisfactory if the harrows are used continuously afterwards, which will result in the control of annual weeds and the retention of moisture which is so essential if planting is to take place at the desired time, namely about the middle of February. Continual working with the harrows will compact the underneath soil and the required firmness should be given to the surface by the use of a Cambridge roller, which can be hired by making application to the District Agricultural Officer.

Poor Clay Soils

The preparation of a seed-bed on the worst of the clay soils calls for special consideration. Drainage is especially important. Pre-cultivation need be only of a surface nature following the growing of a pea crop.

The reason for adopting this method is that usually there is not more than about one inch of fertile and aerated soil, and this becomes buried by deep ploughing, leaving, the poor non-friable clay upon which the young plants have to establish. By surface cultivation (about one and a half inches deep) the fertile layer is retained at the top where it is required.

The growing of a preparatory crop permits a long period of aeration of the surface layer, which mellows it, while the growing crop keeps down weeds. Peas are particularly suitable, as they assist in building up the nitrogen content which is usually inadequate. The worst possible course is to plough stubbles, or in fact any land, in the Autumn after the first rains and then plant immediately. A few extra weeds are preferable to a loose seed-bed from which the frost will surely lift all clovers at least. Onion Twitch is not really serious if present in only small amounts, but Agrostis and Long Twitch should always be regarded with caution.

Species to Sow

Variation of soil type must necessarily be considered in relation to pasture mixture. A broad classification of soil types with species most suited to them is as follows:—

1. Good heavy chocolate.
2. Good heavy chocolate and ironstone (gritty).
3. Black (heavy).
4. Black and ironstone (gritty).
5. Black, brown and yellow clays (denuded).

FIG. I

FIRST YEAR STRIKE ON CLAY FLATS. FALLOWED GROUND.
PHOTO SEPTEMBER.

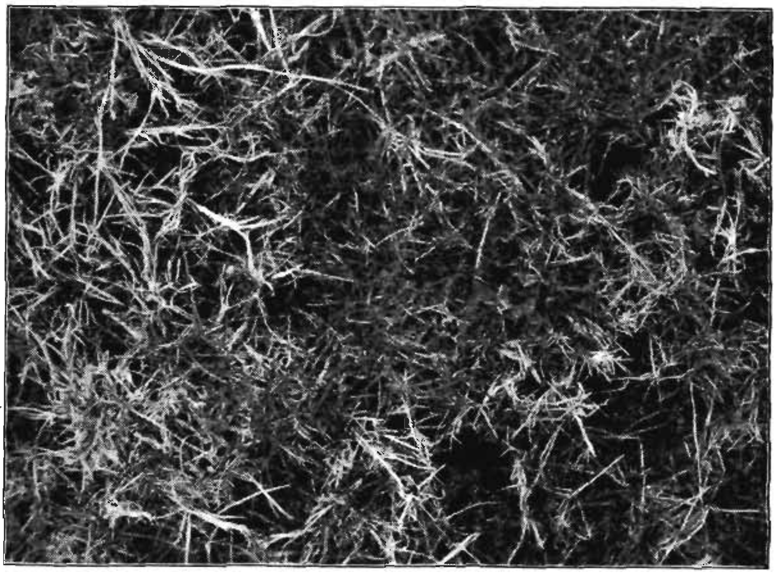


FIG. II

PORTION OF SAME PADDOCK AS SHOWN IN FIG. 1. PLOUGHED JUST BEFORE SEEDING IN THE AUTUMN, BUT TREATMENT OTHERWISE SIMILAR. NOTE LACK OF COLOUR. LIGHT COLOURED GRASS IS TWITCH.

All of these are alike in their ability to grow perennial ryegrass and Wild White Clover better than almost anything else. Subterranean Clover thrives on the heavy chocolate, and black gritty soils, and usually does fairly well on the gritty chocolate, with occasional poor results due to too much iron in the soil; while on the other black land its success or otherwise appears to depend upon the amount of clay present. On the black and brown denuded clays, particularly the latter, it is entirely out of place.

Cocksfoot gives excellent grazing on the heavy chocolate in particular and is worthy of consideration also on the gritty chocolate land. On the black soils it is not important, as it frosts too badly in Winter.

Phalaris tuberosa should thrive on the black and good chocolate areas if it has any real place at all in pastures, but the use of this species is still in the experimental stage.

Red Clover does well on the better land and should be included where hay is a prime consideration.

The basis of any mixture for heavy soils must be perennial ryegrass and Wild White Clover, as these are capable of heavy stocking when required most. Subterranean Clover has many good points, but its failure to grow into the Summer definitely classes it as inferior to Wild White, which has no equal as an all-the-year-round clover on these soils.

Recommended mixtures per acre are as follows:—

For Heavy Chocolate and Free Black Soils:

Tasmanian Certified Perennial Ryegrass	25 lbs.
Permanent Pasture Certified Wild White Clover	2 lbs.
Subterranean Clover	4 lbs.
Red Clover	4 lbs.

Clay Soils—Heavy Black Soils and Brown Clays:

Certified Perennial Ryegrass	25 lbs.
Certified Wild White Clover	3 lbs.

Planting

To get ready for planting, mix together 4 lbs. of Subterranean Clover and one bag of Super, and drill this with the oat cover crop, using one and a quarter bushels of oats to the acre. Then, if the land is at all loose, use the roller and broadcast the other seed on the rolled surface, leaving out the White Clover. Harrow lightly and then by means of a "spinner" broadcast the White Clover, which, if the seed-bed is good, will not need covering. If, however, the land is dry, broadcast the White Clover with the grass seed, but be certain that the harrowing is not too heavy.

Time of Sowing

On the land under discussion, Winter frosts are severe and unless early planting is practised extensive loss due to the lifting of the young seedlings out of the ground will occur. Endeavour to plant during the third week in February. Pastures sown after the last week in March are liable to suffer severely. Late sowing,

FIG. III

FIVE YEAR OLD SUBTERRANEAN CLOVER PASTURE ON DENUDED CLAY. HAS BEEN TOP-DRESSED ANNUALLY. PHOTO SEPTEMBER.

FIG. IV

SUBTERRANEAN CLOVER ON A PADDOCK ADJOINING THAT SHOWN IN FIG. 3. CHOCOLATE SOIL. PHOTO SAME DATE AS FIG. 3.

particularly on clay flats, often results in loss of Winter feed, because no grazing is possible before heavy Winter rains and without any consolidation from stocking the land is too soft to carry stock in the Winter, even though there may be feed on it.

Grazing Management of Young Pastures

If sown in good time there should be a first feeding off about the middle of May, when the young oats and grass are two to three inches high. Put in a large number of sheep in preference to cattle, and to give consolidation, feed fairly hard for say three or four days. Take off the stock and again, when there is a fair bite, give another quick feeding off, following this practice throughout. Beware of "poaching" of the ground, keeping cattle off the area if they bog to any great extent. Do not endeavour to obtain a hay crop in the first year, as this is liable to weaken the young pasture, being particularly severe on the White Clover.

PREVENTION OF TETANUS

From time to time the Animal Health Service of the Department of Agriculture is called upon to deal with cases of tetanus, or "lockjaw," as it is commonly called. This disease is due to the infection of wounds by the tetanus bacillus. Deep wounds, such as nail pricks, stake wounds, etc., are most likely to be followed by tetanus, especially where the animals are in cities, stables or yards where manure and dirt are present. Some areas appear to be heavily contaminated with the germs and cases occur at fairly frequent intervals.

Treatment of tetanus is always difficult and costly, requiring large quantities of expensive antitoxin, especially when it is not commenced soon after the onset of symptoms. Prevention on the other hand is comparatively easy and cheap. A reliable vaccine for immunising animals against tetanus is now available, a solid immunity being developed approximately six weeks after inoculation. The cost for a horse is Four Shillings.

Antiserum given following a wound is also a sure and immediate safeguard against tetanus following the injury, but this protection only lasts a few weeks. The cost is small and well worth while when valuable animals are involved.

Veterinary Pathologist

BULL SUBSIDY SCHEME

The original Bull Subsidy Scheme rules provided that only one subsidy was payable on any bull and that any dairyman could only once receive assistance through the scheme.

These rules have now been amended and a subsidised bull which has outlived his usefulness in any herd may be sold and the purchaser will be entitled to a subsidy.

Further, a dairyman who has already received a subsidy will be entitled to a further subsidy in cases where:—

1. The bull he purchased through the scheme has:
   - (a) either died, or become sick, diseased or injured so as to be of no further use as a sire; or
   - (b) has been in the herd for so long that his continued use is no longer desirable; or where
2. the herd is of sufficient size to warrant the use of more than one bull.

When making application for a second subsidy the applicant should stipulate which of these conditions apply in his particular case.

Chief Dairy Officer

THE PEA MITE AND THE RED-LEGGED EARTH MITE

By J. W. EVANS, Entomologist

The Pea Mite (Penthaleus major (Duges))

CROPS of Winter Peas in Southern Tasmania are sometimes seriously injured following the attack of small black mites with red legs. These mites, which may occur in myriads on the surface soil, have been recorded in New South Wales (Froggatt, 1921), as a pest of oats, and reported by Swan (1934), as showing a preference for grasses over broad leaved plants. In Tasmania they are widely distributed in pastures and have been seen feeding on charlock *(Brassica sinapis)* to such an extent as to produce whitish blemishes on the leaves, but except in one instance have only been observed by the writer as of economic importance on peas. In the instance referred to, with small pasture plots maintained by school-children, the clover had been completely destroyed and the grass seriously affected.

Nature of Injury

When the mites are very abundant, germinating peas may be killed before they reach the soil surface, and young plants become so stunted and weakly as to fail to develop. Infested plants may be recognised by their whitish appearance.

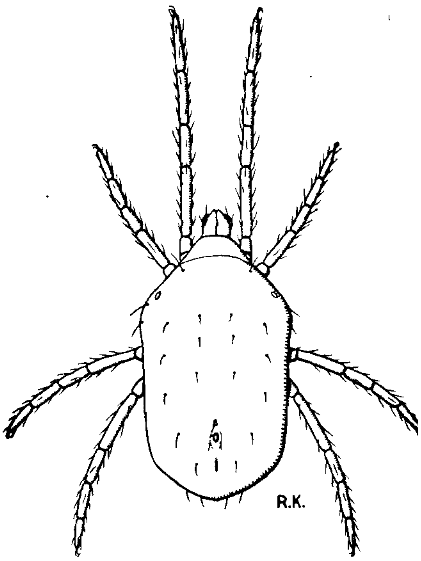


FIG. I

PENTHALEUS MAJOR (x 35)

Life-History and Habits

The eggs do not hatch until the soil surface on which they are resting remains moist over an extended period; thus during the Summer months little development takes place, and it is not until the Autumn that conditions are favourable for the hatching of the eggs.

Young mites appear during April and become adult in from six to eight weeks. They feed by suction, rupturing the surface cells of leaves, and are especially active on warm, sunny days. During cold, cloudy weather they are less active and may be found sheltering under small lumps of surface soil. Eggs are laid on leaves and there are a number of generations during the year.

Although these mites are most often observed during June and July, when the damage to peas becomes apparent, they are active until October or November, when decreasing soil moisture and increased temperatures combine to produce conditions unfavourable to their continued existence and development.

Control

Most satisfactory control can be attained by cultural methods. Land known to be infested, in which peas are to be planted, should be ploughed in late April or early May, or a clean fallow maintained throughout the early spring and summer. The purpose of the autumn ploughing is to turn under and destroy the mites after they have hatched from the over-summering eggs, and of the spring and summer fallowing to render conditions unfavourable for the deposition of eggs.

If cultural control measures have been neglected, infestations may be checked by treating the plants with one of the dusts recommended for the Red-Legged Earth Mite.

The Red-Legged Earth Mite (Halotydeus destructor (Tucker))

The Red-Legged Earth Mite closely resembles the Pea Mite, but differs in the coloration of the body. In the former the body is entirely black, whilst the Pea Mite has an area of red pigmentation on the dorsal surface.

The Red-Legged Earth Mite, which was probably introduced into Western Australia from South Africa, now also occurs in South Australia, Victoria and New South Wales. Although present on both King and Flinders Islands, so far as is known, it is not yet established on the Tasmanian Mainland.

This mite is a very much more injurious pest than the Pea Mite, and will feed on a wide variety of garden plants, market crops, and on clover. It is especially injurious to young plants, and abundant on light sandy soil.

In its life-history and the nature of the injury caused by its feeding activities it is similar to the Pea Mite, and it is probable that its greater importance as a pest is due to its superior reproductive powers.

Control

As with the Pea Mite, control can be attained by cultural methods, and a well-kept autumn and early summer fallow will temporarily free an infested area.

Chemical control methods, on account of their cost, are generally only practicable for the treatment of vegetables and oramental plants, but if warranted may also be used on pastures.

Spraying is seldom satisfactory, as although contact sprays such as Nicotine-Sulphate and even lime sulphur, will destroy those mites that come in contact with the spray, re-infestation of treated plants will soon follow. For garden plants, derris or pyrethrum dusts are recommended, and the dusting powders, of which particulars follow, have been used with success in Western Australia and Victoria.

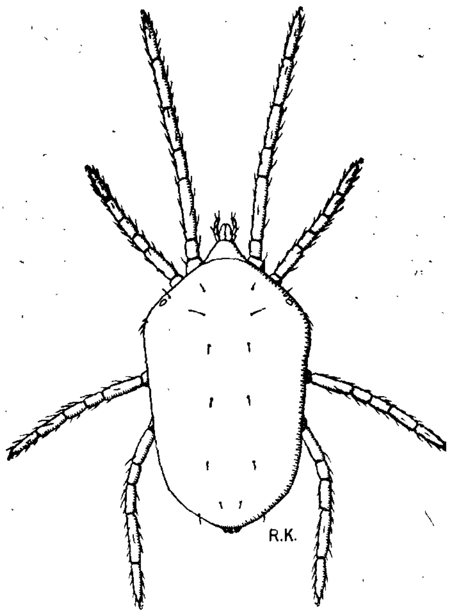


FIG. II

HALOTYDEUS DESTRUCTOR (x 40)

For use on pastures, a dust prepared by mixing together 1 lb. of 15 per cent carbolic powder and 4 lbs. of superphosphate, applied at the rate of 1—1½ cwt. per acre, is recommended. This dust, which should be used soon after mixing and only applied during the warmest part of the day, is most beneficial if applied early in the winter, a few weeks after the autumn rains.

Tobacco dust and lime mixed in equal quantities are also of value, as well as a dust prepared by mixing half a kerosene tin of tobacco dust, a similar quantity of lime and half a pint of kerosene. The kerosene is poured onto the lime and allowed to stand overnight; next day the tobacco is added and the whole thoroughly mixed.

Gardens and areas of vegetable crops that have been rendered free of the mite by cultural or chemical methods, can be protected for some weeks by a strip of creosote about three inches wide around the boundary fence.

REFERENCES:

Froggatt, W. W., 1921. Agric. Gaz. N.S.W., 32; 33.
Pescott, A. T. M., Leaflet No. 4, Dept. of Agric., Victoria.
Newman, L. J., Leaflet No. 106, Dept. of Agric., W. Australia.
Swan, D. C., 1934. Journ. Agric., S. Australia, 38; 353.

WHEAT VARIETY TRIAL

Last year a trial of the more promising wheat varieties from Strathroy was sown at the Departmental Farm, Cressy. The following yields were obtained from each variety, but the results are inconclusive since they are based on one season's trial only.

Variety	Bushels per acre	Comparison with Bræmar Velvet	Date of Ear Emergence
Calare	27.9	+ 4 bushels	Nov. 5th
Bræmar Velvet, Seln. 24	25.2	+ 1.2 „	„ 9th
Solid Straw Velvet	24.6	+ .7 „	„ 11th
Carimbla	24.1	+ .2 „	„ 5th
Standard Bræmar Velvet	23.9		„ 12th
Turvey	22.9	- 1 „	„ 5th
Sutton	22.4	- 1.5 „	„ 5th
Major	21.8	- 2.1 „	„ 6th
Morley	21.6	- 2.3 „	„ 5th
Cross Leven	21.5	2.4 „	„ 10th
Cadia	21.3	- 2.6 „	„ 5th
Bobin	20.7	- 3.2 „	Oct. 30th
Mogul	20.2	- 3.7 „	Nov. 7th
Free Gallipoli	20.0	- 3.9 „	„ 2nd

The results have been tested statistically and all differences of over 1.9 bushels per acre are significant, (i.e., they are real differences and not due to chance). The wheat was sown on the 26th May, 1937, at the rate of 100 lbs. per acre, with 1 cwt. superphosphate per acre. The winter was a severe one and the wheat did not make much growth until the spring, and in consequence was not fed off at all. Growth in the spring was fairly rapid and the exceptionally warm weather in November accelerated ear emergence and flowering and probably reduced the number of heads per plant and the number of grains per head. The heavy rains of December caused the grain to fill well and a good sample was obtained. The yields are rather low but the trial was situated in a poor portion of the paddock. It is intended to repeat the trial this year.

Agronomy Division

THE MANAGEMENT OF BREEDING EWES

By J. H. G. LLOYD, District Agricultural Officer, Burnie

THE breeding of fat lambs for export has increased considerably during the last two years, but we can only say that we are now at the commencement of the industry. It has been conculsively proved this year that this State can produce prime quality lambs which compare favourably with the best produced in any other country.

Many farmers will be running ewes this season for the first time, and the following points are worthy of close attention.

It will be conceded at the outset that no matter how good may be the farm and the stock, very little can be achieved without good management. To obtain the best results from breeding ewes particular attention should be paid to their management by:—

1. Endeavouring to get them all into an even, fit healthy condition, neither too fat nor too thin, after weaning and prior to flushing.
2. Flushing the ewes for two to three weeks prior to and during mating.
3. Regulating their winter feed supply so that it is improved in quality as pregnancy progresses.

After weaning, or (in the case of those farmers who are just beginning with sheep) when ewes have been purchased, they should be carefully looked over and graded. Those in high condition should be given a very limited amount of feed, while the poorer sheep should receive special treatment, the object being to get them into an even condition prior to flushing.

Drenching

After weaning is an ideal time to drench ewes. Internal parasites are most numerous as a rule in wet seasons when there is a surplus of rough feed. Indications of the presence of worms are a generally unthrifty and dull appearance, paleness of the skin, and, in bad cases, a tendency to scour. Several different types of worms are liable to occur in the stomach and intestines of sheep, the treatment for which has already been set out in the August, 1936 issue of the Journal. The recommendations there given are reproduced in detail and are as follows:—

Much experimental work has recently been done in an effort to obtain a satisfactory drench for the treatment of the various types of worms which locate in the stomach and intestines of sheep, and cause considerable economic loss to the breeder.

Copper sulphate (bluestone) alone is effective against certain species of these parasites, but is quite innocuous to others. Its presence in any such treatment is, however, essential owing to its action on the stomach, which results in the drugs being brought into direct contact with the worms without being diluted by the paunch contents.

After careful study of the results in other States, coupled with those obtained here, the officers of the Animal Health Service have now adopted the following standardised drench for treatment of affected sheep:—

Bluestone	1 lb.
Black Leaf 40 (Nicotine Sulphate)	16 ozs.
Water	6 gallons

Dosage:

Adult sheep	2 ozs.
12-18 months	1½ozs.
6-12 months	1 oz.
4-6 months	½ oz.

This drench can be repeated at fortnightly intervals when necessary. Owing to the action of the bluestone there is no necessity to starve the sheep prior to drenching; in fact, when using Black Leaf 40, this practice may result in poisoning the animals.

Drenching should be followed by an improvement in the feed supply, supplementary crops such as rape being most useful for this purpose. If none are available frequent changes on to clean grass paddocks, or the feeding of chaff with a little rock salt are advisable. Badly affected sheep should always be drafted out from the flock and kept by themselves. It will be found that if this is not done the number of deaths will increase, as the stronger sheep get over the ground quicker and take the best of the feed. In bad cases drenching may be repeated at intervals of ten days to a fortnight.

Flushing

This is done by changing the ewes from dry to succulent food, or vice versa, two or three weeks before mating. The class of feed used is probably not so important as giving a suitable change and an increase in amount. Suitable crops for flushing are Chou Moellier, early turnips and Algerian Oats. The first two, sown in spring on a good fallow, produce a large amount of autumn feed for a small outlay. Algerian Oats, on the other hand, are sown early in the new year.

The effect of flushing, especially on ewes that have been kept in good store condition all the summer, is to tone up the system generally and consequently they mate readily. The result is that the majority of ewes lamb within a few weeks, which means an even line and a minimum of shepherding at lambing time. Lambs born out of season are relatively costly to rear and interfere with the general management of the flock. The rams should be put out approximately six months before the natural flush of grass in spring. This varies in different parts of the State, and each farmer must determine for himself the most suitable time to mate. A month to six weeks is quite long enough for the rams to stay out, for if the ewes have been well flushed and properly managed, they will all be in lamb by this time. A light crutching of the ewes and ringing of the rams is advisable before mating. During mating the flock should be yarded at least twice a week, and with small flocks, yarding each night is desirable.

Fifty ewes are sufficient for one ram, 30 for a ram lamb. The use of the latter is not advocated, but sometimes cannot be avoided owing to two-tooths being unprocurable.

Where the size of a flock requires the use of several rams, these should not all be put together. Fifty per cent. is sufficient for the first ten days or a fortnight, when they may be taken out and the other half put with the flock for a similar period. For the last two weeks all the rams may be put out.

After mating, the ewes need to be just kept moving forward in condition. If they are allowed to get into high condition in the autumn and then receive a check before lambing, twin lamb disease is often induced. This can result in heavy losses and is extremely difficult to combat. Prevention is the only course to adopt.

Winter Care

In damp seasons or on low-lying land a close watch should be kept for foot-rot. This disease in sheep is now proclaimed under the Stock Act and all stockowners having affected sheep or sheep which they suspect of being affected must isolate such animals and report immediately to the Animal Health Service. For information on foot-rot and methods of prevention and treatment, flockowners are referred to an article which appeared in the last (February, 1938) issue of the Journal.

In order to avoid any injury which may check the general condition of the ewes, it is recommended that crutching be carried out at least eight weeks before lambing, especially where labour is employed. However, if a farmer proposes to undertake the work himself, it may be delayed even later provided sufficient care is exercised.

Winter Feeding

Supplementary feeding should be commenced before there is any tendency for the sheep to lose condition. If it is intended to feed anything which may be strange to the sheep, it is essential to commence feeding earlier than would otherwise be considered necessary. In utilising such crops as turnips, it is advisable to feed a paddock in small breaks. This enables the crop to be cleaned up properly and waste is reduced to a minimum.

Turnips by themselves are not a balanced food, and hay or chaff should always be fed with them. Even the addition of straw, where nothing else is available is preferable to turnips on their own. On most farms the necessary dry matter can be provided by giving a run off on to a rough grass paddock. This is the time of the year when the flock can be exercised with advantage, and it is often possible so to arrange the feeding of the turnip crop that the ewes have a considerable distance to walk between the turnips and their run-off paddock.

It is beneficial to ewes to keep them supplied constantly with mineral licks and the following is a mixture to which they should have free access:—

Coarse Salt	100 parts
Bonemeal	50 parts
Superphosphate	10 parts
Sulphate of Iron	1 part

Molasses (1 to 3 of water) sufficient to make the mixture crumbly moist.

Lambing

Where circumstances permit, it is a sound policy to go through the ewes about one month prior to lambing and remove those which are backward in condition, so that they may receive better feed. Contrary to the usual idea, it is advisable to have some dry feed available after lambing, so that the ewes can at all times have dry feed along with the pasturage.

The most suitable way to manage ewes at lambing is to draft out each morning those which have not yet lambed, leaving the others behind with their lambs. These may be left undisturbed for a day or so before being mobbed up with the other ewes and lambs. This saves an immense amount of shepherding, and also allows for the docking of the first half of the lambs when they are old enough without disturbing the younger ones, and the ewes that have yet to lamb.

Docking

The most favourable time to dock is when lambs are from three to four weeks old. Temporary yards should always be erected and for this purpose a few coils of wire netting and some hurdles are excellent. The yards may be erected in a convenient corner of the paddock, and the freshly docked lambs are assured of being dropped on clean ground, the risk of infection thus being greatly diminished.

Some disinfectant should always be available at docking time for sterilising instruments, etc., and, where there is a risk of infection with Jointill or Arthritis, a suitable antiseptic should be provided for local application.

Some farmers separate their lambs from the ewes after they have been yarded and prior to docking, but this is really unnecessary and involves a great deal more handling and knocking about. The main thing to remember at docking time is not to rush. Care in mustering ewes to the yards and in handling the lambs while docking is most important, and the little extra time spent on this operation is well repaid. After docking, lambs should be kept going ahead the whole time until they are ready for slaughtering. The slightest check often means a considerable increase in the time required for fattening.

Weaning

It is advisable to wean lambs which are not sold as "milk lambs" when they are from three to four months old, and while they are still thriving. They should always be weaned on some suitable feed such as rape, and where this is not available they should be put on to a clean grass paddock, preferably one that has been cleaned up by cattle.

It is a great mistake to leave lambs on their mothers too long, for the benefit of the small amount of milk they receive is often lost when ewes are run on pasture that has little suitable lamb feed, and has become fouled by constant grazing. Such conditions frequently result in the lambs becoming infested with worms. The art in stock management is to be able to tell when an animal is going back. This comes naturally to some farmers, but with many it has to be acquired by constant observation and experience.

After weaning (that is, where fat lambs are being raised), the lambs can be finished off on rape. Forward lambs will fatten in from two to three weeks on a good rape crop, and it is essential for every farmer to have a few acres of this excellent forage each year as there is always bound to be a percentage of lambs that will not go away fat off the mother.

Care and attention are just as necessary with ewes as with other breeding stock if good results are to be obtained. It is invariably necessary to provide a certain amount of supplementary feed, and the prudent farmer will always have at least six months surplus feed on hand, in case of seasonal shortage.

BEAN DISEASES

By J. O. HENRICK, Plant Pathologist

DURING recent years the small grower in Tasmania who relies on seed bought in packets or small quantities has been experiencing many set backs with the bean crop. Results in some cases have been so bad that quite a number have given up the growing of French Bean varieties. This state of affairs has been brought about largely through the attacks of Bean Anthracnose (Pod Spot) and Bacterial Blight, on which the following notes may prove of assistance to growers.

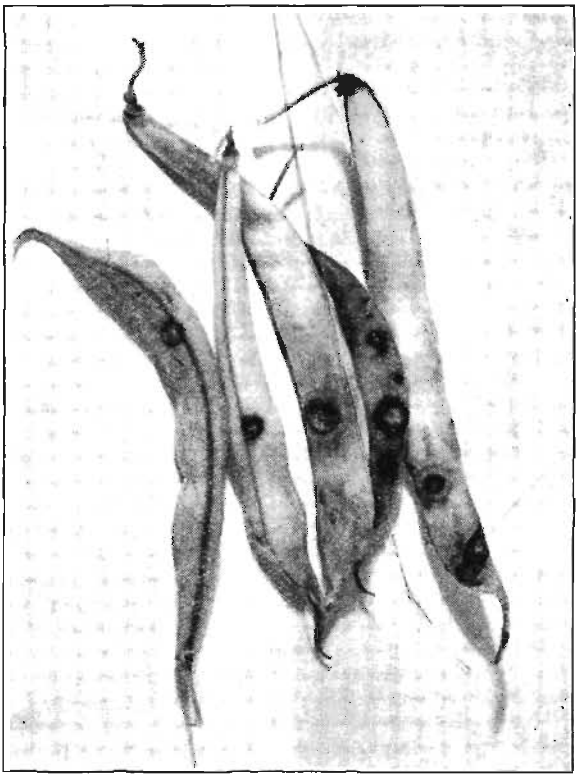


FIG. 1
BEAN ANTHRACNOSE ON WHITE DWARF BEANS

1—Bean Anthracnose

(Glomerella lindemuthianum, Shear)

The stems, leaves, and pods of beans, particularly the dwarf types, are attacked, and wet, cold weather provides ideal conditions for the rapid spread of the disease. Although there may be

BEAN DISEASES

By J. O. HENRICK, Plant Pathologist

DURING recent years the small grower in Tasmania who relies on seed bought in packets or small quantities has been experiencing many set backs with the bean crop. Results in some cases have been so bad that quite a number have given up the growing of French Bean varieties. This state of affairs has been brought about largely through the attacks of Bean Anthracnose (Pod Spot) and Bacterial Blight, on which the following notes may prove of assistance to growers.

FIG. 1
BEAN ANTHRACNOSE ON WHITE DWARF BEANS

1—Bean Anthracnose

(Glomerella lindemuthianum, Shear)

The stems, leaves, and pods of beans, particularly the dwarf types, are attacked, and wet, cold weather provides ideal conditions for the rapid spread of the disease. Although there may be evidence of the disease in isolated plants in the crop right from the time they are through, usually the first indication the grower notes of the trouble is the appearance on the pods of small brown areas or spots which later become black and sunken. These sunken spots have a reddish brown margin or halo, and in the basin a pinkish mass of spores develop. (See Fig. 1).

The attack on the pods may be so severe that the fungus penetrates the wall and affects the seed.

Given suitable weather conditions for the development of the disease, the following symptoms may appear during the growth of the plants, and the grower should keep a good look out for them.

(a) If infected seed has been planted it will either not germinate or if it does, the cotyledons (two halves of the bean seed which are carried above ground) will probably show blackened marks and be a source of spore production for infecting other plants.

(b) Sunken black spots may appear on the stems, extend and so weaken the plant that it collapses.

(c) On the leaves the disease usually produces small, dead areas on the upper surface, and on the lower side the veins are blackened.

Rain splash, wind and intercultivation are methods by which the disease is spread.

Control.

1. If a diseased crop has been produced be sure to destroy all debris by burning.
2. Ensure good drainage of the planting area.
3. Rotate crops and plant the next season's beans well away from where last season's infected crop was grown.
4. Cultivate only when the plants are dry to reduce, as far as possible, the chance of carrying infection from one vine to another.
5. When cultivating keep a good lookout for any plants showing the symptoms mentioned under a, b and c, and if any are noted remove and burn them.
6. Select your own seed or else obtain it from a source known to be clean.

The selection of healthy seed presents no great difficulty. Select pods showing no sign of a blemish and the seed so obtained will be healthy.

2—Bacterial Blight

(Bacterium phaseoli, E.F.S.)

This disease is much more serious than Bean Anthracnose as the organism may permeate the whole plant. Hence it is not possible to obtain healthy seed by selecting unblemished pods. Seed obtained from wholly healthy plants alone is safe.

Unlike Anthracnose, it is favoured by *warm,* moist conditions and so makes its appearance more in summer.

The symptoms generally noted by the grower are those showing in the leaves and pods.

"Water soaked" areas, at first round, later becoming irregular in shape, show up on the leaves and pods. On these areas there frequently appears a thin pale yellow semi-transparent skin which is the result of the drying of bacterial ooze.

(a) On the leaves the spots are noticeable on both sides. They enlarge, the tissue becomes very papery, dies, turns brown, and in wind and rain, on account of its brittleness, becomes very ragged. (See Fig. 2).

(b) On the pods the areas do not dry up but retain the water-soaked appearance. (See Fig. 3).

(c) On the stem the plant may be girdled just about the point of lowest branching. Plants so attacked quickly wilt and may break off.

FIG. II

SHOWING RAGGED REMNANTS OF FOLIAGE

FIG. III

NOTE WATER-SOAKED AREAS DUE TO BACTERIAL BLIGHT, AND BLACK SUNKEN AREAS CAUSED BY ANTHRACNOSE

The disease is carried over by the use of infected seed and debris left lying about from a previous diseased crop. From plant to plant spread is by insects and the agencies mentioned for Anthracnose.

Unlike Anthracnose, it is favoured by *warm,* moist conditions and so makes its appearance more in summer.

The symptoms generally noted by the grower are those showing in the leaves and pods.

"Water soaked" areas, at first round, later becoming irregular in shape, show up on the leaves and pods. On these areas there frequently appears a thin pale yellow semi-transparent skin which is the result of the drying of bacterial ooze.

(a) On the leaves the spots are noticeable on both sides. They enlarge, the tissue becomes very papery, dies, turns brown, and in wind and rain, on account of its brittleness, becomes very ragged. (See Fig. 2).

(b) On the pods the areas do not dry up but retain the water-soaked appearance. (See Fig. 3).

(c) On the stem the plant may be girdled just about the point of lowest branching. Plants so attacked quickly wilt and may break off.

FIG. II

SHOWING RAGGED REMNANTS OF FOLIAGE

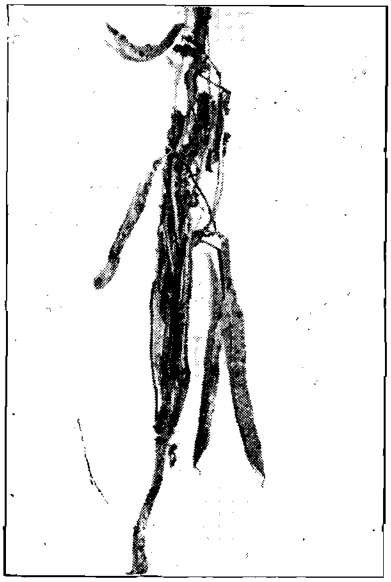


FIG. III

NOTE WATER-SOAKED AREAS DUE TO BACTERIAL BLIGHT, AND BLACK SUNKEN AREAS CAUSED BY ANTHRACNOSE

The disease is carried over by the use of infected seed and debris left lying about from a previous diseased crop. From plant to plant spread is by insects and the agencies mentioned for Anthracnose.

Control.

Cleaning up of diseased material, rotation of crops, insurance of good drainage, and care in intertillage, as recommended for Anthracnose, are all necessary. Seed used must be selected from healthy plants, or better still, obtained from known clean areas.

REFERENCES:

1. Charles Chupp, "Manual of Vegetable Diseases," pp. 13-30.
2. Erwin F. Smith, "Bacterial Diseases of Plants," pp. 280-299.

THE HERD SIRE

One of the problems with which a dairyman is often confronted, is for what period it is safe to use the same bull in the herd; whether he should be discarded as soon as his heifers are ready for service, or whether he may be retained for use with his own daughters.

So far as grade herds are concerned, it is usually quite safe to use a bull back with his own daughters, except in cases—

1. where the bull has a defined fault which is being reproduced in his heifers, in which case to use the bull with his daughters, would intensify the weakness; or
2. where line breeding has been practised in the herd and the bull in use is closely related to the previous herd sire, in which case such members of the herd as were sired by the previous bull might bear a blood relationship to him, too close for his use on his own daughters to be advisable, but this condition will not apply in the case of many grade herds.

It is, however, not safe to dogmatise on this matter, every producer must be guided by what he knows of his stock and type of the bull and his progeny but except in the cases mentioned above, no producer need worry about in-breeding by using a bull with his own grade daughters.

Chief Dairy Officer

SOIL EROSION

In those continents more recently occupied by the white man, America, Africa and Australia, intensive grazing and cultivation have led to losses of soil through erosion by wind and water. A recent pamphlet issued by the Bank of New South Wales explains how soil erosion occurs and describes methods to control and prevent this menace.

An article in the Victorian Journal of Agriculture (Vol. XXV, p 469) gives numerous illustrations of soil erosion in that State, and those familiar with the agricultural and pastoral areas of Tasmania could find similar local examples.

Although we have small areas showing the effects of wind erosion in the Midlands, our chief concern is water erosion. The relatively steep slopes and high rainfall of much of our agricultural land in the North-West and North-East necessitates special vigilance for the first signs of gullying or exposure of rocks. Flat land may become subject to erosion by run off from higher country with insufficient grass or tree cover.

The most important principle to be kept in mind is that land subject to water erosion should be utilised according to its slope. Experiments in the U.S.A. show that steep slopes one in five and upwards should carry chiefly trees, moderate slopes one in ten should carry chiefly grass, and should not be cultivated frequently, while slopes from one in twenty to one in thirty under cultivation should be provided with contour banks if losses through erosion are to be avoided.

Agronomy Division

Control.

Cleaning up of diseased material, rotation of crops, insurance of good drainage, and care in intertillage, as recommended for Anthracnose, are all necessary. Seed used must be selected from healthy plants, or better still, obtained from known clean areas.

REFERENCES:

1. Charles Chupp, "Manual of Vegetable Diseases," pp. 13-30.
2. Erwin F. Smith, "Bacterial Diseases of Plants," pp. 280-299.

THE HERD SIRE

One of the problems with which a dairyman is often confronted, is for what period it is safe to use the same bull in the herd; whether he should be discarded as soon as his heifers are ready for service, or whether he may be retained for use with his own daughters.

So far as grade herds are concerned, it is usually quite safe to use a bull back with his own daughters, except in cases—

1. where the bull has a defined fault which is being reproduced in his heifers, in which case to use the bull with his daughters, would intensify the weakness; or
2. where line breeding has been practised in the herd and the bull in use is closely related to the previous herd sire, in which case such members of the herd as were sired by the previous bull might bear a blood relationship to him, too close for his use on his own daughters to be advisable, but this condition will not apply in the case of many grade herds.

It is, however, not safe to dogmatise on this matter, every producer must be guided by what he knows of his stock and type of the bull and his progeny but except in the cases mentioned above, no producer need worry about in-breeding by using a bull with his own grade daughters.

Chief Dairy Officer

SOIL EROSION

In those continents more recently occupied by the white man, America, Africa and Australia, intensive grazing and cultivation have led to losses of soil through erosion by wind and water. A recent pamphlet issued by the Bank of New South Wales explains how soil erosion occurs and describes methods to control and prevent this menace.

An article in the Victorian Journal of Agriculture (Vol. XXV, p 469) gives numerous illustrations of soil erosion in that State, and those familiar with the agricultural and pastoral areas of Tasmania could find similar local examples.

Although we have small areas showing the effects of wind erosion in the Midlands, our chief concern is water erosion. The relatively steep slopes and high rainfall of much of our agricultural land in the North-West and North-East necessitates special vigilance for the first signs of gullying or exposure of rocks. Flat land may become subject to erosion by run off from higher country with insufficient grass or tree cover.

The most important principle to be kept in mind is that land subject to water erosion should be utilised according to its slope. Experiments in the U.S.A. show that steep slopes one in five and upwards should carry chiefly trees, moderate slopes one in ten should carry chiefly grass, and should not be cultivated frequently, while slopes from one in twenty to one in thirty under cultivation should be provided with contour banks if losses through erosion are to be avoided.

Agronomy Division

Chief Agents
ROYAL INSURANCE COMPANY

Established 1831

R & SONS LTD.

Branches and Agencies: LAUNCESTON, BURNIE, STANLEY

: MOONAH

re Stock

. C. Nickolls)

ULAR SALES
at

TOWN OATLANDS
AND CAMPANIA
.E TUNNACK
K NUBEENA
: KOONYA
MELTON

es Store
d for

Engineering

(Hugh Cruickshank)

Manufacturers of Automatic Pumping Plants, Case - Planing Machines, etc.

Repair Work of all Description, including Oxy and Electric Welding

Agents for Ball-Bearing Coy. of Aust.—Ball Rollers, Timken Bearings

"LISTER" Diesel Engines

(H. M. Cane)

Amazing Economy — Low Consumption of Cheap Grade Fuel Oils. Easy Starting, done by hand without any starting device whatever, due to new unique "LISTER" Patented Combustion Head.

Operated on 4-stroke principle.

Automatic Lubrication.

SHEEP DRENCHES, GRASS AND CLOVER SEEDS, BAGS, &c., &c.

(G. E. Mather)

WE CAN SUPPLY—

SAYERS' BLU-NIK for control of all worms.

SAYERS' FLUKE REMEDY—Use this and have healthy stock.

SPECIAL DOSING SYRINGES.

ALL VARIETIES of GRASS and CLOVER SEEDS of the HIGHEST GERMINATION and PURITY.

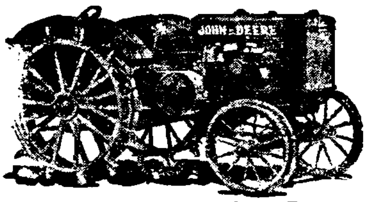
T. . Seeds will bring you Success, Profits and Prosperity.

Our Seeds grow Good Will as well as Good Crops.

NEW & SECOND-HAND CHAFF BAGS. SECOND-HAND CORN SACKS, SUGAR SACKS and POTATO BAGS of Good Quality.

WIRE, WIRE NETTING, RINGLOCK, etc., etc. (full stocks on hand).

"JOHN DEERE TRACTORS



For Farming, Orchard or Power Purposes.

ECONOMY—Burns Diesel Fuel O at 8d. per gallon, cutting workin costs 33 per cent.

SIMPLICITY — Only 2 cylinders - few moving parts.

The most power — for the longe: time — at the lowest cost.

ON SALES at the Railway Yards. Correspondence Invited.

Chief Agents
.ROYAL INSURANCE COMPANY

Established 1831

R & SONS LTD.

Branches and Agencies: LAUNCESTON, BURNIE, STANLEY

es: MOONAH

;tore Stock
(H. C. Nickolls)

REGULAR SALES
at

- TOWN	OATLANDS
.AND	CAMPANIA
LE	TUNNACK
)K	NUBEENA
.E	KOONYA
L	MELTON
)	

sses Store
nd for

Engineering
(Hugh Cruickshank)

Manufacturers of Automatic Pumping Plants, Case - Planing Machines, etc.

Repair Work of all Description, including Oxy and Electric Welding

Agents for Ball-Bearing Coy. of Aust.—
Ball Rollers, Timken Bearings

SHEEP DRENCHES, GRASS AND CLOVER SEEDS, BAGS, &c., &c.
(G. E. Mather)

WE CAN SUPPLY—
SAYERS' BLU-NIK for control of all worms.
SAYERS' FLUKE REMEDY—Use this and have healthy stock.
SPECIAL DOSING SYRINGES.
ALL VARIETIES of GRASS and CLOVER SEEDS of the HIGHEST GERMINATION and PURITY.
T. . Seeds will bring you Success, Profits and Prosperity.
Our Seeds grow Good Will as well as Good Crops.
NEW & SECOND-HAND CHAFF BAGS.
SECOND-HAND CORN SACKS, SUGAR SACKS and POTATO BAGS of Good Quality.
WIRE, WIRE NETTING, RINGLOCK, etc., etc. (full stocks on hand).

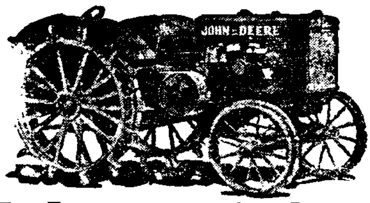
"LISTER"
Diesel Engines
(H. M. Cane)

Amazing Economy — Low Consumption of Cheap Grade Fuel Oils. Easy Starting, done by hand without any starting device whatever, due to new unique "LISTER" Patented Combustion Head.

Operated on 4-stroke principle.

Automatic Lubrication.

"JOHN DEERE TRACTORS"



For Farming, Orchard or Power Purposes.

ECONOMY—Burns Diesel Fuel Oil at 8d. per gallon, cutting working costs 33 per cent.
SIMPLICITY — Only 2 cylinders — few moving parts.
The most power — for the longest time — at the lowest cost.

:TION SALES at the Railway Yards. Correspondence Invited.

SOME IMPRESSIONS OF POTATO CULTURE IN GREAT BRITAIN

By C. E. W. OLDAKER, Agronomist and Senior Port Inspector

THROUGH the courtesy of officials attached to the British Ministry of Agriculture and Fisheries, an itinerary for the purpose of a general survey of the potato industry was arranged for me while on a visit to the Old Country during the summer of last year. The tour so arranged was comprehensive and provided an interesting and valuable opportunity for enquiry into many phases of potato culture.

At the outset a brief comparison, relating to crop acreage and production, between the United Kingdom and our own State may be helpful. Here, each year, we grow approximately 37,000 acres with an average yield computed by the Government Statistician to be in the vicinity of three tons per acre. In Scotland, with closely approximates to the size of Tasmania, we find that the total crop area is round about 140,000 acres, producing the excellent average yield of seven tons per acre, a splendid record especially when the severe conditions of the North are considered. England and Wales together grow about half a million acres, while the total throughout the British Isles, inclusive of the Irish Free States, exceeds one million acres. Throughout each country crop returns average six-and-a-half to seven tons per acre. A possible unfairness in making yield comparisons between Tasmania and Great Britain is that, in the Old Country mostly prolific white-skinned varieties for home consumption are grown. Tasmania relies principally upon an export trade and for this purpose one important section "Bismark" is lifted in an immature condition, while the main crop "Brownell," with compensating values as an export article probably unequalled by any other variety, is of moderate yield capacity.

Soil Preparation, Planting and Manuring

While tenant farmers in Great Britain are in most cases subject to strict conditions of crop rotation and cultivation, an amount of criticism is at times levelled at small land owners, and some tenants, who carry on inadequate methods, such as an undue proportion of cash cropping, or lack of rotation in the farm scheme. There is, however, a wide variation in practice. While in some cases a crop rotation over, say, six years is required, there are instances in which potatoes have been grown every year on the same land beyond the memory of living man. This relates at least to early districts, e.g. in Cornwall, where broccoli occupy the land during winter and a potato crop in spring and early summer. Here, however, there is a return of organic matter to the soil which may consist of a compost of farmyard manure, seaweed, and town refuse, with sand, to the extent of 20 to 30 tons per acre every third year, or lighter yearly applications. Except on some of the fen country of East Anglia, the aim of most growers is to dress the soil liberally with some form of organic manure. If this is not done a suitable rotation in which grasses and clover play an important part is adopted. Almost throughout the country thorough pre-cultivation of the soil is carried out. The surface is then ridged with a double mouldboard plough, the setts dropped in the hollows, and the ridges split to cover. Not in any one instance did the use of a mouldboard plough to cover the "seed" in the manner with which we are familiar, come under notice.

Seed

Although "round" seed is generally approved and used in far greater quantities than any other description there is neither flat rule nor definite recommendation generally operative. Special grades of small tubers to go through diddle meshes of one-and-three-quarter and two inches are produced under methods of close planting by seed growers associations of Scotland, Ireland, Wales and the North of England. In Lancashire, however, large tubers cut to setts are sometimes preferred, while in Ireland both cut and round are used without value distinction. Where cut setts are used, the latest approved practice is to plant without further treatment as soon as possible after the knife. Recent experiments have shown that setts cut in a moist atmosphere produce a better stand than those similarly dealt with in dry conditions. "Budding" or greening of seed stocks through the employment of shallow trays is much in vogue and in many instances growers have gone to considerable expenditure in the construction of suitable barns and equipment.

The seed quantity used per acre varies considerably in different parts of the country according to local conditions and the purpose for which the crop is intended. The range covers say 15 to 20 cwt. for main crops in the North to two-and-a-half tons per acre in the South where close planting for early marketing is the object.

Artificial Manuring

In commercial production there are many variations in methods of application and the quantity of artificial manures employed per acre. A mixture based on Super., say eight to ten cwt., with Sulphate of Ammonia, three cwt., and Sulphate of Potash, three cwt. approximates, with degrees above and below, a dressing per acre very largely used. Even on the lighter fen country of Lincolnshire, one case in which the farmer had applied 18 cwt. of a similar mixture to be followed by five cwt. Nitrate of Soda was noted. Such applications are either distributed mechanically and worked into the soil prior to ridging or along the bottom of the furrow by hand, or machine, before planting. Some trials have shown that better results are achieved through spreading the manure along the furrow with the setts.

Strongly opposed to the view held in Tasmania that phosphatic manure, with a little or no nitrogenic addition, is best suited for early cropping, a heavy top dressing of Nitrate of Soda ranging from five cwt. to ten cwt. per acre is used in districts of the East and South of England. In some localities the latter quantity is applied between the rows by hand when the plants are about six inches high. Crops so treated may yield 11 and 12 tons per acre, dug while still in a very immature condition, and when the majority of tubers range in size from that of a walnut to a little larger than a domestic hen egg—the size approved by English consumers.

In Northern Ireland the nearest approach to our own Departmental recommendation was found. Varietal trials conducted by officers of the Ministry of Agriculture had as a manurial treatment per acre the approved standard mixture composed of Super four cwt., Sulphate of Ammonia, one cwt., Potash, one cwt. This was in addition to an earlier dressing of farmyard manure.

Harvesting Early Crops

Methods of lifting "first earlies" were seen during June on several farms in Cornwall. Ploughs specially designed for the purpose are used for turning out the rows which are necessarily left unmoulded on account of close spacing, i.e., 12 inches between the rows with six to nine inches separating the plants. Men folowing the plough shake free the upturned haulms while others, by hand picking, separate the tubers into two classes. These are packed to uniform weights (approximately, half cwt.) in paper bags resembling those used in this country for cement. The whole process is carried out very rapidly in order to catch early and profitable market rates. On one farm no less than 41 men were employed together in harvesting a three-and-half acre paddock. At the time of my visit the selling price was 7/- per cwt. which represented a reduction from 11/- of a few days previously. Wages paid to workmen amount to £1/16/0 per week or 6/- per day of 8¼ hours. Motor lorries are in attendance for prompt removal of the produce to rail or nearby market.

Crop Examination Under Seed Certification Scheme

Considerable interest was attached to time spent in the field with officers of the British Ministry of Agriculture and Fisheries, England and Wales, including also the Departments of Scotland and Northern Ireland in examination of the methods concerned with seed crop certification. Careful attention was paid to the technique employed with accepted variations applying to different schemes or associations. Visits were paid to seed growers acting in a Cumberland Association, near Penrith, where some attractive crops were examined in company with the Ministry's Field Officer for that district. Working methods, in which an important consideration is the elimination of rogues (foreign varieties) were noted.

Probably the widest divergence in practice lies between the methods of Scotland and Northern Ireland. In Scotland replicated counts are taken of all diseased plants in parallel and transverse sections of the field by two officers working independently at the same time. Various degrees in intensity of virus infection are classified and recorded. Infection by "blackleg" and the presence of "wildings" is also taken into consideration. At the conclusion of a survey figures are compared and upon the average finding is based a recommendation regarding the class of certificate to be the soil liberally with some form of organic manure. If this is not done a suitable rotation in which grasses and clover play an important part is adopted. Almost throughout the country thorough pre-cultivation of the soil is carried out. The surface is then ridged with a double mouldboard plough, the setts dropped in the hollows, and the ridges split to cover. Not in any one instance did the use of a mouldboard plough to cover the "seed" in the manner with which we are familiar, come under notice.

Seed

Although "round" seed is generally approved and used in far greater quantities than any other description there is neither flat rule nor definite recommendation generally operative. Special grades of small tubers to go through diddle meshes of one-and-three-quarter and two inches are produced under methods of close planting by seed growers associations of Scotland, Ireland, Wales and the North of England. In Lancashire, however, large tubers cut to setts are sometimes preferred, while in Ireland both cut and round are used without value distinction. Where cut setts are used, the latest approved practice is to plant without further treatment as soon as possible after the knife. Recent experiments have shown that setts cut in a moist atmosphere produce a better stand than those similarly dealt with in dry conditions. "Budding" or greening of seed stocks through the employment of shallow trays is much in vogue and in many instances growers have gone to considerable expenditure in the construction of suitable barns and equipment.

The seed quantity used per acre varies considerably in different parts of the country according to local conditions and the purpose for which the crop is intended. The range covers say 15 to 20 cwt. for main crops in the North to two-and-a-half tons per acre in the South where close planting for early marketing is the object.

Artificial Manuring

In commercial production there are many variations in methods of application and the quantity of artificial manures employed per acre. A mixture based on Super., say eight to ten cwt., with Sulphate of Ammonia, three cwt., and Sulphate of Potash, three cwt. approximates, with degrees above and below, a dressing per acre very largely used. Even on the lighter fen country of Lincolnshire, one case in which the farmer had applied 18 cwt. of a similar mixture to be followed by five cwt. Nitrate of Soda was noted. Such applications are either distributed mechanically and worked into the soil prior to ridging or along the bottom of the furrow by hand, or machine, before planting. Some trials have shown that applied between the rows by hand when the plants are about six inches high. Crops so treated may yield 11 and 12 tons per acre, dug while still in a very immature condition, and when the majority of tubers range in size from that of a walnut to a little larger than a domestic hen egg—the size approved by English consumers.

In Northern Ireland the nearest approach to our own Departmental recommendation was found. Varietal trials conducted by officers of the Ministry of Agriculture had as a manurial treatment per acre the approved standard mixture composed of Super four cwt., Sulphate of Ammonia, one cwt., Potash, one cwt. This was in addition to an earlier dressing of farmyard manure.

Harvesting Early Crops

Methods of lifting "first earlies" were seen during June on several farms in Cornwall. Ploughs specially designed for the purpose are used for turning out the rows which are necessarily left unmoulded on account of close spacing, i.e., 12 inches between the rows with six to nine inches separating the plants. Men folowing the plough shake free the upturned haulms while others, by hand picking, separate the tubers into two classes. These are packed to uniform weights (approximately, half cwt.) in paper bags resembling those used in this country for cement. The whole process is carried out very rapidly in order to catch early and profitable market rates. On one farm no less than 41 men were employed together in harvesting a three-and-half acre paddock. At the time of my visit the selling price was 7/- per cwt. which represented a reduction from 11/- of a few days previously. Wages paid to workmen amount to £1/16/0 per week or 6/- per day of 8¼ hours. Motor lorries are in attendance for prompt removal of the produce to rail or nearby market.

Crop Examination Under Seed Certification Scheme

Considerable interest was attached to time spent in the field with officers of the British Ministry of Agriculture and Fisheries, England and Wales, including also the Departments of Scotland and Northern Ireland in examination of the methods concerned with seed crop certification. Careful attention was paid to the technique employed with accepted variations applying to different schemes or associations. Visits were paid to seed growers acting in a Cumberland Association, near Penrith, where some attractive crops were examined in company with the Ministry's Field Officer for that district. Working methods, in which an important consideration is the elimination of rogues (foreign varieties) were noted.

Probably the widest divergence in practice lies between the methods of Scotland and Northern Ireland. In Scotland replicated issued in compliance with the condition of the crop. Borderline cases of infection are permitted inclusion. In Northern Ireland counts are not taken but instead the fields are traversed by officers who take their recommendations purely on general observation regarding the health and suitability for seed purposes of any crop so examined.

It is interesting to note that seed improvement and certification schemes in Wales, North Ireland, and the Free State were initiated under aegis of the Government at exactly the same time (1927) as similar work was undertaken in Tasmania with a like success throughout.

In Wales a crop, and insect population, survey first determined the suitability of several districts for healthy seed production. Under binding conditions selected growers in approved localities were then supplied with special Scotch or Irish seed and from this beginning a sound scheme under strict supervision and control is growing up.

In this connection high altitude is not regarded as an all important factor as some of the best certificated crops to-day are being grown in the Isle of Anglesea with little elevation above sea level. Bleak weather conditions, including wind and rain are sufficient, apparently, to provide comparative freedom from insect vectors. It is also believed that in some coastal districts a strong prevailing sea breeze is responsible for early maturation of crops. This condition is reached before the known maximum incidence of insects and thus cross infection is, to an extent, escaped.

Valuable work with which seed certification is linked is being conducted at the University College Farm, Bangor, including varietal and yield trials as well as tests and demonstrations indicating the behaviour of plant diseases.

In Northern Ireland some impressive crops were seen particularly in County Down. Excellent results have been attained in seed improvement through single plant selection as a nucleus for building up healthy stocks to commercial quantities. Yields running from 15 to 20 tons per acre are frequent, but it must be remembered that prolific white-skinned varieties, grown under congenial soil and climatic conditions plus generous manuring and attention, are largely responsible. A high degree of plant health is, however, undeniable.

Good work, with some outstanding results, has been done by officers of the Irish Free State Department of Agriculture. In fact one English authority stated that "they are raising the best seed potatoes in the World." Specialised seed improvement was started ten years ago simply through plant selection and rogueing, although methods have now been advanced. Here, working in close association with University authorities, laboratory science takes a part in practical application.

Virus Research and Commercial Application

During my stay, visits which provided a great deal of interest and valuable information were made to the University College Farms at Cambridge, Bangor, North Wales and Dublin. In every case I was afforded instructive conversations and demonstrations by well known authorities.

While so much has been achieved by research workers of recent years in elucidating hitherto obscure conditions relating to virus diseases and their behaviour, it is evident that a vast field still awaits exploration. To those engaged it presents one of the most important and engrossing problems in modern science especially when the economic importance of the potato and other crops liable to a virus infection is considered.

Apart from the indisputable value of the advances which have been made through research, certain differences of opinion exist amongst leading workers. For instance, while a generally accepted view is that breeding and production of potato varieties entirely free of virus diseases should be the aim, there is not entire concurrence. One leading authority expressed the opinion that "it is better to breed for a perfect carrier in preference to evolving healthy but susceptible varieties." This was further supported in another instance, when it was said that "an ideal condition of complete health and all that it means is impossible in the economic sense." Admittedly something of the sort may be attained in the laboratory, insect proof houses, and so on, but what is the ultimate good of that? Stock so raised will, in a couple of years, after release for commercial production, be "back to the same old thing." It was further stated that "there are probably not any potatoes in the world without some form of 'healthy virus' regardless of the standard of attention and certification." Still another official stated that "in order to secure really early maturation in potato varieties a degree of virus infection must be present." Further remarkable evidence in support of this view relates to "Dargill Early," a variety being grown in Scotland as a seed crop for early commercial growers in the South of England. The top growth is not unlike that of the "Bismark" in its habit of developing "bolters" amongst a normally low, or dwarf, type of plant. Southern growers are now actually asking for seed supplies carrying a degree of infection in order to secure early tuber development.

Plant Breeding and Registration

Visits were also made to the Plant Breeding and Seed Registration Stations at Ormskirk, Lancashire; Costorphine, Edinburgh; Craibstone, Aberdeen; and Stormont, Belfast; where every facility for examination of crops and methods was kindly made available under the guidance of officers Operations having a wide scope are being conducted at these stations under meticulous care and system and it is regretted that time did not allow my making a more intensive study. Much valuable information was, however, gained in matters relating to both seed raising and plant diseases.

A great deal of work in exacting detail is being carried out on behalf of plant breeders in determining immunity from diseases and suitability for commercial production, or otherwise, of new varieties. In view of the heavy cost involved, both in time and money, it appears doubtful whether results are commensurate with expenditure. The position at present is that there are probably scores of distinct varieties throughout the country, many of which cannot lay claim to any especial distinction, or value. In addition many synonyms still occur although this has been corrected to a great extent during recent years. In several instances a view was expressed deploring the encouragement of so many varieties which have little to commend them, in comparison with old and established stocks, apart from the fact that they are new.

One authority on the Industry stated that "despite the continuous breeding of new varieties during recent years none have the value of some of the earlier, well known sorts." It is also a significant fact that of a total crop area of 140,000 acres in Scotland, 8,000 acres only are occupied by varieties bred during the last 20 years.

From the foregoing it must not be assumed that breeding should be intirely discouraged. It is, neverthless, definite that any new production should be tried out for a term of years sufficient to thoroughly establish its usefulness before release to commercial growers.

Conclusion

I am convinced that any country of importance in potato production must, to a certain extent in detail, work out its own salvation. Modified through geographical position, soil and climatic conditions, or the varying behaviour of diseases and disease vectors, methods which may be successfully applied in one locality do not necessarily produce the same results 100 miles away.

While research workers are attacking the many abstruse problems confronting the scientific world, much can be done to retrieve a drifting position through the exercise of common sense and enthusiasm. The indisputable success of seed improvement schemes referred to as well as our own experience in Tasmania in raising comparatively healthy and productive stock, is sufficient evidence.

My indebtedness is acknowledged, with many thanks, to all those with whom I came in contact throughout my tour, for the unfailing courtesy and ready assistance accorded me.

FARM BUILDING CONSTRUCTION

No. 2.—GENERAL PRINCIPLES OF CONSTRUCTION

By J. TILT, Agronomist

This is the second in a series of articles on practical farm building construction which commenced in the last (February) issue. In the first article the use of concrete for general constructional purposes was discussed. In this portion of the series it is proposed to deal with general carpentering methods that would be applicable to most farm buildings, and in future articles to give plans and specifications for various types of buildings.

Pegging Out a Building

IT will assist greatly in pegging out a building to use a square made of 10 ft. lengths of 3 in. x 1 in. hardwood. Two of these lengths are securely joined at right angles and braced by a third length nailed diagonally across to the extreme ends. By this means a right angle may be pegged out rapidly and accurately. The angles of a square or rectangular building can be tested by measuring the diagonals. If they are equal and opposite sides are also equal in length, then all the angles are right angles. When excavation is necessary, as for a concrete foundation, it is best to put temporary pegs only on the actual corners, then right along the sides and place additional pegs about two feet past each corner. Lines can then be run between these pegs and the positions will not be lost when the excavations are made.

Floors

The usual method of constructing a wooden floor is for the flooring to rest on timber joists, usually of 5 in. x 2 in. hardwood set on edge and spaced at from 1 ft. 6 in. to 1 ft. 9 in. centres. These joists in their turn rest on bearers of heavy timber such as 5 in. x 3 in. also laid on edge and spaced about 6 ft. apart. If the building were to be more than 9 ft. wide and not to be used for storing heavy materials, bearers would not be necessary and the joists could run from one wall to the other without support. This form of construction is shown in sketch "A," which illustrates a cut away section of a small building about 9 ft. across. It will be noticed that there is a timber base plate resting on the concrete foundation and that the floor joists rest on this.

The timber used for joists sometimes varies in width and it is necessary to allow for this, otherwise the floor level will be uneven. Any timber under average width should be selected for the outside joists, and these should be placed in position first, afterwards fixing a line between them. The intervening joists are then tested with the line before fixing, and any that project above the line can be lowered slightly by taking off a little wood where they rest on the plate.

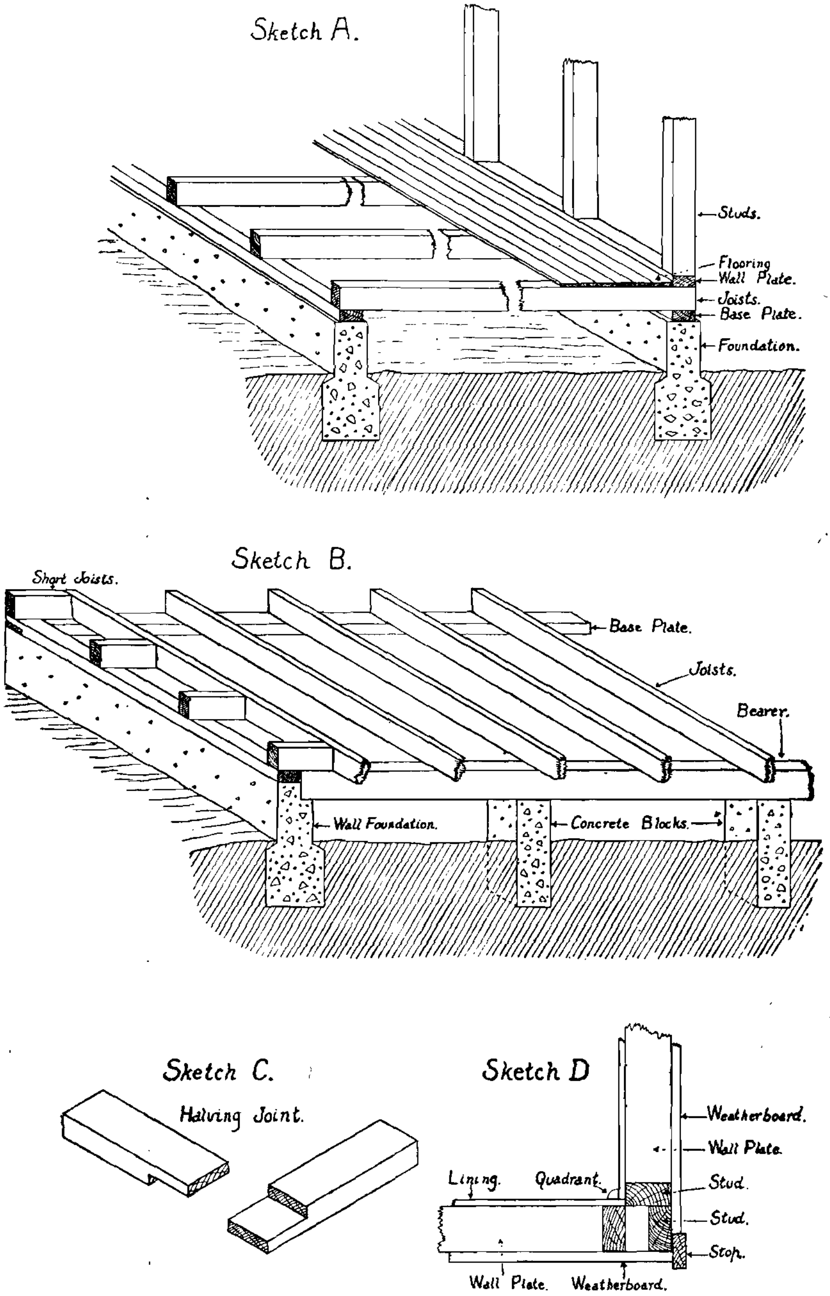

Sketch A.
Studs.
Flooring
Wall Plate.
Joists.
Base Plate.
Foundation.
Sketch B.
Short Joists.
Base Plate.
Joists.
Bearer.
Wall Foundation.
Concrete Blocks.
Sketch C.
Halving Joint.
Sketch D
Weatherboard.
Wall Plate.
Lining.
Quadrant.
Stud.
Stud.
Stop.
Wall Plate.
Weatherboard.

FIG. I

Where the size of the building necessitates the use of bearers, these should rest on concrete blocks spaced approximately 4 ft. apart along their length, and their ends should rest on small ledges projecting from the concrete foundation wall. As it is necessary for the top face of the bearer to be level with the top of the base plate, which is of 4 in. x 2 in. hardwood on its flat, the concrete blocks supporting the bearers will need to be 3 ins. below the actual foundation. This arrangement, together with the short joists put in to carry the plate for the wall which runs parallel to the joists, is shown in sketch "B."

The laying of flooring boards is comparatively easy, but there are a few points to bear in mind. The space from the tongue to the top of a board is slightly greater than that from the tongue to the bottom. The board is made in this manner to allow for wear on its face, and unless each one is laid the right way up the line of the floor will be uneven. Greater strength is obtained if the nails are put in at an angle. Two nails should be driven in where each board crosses each joist, one sloping towards the flooring already laid and the other in the opposite direction. Carpenters are in the habit of using special floor cramps to force the boards up tightly together, but these are rather expensive and if one should not be available two ordinary car jacks will serve the purpose quite well. The jacks should not be allowed to come in contact with the flooring itself; a waste piece of timber should be used as a buffer between the flooring and the jack. If auto jacks are not available a crowbar or wedges can be used, but only a few boards should be cramped up at one time by this method.

All bearers and joists should be kept well clear of the ground, otherwise they are liable to rot. Furthermore, adequate arrangements for ventilation should be made. Recent research has shown that one square inch of ventilation per foot of wall length is necessary below a floor. If the concrete foundation wall extends right up to the joists, provision for ventilation can be made between the joists. Gaps a foot long and the width of one weatherboard can be left at intervals and covered with fine wire netting, or the ordinary galvanized iron ventilators as used by builders can be employed.

Floors are often noticed with the boards raised at the edges and low in the centres. This is usually caused through the air under the floor containing more moisture than that in the building so that the underneath side of the floor board slowly absorbs moisture and expands, while the edges turn up. This fault is difficult to remedy, but it can be prevented by adequate ventilation of the space under the floor. Another contributing factor is that of excessive dampness in the soil under a building. In some cases this is impossible to prevent, but when a building is being erected the soil should be left a little high around the foundation so that the water will flow away.

Walls

Timber Framing:

The first step in constructing a timber-framed wall is to lay a timber base plate, usually of 4 in. x 2 in. hardwood, on the floor joists. The plate is laid on its flat. The studs are then nailed to it and a similar plate rests on top of the studs.

Where the base plate is joined at the corners and wherever joins occur throughout its length, the halving joint should be used. See sketch "C." This makes the plate continuous all round, and makes for stability. Where side walls or partitions join the outside wall, a slight variation of the halving joint is used. Half the thickness of the outside plate is cut away for a distance equal to the width of the plate of the side wall, and the latter is treated in the same manner as for a corner. When this plate is finished the measurements are transferred to fresh timber and a similar plate is cut for the top. The position of all studs is now marked on both plates and the studs are cut to length.

There are two different methods of erecting the wall frame, the choice depending on the assistance available and the size of the wall. For a small wall the two plates and the studs can be laid on the floor joists and the whole section joined together in this position. Fairly long nails are necessary, say 4 in. nails with 4 in. x 2 in. timber, and should be driven vertically down through the plate into the stud. When the section is completed the job is squared up and a diagonal brace of 3 in. x 1 in. hardwood nailed on temporarily. Finally the wall section is upended into position, the base plate is nailed to the joists and temporary stays are fitted to the frame to hold it in position until the remaining sections are erected.

In the case of larger buildings, the method described above presents some difficulty. The most convenient procedure is to nail the base plate in position first, then skew-nail the corner studs to it and others at 10 ft. intervals. A temporary stay is then fitted to each stud to hold it in place for the time being. Next the top plate is nailed into position on top of the studs already erected and the rest of the uprights are put in, one man standing them up in position and securing them to the base plate, while another completes the nailing down of the top plate. As each wall section is finished, the job is tested for squareness and diagonal braces are nailed on temporarily. These braces are removed when all the wall sections are in place, their position and the angle at which they cross each of the studs first being marked with a pencil. Finally the marked portions are cut out with saw and chisel, and the braces let in flush with the face of the studs, to which they are securely nailed.

If the building is to be finished outside with weatherboards, the studs are usually set 1 ft. 10 ins. to 2 ft. apart. Wider spacing than this is inadvisable, as it is apt to result in the opening up of the weatherboards between the studs. For most work 4 in. x 2 in. hardwood is the most suitable size for plates and studs.

Where a large wall is being erected without any lateral support from interior partitions, studs of 4 in. x 3 in. timber should be put in at intervals to stiffen up the wall, especially alongside any large doors or windows. If the building is not to be lined inside a single 4 in. x 3 in. or a 4 in. x 4 in. stud on the corners is sufficient, but if it is to be lined three 4 in. x 2 in. studs will need to be grouped on the corner to take the lining. (See sketch "D").

Roofing

In considering the layout of the roof, the first thing to be decided is its pitch or slope. A steep roof requires more roofing iron than one with a moderate slope and has no particular advantage, unless the building is required for a special purpose such as a stable with a loft above, in which case a steep roof would increase the capacity of the loft. On the other hand, if the roof is too flat water is apt to blow up under the joins in the iron should any looseness develop. For fairly large farm building a pitch of 1 in 5 may be regarded as satisfactory. Small building, such as dairies, etc., would be best with a pitch of 1 in 4, while a house would probably appear somewhat flat-roofed with a pitch of less than this.

The pitch of a roof is the rise in proportion to the span. Thus, a roof with a 20 ft. span and a rise of 4 ft. would have a pitch of 4 in 20 or 1 in 5.

When designing a roof it is advisable to adjust the pitch and overhang so as to avoid any cutting of the iron. Roofing iron is made in foot sizes from 5 ft. to 10 ft. and thus the design can be adapted to the most suitable length for the purpose. If two rows of iron are needed on the one slope six inches must be allowed for for overlap. It will be found of great assistance to draw a small scale plan of the roof span of the building, choosing a simple scale such as ½ in. to 1 ft. (See sketch "E").

Mark with vertical lines the overhang desired and the centre-line of the roof. Then by sliding the ruler along and measuring from the eaves to the centre line it is possible to see at a glance the pitch that would result from any particular length of iron or vice versa. Thus in the case of a roof having a span of 14 feet. and an overhang of 1 ft. 6 in., the use of 9 ft. iron would result in a pitch of slightly less than 1 in 5, while 10 ft. iron would give one of slightly less than 1 in 3. In this case the best method would be to use 9 ft. iron and any necessary increase in the pitch could be provided for by reducing the overhang 3 inches.

Setting out rafters is likely to present some difficulty to one lacking experience, but the following method is probably the simplest: Using either the corner of the building or the 10 ft. square used in pegging out, measure from the angle a distance equal to half the span of the roof, less ½ in. The span in this case is represented by the outside measurement from wall to wall. Also measure from the corner along the other side of the square a distance equal to the rise of the roof from wall to ridge plus 1½ in.. Then lay the rafter on the frame as in sketch "F," the inside edge touching the two marks. Mark the angle at the top end ready for sawing off, and at the bottom end run a line 1½ in. into the rafter at right angles to the side of the frame. Give the line a right angled turn towards the inside of the rafter, saw the piece out and saw off the top level. Next cut a second rafter using the one already cut as a pattern and try the pair on the roof with the ridge board between. If the rafters are not a good fit adjustment can be made before sawing the remaining ones, using the first pair as a pattern. Leave the lower ends of the rafters uncut until all are in position, when a line can be stretched from end to end and all the rafters sawn off level. The usual spacing for rafters is 3 ft. apart, and they

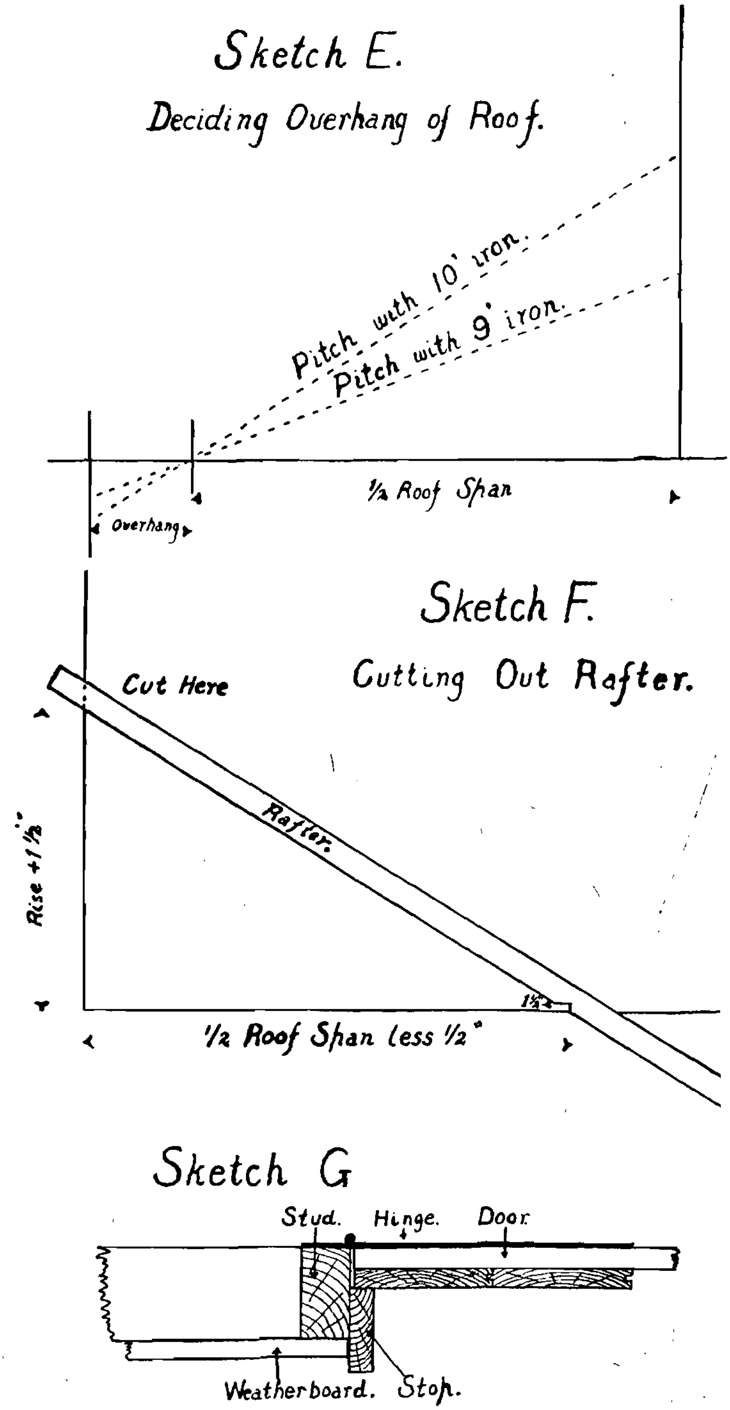

Sketch E.
Deciding Overhang of Roof.
Pitch with 10' iron.
Pitch with 9' iron.
Overhang
½ Roof Span
Sketch F.
Cutting Out Rafter.
Cut Here
Rafter.
Rise +1½"
½ Roof Span less ½"
Sketch G
Stud.
Hinge.
Door.
Weatherboard.
Stop.

FIG. II

are usually made of 4 in. x 2 in. timber with a 6 in. x 1 in. ridge-board. The ridge-board usually projects about 1½ in. above the rafters. The purlins, to which the iron is nailed, are then put on. These are usually made of 3 in. x 1½ in. hardwood and should not be spaced more than 3 ft. apart.

When putting the iron in position each sheet should overlap by 1½ flutes, and to make this possible it is necessary that each alternate sheet should be put on with the reverse side uppermost. Galvanised roofing nails should always be used and care should be taken not to drive them in too hard and thus dent the iron, while equal care is required to ensure that they are driven in sufficiently far to preclude leaving a gap between the washer and the iron.

Spouting is made in 6 ft. lengths and a range of widths from 3 to 6 in. The width most suitable depends of course on the size of the building and the amount of water which has to be carried away. Two types of spouting are manufactured, viz., the "Quadrant" and the "O.G." pattern. Ready made angles are available in both types of spouting, and are much more convenient than making the angles on the job. Spouting brackets are the best means of holding the spouting in position. These are fixed on to the ends of each rafter, the spouting is placed on them and finally the ends of the brackets are bent over, or a small bolt is put through into the spouting, depending on the type of bracket used.

Doors

Doors for farm buildings can easily be made out of tongued and grooved pine lining with dressed hardwood ledges and braces. Pine is preferable to hardwood on account of its lightness. The pine boards forming the face of the door are nailed to the ledges and braces in which the nails are able to hold securely. The door is hung on Tee hinges screwed on to the ledges. Three ledges, one in the centre, and one about 8 in. from each end, and two braces, all made out of 4 in. x 1 in. dressed hardwood, would make a substantial foundation for such a door. If a pair of carpenter's cramps are not available, the pine boards can be cramped together quite well with a couple of wedges.

The cheapest method of hanging doors in farm buildings where finish is unimportant is to dispense with the door frame and hang the door direct from the studs. Stops of 4 in. x 1 in. hardwood can be used and these can also serve as stops for the weatherboards. (See sketch "G"). To prevent rain water getting into the walls, strips of galvanized iron flushing should be placed on all doors and windows. These should be fixed before the weatherboards or other wall covering is placed in position. The iron strips should be cut about 3 in. wide and fixed in position by nailing one edge to the door or window head, then turning the other edge down neatly just over the corner of the door or window stop.

Windows

In planning farm buildings, it is convenient and economical to have all the windows consisting of panes of glass of a standard size, say 10 in. x 14 in. Spare panes can then be kept on hand and any breakages can be replaced easily and quickly. A window of any desired size could easily be made by using various numbers of this standard sized pane. A big saving in cost will result if the sashes only are ordered from the joinery works and so made as to fit directly to the studs in a similar manner to the doors.

Weatherboarding

Several points need to be observed in putting on weatherboards. These are usually shaped so that when the top portion of the board is flush against the stud the lower edge is about ½ in. away. This is to allow for the top of the weatherboard below lying between it and the stud when the boards are overlapped. Before the bottom board is put on some packing of the right thickness must be tacked on to the wall to pack out the lower edge. If this is not done, difficulty will be experienced in putting on the remaining boards. The position of each board should be marked on both corner stops and a line stretched between these marks. This provides a guide when nailing on the boards and ensures that they are all straight and even. It is perhaps needless to point out that all joins must be made over a stud. The last board to be put on at the top is nailed at the bottom to the top plate of the wall and at the top to a special nailing batten, usually of 3 in. x 1½ in. hardwood, nailed on top of the rafters and running parallel to the purlins, the board being cut so as to fit between the rafters. In some buildings such as stables it is an advantage to leave this board off and nail a strip of fine wire netting in its place for ventilation.

[To be Continued]

HERBS AND THEIR CULTIVATION

By T. D. RAPHAEL, Horticulturist

BEFORE entering into a description of the various plants which might be classified under the term Herbs, it should be mentioned that in the present article this term will be applied only in its more restricted sense, that is, to those plants which are generally used either for flavouring and seasoning or lending aromatic qualities and distinctive tastes to meats, sauces, wines, etc. Actually, in its widest sense the greater part of the plant kingdom could be broadly classified as herbs, and particularly, from the herbalist's point of view, all those plants used for medicinal purposes.

During the last century the herb garden occupied an important place in the private garden and commercial herbalists were comparatively numerous. At the present time, however, with the advance of science, the average man prefers to purchase his drugs direct from the local chemists, and the old homemade remedies and potions have either dropped into the background or appeared in the chemist's shop under a trade name. In the same manner also, the housekeeper is content to buy the necessary ingredients for seasoning and flavouring from her grocer or butcher; in short, with the exception of one or two species, herbs are now regarded more as a curiosity in the modern garden than a useful adjunct.

On perusing the following pages the average reader will no doubt be struck by the fact that several of the listed plants are regarded in Tasmania more or less as weeds and therefore unworthy of discussion here. Amongst these might be mentioned Fennel and Horehound, two well known frequenters of roadsides and railway embankments. Again, certain other plants such as Celery and Parsley are inseparable from the vegetable garden, whilst Thyme, Borage and Hyssop have been relegated in Tasmania to the flower border and rock garden, almost to the exclusion of their culinary uses. As formal border and low hedge plants, Chamomile, Lavender and Rosemary have proved particularly adaptable and are retained in most modern gardens primarily for this purpose, yet not so long ago their use in this direction was of negligible importance.

Amongst the herbs discussed it is of interest to note that no less than fourteen belong to one Botanical family—the *Labiatae*, which is well represented by the common mint. Of the remainder, nine belong to the Parsley family, the *Umbelliferae;* four to the Daisy family—the *Compositae*, and nine to individual families, as detailed later.

Balm

(Melissa officinalis—LABIATAE)

Hardy perennial, one to two feet. Originating from Southern Europe. It can be raised from seed, but is propagated by division of the clumps in autumn, and succeeds best in a sunny situation.

The flowers are yellowish-white in colour and much visited by bees, whilst the green leaves when crushed have a sweet lemon-like odour.

USES.—The leaves are used for seasoning, and particularly in liqueurs, scents and medicine.

Basil

(Ocymum Basilicum—LABIATAE)

Tender annual, one foot. The seed may be sown in gentle heat in September or outdoor at the end of October. Plant or thin to eight inches apart and ensure that an adequate water supply is available throughout growth. Light, rich soils produce the most satisfactory results. When the plants come out into flower they should be cut down to the base and the tops tied into small bundles and slowly dried for winter use. The original plants may be lifted when frosts commence and placed in cold frames where young green shoots will be available throughout the winter.

FIG. I
A PORTION OF A PLOT SOWN WITH HERBS IN SPRING
These include Borage, Sweet Marjoram, Hyssop and Caraway

USES.—The leaves and stems have a clove-like flavour and are used in seasoning meats.

Dwarf Basil (O. minimum) is sometimes cultivated under the name of Bush Basil.

Borage

(Borago officinalis—BORAGINACEAE)

Hardy annual, which, however, under certain conditions will persist. The plant is coarse-growing, up to two-and-a-half feet with large rough leaves and rather attractive inflorescences consisting of bright blue flowers. It is particularly vigorous in growth, seeds readily, and will hold its growth with a minimum of cultivation in almost any soil.

USES.—More generally cultivated in Europe than elsewhere. It is used largely in the manufacture of cordials and claret cup.

Caper—Bush

(Capparis spinosa—CAPPARIDACEAE)

Perennial, a straggling shrub up to four feet. This can only be grown successfully under more or less sub-tropical conditions, and in such does well on dry, stony or gravelly banks or areas difficult to utilise in other ways. The flower is striking, being an inch or more in diameter and usually white with bluish coloured stamens.

USES.—The flower buds when small, are collected, and pickled in vinegar, after which they are used in the well known "caper sauce."

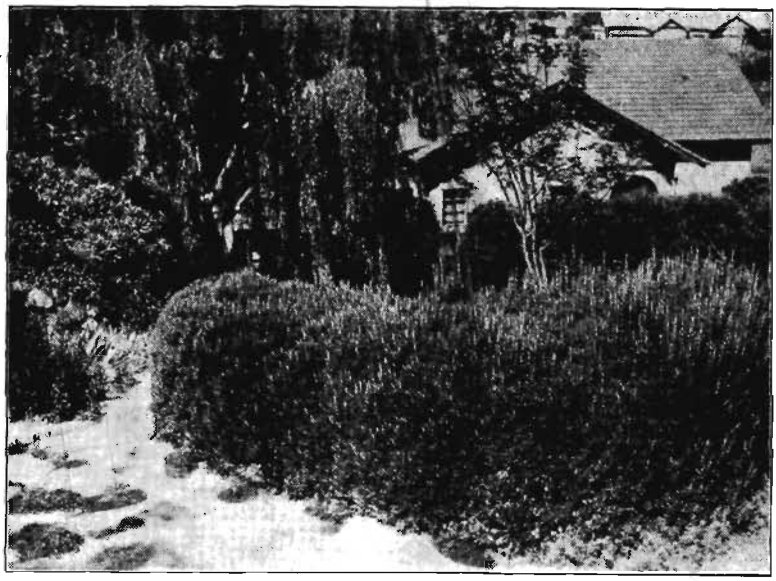


FIG. II
A YOUNG HEDGE OF ROSEMARY FLANKING CRAZY PAVEMENT AND ROCK GARDENS

Caraway

(Carum carvi—UMBELLIFERAE)

Annual or biennial. The finely divided leaves are clustered at the base of the plants and the stalks bearing the flowers often run up to about two feet. Crops are generally grown from seed which has been sown in the spring of the previous year, though by autumn sowing and even spring sowing crops may be obtained in the following summer. Seed is sown in drills which are spaced from two or three feet apart, and pl[illegible] r to six inches in the row at a later d[illegible]

USES.—Although both the root and young shoots are sometimes eaten, it is the seed which is the main product. These are very largely used in flavouring cakes, pastry, bread, etc.

Celery

(Apium graveolens—UMBELLIFERAE)

Biennial plants which bear a flower head two feet or more in height. The leaves will attain one foot in length under average conditions.

Although celery is primarily a vegetable, it is in addition very often cultivated for flavouring purposes and for the manufacture of extracts. In such cases plants may be reared by the sowing of seed thinly in gentle heat, and later planting out at 12 inches by six in a good loam. Rapid growth will be made and leaves can be removed from the base as required, the stalks below the leaflets being used for a variety of purposes. Most growers of this vegetable generally form small beds, as indicated, from surplus plants, or sow seed in the open and thin.

Chervil

(Anthriscus cerefolium—UMBELLIFERAE)

Annual, from twelve to twenty inches; reaches maturity very quickly. Sowings are made at intervals throughout the year and leaves are ready for use in from six to eight weeks. A shady or cool spot must be selected, particularly for the later sowings. There are two distinct varieties—viz., plain-leafed and curly-leafed, each, however, with very similar qualities. In all cases it is advisable to use the latter type, which with its distinctive leaf cannot be mistaken for other noxious or poisonous umbelliferous plants.

USES.—Owing to its strong and aromatic flavour chervil is indispensible in salad mixtures and is also used like parsley for garnishing purposes.

Chives

(Allium schoenoprasum—LILIACEAE)

Perennial, growing in close slumps or tufts and attaining a height of from six to eight inches. The leaves are very numerous and are onion-like in structure. The plants grow well in narrow borders and are rarely set out in special beds, though of course, if this is thought necessary good results may be obtained by setting in rows one foot apart.

Propagation is done by division and beds should be completely lifted and re-set at intervals.

USES.—The leaves are cut off when required and used in salads, soups and stews. Frequent cutting stimulates increased growth, and if manuring is not neglected supplies will be well maintained.

Coriander

(Coriandrum sativum—UMBELLIFERAE)

An annual, attaining from two to three feet in height with strong-smelling, much-divided leaves and small whitish flowers.

USES.—The plant is easily grown in the garden. The leaves are sparingly used for garnishing, but the seed, like Caraway, is popularly used for the flavouring of pastries, confections. liqueurs and in many culinary preparations.

Dill

(Anethum graveolens—UMBELLIFERAE)

This plant may be grown as an annual or perennial, and reaches from two to three feet in height, with much-divided leaves and small yellowish flowers, similar to Fennel.

USES.—The leaves are occasionally used for flavouring and medicinal preparations, whilst the bitter-flavoured seed is used in seasoning pickles, sauces, etc.

Fennel

(Foeniculum vulgare—UMBELLIFERAE)

Perennial, reaching several feet in height. Three species are grown for general use. Cultivation consists in sowing in rows two feet apart, and thinning plants to about one foot. A bed formed in this way will last for several seasons, but renewal is recommended at three year intervals.

USES.—The feathery leaves are used sparingly for flavouring fish sauces, and for garnishing. The main part utilised, however, is the seed which is frequently employed in the manufacture of liqueurs.

Florence Fennel (F. dulce) is cultivated in Europe, and certain portions cooked and eaten like a vegetable.

Horehound

(Marrubium vulgare—LABIATAE)

Perennial, one to three feet in height, bushy in character with simple toothed leaves. The flowers are whitish in colour and inconspicuous. Propagation is done by dividing the clumps or by sowing the seed lightly in the proposed permanent location. Practically no cultivation is necessary.

USES.—The leaves are cut and used for seasoning, whilst large quantities are used in confections, and also in medicines for coughs and colds.

Horse Radish

(Cochlearia armoracia—CRUCIFERAE)

Perennial with long-stalked leaves, twelve to sixteen inches, arising from tuberous roots. Propagation is carried out by planting small pieces of root from two to three inches long. Results are more satisfactory if pieces of the crown are selected for this purpose with root attached. These sets are planted in trenches twelve to fifteen inches deep, the distance between each row being two feet, with the sets at ten inches apart in the rows. The most satisfactory results are obtained from rich, deeply-worked soils.

USES.—When required for use, the plants are lifted, the roots removed, and prepared for use by grating finely, being eventually blended into a thick sauce. It is sometimes employed as a condiment like mustard.

Hyssop

(*Hyssopus officinalis*—*LABIATAE*)

A perennial, much branched sub-shrub growing to about eighteen inches. The flowers are small and clustered along the spikes; blue is the commonest colour, but whites and pinks also occur.

Propagation is carried out by seed, cuttings and plant division. In colder parts, hyssop is regarded as an annual, the seed being sown in spring and the plants later thinned or set out at twelve inches square. This plant, being attractive, is grown frequently as a border or edging to other beds.

USES.—The flower spikes are picked on opening and dried, being prepared by grinding finely and adding to flavour soups, etc., and to a lesser extent medicinally. The green parts are used for flavouring certain salads, and in the making of absinthe.

To be continued.

BOOKS OF AGRICULTURAL INTEREST

The Organising Committee of the Fourth International Grassland Congress held in Great Britain from the 8th to the 23rd July, 1937, has recently made available a report containing the full texts of all papers delivered to the Congress during a three days session at Aberystwyth, Wales. This is a large work covering nearly 500 pages of matter to which some of the World's foremost grassland research workers have contributed. The subjects dealt with are practically all of a fundamental nature, and the whole makes a valuable collection of up-to-date information on the investigation of world-wide grassland problems, and on recent developments in pasture plant improvement work. Though the papers are principally of value to the research worker, they contain much which is also of value and interest to the agriculturist.

The report contains several contributions from Australian workers and many from other Empire and English-speaking countries. All contributions from members of non-English speaking countries are printed in German, but comprehensively summarised in English. Few of the papers are so technical as to place them beyond the understanding of the average reader

Much food for thought is contained in the Presidential Address by Professor R. G. Stapledon, which occupies the foremost place in the report. Professor Stapledon, who is the Director of the Welsh Plant Breeding Station and of the Imperial Bureau of Plant Genetics, is an Agricultural Scientist of much distinction, and is recognised as one of the World's leading authorities on grassland and pasture plants. Any views to which he gives public expression must therefore command the closest attention. The address is almost entirely in non-technical language and deals with trends and fields of modern grassland investigation and pasture plant improvement as well as with certain principles of grassland management which, though based mainly on English conditions, are of more or less general application. A study of this address is commended to all who are interested in pastures.

Copies of the report are obtainable post free at 40/- per copy from the Joint Secretaries of the Fourth International Grassland Congress, Aberystwyth, Wales. A smaller volume of 87 pages, containing abstracts of the majority of the papers delivered, is available from the same source at 5/- per copy.

ABORTION-FREE HERDS

As at 31st March, 1938

THE following herds have been declared free of Contagious Abortion in accordance with the requirements of the scheme for certifying herds.

Northern District and Flinders Island

Owner	Address
Ashley Home for Boys	Deloraine
Badcock, B. M.	"Willow Vale," Whitemore
Badcock, F. R., and Sons	Whitemore
Badcock, L. A.	Whitemore
Barker, A. C.	Lemana Junction
Barker, F. T.	Ravenswood
Beardwood, T. J.	Peel Street, Prospect
Blundstone, Estate J. E.	(Whitemark Herd) Flinders Is.
Davie, J. L.	Blue Rocks, Flinders Island
Foster, R. J. L.	"Pleasant Banks," Evandale
Gardner, H. R., and Sons	Relbia
Gladman Bros.	Carrick
Gowans, W. C.	Glengarry
Green, S. G.	Penquite
Hall, E. G.	"Alanvale," Launceston
Hamilton, R. W. L.	Ranga, Flinders Island
Hammond, G.	Blue Rocks, Flinders Island
Harley, C. D.	Whitemark, Flinders Island
Haworth, H.	Ranga, Flinders Island
Heazlewood, H. R.	Whitemore
Heazlewood, Roy K.	Whitemore
Heazlewood, Tas. A.	Hagley
Hingston, S. J.	"Rosaville," Whitemore
Iles, Mrs. E. T.	Whitemark, Flinders Island
Lansdell, Mrs. Elsie	Bracknell
Mackenzie, E. E.	Ranga, Flinders Island
Martin, W.	Ranga, Flinders Island
Mathews, S.	Whitemark, Flinders Island
Morton, R.	Emita, Flinders Island
Paterson, J. W.	Longford
Relbia Farm and Dairy Co.	Relbia
Reynolds, H. B.	Relbia
Scott, H. Barclay, and Sons	Whitemore
Stuart, L. A.	"Valmont," Whitemore
Thompson's Estate	"Wingaroo," Emita, Flinders Island
Walker, J.	Whitemark, Flinders Island
Wells, H. Lucadou	"The Moat," Carrick
Welsh, W.	Whitemark, Flinders Island
Willis, V.	Whitemark, Flinders Island

North-Eastern District

Beswick, A. M.	*Branxholm*
Beswick, R. D.	Derby
Briggs, A. H.	"The Grange," Scottsdale
Briggs, C. H.	"Cloverlea," Scottsdale
Daft, E. G.	Lietinna
Dilger, A. C.	Herrick
District School Farm	Scottsdale
Edwards, J. C.	Derby
France, A., and Sons	Ringarooma
Geale, G. B.	Jetsonville
Gill, V.	Minstone Road, Scottsdale
Goss, L. V.	West Scottsdale
Haines, H. C.	"Cranleigh," Ringarooma
Hookway, H. H.	Scottsdale

Owner	Address
Jessup, A. V.	Springfield
Johnson, J. F. and G. M. L.	"Queechy," St. Helens
Loosmore, T. C.	Scottsdale
McKenzie, F. R.	Winnaleah
Mervyn Bræ Stud	Scottsdale
Priestley, Tas. R.	North Scottsdale
North-Eastern Soldiers' Memorial Hospital	Scottsdale
Ranson, F. W.	Derby
Ranson, J. S.	Branxholm
Robinson, H. A.	New River, via Ringarooma
Salier, H. G.	"Vine Grove," Scottsdale
Smith, Eric J.	Springfield
Steel, L. J.	Falmouth
Treloggen, D.	St. Helens
Treloggen, J. W., and Sons	St. Helens
Wadley, R. J.	Springfield
Williams, J. H.	Springfield

Circular Head District

Freeman, G. J.	Montumana
French, H. R.	Montumana
King, L. S.	Forest
Lee, L. S.	Roger River
Mackay, Prof. J. H.	Roger River
Malley, E. R.	Roger River
March, Mrs. A.	Lileah
Marshall, D. H.	Roger River
Medwin, C.	Montumana
Medwin, G.	Montumana
Ollington, W. L.	Forest
Ollington, W. W.	Forest
Reasons, A.	South Forest
Spinks, L. K.	Lileah
Stone, J. T.	Roger River
Wyllie, A.	Forest

North-Western District

Beveridge, H. C., and Sons	New Ground
Bovill, H. Y.	"Thornhill," East Devonport
Briggs, G. H.	Glance Creek
Cannon, S. L.	Gunn's Plains
Coombe and Bedlington	Forth
Dicker, W. T.	Yolla
Gladwell Bros.	Elliott
Harding, W. T.	Somerset
Hiscutt, J. T.	Howth
Kuipers, Capt. D.	Wynyard
Lakin, G. M.	Gawler
Lambert, J. D.	Latrobe
Lambert, K. T.	Merseylea
Littlejohn, Mrs. H.	Penguin
Loane, N. E.	Wesley Vale
Mackenzie, R. G.	Somerset
Marriott, H.	Yolla
Morse, R. V.	Yolla
Parsons, G. H.	Thirlstane
Perkins, V.	"Calthorpe," Latrobe
Robotham, H. V.	"Rothstock," Ridgley
Roebuck, Newcombe	"Alfriston," Native Plains
Rockliff, H. V.	Riana
Sadler, B. T.	"Rannoch," East Devonport
Townsend, A. W.	Ridgley
Travers, J. A.	Sulphur Creek

Owner	Address
Trethewie, F. E.	Lower Mt. Hicks
Wells, J. L.	Upper Mt. Hicks
Wing, S. E.	Preston

Southern District

Allanby, C.	Bream Creek
Alomes, Mrs. V.	Bream Creek
Bryan, J. R.	Copping
Calvert, A. D.	Granton
Calvert, M. M.	Cambridge
Clifford, Frank G.	Kellevie
Cooley, H. S.	Bream Creek
Corney, G.	Campania
Dodridge, S.	Cambridge
Dransfield, W.	Copping
Eyles, E.	Waterworks Road, Hobart
Featherstone, F.	Sorell
Featherstone, G. J.	"Belmont," Sorell
Fergusson, F. C.	"Brooklyn," Penna
Fisher, James E.	Oatlands
Hanslow, G. T.	"Green Fields," Cambridge
Hills, G. and F.	"Braeside," Cambridge
Lachlan Park Hospital	New Norfolk
Lewis, N.	Cambridge
Lucas, H. E.	Kingston
Mays, L.	Waterworks Road, Hobart
Meredith, D. O.	Plenty (Box 634B, G.P.O., Hobart)
McLeod, T. B.	Richmond
Reed, G. E.	Berriedale
Rumney, B. L.	Lower Sandy Bay, Hobart
Shoobridge, H. W. and A. G.	Bushy Park
Smith, W. J.	Copping
Steele, R.	West Hobart
Tatnell, T.	Bream Creek
Taylor, M. K.	Brighton
Watchorn, J. B.	Kingston
Wilson, F.	Waterworks Road, Hobart

ALL-AUSTRALIAN EXPORT BACONER AND PORKER COMPETITIONS

The following statment relating to the second series of Competitions has been received from the Australian Meat Board.

Entry forms in connection with the second series of these competitions are required to be lodged with Works Management on or before the 15th April next, and entries should be forwarded to Works in time for them to be treated and shipped so as to arrive in London for judging on the 15th July.

Pig producers are reminded that such competitions provide important publicity for Australian pigmeats in the United Kingdom, and that the reports of the judges on individual entries are a valuable index to the producers concerned of their achievement and a guide to the type required in the United Kingdom market.

Each entry should comprise three pig carcasses, including heads, bred and fattened by the entrant.

Only one entry of each particular breed or cross will be allowed from each entrant. The sire of the entry must be purebred and from a litter recorded by the Australian Stud Pigbreeders' Society.

Weights for baconer carcasses should be not less than 120 lbs. nor more than 160 lbs. dressed and including heads. Weights for porker carcasses should be not less than 60 lbs. nor more than 90 lbs. dressed and including heads.

Prize money totalling £25 is awarded by the Board to successful entrants, and in addition a trophy valued at £10-10-0 is competed for.

No entry fee is charged.

Entry forms and conditions of the competitions are obtainable from the usual trade channels, also on application to the Secretary, The State Meat Board, Temple Place, Hobart.

STRAWBERRY RUNNER BEDS

Strawberry growing at the present time is a vastly different proposition to what it was ten years ago, when almost any area of recently cleared ground could be planted out with almost any strawberry runners available, with the assurance of a successful and lasting bed.

There are several reasons for this; in many districts the strawberry weevil will render the establishment of an even and lasting area impossible. In other districts leaf spot fungus, Armillaria root-rot and mildew take a heavy toll. Perhaps the main trouble, however, is virus disease, and as this is very widespread on almost all varieties, growers are advised to adopt the policy of establishing runner beds. The object of these is to eliminate diseased and faulty plants without interfering in any way with a permanent area.

A small bed of runners, taken only from the most vigorous and healthy plants available is established in an isolated, and if possible, elevated position on good soil. From October onwards at fortnightly intervals the plants are carefully examined and any which show lack of vigour, pale coloured, yellow edged, crinkled or otherwise deformed centre leaves, are removed. The ideal plant should be reasonably upright in habit, producing large healthy coloured foliage with the individual leaflets smooth, broad and evenly serrated. Periodic spraying with nicotine sulphate in the early stages and dusting later with a mixture of Derris dust is strongly recommended for the control of insect pests and vectors of disease. Planting at 5—6 feet square is advisable and all plants are, of course, deblossomed, as the aim is to obtain a maximum number of runners in the shortest time possible. Plants handled in this way should produce 50 or more strong runners each, after which the whole bed may be lifted and the area utilised for other purposes.

Horticultural Division

THE GERMINATION OF CLOVER SEED

A poor strike sometimes follows the sowing of clover seed, because a high percentage of what is known as "hard" seeds is present. These seeds can be made to germinate readily by applying friction to them in such a way as to scratch their outside surfaces lightly. In the ordinary way, however, they seldom germinate until they have lain in the ground for a season, or perhaps longer.

Under the Seeds Act the seller is required to state the percentage of germination and the percentage of hard seeds in certain clovers, and farmers are advised to give close consideration to such particulars. In reporting on germination tests the department always includes a proportion of any hard seeds as germinable, (this proportion varying from one-half to one-third according to species), but the report also shows the actual proportion of hard seeds. Thus, in the case of a test of White Clover in which there were 30% hard seeds (one-third allowed as germinable), and the remainder had grown normally, the seller's statement would show "germination—80%, hard seeds—30%." This would indicate that 70% of the seeds could be expected to germinate at once and at least a further 10% at some indefinite future time.

All hard seeds cannot be rated as germinable, though in fresh and unimpaired seed the majority undoubtedly are. In the case of samples whose germination has declined, however, from any cause, it is probable that some of the hard seeds would be affected, hence the principle of allowing only a recognised percentage.

Hard seeds, provided they do not exceed 15% to 20%, are no great disadvantage in a perennial clover, since most of them do eventually germinate and thicken up the stand. With annual clovers, however, such a sample can only be regarded as capable of establishing a number of plants consistent with the actual percentage germination.

Clover seed is sometimes treated commercially to render hard seeds immediately germinable. This is a simple process but calls for special plant. One such plant is at present in operation in Tasmania, and it is not unlikely that others will be introduced or devised in the future.

Seed-Testing Station

PURE-BRED HERD RECORDING

LEADING HERD FOR THE PAST TWO YEARS

Owned by Mr. L. A. Stuart, Whitemore

1935-36—Average production of 12 cows: 7,810 lbs. milk; average test, 5.9%; 461 lbs. butterfat

CHILD WELFARE NOTES

By OLIVE M. GREEN, Sister-in-Charge, Baby Health Clinic, Launceston

COMMON DISORDERS OF INFANCY

Vomiting Babies

VOMITING seems to occur with much less provocation in babies than later on in life, and may be due to some error in the diet or the method of feeding, or it may be due to the onset of an acute illness. Where the infant is apparently suffering from an acute illness, or the vomiting persists permanently, a doctor should always be consulted.

However, the simple "putting up" of food just after feeding is usually due to the baby getting too much food, or being allowed to suck too greedily or rapidly without interruption. Or the milk may be too rich. There are three ways of treating this condition.

1. Remove the baby from the breast at intervals during the suckling. A good plan is to give baby three or four sucks from the breast, then allow a rest, just long enough to allow baby to take a breath. Do this for the first five minutes when the breast milk is flowing so rapidly, then let baby suck at will for the rest of the feed.
2. Fluid flows slower uphill than downhill, so try feeding baby on a pillow on the lap, pushing the breasts up so that the baby has to work harder for his food.
3. Shorten the time at the breasts, giving only ten to fifteen minutes every four hours instead of the usual twenty minutes.

If these measures do not suffice, give one tablespoon warm boiled water immediately before each nursing. Also watch carefully the handling of the infant during and after feeding, as talking to him or jigging him at this time will quickly produce a vomiting baby.

For the artificially fed babe, see that the food is properly balanced and that the correct recipe is used. Give the exact amount of food required for his age, and make sure that the hole in the teat is not too big. Take fifteen to twenty minutes to feed baby. The milk mixture must be given at blood heat and warmed up again half-way betweeen the feed, as food which is given too hot or too cold may cause vomiting.

As a temporary measure it may be necessary to dilute the milk mixture with extra water, and boil the milk for a longer period.

Colic

Colic or a "windy spasm" is a very common disorder in the first month of life, even occurring in breast-fed babies. It causes baby intense pain and is accompanied by extreme restlessness, lusty screaming and writhing or kicking. There is a drawing up of the legs onto the abdomen, which becomes very hard and distended. Colic may be caused by over or irregular feeding, wrongly balanced milk mixture, feeding too quickly or too slowly, also by constipation, diarrhœa, chills, fright, etc.

To relieve the acute attack it is necessary to help baby to get rid of his wind. This can best be done by giving him a good drink of warm boiled water. Do not give any food during or immediately after an attack. It is allowable to give one teaspoon boiled water in which a small quantity of baking soda (about one-eighth of a teaspoon) has been dissolved. Then hold the baby up firmly against your chest and gently rub his back with your hand, and thus try to dislodge his wind.

If the abdomen is swollen and hard, give a small enema of salt and water (one teaspoon of salt to one pint of water), using about two or three ozs. of fluid. Use a small rubber enema bulb for this. A pad of hot flannel may be placed over the abdomen at the same time.

Dilute baby's food at the next feeding and gradually work back to full strength.

Thrush

Although thrush is a fairly common ailment of infancy, it is a preventable one. The disease appears in the mouth as small white specks on the inside of the lips, cheeks, tongue and on the roof of the mouth. It is caused by the growth of a germ, and may be prevented by observing scrupulous cleanliness in all that pertains to baby's feeding. Also, unless baby's mouth is seen to be unhealthy, it should not be swabbed out as a daily routine, because the lining of baby's mouth is very delicate and may easily be injured by unskilled swabbing and unsterilised swabs. Dummies or charms are dirt and disease carriers, and must certainly not be used, if thrush is to be avoided.

If thrush develops, the mouth may be gently swabbed before and after each feeding with a solution of soda (one teaspoon of soda-bi-carbinate to one pint of warm boiled water). A solution of glycerine and borax (glycerine half an ounce, boracic acid one teaspoon, and boiling water five ounces) may also be used for obstinate cases. To swab the mouth, trim the nail of your little finger well back so that it will not scratch the delicate lining, wrap a small piece of boiled gauze or soft linen soaked in this solution round your finger, and gently dab the white spots, tongue, roof of the mouth, etc. Burn the gauze immediately, because Thrush is decidedly contagious. Glycerine and Borax can be procured ready mixed from any chemist.

Sore Buttocks

A little knowledge and attention on the part of the mother should prevent any irritation, redness, soreness or inflammation of the baby's buttocks. The following are some causes of the condition:—

1. Uncleanliness, or leaving the baby to remain in wet or soiled napkins.

2. Digestive upset, caused by a wrongly balanced food, etc.
3. Diarrhœa or frequent motion caused by an infection or by overfeeding.
4. The mother who is breast feeding her baby may be eating an excessive amount of sweets and fats, or she may be taking strong purgatives (pills).
5. If artificially fed, the milk mixture may contain the wrong kind of sugar (cane sugar) or have too high a percentage of sugar or fats.
6. Baby may be having malt, sugar or sweets and biscuits, all of which may easily cause scalded buttocks.
7. The use of strong soaps, washing soda or blue when washing the napkins.
8. Harsh irritating napkins next to the skin.
9. Thick caking of powders on the skin.
10. Acid motions or urine.

Treatment

Correct any errors in the mother's or baby's diet. Hold baby out regularly and change the napkins as quickly as possible when wet or soiled. Gently swab the affected parts, after the usual cleansing with soap and water, with a soda solution. Dry and apply Karitane Ointment, or equal parts Zinc Ointment and Castor Oil. Use soft napkins and temporarily use the ointment on a small piece of boiled soft old linen or gauze over any broken area.

Take the napkins off daily for a short period and allow baby to kick in the early morning sun to help tone the skin. Guard against chills and give him more boiled water to drink.

If the motions are frequent, greenish or very acid and fermentative, it is advisable to give baby a dose of Castor Oil, followed by a period of starvation, and later, weakened food, gradually returning to the normal diet. Remember, that when you are withholding food, your baby needs an abundance of warm water instead.

for transmission by Post as a Periodical]

Vol. IX—No. 3
(New Series)

1st August, 1938

The Tasmanian Department of Agriculture

THE TASMANIAN JOURNAL OF AGRICULTURE

Published by Direction of
The Hon. the Minister for Agriculture

Edited by
A. H. WOODFORDE

Published Quarterly

Price, 6d.

J. Walch & Sons Pty. Ltd., Hobart

The Tasmanian Journal of Agriculture

CONTENTS

The Tasmanian Journal of Agriculture

Vol. IX | Tasmania, 1st August, 1938 | No. 3

EFFECTS OF IMPROVED PASTURE ON SUPERFINE MERINO WOOL

"VALLEYFIELD" TRIALS

By J. A. DUMARESQ, Veterinary Pathologist

Introduction

THE increasing areas of land which are being laid down with improved pastures each year raised the question as to whether the characteristics of superfine Merino wool can be successfully maintained when the sheep are grazed on this type of feed. In order to secure information on the differences between two originally identical groups of sheep run on improved and natural pastures, a trial was commenced in December, 1936, by the Animal Health Service of the Department of Agriculture, with the co-operation of the Council for Scientific and Industrial Research.

The grazing areas and the sheep were generously made available by Mr. R. R. Taylor of "Valleyfield" near Epping, where the trial has been carried out. The thanks of the Department are tendered to Mr. Taylor, both for this and for his ever-ready assistance in the managing of the flocks for weighing, shearing, etc. The trial was initiated by Mr. W. E. Chamberlin, then Veterinary Pathologist of the Department of Agriculture, in co-operation with Dr. I. Clunies Ross, then of the Council for Scientific and Industrial Research.

The sheep used in the trial belong to the well-known "Valleyfield" flock, which was originally founded on "Winton" blood. The latter flock dates back 108 years, and during that period there has been very little introduction of outside blood to either flock, so that the sheep have a well defined and stabilised genetic history.

In December, 1936, 75 two-tooth sheep and 100 hoggets were weighed, shorn, and the individual fleeces weighed and classed. From these 25 pairs of two-tooths and 35 pairs of hoggets were selected, each pair being uniform for body weight, fleece weight, spinning count at shoulder and fleece length. Colour and character could not be kept absolutely uniform, but care was taken to see that they were not too divergent. One sheep from each pair was then allotted at random to the natural pasture group and one to the improved pasture group. There were thus two uniform groups of 60 animals, each containing 25 two-tooths and 35 hoggets.

The groups were separated and the trial actually commenced on 22nd January, 1937, all the sheep having been run together on mixed pastures since the shearing in December. As the subdivision of the experimental area was not completed until August, the two groups were kept on several different paddocks from January till August, but one group was always run on improved and the other on natural pasture. The improved pasture consisted mainly of Subterranean Clover with English Ryegrass in some paddocks, and was stocked at the rate of approximately three sheep per acre. Natural pasture comprises chiefly Danthonia Spp. and on this the stocking was approximately one sheep per acre.

From August onwards the natural pasture group was on one paddock of 60 acres, and the improved pasture group on 20 acres of Subterranean Clover and Ryegrass, sub-divided into three plots. During the Spring the 60 experimental sheep could not control the growth on the improved pasture plots, and additional sheep were grazed on these as required.

All sheep were weighed monthly, and on fæcal samples taken from ten sheep selected at random in each group, ova counts were made to determine the degree of parasitic infestation.

The monthly rainfall during 1937, was as follows:—

January	302 points
February	100 ,,
March	193 ,,
April	40 ,,
May	132 ,,
June	17 ,,
July	152 ,,
August	107 ,,
September	171 ,,
October	243 ,,
November	40 ,,
December	299 ,,
Total	1,796 points

Three deaths occurred during the year. One of the hoggets in the improved pasture group was found dead during April, but the cause of death was not determined. Two more in the same group died from exposure during bad weather immediately after shearing in December.

In November, 1937, the sheep were examined and the fleeces classed for spinning counts at shoulder, flank and britch, and for length, character and colour, as in 1936.

In December the sheep were again shorn and the fleece, belly, neck pieces, and stained pieces from each sheep weighed individually. The fleeces were classed by Mr. Taylor and baled with the rest of the clip, a record being kept of the class in which each fleece was placed. A sample from the shoulder of five sheep in each sub-group was also examined microscopically. At this date the sheep were, of course, four-tooths and two-tooths, and they will be referred to as such in the discussion of these results.

Experimental Results

The results in general confirm those of Ross, Graham, Turner, Carter and Munz, (1937).

Parasitic Infestation

The monthly examination of fæces revealed an insignificant infestation with internal parasites in both groups throughout.

Body Weight

Table 1 shows the weights of each group as at December, 1936, and December, 1937.

TABLE 1

December, 1936			December, 1937			
Sub-Group	No.	Mean Body Weight (lbs.)	Sub-Group	No.	Mean Body Weight (lbs.)	Increase (lbs.)
2-tooths			4-tooths			
Improved Pasture	25	51.2	Improved Pasture	25	79.3	28.1
Natural Pasture	25	51.6	Natural Pasture	25	68.7	17.1
Hoggets			2-tooths			
Improved Pasture	35	48.3	Improved Pasture	32	78.1	29.8
Natural Pasture	35	48.9	Natural Pasture	35	66.7	17.8

It will be seen from this that the four-tooths on improved pasture gained an average of 11.0 lbs. per head more than those on natural pasture and the two-tooths 12.0 lbs. per head more.

Weight of Greasy Wool Cut

Table 2 shows the average weight of greasy wool cut per head in each sub-group:—

TABLE 2

Group	Belly	Neck	First Pieces	Stained Pieces	Allowance for Locks	Fleece	Total
Natural Pasture							
4-tooths	0.72	0.57	1.9	0.30	0.7	3.96	8.2
2-tooths	0.72	0.6	1.87	0.34	0.7	3.95	8.2
Improved Pasture							
4-tooths	0.91	0.79	2.10	0.5	0.9	5.26	10.5
2-tooths	0.92	0.79	1.95	0.5	0.9	5.28	10.4

(It was found that the total weight of locks and bellies was approximately the same for the whole flock, so the allowance for locks in the above table was made the same as the weight of the bellies in each group.)

It will be seen from this that the improved pasture groups cut an average of 2.2 lbs. per head more wool than those on natural pasture. This shows a yield per acre of 31.5 lbs. for improved pastures, and 8.2 lbs. for natural pastures.

Fleece Characteristics

Table 3 (a) shows the analysis of the fleece characteristics at the beginning of the trial, November 1936, and Table 3 (b) at the end of the first year, November 1937.

Staple Length

No significant differences were observed between improved and natural pastures.

Colour

Tables 3 (a) and 3 (b) show that, although there were no differences between sub-groups at the 1936 shearing, the improved pasture sub-groups contained a significantly higher proportion of only fairly bright fleeces at the 1937 shearing.

Character

No differences between improved and natural pasture groups were observed.

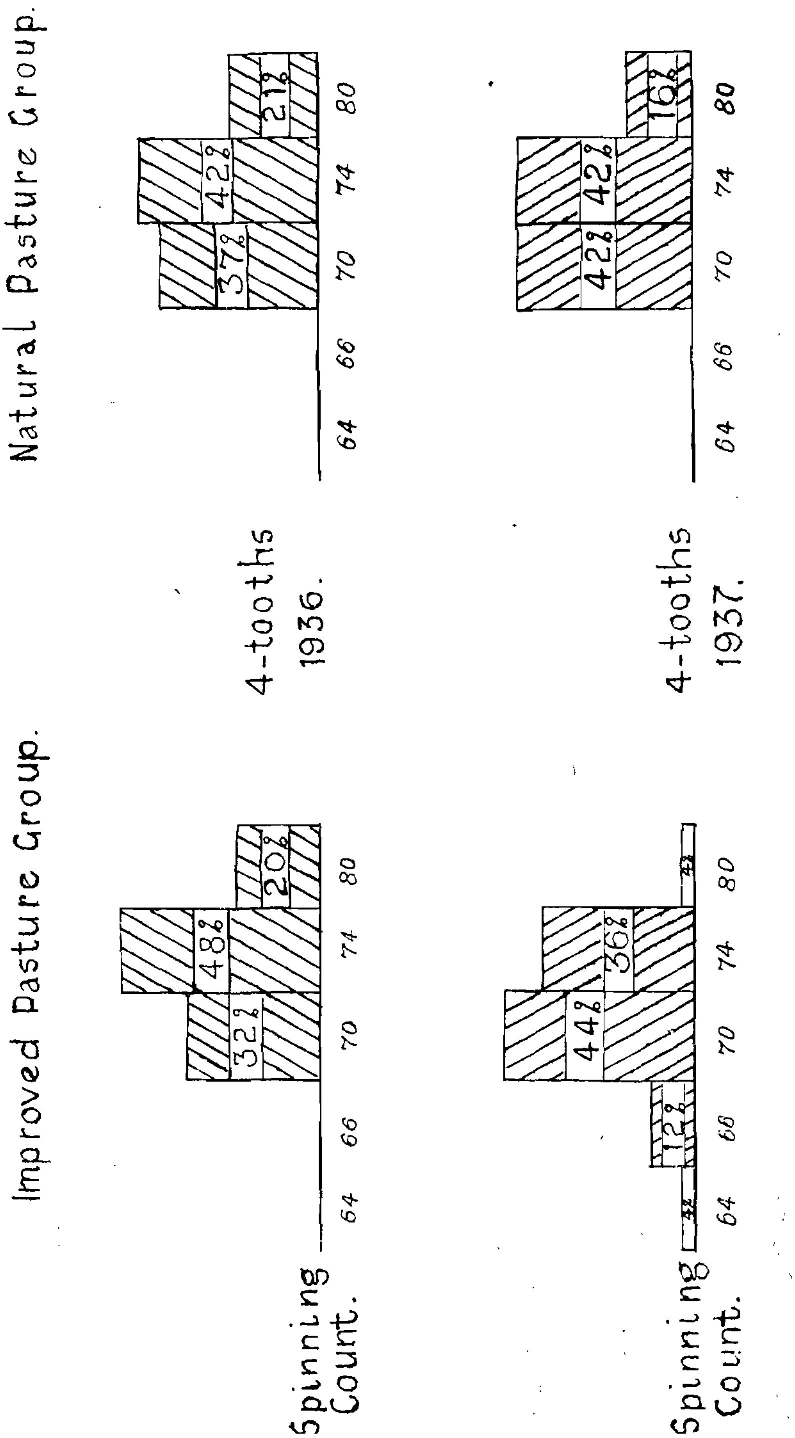
Sub-Group	No. in Sub-Group	Mean Total Fleece Weight (lb.)	Mean Staple Length (in.)	PERCENTAGE OF EACH SUB-GROUP IN EACH CLASS ACCORDING TO—																									
				SPINNING COUNT																		COLOUR				CHARACTER			
				SHOULDER						FLANK						BRITCH													
				64	66	70	74	80	Total	64	66	70	74	80	Total	60	64	66	70	74	Total	F.B.	B.	V.B.	Total	F.G.	G.	V.G.	Total
4-tooths Improved	25	5.6	3.03	—	—	32.0	48.0	20.0	100	—	—	16.0	64.0	20.0	100	—	—	—	56.0	44.0	100	40	84.0	12.0	100	16.0	40.0	44.0	100
4-tooths Natural ..	25	5.5	3.06	—	—	37.5	41.7	20.8	100	—	—	33.3	41.7	25.0	100	—	4.2	—	58.3	37.5	100	8.3	87.5	4.2	100	8.3	37.5	54.2	100
2-tooths Improved	35	6.1	3.48	—	—	79.4	20.6	—	100	—	—	73.5	17.6	8.9	100	—	2.9	41.3	52.9	2.9	100	—	97.1	2.9	100	—	26.5	73.5	100
2-tooths Natural ..	35	6.0	3.44	—	—	80.0	20.0	—	100	—	—	71.4	22.9	5.7	100	—	—	42.9	54.3	2.8	100	—	94.3	5.7	100	—	22.9	77.1	100

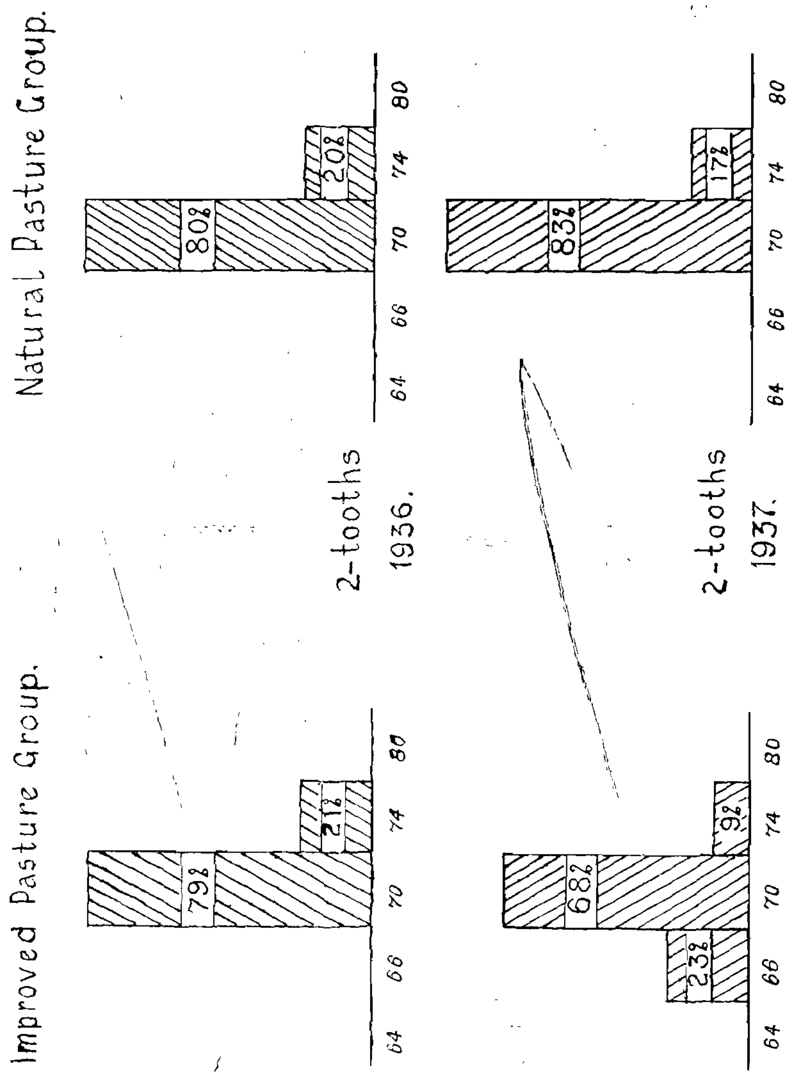
TABLE 3 (b) — Fleece Characteristics — Analysis, December, 1937

Sub-Group	No. in Sub-Group	Mean Total Fleece Weight (lb.)	Mean Staple Length (in.)	Shoulder 64	Shoulder 66	Shoulder 70	Shoulder 74	Shoulder 80	Shoulder Total	Flank 64	Flank 66	Flank 70	Flank 74	Flank 80	Flank Total	Britch 60	Britch 64	Britch 66	Britch 70	Britch 74	Britch Total	F.B.	B.	V.B.	Colour Total	F.G.	G.	V.G.	Character Total
4-tooths Improved	25	9.6	3.13	4.0	12.0	44.0	36.0	4.0	100	—	4.0	52.0	44.0	—	100	—	16.0	36.0	48.0	—	100	36.0	48.0	16.0	100	—	52.0	48.0	100
4-tooths Natural .	25	7.5	2.95	—	—	41.7	41.7	16.6	100	—	—	16.7	58.3	25.0	100	—	4.2	—	83.3	12.5	100	4.2	75.0	20.8	100	—	25.0	75.0	100
2-tooths Improved	34	9.5	3.30	—	23.5	67.6	8.9	—	100	—	5.9	79.4	14.7	—	100	—	23.5	53.0	23.5	—	100	17.6	79.4	3.0	100	—	29.4	70.6	100
2-tooths Natural ..	35	7.5	3.16	—	—	82.9	17.1	—	100	—	2.9	68.6	25.6	2.9	100	5.7	—	34.3	60.0	—	100	—	88.6	11.4	100	—	17.1	82.9	100

TABLE 4

Changes in Spinning Count at Shoulder





Spinning Count

Shoulder.—As seen from Table 3 there were no differences between sub-groups at the 1936 shearing, but in 1937 the improved pasture sub-groups showed a higher proportion of fleeces with lower counts (70's and 66's) than did the natural pasture sub-groups. This is shown graphically in Table 4. The association was statistically significant among the four-tooths, but not among the two-tooths. Examination of the percentages shows, however, that the bulk of the four-tooth fleeces, whether from improved or natural pasture, fall in the 70's or 74's class, and the two-tooths in the 70's class. A significantly greater proportion of fleeces moved down in count from 1936 to 1937 among the improved pasture than among the natural pasture sheep, but again the bulk of the fleeces which did change, moved one grade only.

Flank.—As seen from Table 3, there was no difference at the 1936 shearing, but in 1937 the improved pasture sub-groups showed a significantly higher proportion of fleeces with lower counts (70's and 66's) than the natural pasture sub-groups. The bulk of the fleeces were 70's in all sub-groups, except the four-tooths on natural pasture, where the highest frequency was in the 74's class, with some 80's.

Britch.—There were no differences in 1936, but in 1937, the improved pasture sub-groups showed a higher proportion of fleeces with lower counts (64's and 66's) than the natural pasture sub-groups.

Practically all fleeces were either 64's, 66's or 70's. A significantly greater number of sheep among the improved pasture lots moved down in britch count from 1936 to 1937. Among the two tooth animals the movement was one grade only, but among the four-tooths a number moved down two grades.

Uniformity of Fleece.—When the three estimates of spinning count available for each sheep were considered together to see how uniform each fleece was, there was no difference between the animals on improved and those on natural pasture.

Changes in Spinning Count.—The records of each sheep were examined to see how the spinning count of its fleece had changed from one shearing to the next. All three counts (shoulder, flank and britch) were considered. An animal whose fleece had become stronger in all three counts, being a whole count stronger in at least one, were considered "stronger".. Anything from all three level to all three only half a grade stronger was considered "slightly stronger" and so on. (A change from 74's to 70's is a whole grade stronger, from 74's to 70/74's is half a grade stronger). The results of this examination are shown in Table V., which gives the percentage of the animals in each sub-group which fell in each class.

TABLE 5

Percentage of each Sub-Group in each Class, According to Changes in Spinning Count from the 1936 to the 1937 Shearing

	Improved Pasture 4-tooths	Natural Pasture 4-tooths	Improved Pasture 2-tooths	Natural Pasture 2-tooths
	%	%	%	%
Finer	—	8.3	2.9	2.9
No Alteration	12.0	54.2	35.3	77.1
Slightly Stronger	16.0	33.3	23.5	20.0
Stronger	72.0	4.2	38.2	—

Microscopic Examination of Fibre Diameter

Five samples of wool from the shoulder of sheep in each sub-group were examined microscopically at the McMaster Laboratory. Each staple was cut into approximately three equal portions—base, middle and tip, and each portion examined separately.

Among the four-tooth animals there was no significant difference, but among the two-tooths the improved pasture sub-group was significantly coarser, there being a difference of approximately 1½*mu* (1/17,000 inch) in the diameter.

All fleeces, except one, showed a base finer than the tip, the mean difference for the sub-groups ranging from ½ to 1*mu*.

Classing and Valuation of Wool

Table 6 shows how the fleeces from each sub-group were classed, and also the broker's estimate of yield and the price realised at auction for each class.

TABLE 6

	CLASS					
	1		1A		1W	
Broker's Classification	Extra Super 74/80		Super 74/80		Super 70/74	
,, Estimate of Yield	64%		64%		60%	
,, Valuation	25d.		23d.		19d.	
Price at Auction	21¼d.		22d.		18½d.	
GROUP	%	No.	%	No.	%	No.
Natural Pasture						
4-tooths (25)	80	20	16	4	4	1
2-tooths (35)	63	22	37	13	—	—
Improved Pasture						
4-tooths (25)	40	10	56	14	4	1
2-tooths (34)	32	11	65	22	3	1

Class 1 is regarded by Mr. Taylor as the first line of these and usually brings the highest price. However, on this occasion (Launceston Wool Sale, January, 1938) Class 1A brought the highest price. 21¼d. was regarded as being below the real value of Class 1, and a similar line brought 25¼d.

Discussion

Though it is necessary, in order to obtain reliable results, to make measurements which can be set down in exact figures and tables, it is often difficult for those unaccustomed to handling figures to gather a correct "general impression" from the resulting mass of statistical data.

In the present trial the most outstanding results are the greatly increased yield of greasy wool on the improved pastures, both per sheep and per acre. In this instance the sheep on improved pastures stocked at the rate of three per acre cut just over 2 lbs. per head more than those on natural pasture stocked at the rate of one per acre. This gives an increased wool production of 23½ lbs. per acre.

As was to be expected the body weight of the sheep themselves was much greater on the improved pastures, the average difference between the two groups being approximately 11 lbs. at the end of twelve months. It is interesting to note that in spite of the increased rate of stocking on the improved pastures parasitism remained negligible in both groups.

As far as the wool itself is concerned, it will be noted that, though the majority of sheep on improved pasture tended to become stronger, the change was seldom more than one grade. Microscopic examination of the wool fibres also showed that the changes in fibre diameter were very slight.

Though the fleeces of the natural pasture group were on the whole brighter, and appeared to carry less "condition," the difference again was not great.

The greater price per lb. obtained at auction for the bulk of fleeces from the improved pasture group is interesting, but the market at the time of sale was in a very unsettled condition, and the broker's valuations are probably a truer indication of the relative prices which would be obtained for the two main lines in most years.

It is proposed to continue this trial and follow any changes in wool characteristics through several generations.

Acknowledgements

We desire to express our thanks to Mr. R. R. Taylor of "Valleyfield," whose generous action in making available the sheep and plots alone has made this experiment possible.

It is also a pleasure to acknowledge the indebtedness of the Department of Agriculture to Mr. D. A. Gill, Acting Officer-in-charge of the C.S.I.R. McMaster Animal Health Laboratory, Sydney, for his advice and assistance, as well as to Miss H. Newton Turner, Biometrician of the same laboratory, who has been responsible for all the statistical work in connection with this experiment, including the selection and pairing of the original sheep and the tabulation of the results.

To Mr. H. Haile for his painstaking and efficient work in classing the fleece characteristics of the sheep, we also extend our thanks.

Summary

1. Sheep on improved pasture stocked at the rate of three per acre gained approximately 11 lbs. per head more in body weight in twelve months than comparable sheep on natural pasture at one per acre.
2. Sheep on improved pasture cut two lbs. per head more wool than those on natural pasture.
3. The yield per acre of greasy wool was 31½ lbs. for improved pasture, and eight lbs. for natural pasture.
4. Sheep on improved pasture for twelve months had fleeces slightly lower in spinning count than those on natural pasture, but the difference was usually one grade only.
5. Sheep on natural pasture tended to have slightly brighter fleeces than those on improved pasture.
6. There was no difference in character or staple length.

REFERENCES:

Ross, I. Clunies; Graham, N. P. H.; Turner, H. N.; Carter, H. B.; and Munz, H.

Pamphlet No. 71, Council for Scientific and Industrial Research.

PRESIDENTIAL ADDRESS TO THE FOURTH INTERNATIONAL GRASSLAND CONGRESS, GREAT BRITAIN, JULY, 1937

By Professor R. G. STAPLEDON, C.B.E., M.A., Director of Welsh Plan
Breeding Station, University College of Wales, Aberystwyth

(Reprinted from the Report of the Congress, issued by the Organising Committee.)

GREENNESS is the subject of my address, for grass is greene and more variedly, and more vitally green than anything in th whole wide world, and green is the vital colour. Young succulen grass is the prince of feeds. Over an enormous area of the worl grass is the foundation of the agricultural industry, and perhap almost everywhere it should be the foundation. Research may wel make this possible—yes, possible everywhere.

Grass (and when I say "grass" I mean, of course, grass an clover) properly used ensures soil fertility, grass marries the soi to the animal and the solid foundation of agriculture is the marriag of animal and soil. That spells humus. While again grass properl employed counters the devastating influences of erosion.

I am proud, indeed, to welcome you here to grassy Wales Though Wales, I hasten to add, is not proud of her grasslands Indeed, for my own part, and speaking as one who has spen twenty-five years conducting research on grassland in Wales, must admit I find the condition of the grasslands of this countr as a whole, and not only of Wales, deeply humbling. But the Great Britain you see, and to the untold benefit of some of yo here present, has always liked to finance agriculture anywhere everywhere, except within her own shores.

I have travelled more than a little, and I know something o grasslands in general, but I have not travelled or seen as much a I should have liked, and I can express no well-informed opinion on many types of the world's grasslands.

I have, however, come to this opinion, and I believe it to b just, nay more, fundamental, that the only rational approach to th problems of grasslands (the practical problems and the researc problems), is the wide regional approach.

The first necessity is to classify our grasslands, and to under stand their inter-relations, and then to work and to plan on th basis of clearly defined regions—natural regions. The proper us of grass and of grassland is a matter of systems of farming, an therefore of facilities. It is a matter essentially of the right imple ments, the right fertilizers and pre-eminently of the right seeds More than this, it is a matter of usage and custom; systems of lan tenure; methods of marketing and a hundred other things, all c which can only be appreciated properly and tackled successfull on a regional basis. What is generally essential is to discredit ol fashions and to introduce new fashions. In this country all manne of old-fashioned clauses in leases are, for example, a great handica to the introduction of new and long-overdue methods. In the matter of seeds, the essential thing is to use the right strain of the comparatively few species that really suit the needs of any well-defined natural region. To organize this is by no means an affair only of plant breeding. The plant breeding to be of the maximum benefit should, however, be conducted in the region it is proposed to serve. It is only by chance, for example, if anything we breed here at Aberystwyth suits say Natal, North America or Norway, and if it does appear to do so at the first flush some plant disease—a rust form, say—may quite decisively intervene. Exploration, yes, and the bringing of new species and of new genes of tried species into every region, but the selection and plant breeding must be conducted within the regions. What we want is not world-wide interchange of commercial seeds with their limited variability, but a world-wide interchange of genes*. It is probably near the truth to say that there is hardly a region in the whole world that has yet got the best combination of agriculturally useful genes in its grassland plants, while I make bold to hazard the opinion that there are many regions in the world that have *not even yet* got the right species to work. But, of this again presently.

I am sure of this, however, that a general world interchange of commercial grassland seeds is bad for the grasslands of the world. It has admittedly done good in the past, it was necessary in the opening up of new countries, but it has also been responsible for a great deal of harm. I agree with Dr. Wilcox that "nations can live at home" in all manner of respects, and in no respect are they better advised so to do (and as far as possible) than in that of their grassland seeds.

I have implied that the first necessity is to map and classify our grasslands, and this is true the whole world over.

I regard this question of mapping of prime importance. We have mapped the whole of Wales, and my first intention was to devote my Presidential Address almost entirely to a detailed discussion of our methods—for I believe they are good methods and as methods are applicable the whole world over. Our maps are, however, on view at the exhibit and I hope Mr. Davies, who has been primarily responsible for the methods and the work, and myself, will have the opportunities of explaining our aims and methods to those who are particularly interested, both around the maps and out on the hills and fields.

So much for mapping. I shall now venture some remarks upon the general problems of grassland, and all said and done, the basic problems are the same the world over. Of necessity I shall have to be selective, and I conceive it as being my business to generalize, and, as you will all have abundant opportunities

---

*GENES.—Here the speaker refers to the microscopic units of the cell mechanism upon which depend all hereditary attributes in pasture plants and all other living forms. The statement implies a need for an interchange of plant material which can be used for breeding new plant forms.

—Editor

amongst yourselves for correcting me, I shall not be afraid of generalizing here and there on insufficient evidence.

The outstanding feature of grassland is its complexity. It is impossible to isolate the factors, and I doubt if it will lead us very far if we attempt unduly to isolate the factors—on the farm and on the ranges all factors interact. Hardly ever do we attempt to grow a single grassland species by itself. I like to grow *Lolium italicum* by itself for winter keep, and we are here experimenting with growing *Phleum pratense* (our S.48) in cultivated drills for winter keep, but this is incidental, and cannot now be discussed. As all of us grow at least two to three, four or more species together to make a sward, competition always enters into the matter. And always, always, always there is the grazing animal.

Soil, climate, grazing animal. Which of these three is the most important factor? Most emphatically the grazing animal! Manure right, sow right and manage the grazing animal wrong and you are nowhere. Without the grazing animal there would be no grassland worthy of the name anywhere in the world. Management is therefore the key to the solution of the whole grassland problem. The real point is this, that the animal makes for itself its own grassland. It is because of this that I say there are regions in the world not yet using the right species (apart from the right genes of the right species). By management entirely alter the conditions, make good lime deficiency, make good phosphatic, and if necessary potassic deficiency, make conditions above everything favourable for a leguminous plant; make it possible to hold animals to the ground, and then you can begin to consider introducing and maintaining species hitherto unthought of.

I believe, and I say this not lightly or without experience, that there are many range areas in the world where it would pay best and where more stock could be carried, and that stock in better health, if about three-quarters or more of the area were let go wild and completely unstocked, and if real and tremendous things were undertaken on well-selected remaining areas. In effect, that is what we are doing here on the Welsh hills, and we are successfully introducing proper grassland species, including, of course, Wild White Clover (*Trifolium repens*) where such species have never before gained a footing. We talk about grass and grassland. No grassland is worthy of the name, and indeed is hardly worth bothering with, unless a legume is at work. Find or breed the right legume for every corner of the world and you have tolerably good grassland in every corner of the world. Make the conditions suitable for legume and manage the sward to favour the legume as well as to feed the animal, and everything else will be easy—the battle will be won.

This is indeed a sweeping generalization, but prove me wrong who can, for not nearly enough work has been done in exchanging legumes all over the world, and in making conditions favourable for legumes, or in breeding legumes.

So much for the geographical problem as I see it; now for the domestic problem, the problem that affects everybody. The domestic problem is clearly threefold. Firstly, how to produce grass at those seasons of the year when it is most urgently wanted; secondly, how to use and to farm grass with a view not merely to maintaining, but with a view always and progressively to increasing soil fertility, and, thirdly, how to manage grass so that the animal always has offered to it young, rapidly growing and succulent grass of maximum nutritive value.

The whole problem, I repeat, resolves itself into management. Each of the above desiderata call first and foremost for rotational treatment. Rotational treatment of a farm as a whole, and of individual fields. Rotation in time and rotation in space. The always doing of something this month with a view to obtaining some definite result two or three months later. Always, too, the need of the sward must rank as of an importance at least equal to the day-by-day needs of the animal. By adopting a system of rotational grazing—intermittent with proper periods "on" and proper periods "off"—the animal can be given somewhere every day what it requires, and the swards need never suffer. One further point, swards will recover from the most villainous of malpractices if such malpractices are not too long continued, and if they are not put into operation at precisely the same time of the year, year after year. Hence the need for rotational management all over the farm. Incidentally, I may here interject that I do not hold with using fields continuously as pastures or continuously as hay meadows; to do so is an offence against the basal idea of rotation in time. For rotation in time I regard as the most fundamental of all grassland principles, and yet, and perhaps on most grasslands, especially on the ranges and open hills, the management is essentially the same month for month, year after year, for generation after generation. Ridiculous folly indefinitely perpetrated in the end enforces a heavy but just retribution, and all over the world millions of acres stand as doleful witness of agricultural practices conducted on a faulty and undeviating time schedule.

So much in general with reference to my three desiderata: now for the particular, and I will deal first with my No. 2, Soil Fertility, for in the last resort on this do "grass when it is wanted" and "succulent and nutritious grass" so largely depend.

I have said that to ensure soil fertility we need to marry our stock to the soil, and the cheapest and most effective way to do this is to plough up all grasslands that will take the plough at regular intervals. Always before ploughing up graze as hard as possible for some months, in order to impregnate the soil with urine and excrement—with what Mr. Bruce Levy so aptly describes as "stock nitrogen". Having turned the sod over, apply lime, harrow in, and you will have made and spread an admirable compost all over your field. Now do what you like. Cash this fertility, or some of it, where you can in a corn or other crop, or sow straight down to grass again, and cash your fertility in more luxuriant grass and build up yet more fertility. I hold that permanent grass where it is possible and on all grounds reasonable to plough is wrong in theory, wrong in fact, is uneconomic and ridiculous. Of course you cannot plough up all the permanent grass, grazings and ranges in the whole world, but with the tractor and modern implements you can plough in all manner of unheard-of-places and under all manner of difficult conditions. Manifestly it would be madness to plough up many types of range country, as that would be to invite certain soil erosion, but such is far from true of all range country. And suppose you can establish a thicker sod than ever before, and establish it quickly, and in the non-erosion season. While with a view simply to the introduction of new species, it is often sufficient merely heavily to cultivate and scratch. Pray remember you can plough up and put straight down to grass again perfectly well, and pray remember also, that the best top dressing of all is that put on the soil itself at the time of sowing seeds (I am now referring to applications of inorganic nitrogen applied to bring grass at some wanted time). How often to plough up is a matter of circumstances and condition. Once in 100 years is better than never; once in 20 years better still, and once in ten years often quite sufficient. Plough more frequently than once in ten years and you begin to be scientific, progressive, and a farmer in very truth, for then amongst other things you can begin to avail yourself of the labours of the plant breeder, and if you do things properly you are going to build up fertility at a prodigious pace. You can farm on the basis of temporary leys of from one to six or eight years' duration, and produce productive grass at all those times of the year that climatic conditions permit stock to graze out of doors. The production of winter grass in telling quantity is, for example, a very real project under the climatic conditions of this country.

In regard to "grass when it is wanted" and "succulent and nutritious grass", I will be very brief, for I have already detained you far too long.

The production of short succulent grass, and at times of the year when most needed, is a refinement of pasture management that is applicable in all its intricate complexity only to the true grassy-clovery swards of the more temperate regions—to the fields of our farm lands. It is to grass of this sort that I am now explicitly referring—to grass in the main consisting of the well-tried European species; species tolerant to and actually thriving best under well regulated heavy grazing and heavy trampling, the species that call aloud for and prosper exceedingly only when amply assured of stock nitrogen.

The production of short grass is then just a matter of rotational and intensive grazing; of intermittent grazing with heavy urination, followed by adequate periods of rest. Once a year the plants must be allowed to grow away to permit adequate root growth. The botanical composition of any more or less permanent or long-duration sward will be a function (almost a direct function) of the times of the year it is grazed hardest, and of the times of the year it is rested. If on any field these times are the same year after year, the number of species will automatically become very restricted and automatically less and less grass will be developed just when it is most needed. If you proceed to accentuate this time factor by applying nitrogen always at the same date, very soon you will kill out the particular species which respond best to nitrogen applied at that particular date—such species or strains will be literally grazed to death. So once more I say, never on long-duration swards and on permanent pastures do the same things to the same date programme on the same field for over two years in succession—rotation in time again! It is often a very sound practice to adhere to a time schedule for two or even three years in succession on short leys (leys of up to three years duration), for when you have ruined such leys you plough them up. Hence one of the outstanding advantages of short leys. Short leys are intended to do a certain thing, and when they will do this thing no longer you plough them up—and I daresay that is about the best of all rules for the management of the grasslands of our farms.

Short grass at different and at all times of the year, and especially at the most difficult times—that is my last point, and I think the most important point of all, and it is one that offers tremendous scope for detailed research.

There are two main avenues of approach, the one by employing special seeds mixtures designed in the main to cater for a particular and short period of the year (once more the glory of comparatively short leys, and the justification of the plant breeder), and the other so to manure and so to rest particular fields that they do in fact have grass to offer at the particular date demanded by the grazing schedule.

I will give two examples of special "time" seeds mixtures. At this station we advocate comparatively simple seeds mixtures, and we have achieved great success with one consisting only of our station bred leafy perennial rye-grass *(Lolium perenne)* (Dr. Jenkin's S.23), rough-stalked meadow grass *(Poa trivialis)* and Wild White Clover *(Trifolium repens)*. In some years the sward so produced (as is common with *L. perenne*) tends to go short in July and August. We have, however, found that another excellent simple mixture is one made up of our station bred meadow fescue *(Festuca pratensis)* (S.53); Dr. Jenkin's pasture-hay timothy *(Phleum pratense)* (S.48) and Wild White Clover *(T. repens)*; this gives palatable and productive grazing all through the season, and in July and August considerably outyields the *L. perenne* mixture. A mixture consisting of our station bred *Alopecurus pratensis* (S.56); our station bred red fescue *(Festuca rubra)* (S.59) and Wild White Clover *(T. repens)* remains wonderfully winter-green and gives an unusual amount of leafage in late February and during March—that to cater for the winter.

As to resting for particular periods, I will take as my example the production of winter grass in this country, for our climate permits of out-wintering. We in this country are now drying spring and summer grass for the winter, and I am inclined to say why not grow winter grass for the winter, and convert it *in situ*? It can be done already, despite the fact that the plant breeder has hardly begun to show his hand in this matter.

What is wanted is winter-green strains and then the plan is to rest the fields completely as from about the middle of August or not later than towards the end of September. By the use of proper strains, resting at the right time and properly manuring, we here at Aberystwyth have obtained grass *in situ* available from Christmas to the end of March, with a crude protein content of from about 14 to as high as 20 per cent of the dry matter. The yield per acre of this sort of grass then available has on occasion exceeded 3,500 lbs. of dry matter. Thus with a range of fields a great deal of grass of high quality can be made available all the winter. Much better winter-grass, and more of it, can be obtained from young leys sown with the right strains than from permanent pastures.

In our experience much better winter-grass is obtained by resting a pasture which has been heavily grazed and saturated with stock nitrogen for some time than from aftermath. If aftermath is wanted for winter-grass such aftermath should not be allowed to grow straight on from after hay harvest, but the field should be grazed heavily as soon as it will hold stock after harvest, given a dose of "stock nitrogen" in fact, and then put-up for winter-grass. At the time of putting-up for winter-grass we always dress with about 1 cwt. to the acre of nitro-chalk—as a supplement to stock nitrogen inorganic nitrogen is invaluable.

I have rather daringly covered a very wide field, and I have (although partly in the interest of brevity) most daringly generalized. I am sure you will appreciate the fact that anything of truth or value that I may have been able to say is due almost entirely to the untiring efforts and competency of my colleagues. They do the work, I do the talking. I am afraid I have talked almost solely around my own experiences, and the work of my own station. But nevertheless, and however unworthily expressed, I think I have said enough to justify the belief that all of us here present are engaged in the study of a very great science; our concern is, however, much more than that; we are concerned also with a very great art, and more still, this, our enterprise is of prime sociological significance and importance.

If the peoples of the world, and to a man, are indeed to be adequately fed with fresh food of the highest quality, and balanced in every respect, then the enormous acreage of the world that stands in grassland of every character, and of no character at all, must be brought to play its full part. It is not only grass itself that is so essential as a feed, but it is the whole acreage under grass that must be made to yield to more intensive treatment. To an ever-increasing extent this acreage must be made to produce better and better grass, and also other necessary crops.

THE PEAR SLUG

By J. W. EVANS, *Entomologist*

THERE can be few people in Tasmania who are unfamiliar with the Pear slug *(Caliroa limacina*, Retz.*)*, since not only does it attack the leaves of trees grown in orchards and gardens, but renders hawthorn hedges unsightly during the latter part of every summer. Of European origin, it has now a wide distribution and flourishes especially in those countries that have a cool temperate climate.

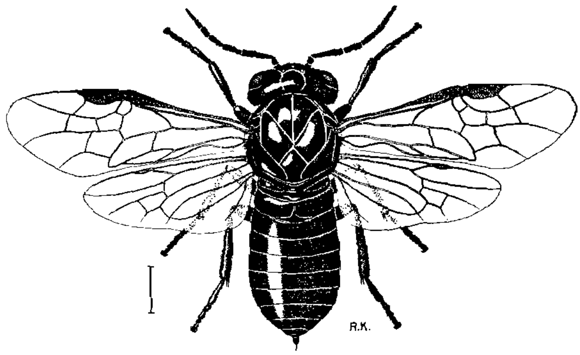


FIG. I
THE PEAR SLUG

Description and Life History

The adult insect (Fig. I) is a small black wasp, usually known as a saw-fly. It is about one-quarter of an inch long and may be seen resting on the leaves of several kinds of introduced trees early during the summer. Whilst a few saw-flies may appear early in November, the majority do not emerge until the middle, or towards the end of this month. Very few male insects occur, and the females are able to lay fertile eggs without prior fertilisation. Eggs (Fig.II) are laid underneath the upper layer of the surface tissue of leaves and hatch in from one and a half to two weeks. The larvæ or "slugs", which are slimy, black objects, with three pairs of legs, are somewhat broader at the head than at the tail end. They feed only on the upper surface of leaves and give rise to characteristic injuries as shown in the figure.

A proportion complete their larval development by the end of December, when they fall to the ground and bury themselves at a depth varying from about two to four inches. They then make small oval cocoons of a parchment-like material, which is covered outside with soil particles. Inside these cocoons they change into the pupal or chrysalis stage and emerge as adult saw-flies some two weeks later.

The adults of this generation thus appear from the middle of January onwards, and the "slugs" to which they give rise feed from the end of January until the end of February, and a few may still be found on leaves during March.

Plants Attacked

Although this insect is usually known as the "Pear Slug", cherry, hawthorn and plum trees are all liable to severer infestations than are pear trees. Larvæ may occasionally be found feeding on the leaves of several other trees, such as walnut and almonds, but the injury they cause them is seldom serious.

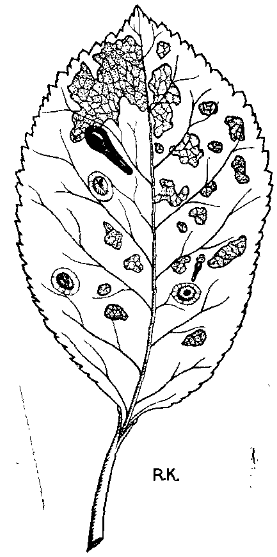


FIG. II
CHERRY LEAF WITH THE EGGS AND LARVÆ OF THE PEAR SLUG

Control

This is one of the simplest insect pests to control, but because it only injures the foliage of fruit trees and not the fruit, and as its activities would appear to have little detrimental effect on infested trees, control measures are seldom attempted.

It is best controlled on fruit trees with lead arsenate, but if it is desired to destroy the insects on plum or cherry trees, when the fruit is ripe or almost ready for picking, lead arsenate should not be used, but instead any contract insecticide, such as nicotine sulphate or derris, applied either as a spray or as a dust.

Hawthorn hedges surrounding gardens should be given two applications of a derris dust, which acts as both a stomach and contact poison. The first application should be made during the first fortnight in December and the second during the first fortnight in February. Of the two recommended applications, the second, which is intended for larvæ of the second generation, is the most important.

Infestations of the Canary Fly *(Typhlocyba froggatti)* on hawthorn hedges. may also be reduced with derris dusts, one application being made early in November and a second one, if warranted, at the end of January.

GRASS AND CLOVER SEED CERTIFICATION—SOME POINTS FOR GROWERS TO NOTE

Perennial Ryegrass, Cooksfoot and Wild White Clover

SEED certification is now assuming such large dimensions that it is desired to take the opportunity, at this time of year, of stressing upon growers the importance of assisting the Department by attention to the provisions of the schemes. A brief resume of the main points to be observed by growers during spring and summer, is as follows:—

All registered areas are recorded at the Agricultural Department, Launceston, and each area so recorded, which passes the field inspection, is permanently registered (and remains so unless, and until it fails to qualify at a subsequent inspection, or the seed harvested from it fails to pass for certification owing to deterioration in type). Notice of intention to harvest seed from such a permanently registered area in any subsequent year must, however, be given by the grower by the 30th September. The owner of every area in the register (except for new areas registered for the first time in any season) is communicated with prior to the closing date for re-registration and is asked to indicate whether or not he proposes to harvest such area or areas. It is most important that growers should give a definite reply by the date mentioned. Failure to do this in the past has caused much inconvenience and unnecessary travelling, and may, in future, disqualify the seed from certification for that season, since non-notification makes it impossible for the necessary re-inspection of the area to be carried out. The harvesting or non-harvesting of any area in any year has not, of course, any effect on eligibility for other years.

The field inspections are made during November and December. In the event of an area failing to meet the required standard of weed freedom, etc., the grower is notified formally of the non-eligibility of the area for certification. Where the area is satisfactory no formal notification is given, but the grower is next circularised at the end of December in reference to threshing. In this communication some general instructions are given, and the farmer is also requested to advise the District Agricultural Officer when he intends threshing. It is realised that it is impossible for growers to give long notice of intention to thresh, but every effort should be made to give some indication beforehand as to the approximate date, even if final notice can only be given a few hours prior to arrival of the drum.

It is desired to draw attention to the fact that it is essential that bags should not be moved out of the paddock until tagged and branded by the inspecting officer. Growers of certified seeds must be prepared to comply with the regulations designed to make the scheme effective and safe. Part of their equipment, as registered growers, should therefore be sufficient sheets or straw to cover their bags in the paddock until such time as the inspecting officer can seal them.

Subterranean Clover

The scheme of certification for Subterranean Clover differs from that of Ryegrass, Cocksfoot and Wild White Clover in that areas are registered annually on the merits of field inspection only, whereas in the case of the other species the area is inspected and registered at time of sowing and remains registered and permanently recorded as long as field inspections prove satisfactory.

Thus Subterranean Clover growers must apply annually for registration, and any grower may apply for registration of any or all of his Subterranean Clover paddocks.

All persons who have previously had areas registered for harvesting, and a good many others, are recorded in the Department's files, and these persons are circularised in August - September as to their intention to harvest. Replies must be returned to the District Agricultural Officer by 30th September. Absolutely no late entries can be accepted. From this year onwards notification of the above will also be published by advertisement in the press. In this manner it is hoped that no one will remain unaware of the position.

Field inspections are made in October and early November. The grower is notified formally if his area cannot be accepted, but not otherwise. The Clover Grower's Committee is supplied with a full list of registered growers for the year as soon as all field inspections have been completed.

Farmers are required, however, to notify Mr. T. B. Monds, Secretary of the Clover Grower's Association, in regard to their readiness for threshing, arrangements then being made by him for the drum to call as soon as possible. This aspect is most important and failure to observe it results in confusion and delays in the itinerary of the drums.

Intending growers desiring to know any details concerning the operation of the Clover Growers' Association and the handling of the seed should apply to Mr. Monds, at Launceston, who would be pleased to furnish information and guidance.

Agronomy Division and Extension Service

ERRATUM

May, 1938 issue—BEAN DISEASES, By J. O. Henrick, Plant Pathologist

On page 83 of the last (May) issue of the Journal, the two photographs showing respectively, Diseased Bean Pods and Foliage, were printed in the wrong order.

The plate marked Fig. II. was intended to occupy the position of that marked Fig. III. and vice versa. As the fiigures stand the legends printed beneath them should be cross-applied, that below Fig. III. referring to Fig. II and vice versa.

GRASS AND CLOVER SEED CERTIFICATION— SOME POINTS FOR GROWERS TO NOTE

Perennial Ryegrass, Cooksfoot and Wild White Clover

SEED certification is now assuming such large dimensions that it is desired to take the opportunity, at this time of year, of stressing upon growers the importance of assisting the Department by attention to the provisions of the schemes. A brief resume of the main points to be observed by growers during spring and summer, is as follows:—

All registered areas are recorded at the Agricultural Department, Launceston, and each area so recorded, which passes the field inspection, is permanently registered (and remains so unless, and until it fails to qualify at a subsequent inspection, or the seed harvested from it fails to pass for certification owing to deterioration in type). Notice of intention to harvest seed from such a permanently registered area in any subsequent year must, however, be given by the grower by the 30th September. The owner of every area in the register (except for new areas registered for the first time in any season) is communicated with prior to the closing date for re-registration and is asked to indicate whether or not he proposes to harvest such area or areas. It is most important that growers should give a definite reply by the date mentioned. Failure to do this in the past has caused much inconvenience and unnecessary travelling, and may, in future, disqualify the seed from certification for that season, since non-notification makes it impossible for the necessary re-inspection of the area to be carried out. The harvesting or non-harvesting of any area in any year has not, of course, any effect on eligibility for other years.

The field inspections are made during November and December. In the event of an area failing to meet the required standard of weed freedom, etc., the grower is notified formally of the non-eligibility of the area for certification. Where the area is satisfactory no formal notification is given, but the grower is next circularised at the end of December in reference to threshing. In this communication some general instructions are given, and the farmer is also requested to advise the District Agricultural Officer when he intends threshing. It is realised that it is impossible for growers to give long notice of intention to thresh, but every effort should be made to give some indication beforehand as to the approximate date, even if final notice can only be given a few hours prior to arrival of the drum.

It is desired to draw attention to the fact that it is essential that bags should not be moved out of the paddock until tagged and branded by the inspecting officer. Growers of certified seeds must be prepared to comply with the regulations designed to make the scheme effective and safe. Part of their equipment, as registered growers, should therefore be sufficient sheets or straw to cover their bags in the paddock until such time as the inspecting officer can seal them.

Subterranean Clover

The scheme of certification for Subterranean Clover differs from that of Ryegrass, Cocksfoot and Wild White Clover in that areas are registered annually on the merits of field inspection only, whereas in the case of the other species the area is inspected and registered at time of sowing and remains registered and permanently recorded as long as field inspections prove satisfactory.

Thus Subterranean Clover growers must apply annually for registration, and any grower may apply for registration of any or all of his Subterranean Clover paddocks.

All persons who have previously had areas registered for harvesting, and a good many others, are recorded in the Department's files, and these persons are circularised in August - September as to their intention to harvest. Replies must be returned to the District Agricultural Officer by 30th September. Absolutely no late entries can be accepted. From this year onwards notification of the above will also be published by advertisement in the press. In this manner it is hoped that no one will remain unaware of the position.

Field inspections are made in October and early November. The grower is notified formally if his area cannot be accepted, but not otherwise. The Clover Grower's Committee is supplied with a full list of registered growers for the year as soon as all field inspections have been completed.

Farmers are required, however, to notify Mr. T. B. Monds, Secretary of the Clover Grower's Association, in regard to their readiness for threshing, arrangements then being made by him for the drum to call as soon as possible. This aspect is most important and failure to observe it results in confusion and delays in the itinerary of the drums.

Intending growers desiring to know any details concerning the operation of the Clover Growers' Association and the handling of the seed should apply to Mr. Monds, at Launceston, who would be pleased to furnish information and guidance.

Agronomy Division and Extension Service

ERRATUM

May, 1938 issue—BEAN DISEASES, By J. O. Henrick, Plant Pathologist

On page 83 of the last (May) issue of the Journal, the two photographs showing respectively, Diseased Bean Pods and Foliage, were printed in the wrong order.

The plate marked Fig. II. was intended to occupy the position of that marked Fig. III. and vice versa. As the figures stand the legends printed beneath them should be cross-applied, that below Fig. III. referring to Fig. II and vice versa.

BLIGHT *(PHYTOPHTHORA INFESTANS)* OF POTATOES IN TASMANIA

By C. E. W. OLDAKER, Agronomist

TASMANIA was first settled in 1803, and as early as 1805, it was recorded that "potatoes and other vegetables did well". Operations were at first carried on in the South of the Island, but as time went on it was found that the rich red basaltic soil of the North produced even better crops of high quality tubers. With the exception of a limited number of white-skinned varieties, usually grown in home gardens, practically the sole potato production of the field was through a variety introduced at the outset of colonization and known under the synonyms of "Red Skin", "Brown's River Red" or "Circular Head", according to the locality in which it was grown.

Throughout the Nineteenth Century any trouble on account of disease appears to have been practically unknown, and growers were assured of reasonable to excellent returns with a minimum of effort. This happy condition continued through the early life of the writer until 1906, and from this time personal experiences concerning the entry and incidence of disease may be related.

While supervising the preparation of seed for planting one day, a curious form of breakdown or decay was noticed through several cut tubers. The condition, neutral as to smell, bore the appearance of solidified brown sugar to a depth of half an inch and more through the flesh tissue under the skin over irregular areas. Nothing was known of this tuber trouble, nor had any unhealthy appearance in the top growth of plants been previously noted. Incidentally, the seed stocks in use had been introduced from a high inland district.

In 1907, it was reported that there was "something wrong" with the crops of several late districts subject to high rainfall. The position was, however, not sufficiently alarming to excite anything beyond a passing comment. It was thought that probably seasonal irregularity was responsible, and that the trouble would disappear with the return of normal conditions.

During the following year 1908, infection increased, both in scope and intensity, throughout localities in which the disease had at first made its appearance. Aided by a wet spring and early summer, a number of cases were reported throughout the usually drier coastal districts of the North-West. Other rotting agencies now took a part, and the tubers were, in some instances, reduced to an evil-smelling, semi-liquid condition, while the hard sugar-like appearance was present in others. There was now definite alarm, and adverse reports from Mainland merchants concerning the rapid deterioration of consignments, which had been landed at Sydney in apparently sound condition, prompted the authorities to take immediate action.

Early during the harvest of 1909, Mr. D. McAlpine, Vegetable Pathologist to the Department of Agriculture of Victoria, and Professor Kirk, of New Zealand, were invited to investigate. Both gentlemen soon established the fact that Irish Blight was responsible for a now serious position. A system of port inspection for shipments beyond the State was established, and also a field control designed to stem, if possible, the rapid advance in crop infection.

Wards were defined from which movement of stocks to healthy districts was prohibited. Spraying with Bordeaux or Burgundy mixture was introduced, and many growers put in costly plants for the treatment of considerable areas.

Again a moist season was the experience in 1910, and although spraying was vigorously carried out at many farms, the blight increased in intensity and operations for the year ended in severe loss to most growers. At the port of Devonport in one week 10,000 sacks packed for shipment in all good faith were almost entirely destroyed and condemned.

The culminating disaster, however, came in 1911. Despite an almost feverish care in the selection of healthy seed, and crop spraying, the disease, once more assisted by humid weather, swept the country. Many crops were entirely destroyed, and early harvesting of those affected to a lesser degree was abandoned on account of the rapid rotting of the tubers after lifting. Later it was found that a small proportion remained sound if left in the soil until towards the end of the year. In this way limited quantities were finally saved.

The season, with its record of worry and financial loss to growers, sounded the death knell of the old "Red Skin", a prolific yielder of good quality tubers. but utterly unable to withstand the attack of blight.

It is interesting to remember that at a time closely approximating the introduction of blight to the country, a new variety of potato appeared, a variety known as "Brownell," which has since taken the place of the "Red Skin" in providing a high standard and the bulk of export quantities to the Mainland market. Its origin is uncertain and a search of literature from other countries, in addition to the importation of seed from stock having a close descriptive resemblance, has failed in positive indentification.

During the period 1908 to 1911, it was found that the "Brownnell" was much more resistant to blight than any other of the old established varieties, although even here loss occurred in varying degrees as the virulence of the disease increased.

With 1912 came a brighter outlook. Using seed stocks representing a "survival of the fittest" under drier seasonal conditions, growers experienced a much happier year on account of a diminution of the disease. Losses were, however, still heavy. Spraying was continued on many farms through repeated applications at intervals of about three weeks.

By the following year, 1913, "Brownells" had become well established through a combination of several valuable characteristics, not the least of which, at the time, was a resistance to disease. There now arose a growing idea that unsprayed crops suffered little more than those which had been expensively treated.

The spring and summer months of 1914-15, were definitely dry and sunny. A few crops were sprayed, but in the great majority of cases no effort was made in this direction, and machines were generally allowed to remain idle. The blight appeared to be rapidly weakening, while the confidence of growers increased in a like ratio.

For ten years after this time little complaint was heard regarding loss through blight, although a minor outbreak was occasionally reported. In many districts, especially of the drier potato growing areas (25 in. to 40 in. rainfall per annum), hardly a trace came under notice for quite a lengthy period. The far North-West of the Island, jutting into the sea and subject to a great deal of Easterly humid weather, was mainly responsible for perpetuating the disease through a time when it had practically disappeared elsewhere. A susceptible white-skinned variety, popular in the locality for some reason, took a leading part in maintaining infection. Crop spraying was, however, entirely dropped.

Some little alarm occurred in 1926 and 1927, when our principal early variety "Bismark", which is also only weakly resistant, went down to blight in several localities. Growers feared a greater spread, but nothing of an epidemic occurred.

From time to time slight sporadic outbreaks occur, sometimes quite serious enough for individual farmers whose varieties and crops are situated in circumstances favourable to development of the disease. Some attention has been given to a control, principally through the easy application of dusting (Bordeaux mixture), but little has been done even in this way.

Today blight is still with us although, through years approaching the season now ending, in a degree insufficient to arouse much concern and certainly nothing approximating the peak infection of 1910-11.

There appears to have been ample reason for the theory that we are now employing more resistant stocks, or that the disease has, to an extent, exhausted its own early vigour upon entry to a new country. As with many theories, a serious doubt has now arisen, particularly in some districts following upon the experience of the current year, in which losses have been heavy. The behaviour of the disease has, however, been peculiar. Practically throughout all main producing districts the crop foliage was blackened and destroyed in varying degrees at, or shortly after, the flowering period.

As far as the effort upon the tubers is concerned, the attack has been irregular and unusual. Under similar soil and climatic conditions, some crops were destroyed to the extent of 50 or 60 per cent, while in others the loss has been negligible. Occasionally "Bismark" growers suffered even more serious loss. This variation has occurred not only between different districts, but sometimes within one locality.

On account of the general spread of blight infection, a fear has arisen that, with a series of moist seasons, the position may again become difficult through an increased intensity in attack and the need for active control on the part of growers. On the other hand a dry sunny year immediately ahead would help towards recovery.

Some trials in the use of several wet spray formulas, carried out by the Department during the year, have indicated a decided benefit to the treated crop. An increase to the extent of 30 per cent. in yield has been recorded in one instance after three sprayings at intervals of three weeks during the infective stages of the disease.

PRODUCTION OF CERTIFIED PERENNIAL RYEGRASS SEED

During the season the production of certified Perennial Ryegrass Seed in Tasmania reached the highest figure since the commencement of the scheme in 1932.

69 growers registered for the season, a total of 1,147 acres being entered for certification. Finally, however, only 21 growers harvested seed, the total area certified being 418 acres.

The season's production amounted to 6,197 bushels, compared with 5,701 (the previous highest figure) last season, the average yield being 14.3 bushels per acre. From one area of 19 acres 880 bushels were secured, giving an average yield of 45.7 bushels per acre. A second area averaged 30.5 bushels per acre from 24 acres, and a third 23.1 bushels per acre from 66 acres.

Average purity (freedom from weed seeds, etc.) of all the lines harvested was 99.1 per cent (maximum 99.8%, minimum 97.0) and average germination 93.5 per cent (maximum 98, minimum 80). Four lines were rejected owing to the germination being below the required standard of 80 per cent, and two on account of the bushel weight being below the standard of 23 lbs.

The seasonal conditions were not conducive to optimum yields and it is reasonable to estimate that they accounted for a lowering of total production by 25 per cent. A hard, dry winter caused a considerable number of areas to be grazed right through and not kept for seed. Secondly, wet conditions prevailed intermittently from October to January, and caused a prolific but "soft" growth tending towards a prevalence of rust and light seed. A very hot spell in November caused premature ripening off of crops on lighter soils. On stronger land the seed ripened normally and yields were not affected to the same extent.

Lucrative returns were secured by the majority of growers owing to the marked shortage of New Zealand Seed. Most growers sold the whole of their crops at a price not below 10/- per bushel.

Agronomy Division and Extension Service

POTATO SEED CERTIFICATION

By R. A. SHERWIN, Chief Agronomist

THE conditions governing the certification of Brownell and Up-to-Date seed potatoes have been published on several occasions in the Journal, the Press and in pamphlet form, and are fairly generally known to farmers. However, it is necessary from time to time to amend the conditions to remove anomalies and to ensure the easy working of the scheme.

It is desired to bring to the notice of interested growers and seed purchasers, two amendments which have come into operation this season. The first applies to the price of First Harvest and Mother Seed Brownells. Growers of these two types of seed may sell at a price agreed upon between buyer and seller, or if the purchaser so desires he may buy at a price fixed by the Department and published in the Press early in August. This price is based on returns from Commercial Brownells during June and July, plus a premium of £1/5/- per ton in the case of First Harvest Seed, and £1/15/- for Mother Seed. In the past the seller of certified seed has been morally bound to sell to the purchaser, if the latter so desired, at the fixed price. For this season and in the future it has been decided that the fixed price will apply only to orders placed prior to the 1st August. Later orders will be subject to mutual agreement on price.

The second alteration applies to complaints regarding the quality of certified seed of both Brownells and Up-to-Dates. Naturally, throughout the scheme the Department aims at a high standard, but for its own protection and also that of growers, only complaints which are lodged by the purchaser within fourteen (14)) days of the receipt of the seed will be investigated. Complaints should be lodged with the local District Agricultural Officer.

For the information of intending purchasers of seed, the following list of First Harvest and Mother Seed growers is published:—

List of Growers of Certified Mother and First Harvest Brownells, Season 1937-38

MOTHER SEED

A. L. Cullen	Nietta	Mediums and Lates
F. R. Barker	South Riana	Mediums and Lates
A. W. Murfet	Paradise	Mediums and Lates
C. Day	Sheffield	Mediums and Lates
A. E. Smith	Yolla	Mediums
W. E. Rothwell	Henrietta	Mediums
K. Chilcott	Branxholm	Mediums

FIRST HARVEST SEED

C. Bates	South Nietta	Mediums
C. K. Bates	Central Castra	Mediums and Lates
P. Chamberlain	South Preston	Mediums
R. E. Gardiner	South Nietta	Mediums and Lates
H. Harding	Warringa	Mediums and Lates
A. Howard	South Nietta	Lates
R. W. Kirkland	Warringa	Lates
C. Ling	South Nietta	Mediums
J. Midgeley	Loongana	Mediums
H. A. Nichols	South Preston	Mediums
R. L. Parsons	Loongana	Mediums
J. A. Pearson	Upper Castra	Mediums
M. & V. Tongs	Warringa	Mediums and Lates
A. Williams	Upper Castra	Mediums
C. E. Williams	South Nietta	Mediums
J. F. Wright	Central Castra	Mediums and Lates
F. Maxfield	South Nietta	Lates
R. C. Fielding	South Riana	Mediums and Lates
J. Miller	Riana	Mediums
W. J. Mainwaring	Riana	Mediums
Ratcliffe Bros.	Riana	Mediums
W. J. Morris	Ridgley	Lates
R. J. Barwick	West Ridgley	Mediums
J. Biggins	Yolla	Mediums
Ira Morse	Preolenna	Mediums
T. P. Murfet	Yolla	Mediums
H. Rothwell	Henrietta	Mediums
W. E. Rothwell	Henrietta	Mediums and Lates
C. H. Stitz	Hampshire	Mediums and Lates
J. Braid	West Kentish	Mediums
J. Cox	West Kentish	Mediums and Lates
C. Day	Sheffield	Mediums and Lates
C. Day	Cethana	Mediums and Lates
L. Dyer	Paradise	Mediums and Lates
J. R. Griffin	Deloraine	Mediums and Lates
W. Hill	Barrington	Mediums and Lates
Morse Bros.	Paradise	Mediums and Lates
A. W. Murfet	Paradise	Mediums
R. W. Gaby	Nabageena	Mediums
H. W. Maguire	Nabageena	Mediums
Oliver Bros.	Ringarooma	Mediums
N. Campbell	Scottsdale	Mediums

List of Growers of Certified Mother Seed and First Harvest Seed Up-to-Dates

R. Tole	Myrtle Bank	Mother Seed
J. R. Skemp	Myrtle Bank	First Harvest Seed
H. Wilson	Lilydale	First Harvest Seed
E. J. Fisher	Oatlands	First Harvest Seed

NOTES ON FENCING

By J. H. G. LLOYD, District Agricultural Officer

FAT Lamb raising calls for good fences. While post and rail and pickets make a good sheep proof fence, a great deal of work is involved in their erection, and, further, the necessary timber cannot readily be procured on the average farm. The only alternative is wire, either plain or barbed, but preferably plain. Some prejudice exists in the minds of many farmers against plain wire. There is really little, if any, foundation for this as a properly constructed plain wire fence will remain sheep proof for many years.

The main point about a wire fence is that it should be tight, and it follows that all posts in key positions, that is to say angles, strainers, and all posts that are subjected to an upward pull, should be securely anchored to prevent their being pulled up when the wires are strained. A slight give in one post of two or three inches is sufficient to slaken a fence.

There are several methods of anchoring or "footing" posts that are to be subjected to an upward pull, as follows:—

1. The Peg and Wire Method

Materials required:—One piece of wood about 4in. x 2in. and not less than three inches longer than the post hole is wide, i.e., a hole 12in. wide requires a peg not less than 15in. long. One piece of plain wire about six feet long.

Method

Double the wire and twist the looped end tightly round the peg, securing it with a staple as in Fig. I. Then dig the hole as in Fig. 11., excavating a small cavity on one side of the hole so that the wire on the peg will run up the side of the post. A chisel ended crowbar is the most useful tool for doing this work. The size of the cavity so excavated will depend on the type of soil; in soft ground it is possible to force the peg to the bottom of the hole without any prior excavating. The opposite applies in hard ground.

Fig. III. shows the post in position with the foot rammed down to the bottom of the hole, and the loose ends of the wire *bent over and stapled tight. If the wire is then not quite tight* enough, another staple can be put in a little lower down the post. The same type of foot can be used on a strainer post with the difference that it is put at the back instead of the side. It is sometimes thought that a strainer does not require footing, and that a stay is sufficient. This is quite wrong, as a stay will not prevent a post from lifting.

2. Another type of foot very useful on sloping ground is shown in Fig. IV. A cross piece is stapled on to the back of the post

FIG. 1

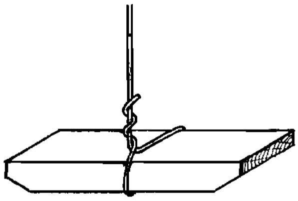


FIG. 2

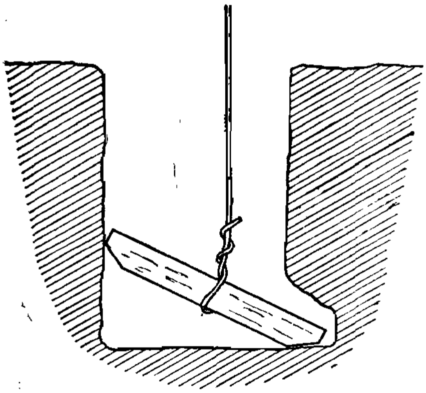


FIG. 3

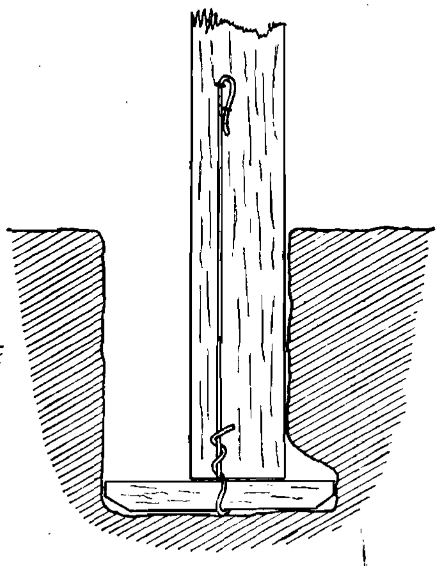


FIG. 4

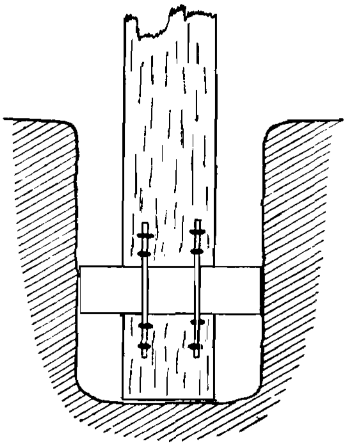
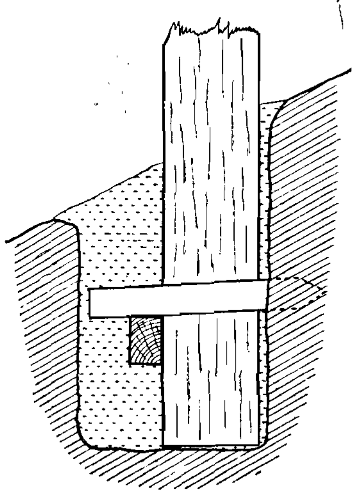


FIG. 5



J.T.

and projects on either side of it. It should be fastened as near the bottom of the post as possible.

The post is then placed in position and a peg driven over the cross piece on either side. To do this it is often necessary to dig away a good deal of earth from the back of the hole, and for this reason this method is more suited to sloping ground, as in Fig. V.

For speed and efficiency it is difficult to improve on the peg and wire method of footing. An added advantage is that the fence cannot lift should the post rot or break off at ground level, as it is held in position by the wire which projects above the ground. Further, if it should become necessary, after a few years, to remove a post that has been footed in this manner, it can easily be dug out after taking out the two staples that hold the wire in position.

General Hints

It is sometimes thought that big posts last longer than small ones. This is quite erroneous as all timber of the same type rots at the same rate, irrespective of size. Use large posts for strainers and gateways where weight is required, otherwise medium sized timber is sufficient. It is not necessary to use strainers for the angles. Strainers should be from eight to ten chains apart according to the ground. At all angles in between use posts of ordinary size, but cut about 6ft. 6in. to 7ft. long. Posts of this type properly stayed and footed will hold against the heaviest strains.

A common practice when erecting a new fence is to sight all the posts. A quicker method is to put in the strainers at each end first, then the angle posts, and run out a couple of wires; the bottom and second top ones are the best; strain lightly and the wires provide an accurate guide which is infinitely better and quicker than sighting. By using the bottom wire in this way the ground line can be determined accurately, and all uneveness can be trimmed off and all hollows filled up as the work proceeds, much time thus being saved.

WOOL BROKERS
STOCK AND STATION AGENTS

PRODUCE
MERCHANTS

Wool, Skins, Hides

(E. H. Webster)

SHEEP SKINS, HIDES RABBIT AND ALL FUR SKINS

Sold on Consignment at Full Market Rates

Land

(H. C. Nickolls)

If you wish to purchase City or Country Property, or wish to sell—

We have Clients requiring Properties of all description.

Our Representatives would be glad to call on you.

Salesmen:
R. H. STANFIELD
M. H. SWAN

Fat Stock

(D. E. Hopkins)

SALES at

ABATTOIR—
Cattle, Sheep—Every Tuesday
Carcase Pork—Thursday

BRIDGEWATER, SORELL—
Store and Fat Stock—
Alternate Mondays

Correct Market Information Supplied
'Phone 9280 (after 6 p.m.)

CA
RO
RIV
COL
HUG
BOT
BUC
Have
Stock
Priva

Shipping

(E. H. Webster and H. R. Neilson)

REPRESENTING—
Oceanic S.S. Coy. (Matson Line)
P. & O. Royal Mail S.N. Coy.
North Pacific-Australia Line
P. & O. Branch Service
British India S.N. Coy.
Clan Line of Steamers
Roosevelt S.S. Inc.

Booklets on Application

A. G. WEBSTE

Telegrams: "WEBSTERS, HOBART"
Head Office, Wool Showroom, Show Rooms: LIVERPOOL STREET
Telephone No. 4
New W

COOPER'S
& BRANDING
STOCK LICKS,
COOPERS' DIP
maintained its reputatio
THE PERFECT DIP. Th
because it is made from the ver
est materials, scientifically treated
has a most valuable sulphur content.
COOPERS' BRANDING FLUID does no
tain tar and will not mat the wool fibres. Its
tation for scouring out is unequalled.
LIXIT, for every class of stock and country. Made in
kinds. We recommend Iodised, Phosphate, or Sulphate of
The "MONARCH" WIRE STRAINER is justly claimed to
best, simplest and most efficient because of its automatic
engaging action.

CONSIGN YOUR PRODUCE TO OUR DAIL

Chief Agents
ROYAL INSURANCE COMPANY

Established 1831

R & SONS LTD.

Branches and Agencies: LAUNCESTON, BURNIE, STANLEY

Stores: MOONAH

Store Stock
(H. C. Nickolls)

REGULAR SALES
at

BELL TOWN OATLANDS
ARLAND CAMPANIA
SDALE TUNNACK
BROOK NUBEENA
VILLE KOONYA
WELL MELTON
AND

ll classes Store
n Hand for
Sale

Engineering
(Hugh Cruickshank)

Manufacturers of Automatic Pumping Plants, Case - Planing Machines, etc.

Repair Work of all Description, including Oxy and Electric Welding

Agents for **Ball-Bearing Coy. of Aust.—Ball Rollers, Timken Bearings**

“LISTER” Diesel Engines
(H. M. Cane)

Amazing Economy — Low Consumption of Cheap Grade Fuel Oils. Easy Starting, done by hand without any starting device whatever, due to new unique “LISTER” Patented Combustion Head.

Operated on 4-stroke principle.

Automatic Lubrication.

COOPERS’ SPRAYS
(G. E. Mather)

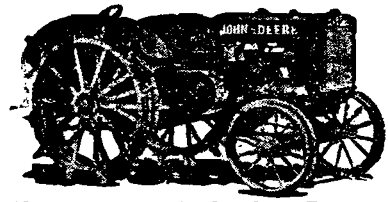
BORDINETTE is far ahead of home-made preparations because of its uniform composition. It is not the usual type of Bordeaux Mixture as it contains ingredients not found in the latter.

COLLOIDAL SULPHUR—for the control of Powdery Mildew and Black Spot.

ARSINETTE.—In using Arsenate of Lead the following points should be kept in mind: (1) Maximum toxic properties, (2) Safety (3) Fineness of particles, (4) Covering quantities Coopers’ Arsinette is specially prepared with due regard to these points.

ALL OTHER SPRAYS IN STOCK

“JOHN DEERE TRACTORS”



For Farming, Orchard or Power Purposes.

ECONOMY—Burns Diesel Fuel Oil at 8d. per gallon, cutting working costs 33 per cent.

SIMPLICITY — Only 2 cylinders — few moving parts.

The most power — for the longest time — at the lowest cost.

AUCTION SALES at the Railway Yards. Correspondence Invited.

No. 3.—A DAIRY

By J. TILT, Agronomist

IT is of great importance that the cream supplied to our butter factories should be of as choice quality as possible and a well designed and constructed dairy can help considerably towards this object. The following are the essential features of a good dairy:—

1. Adequate ventilation, especially near the floor.
2. Floor impervious to water.
3. Walls that can be washed down.
4. Building made fly-proof.
5. Roof constructed with a generous overhang.
6. Roof insulated against heat.

In co-operation with the dairy division a small dairy 6ft. x 8ft. (inside measurements) has been designed. If a larger dairy is required the method of construction would be similar. The specifications are as follows:—

Concrete floor 3in. thick, concrete wall foundations 4in. thick. Hardwood framing 4in. x 2in., weatherboard walls, asbestos cement ceiling, galvanised iron roof and the walls lined with plain galvanised iron. Pine door 6ft. 6in. x 2ft. 6in. and small hopper type window.

The list of materials, their purpose in the building and approximate costs are as follows:—

		£	s.	d.
Hardwood—				
4in. x 2in.	17/16ft. Studs, Plates and Miscellaneous			
4in. x 2in.	9/14ft. Rafters and Ceiling Joists			
3in. x 1½in.	8/12ft. Purlins			
6in. x 1in.	1/12ft. Ridging			
3in. x 1in.	3/10ft. Bracing			
	Total, 316 super ft. at 14/- per 100 super ft.	2	4	3
Dressed Hardwood—				
3in. x 1½in.	4/8ft. Weatherboard Stops			
4in. x 1in.	5/7ft. Door Ledges and Stops			
6in. x 1in.	2/13ft. Barge Boards			
	Total, 37 super ft. at 6d. per ft.		18	6
Weatherboards—				
550ft. Dressed Weatherboards at 17/- per 100		4	13	6
Joinery—				
One Sash and Frame complete. Hopper Type, Sash Hinged at bottom. 2ft. 7in. x 2ft. 1in.		2	0	0

Galvanised Iron—

13/6ft. Sheets Corrugated at 3/3	2	2	3
2/6ft. Length 14in. Ridging at 1/8		3	4
14 Sheets 6ft. x 2ft. Plain Galvanised Iron at 2/7	1	16	2

Miscellaneous—

Asbestos Cement—2 Sheets 6ft. x 4ft. at 2/2 sq. yd.		11	7
Cement—5 Bags at 4/3	1	1	3
Round Iron—½in. 8f.			8
" " ¼in. 64ft.		1	8
Fly Wire 24in. wide—9yds. at 1/5		12	9
Hinges—1pr. 12in. T		1	6
Pad Bolt		1	6
Paint		15	0
Sundries		10	0
TOTAL COST OF MATERIALS	17	13	11

These prices are those ruling in Launceston at the time of writing, but, with the present unsettled condition of the steel industry prices are liable to fluctuate somewhat. If a cheaper dairy is desired, sawn weatherboards or palings may be used instead of the dressed weatherboards. In this case the purchase of dressed hardwood for the weatherboard stops and barge boards would not be justified. A further saving would be to purchase the window sash only from the joinery works, and have it fitting direct against the studs.

Wall Foundations

When the site has been selected peg out a rectangle 6ft. 8in. x 8ft. 8in. for the outside of the walls. Decide the height of the floor (about 6in. above ground level is suitable), then dig a shallow trench about 6in. wide for the wall foundations. Now erect the necessary boxing for the concrete, allowing 4in. for the thickness of the wall and for the boxing to come 5in. above the floor level, except at the position for the door. Here a gap of 2ft. 10in. is left, 2ft. 6in. being required for the door and 4in. for the studs, to the floor level. Also allow for a drain 3in. in diameter at floor level on the concrete wall the opposite side to the door. Next mix and pour the concrete, placing two bands of ¼in. round iron at intervals for reinforcing. Set two dowels of ½in. round iron for each wall plate. These dowels are set about 6in. into the concrete with a right angle bend, and project about 5in.

Walls

When the concrete has set sufficiently the construction of the wall is commenced. Base plates are cut out of 4in. x 2in. hardwood, two lengths at 6ft. 8in., and two at 8ft. 8in. being required. These are laid on their flat on the concrete, joined at the corners with a halving joint and held to the concrete by the dowels which pass through holes in the plates and are bent over. Bridge over the door gap and saw the piece out after the majority of the studs are up. Similar plates are now prepared for the top of the wall except that the longer plates project 1ft. 6in. at each end to allow for the overhang of the roof.

The 22 studs are next sawn to length. The height from floor to ceiling is 8ft., therefore the length of the studs will be 7ft. 3in. allowing 5in. for the concrete and 4in. for the two plates. Twenty studs are now sawn to this length while the two which are to be placed alongside the door will require to be 7in. longer, as they will go right to the floor. The position of the studs is shown on the plan and instructions for erecting the wall will be found in the last issue of the Journal, in which general principles of building construction were outlined.

The best position for the window is on the side opposite the door. The hopper type of window with the sash hinged at the bottom and opening inwards is the best type for dairies. One method is to buy the sash and frame complete from a joinery works, or the cheaper method is to dress the sides of the two studs against the window and fit the sash direct to these, and resting on and hinged to a sill of 6in. x 1½in. dressed hardwood set at an angle.

Ceiling

The ceiling of asbestos cement sheets insulates the dairy from the heat of the iron roof. Five ceiling joists are necessary. These are cut 6ft. 8in. long from 4in. x 2in. hardwood and nailed on their edge. A joist is set on each side with centres 1in. in from the inside edge of the wall, another is placed in the centre where the two sheets will join and one along the centre position for each sheet. Use 1in. clout tacks for nailing the asbestos cement.

Roof

The roof consists of a 6in. x 1in. ridge board, 6 rafters of 4in x 2in. hardwood and four purlins of 3in x 1½in. hardwood on each side to take the iron. Methods of deciding the pitch of the roof were explained in the last number of this series. If the top of the rafter is set 2ft. 9in. above the top plate and 6ft. iron is used, the overhang will be 1ft. 6in. The lower ends of the rafters are left uncut till the roof is on and then cut off level. When the rafters are in position the purlins are put on, spaced as shown in the plan. The edge of one pair of purlins is placed directly over the outside edge of the wall so that the top edge of the top weatherboard on each side can be nailed to it. The barge boards are now put on. These consist of 6in. x 1in. dressed hardwood, an inch longer than the rafters and having the same bevel on the ends. These four boards are nailed to the outside rafters and parallel to them and with their top edges 2in. higher than the rafters. The roofing iron is next applied, nailing the outside edge to the barge boards. Six and a half sheets of iron are required for each side. Nail to the bottom purlin on every second flute and the centre purlin at every third flute, taking care that the outside flute is nailed. The ridging is then put on. Spouting is not really necessary.

Ventilation

This is provided for by placing nogging right around at the bottom one foot above the concrete wall foundation and tacking fly-wire from this to the base plate. On the outside two rounds of

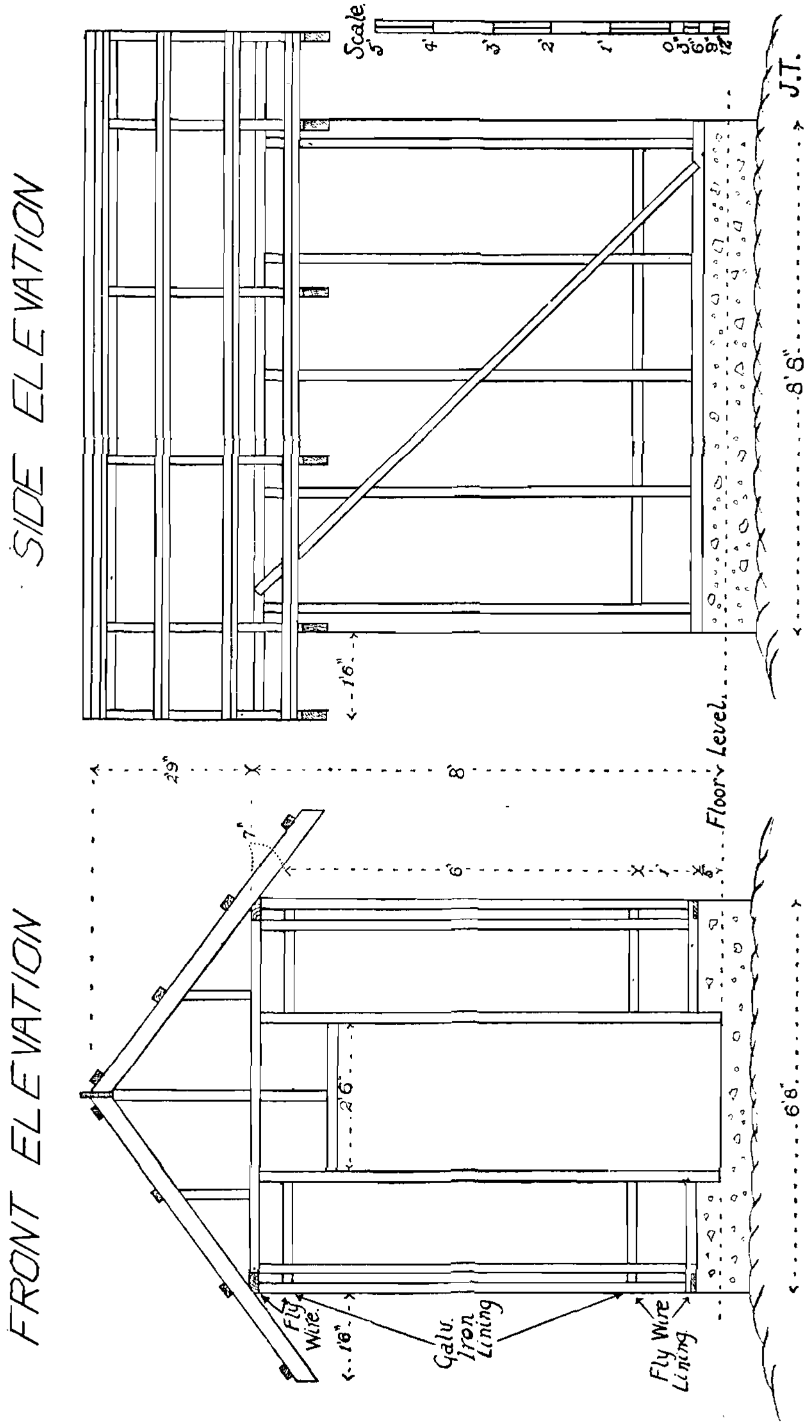

FRONT ELEVATION
SIDE ELEVATION
Scale
Floor Level.
Galv. Iron Lining
Fly Wire.
Fly Wire Lining
8'8"
6'8"
2'6"
1'6"
8'
29"
6'
J.T.

FIG. I

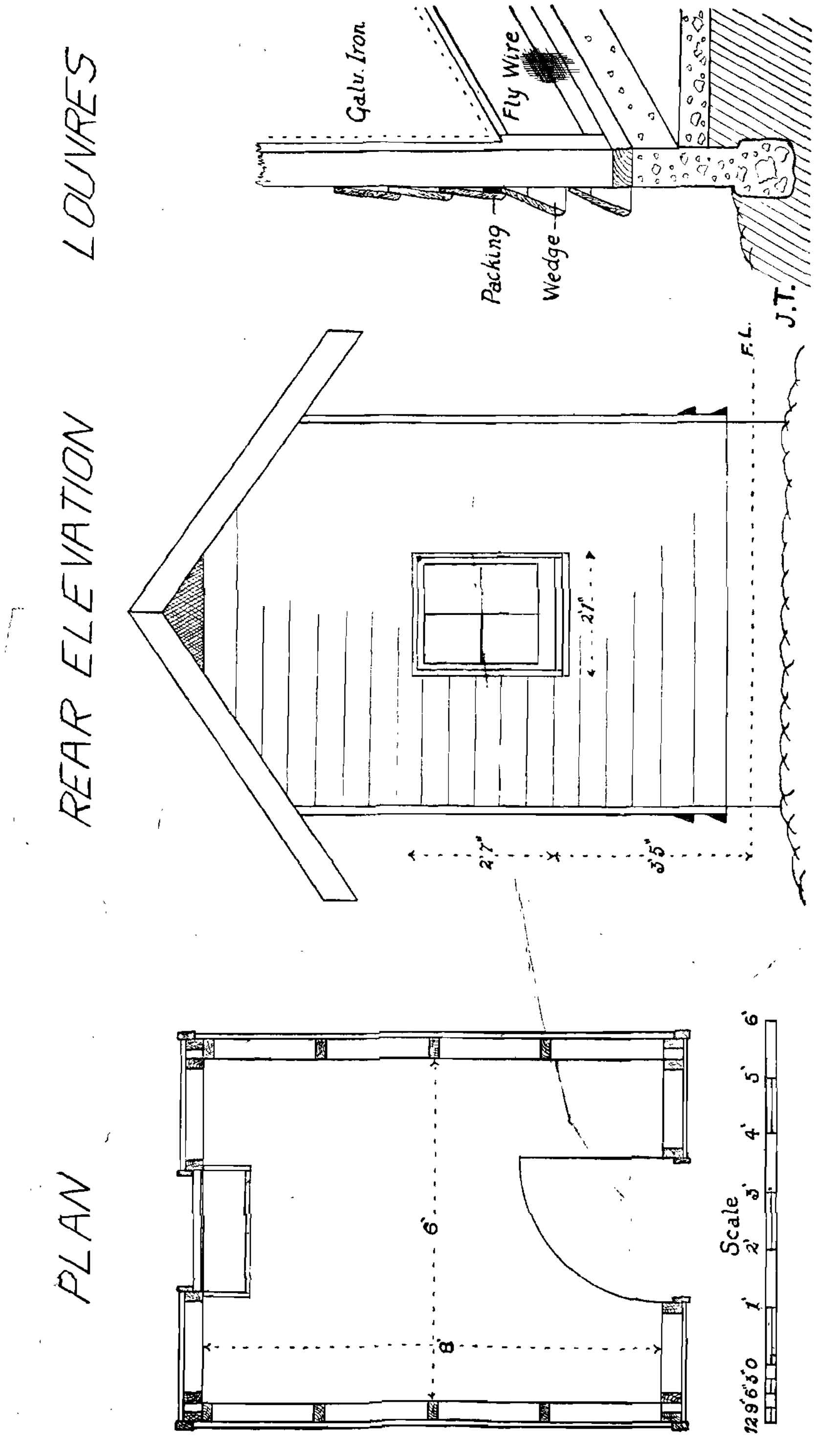

PLAN
REAR ELEVATION
LOUVRES
Galv. Iron
Fly Wire
Packing
Wedge
J.T.
F.L.
2'1"
2'7"
3'5"
6'
8'
Scale
12 9 6 3 0
1' 2' 3' 4' 5' 6'

FIG. II

weatherboards are put on as shown in figure II. to allow the air to reach the fly-wire. Another round of nogging is placed 6ft. above the first lot to take the top edge of the 6ft. plain galvanised iron lining, and, on the two sides sheltered by the overhang of the roof, the space from this upper nogging to the top wall plate is covered with fly-wire. It is a good plan to have a piece of fly-wire or $\frac{3}{4}$in. netting in the top of each gable. This will allow a circulation of air in the space between the ceiling and the roof and tend to keep the building cool. Perforated zinc may be used in place of the fly-wire as it has a longer life.

Finishing off Walls

The door stop of 4in. x 1in. dressed hardwood is now put on. The method of hanging a door direct to the stud has already been explained in the last number of this series. The stops project $1\frac{1}{4}$in. beyond the face of the stud. A narrow strip of galvanised iron is nailed to the top door stop along one edge and the other edge nailed to the door head to prevent water leaking off the weatherboards around the back of the stop. If the window is to be fitted direct to the rafters, similar stops and flushing are put in position here. Vertical corner stops of 3in. x $1\frac{1}{2}$in. dressed hardwood are now put on each corner from the concrete to the floor, then the weatherboards are nailed on, the bottom one being packed with wedges right around as shown in the sketch. Weatherboarding is then carried on in the normal manner till the second row of nogging is reached where a gap is left along the two sides to the top plate. A weatherboard is cut to fit in between the rafters, the top edge being nailed to the purlin, and the bottom edge to the top plate. The weatherboarding of the gables is carried on till about 1ft. from the ridge and the remaining triangle is filled in with fly-wire.

Lining

The 6ft. x 2ft. sheets of plain galvanised iron when stood on their ends should reach from the bottom to the top nogging, and from one rafter to the next. Ordinary 1in. flat-headed nails make a neat job of securing the iron, and, if the latter is put on neatly, no cover strips should be necessary.

Door

A suitable door can easily and cheaply be made from 6in. x $\frac{3}{4}$in. tongued and grooved pine lining boards. Cramp five of these boards 6ft. 6in. long together and nail to braces and ledges of 2in. x 1in. dressed hardwood.

Floor

The putting down of the concrete floor is a straight forward job, and if the directions already given in the first of this series are followed little trouble should be experienced. As the floor will be washed frequently the surface should be well worked with a steel float to get it as smooth as possible. The floor should be about 3in. thick, and have a slight slope about 2in. in 8ft. towards the outlet. The outlet is best placed on the opposite side to the door if this fits in with other drainage.

Painting

Do not wait until the building is finished before putting on the priming coat. The best procedure is to give the faces of all the weatherboards, the stops and the door and window frames a priming coat before they are put on. The boards for the door should be painted separately, working the paint well into the tongue and grooving before cramping the boards together. The second coat is then put on when the building is completed. All nail holes, etc., are puttied up after the priming coat is put on.

[To be Continued]

THE SUPPLY OF PLANT FOODS

The food of the plant consists of a small number of essential substances, some of which are obtained from the air while the remainder are supplied by the soil. The latter are taken into the plant only when they are dissolved in the soil; food in this state is termed "available".

The total natural supply of food in the soil is sufficient for many crops, but the bulk is unavailable as it exists as a solid, and is only very slowly dissolved. Its gradual solution maintains a supply of available nutriments. Where the rate of renewal is slower than the rate at which the crop exhausts the supply a deficiency occurs.

Deficiencies are in nearly all cases confined to one or more of the following:—Phosphates, Nitrogen, Potash and Lime. All of these essential elements can be supplied in concentrated form by the use of artificial manures. Nearly all Australian soils are deficient in Phosphate, hence the widespread use of superphosphate or "super".

Normal plant growth is dependent upon the presence of a sufficient supply of all of the essential foods. An excess of any one food will not compensate for the deficiency of another; thus, a heavy dressing of super will not produce the required result if the soil is seriously deficient in nitrogen.

Agronomy Division

RHUBARB CULTURE

By T. D. RAPHAEL, Horticulturist

LIKE many fruits and vegetables that are held in high esteem in England, but receive only cursory treatment here, rhubarb is seldom grown to perfection and in consequence does not fill the place in public popularity to which it is entitled. A short article, therefore, stressing the value of certain cultural considerations with a view to improved quality and ultimately increased demand, may be of assistance.

In addition to its health-giving properties, rhubarb commends itself to the average layman in that it can be made to grow under most conditions, and if handled correctly provides tender stalks of refined flavour practically the year round.

Although most market gardeners in Tasmania have a patch of rhubarb on their property, the roots receive comparatively little attention, and the highly prized forced article is almost unknown, and is rarely offered for sale to the public. The question, too, of varieties and strain would amply reward more serious consideration. In England, the focal point of the rhubarb industry centres around Leeds, and each spring a show devoted exclusively to rhubarb is staged, in which most of the leading growers of the British Isles compete. Classes are naturally more or less confined to the forced product at this season and competition is yearly becoming keener.

Botanically, rhubarb belongs to the family *Polygonaceae*, and many of the plants cultivated for culinary purposes are said to have been derived from *Rheum rhaponticum*, a native of Asia Minor, and named after the province of Pontus in that country. *Rheum undulatum* and *Rheum hybridum*, species once again of Asiatic origin, have also produced popular varieties now in culinary use.

As already suggested, the cultivation of rhubarb for commercial purposes may be pursued by two distinct methods, the first involving field cultivation for general main crop supplies, and the second forcing for the delicious out-of-season product.

Whatever method it is intended to pursue, the initial preparation of the soil and propagation of plants is the same, and it would therefore be relevant to consider field culture in all its aspects, and then pass on to the specialised forcing methods employed.

Soils and Soil Preparation

Though rhubarb can be exceptionally vigorous and strong in growth, soil preparation is very important. Probably the ideal soil is a deep and moderately light sandy loam. Prior to planting, "bastard" trenching or ploughing and sub-soiling is strongly recommended, a dressing of from 20 to 30 loads of good farmyard manure being applied at the same time. The freer the land is from weeds of a perennial type, the better, for in the early stages young sets are very susceptible to injury through competition from other plants.

Propagation

Although a reasonably good sample of rhubarb can be obtained from seed, and the bulk of the plants thus produced come true to the characteristics of the parent, varieties are by no means fixed. For this reason, the majority of recognised types are propagated by root division rather than seed. Large commercial growers and seed merchants, however, regularly make sowings from selected plants and strains, and later, by re-selection and root division, eventually work up very fine stocks particularly adapted to their locality and market requirements.

Sowing

Seed is generally sown in September, and under average conditions the rows may be run at three feet apart, and the young plants first thinned to six inches and then re-thinned and rogued with the object of eliminating poor types, until a stand is left at from 12 to 18 inches in the row. Under favourable conditions in Tasmania, it is not unusual for a proportion of the young leaves to be actually fit for pulling and marketing six or seven months from sowing, but this practice is not recommended if really strong roots are to be obtained. During the spring following sowing, good stands of seedling rhubarb can be thinned to three feet in the row and further extension be made with the thinnings. After the second growing season the observant grower can, if desired, make his selection of clonal stocks for future beds. It is assumed that he will start where the seed merchant left off, and select only from exceptionally vigorous plants true to the original parent variety and with perhaps certain characteristics which appear to commend them particularly to local conditions.

Root Division

In this method, which is undoubtedly the most certain, the whole root is lifted intact and is divided with a knife or chopper, so that each portion contains at least one good eye. The sets thus obtained are trimmed and planted out in their permanent positions at from three to four feet square, according to soil and habit of growth.

Prospective growers who wish to enter the trade with the assurance that, as far as variety is concerned, nothing has been left to chance, are advised to obtain sets or well developed roots of two or three leading varieties from a thoroughly reliable source. Good seed handled in the manner detailed may also provide very useful material for future stock, but as already indicated, is less certain. With regard to the duration of beds, whilst such have been known to remain commercially profitable for ten years, and more, five years is more usual, and for a good succession, areas might be laid down every second year with advantage.

Routine Work

Like other crops, rhubarb responds to frequent cultivation and suppression of weed growth throughout the summer season. Where intensive methods are practiced, inter-crops, such as lettuce, spinach, and even dwarf peas or French beans can be grown between the rows, particularly in the earlier years of a young bed.

Picking may be carried out continuously on two year and older beds which have been adequately manured and worked, and provided this is done in moderation, no serious weakening of the plants will result. No plants in the cropping area should be permitted to run up seed heads, the flowering stems being removed immediately they are noticed.

In May the area is prepared for winter by removing all the dying leaves and digging in a dressing of farmyard manure or six cwt. of blood and bone per acre. Drainage furrows are also advised. In view of the fact that the plant is a gross feeder, an additional dressing of artificials composed of two cwt. Sulphate of Potash and four cwt. Superphosphate is given in August. In November the plants will respond to an application of two cwt. Sulphate of Ammonia; an earlier dressing of nitrogenous fertilisers is advisable where organics have been restricted.

With regard to the actual picking of the leaves, these are removed from the root by catching the stalks close to the ground and detaching with an outward twisting movement. When executed in this way the pale coloured base and sheath come away with the rest of the stem. The leaf blade is removed, and the stalks bunched in dozens of equal size and quality. The young leaf stalks are the most desirable for general use.

Early Crops and Forcing

Early produce yields the most remunerative returns to the grower, and it therefore follows that if the season can be advanced even to a comparatively slight extent by altered cultural practices, it is to the grower's advantage.

Assuming that selection of locality, soil and aspect have received due consideration, the chances of early produce will be still further enhanced by covering the crowns in late autumn with leaves, straw litter, and stable manure, to a depth of about six inches. This results in rapid development, and will induce the production of succulent, if somewhat short stalks early in the spring.

The next method is really an elaboration of the ridging system, and involves the use of inverted pots, boxes, baskets, or tubs, with detachable bottoms. These are placed over the crowns of the plants and insulated on the outside with a coating of fermenting manure. In this way not only is early growth promoted by the heat of the manure, but the stalks have ample room for development, and being in total darkness are long, tender and delicately coloured. Picking is permitted by removal of the detachable bottoms, and these are replaced after the removal of all those stalks which have attained the right stage of development.

Another system is to lift the roots in June, and pack them closely together in frames placed on top of a one-and-a-half to two feet layer of manure. In this way the manure is greatly economised, and the heat generated is conserved by the surrounding soil. Light is, of course, excluded by movable wooden sashes or thick sacking over the ordinary glass, and excellent samples can be produced.

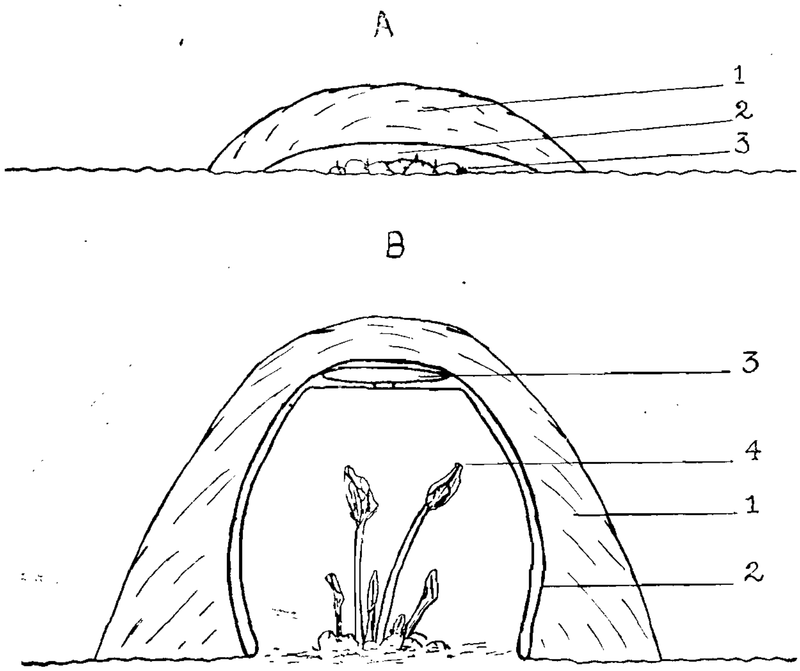


FIG. I

FORCING IN THE OPEN

A — Layer of manure.
2. Layer of soil.
3. Root.

B — 1. Layer of manure.
2. Inverted cask, box, or other container.
3. Detachable bottom.
4. Young rhubarb stalks.

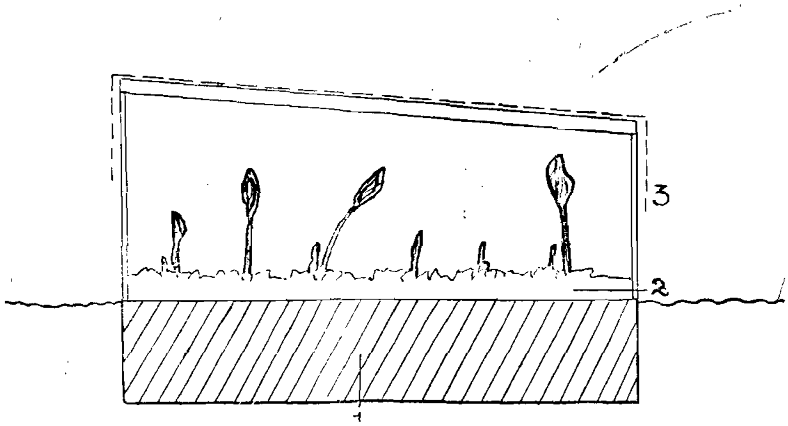


FIG. II

FORCING IN COVERED FRAMES SET ON HOT BEDS

1. Layer of decomposing manure.
2. Shallow layer of soil or leaf mould.
3. Tarpaulin or other cover to exclude light.

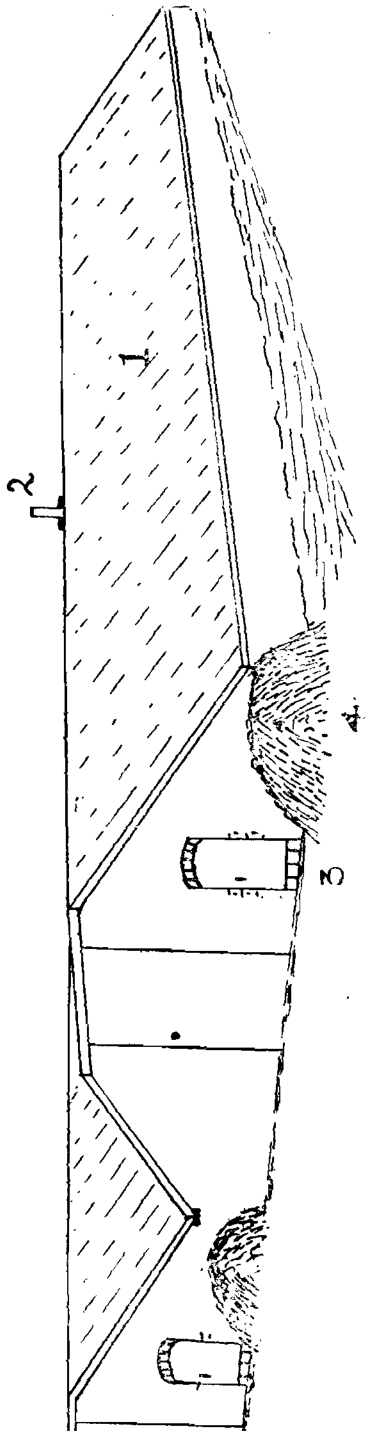


FIG. III

FORCING IN HEATED PITS OR SHEDS

1. Roofing material or tarpaulins, sacking, etc., placed over glass.
2. Central chimney.
3. Furnace. There are usually two, one at each end, with flues running to the central chimney.
   Hot water and steam heating systems are also used.
4. Fuel.

So far all the methods described require large quantities of farmyard and stable manure, and as this, though excellent, is becoming increasingly difficult to procure, other methods have been evolved. By far the greater portion of the forced product is now obtained by lifting specially selected roots and transferring them to heated houses, cellars or pits.

Much of the success in forcing depends upon the production of really large, healthy stools, and consequently three year roots grown with ample room for maximum development have proved the most satisfactory. During the summer prior to forcing, little or no leaf should be cut from these plants. In colder districts inland and at higher elevations the plants can be "finished off" more rapidly in autumn, which is an advantage where it is desired to commence forcing operations in May. Normally, however, plants are ready for lifting in June, and, if correctly forced, stalks should be available from July onwards. It is recognised that very early forcing rarely produces the quality and quantity of later work.

The lifted roots, when transferred to their forcing quarters, are packed closely together on borders of prepared soil four feet wide and leaf mould is then scattered on top to assist the retention of moisture around the crowns, light, of course, being excluded. For the first week, provided the mean temperature of the house is five or six degrees above outdoor conditions, no heat will be necessary, but after this period the mean temperature should be gradually raised to and eventually maintained at 60 degrees Fahrenheit. The beds are kept reasonably moist by sprinkling with the hose on alternate days, but should never be soaked.

Young stalks are removed when they have reached 15 inches or so in length and should then be culled, graded and neatly bundled. These bundles are prepared by tying with raffia at each end, and may be sold by weight rather than by number of sticks. With the forced product, it is unnecessary to remove the blade of the young leaf.

After forcing, the roots are re-selected and planted out of doors where they soon regain normal vigour, though unsuitable for forcing purposes again until two seasons have elapsed.

Varieties

Surprisingly little care has been exercised in the selection of varieties by growers in this State, and a few notes may be of assistance. In England, the leading varieties for all-round work are as follows:—Champagne—a large well-coloured early; Prince Albert—also vigorous and early; Linnæus—a second early with excellent colour; Victoria—a heavy producing, coloured late; Dawes Champion—highly coloured, though less vigorous than Victoria.

For forcing purposes the following varieties:—Early Albert (selection); Sutton; Linnæus; Victoria (selection). Dawes produces a very highly coloured stalk when forced, and Appleton, a more recent introduction, is also taking a place in commercial production.

Selections of Victoria, Albert, and others are already grown locally, but stocks are very mixed indeed, owing to intermittent propagation by seed.

Mainland nurserymen catalogue a fair range of selections and in addition to those already mentioned, Topps Winter and Wilson's Ruby are outstanding.

If full use is made of these varieties an extended season of good quality sticks will be assured and, by means of judicious forcing, the short winter gap will be bridged by a high quality product which must eventually claim a strong demand and yield lucrative returns to the producer.

the flowers themselves are frequently stripped from the flower-stalk and used as such without further preparation.

There is another Lavender (Lavandula spica) which is also in cultivation. This plant is inferior, and the odour of the extracted oil is rather strong and unpleasant, but is reputed to have certain medicinal properties. It is sometimes employed as an adulterant to the true lavender.

MARJORAM, POT

(Origanum vulgare—LABIATAE)

Perennial, growing into a bunch or clump eighteen inches to two feet in height. Propagation may be done by seed, a thinned border thus formed lasting for a number of years without much attention. The flowers are attractive, being purple generally, but varying to pink and white in some strains.

USES.—The flowers and leaves are used for flavouring either in the green or dried states.

MARJORAM, SWEET KNOTTED

(Origanum Majorana—LABIATAE)

A perennial, but grown as an annual in colder regions, reaching eighteen inches or more in height.

Propagation is done by seed sown in spring, the plants being then thinned ont to nine inches apart in the rows. The first leaves are generally ready for harvesting within six or eight weeks of sowing.

USES.—The flower heads which carry small white florets, and the green leaves may be used as condiments and are excellent for flavouring soups, stews, etc. The volatile water-soluble oil is also sometimes used medicinally.

MINT

(Mentha viridis—LABIATAE)

Perennial herb with a creeping rootstock, reaching two feet in height. Propagation is usually done by division in spring, though cuttings and seed are also quite satisfactory. A cool, moist situation is very desirable. Plantings are made in rows two feet apart and six inches between the sets. If properly looked after such beds will last about three years, when renewal is recommended.

USES.—Very commonly used for flavouring, and in mint sauce.

PARSLEY

(Carum petroselinum—UMBELLIFERAE)

Biennial, low and close-growing with fern-like, or much curled leaves arising from the base of the plants.

Propagation is done from seed, and commencing in early spring, several successional sowings are made. In late summer a final sowing takes place for the supply of leaf during winter and early spring. The plant, which thrives on both good light and heavy soils may be used as an edging or is cultivated in rows one foot apart, the young plants being thinned to four inches apart in the row. In the late sown beds, however, thinning should be done sparingly, as the leaves produced are small, the denser rows will also winter more satisfactorily. It is advisable to grow only the fern or curly-leafed varieties. These are not only better for garnishing, but will ensure the consumer against the inadvertent use of closely allied poisonous species.

USES.—Very commonly employed for garnishing most dishes, and in soups, white sauces and stews.

ROSEMARY

(Rosmarinus officinalis—LABIATAE)

A perennial, upright, much-branched, aromatic undershrub, attaining up to four feet in height. The narrow leaves are green on top and grey on the under-sides, whilst the flowers which are borne in leafy clusters are blue-grey in colour.

It is rarely propagated by seed, branches or tufts removed from the parent plants, striking readily when planted firmly in the soil. An open, rather light, dry soil produces good results, and better types are therefore rarely used for this plant. Little or no cultivation is necessary, once the plants are established, and they make a low attractive hedge or border when set out two feet apart.

RUE

(Ruta graveolens—RUTACEAE)

Though a perennial and propagated by division, plants may be easily raised from seed and set out at 18 inches square; a height of from one-and-a-half to two feet is usual, the leaves being twice or thrice divided and the flowers large and greenish in colour.

USES.—The leaves are bitter with a rather unpleasant, pungent odour. The plant used to be much utilised for seasoning.

SAGE

(Salvia officinalis—LABIATAE)

Perennial, growing to 18 inches. The shrubby growth is woody in form with oval, pale green leaves, and spikes bearing clusters of bluish flowers.

Propagation may be done successfully by seed sown in autumn or spring, but where a particularly good type is required, softwood cuttings taken from selected plants in early spring may be struck under glass, and later set out at 15 inches square in permanent quarters. Such beds or edgings will last a number of years if kept reasonably clean, and should be cut down each spring to within six inches of the ground. The plant thrives best in well-drained to rather dry calcareous soils.

USES.—The fresh leaves are much used for seasoning pork, sausages, poultry and game. A good keeping product is obtained by cutting and carefully drying the young shoots before flowering.

SAVORY, SUMMER

(Satureia hortensis—LABIATAE)

Annual dwarf-growing herb, rarely exceeding eight inches in height with clusters of white or pink flowers.

Propagation is carried out by seed sown in a warm, well-drained situation during September. The distance between rows is generally about one foot, thinning being done to eight inches apart in the row. Where grown in borders, slightly closer planting can be done.

USES.—The leaves, which are aromatic, may be removed as required for flavouring purposes. When drying for winter use the plants are allowed to grow to the flowering stage, and are then cut down and handled in the usual way.

SAVORY, WINTER

(Satureia montana—LABIATAE)

Perennial plant from 12 to 18 inches in height, and rather spreading in habit. The white, pink, or lilac flowers are borne in axillary clusters.

Propagation can be done either by seed, cuttings or plant division, and owing to the rather spreading habit, from 15 to 18 inches should be allowed each way, in the permanent beds.

USES.—The leaves and young shoots are employed for flavouring purposes as with summer savoury.

TANSY

(Tanacetum vulgare—COMPOSITAE)

A herbaceous, aromatic perennial, to three feet with oblong much divided leaves and yellow flowers in clustered terminal heads. Full grown plants are obtained from seed in a very short period, and continuous supplies of leaf may be assured by periodically removing the flower heads.

USES.—The leaves are employed in the flavouring of omelettes and puddings, as well as in seasoning. Medicinal extracts of Tanacetum are stocked for a variety of disorders.

TARRAGON

(Artimesia Dracunculus—COMPOSITAE)

Aromatic perennial, two to three feet with numerous branching stems and lanceolate leaves, the inconspicious white flowers are generally sterile.

Propagation is done by division or by striking cuttings in spring, the young plants being set out at one foot square. Rather dry soils of poor quality may be utilised successfully.

USES.—The leaves impart the flavour of anise, and are widely used for seasoning of salads, vinegar, pickles and the like. Oil of Tarragon is also important, being distilled from the leaves and stems gathered just before flowering.

THYME, COMMON

(Thymus, vulgaris—LABIATAE)

Perennial, very dwarf, branched shrub, up to six inches with triangular, fragrant leaves, the small lilac pink flowers are produced in clusters towards the tip of the stem.

Propagation may be done in well-drained, warm soils from either autumn or spring sown seed, or by division and cuttings. This plant is particularly suitable for borders, four inches being allowed between the plants, but if cultivated in beds a foot must be allowed between rows for easy hoeing, etc. Renewal is recommended once every three or four years.

USES.—The leaves and shoots are used for seasoning, supplies for winter flavouring being assured by cutting the shoots when the first flowers appear, and then bunching and drying in the usual way.

THYME, LEMON

(Thymus Serpyllum vulgaris—LABIATAE)

Perennial, creeping under-shrub with very small lilac or pink coloured flowers more or less congested into a head. With such habits this plant is particularly prized for rockeries and stone borders.

Propagation is similar to the methods used for the common Thyme, and it succeeds under very similar conditions; it will spread and layer naturally.

USES.—The leaves are of delicate and agreeable flavour and often used where only a mild seasoning is desirable.

GENERAL

Whilst an effort has been made to deal separately with the commonest and most popular herbs in cultivation, there are, however, a large number which are well-known by name and reputation but are seldom seen growing. Amongst these might be mentioned Angelica, the seed of which is used in liqueurs, the leaf stalks in confections and the root in medicine. Anise *(Pimpinella Anisum—UMBELLIFERAE)*, with its aromatic seed heads so generally used in liqueurs and confections (aniseed oil). Chamomile *(Anthemis nobilis—COMPOSITAE)* from which various stimulative decoctions are made. Wormwood *(Artemisia Absinthium—COMPOSITAE)* a stimulant used in flavouring and liqueurs. Saffron *(Crocus sativus—IRIDACEAE)* in which the flower parts are dried and used for colouring and confections. Round-leaved Sorrel *(Rumex scutatus POLYGONACEAE)* and certain other Sorrels, Rampion *(Campanula Rapunculus—CAMPANULACEAE)* and Purslane *(Portulaca oleracea—PORTULACACEAE)* are also frequently listed in Seed Catalogues under "Herbs," though actually used more as salads or cooked vegetables.

Probably many other plants could be mentioned which might claim inclusion in the present treatise, but as already stated the leading varieties have been reviewed and those seeking further information can only be referred to the popular herbals or other pharmaceutical works.

For general information a table summarising the herbs discussed and the main uses to which they are put, is appended.

HERBS	USES: Garnishing	Seasoning	Condiments, Sauces and Pickles	Confectionery and Cakes	Cordials, Wines and Liqueurs	Salads and Vegetable	Medicinal	Scents and Perfumes
1. **Angelica** (Archangelica officinalis)—**Umbelliferæ**	—	—	—	stems, etc	—	leaf	root	—
2. **Anise** (Pimpinella anisum)—**Umbelliferæ**	—	—	seeds	seeds	seeds	—	seed	—
3. **Balm** (Melissa officinalis)—**Labiatæ**	—	leaves	—	—	leaves	—	—	l'ves, etc.
4. **Basil, Sweet** (Ocymum Basilicum)—**Labiatæ**	—	leaves	—	—	—	—	—	extract
5. **Borage** (Borago officinalis)—**Boraginaceæ**	flowers	—	—	—	fl'r heads	—	—	—
6. **Caper-Bush** (Capperis spinosa)—**Capparidaceæ**	—	—	fl'r buds	—	—	—	—	—
7. **Caraway** (Carum carvi)—**Umbelliferæ**	—	—	seed	seed	seed	—	—	—
8. **Celery** (Apium graveolens)—**Umbelliferæ**	leaves	leaves	leaves	—	—	stems	—	—
9. **Chamomile** (Anthemis nobilis)—**Compositæ**	leaves	—	—	—	—	—	extract	extract
10. **Chervil** (Anthriscus cerefolium)—**Umbelliferæ**	leaves	leaves	—	—	—	leaves	—	—
11. **Chives** (Allium schœnoprasum)—**Lilaceæ**	—	leaves	leaves	—	—	leaves	—	—
12. **Coriander** (Coriandrum sativum)—**Umbelliferæ**	—	—	seed	—	seed	—	—	—
13. **Dill** (Anethum graveolens)—**Umbelliferæ**	—	seed	seed	—	—	—	—	—
14. **Fennel** (Fœniculum officinale)—**Umbelliferæ**	—	—	leaves	—	—	stems	—	—
15. **Horehound** (Marrubium vulgare)—**Labiatæ**	—	leaves	—	—	—	—	leaf ext't	—
16. **Horse Radish** (Coclearia armorachia)—**Cruciferæ**	—	—	root	—	—	—	—	—
17. **Hyssop** (Hyssopus officinalis)—**Labiatæ**	—	—	l'ves, etc.	—	—	—	—	—
18. **Lavender** (Lavandula vera)—**Labiatæ**	—	leaves	—	—	—	—	extract	fl'r ext't
19. **Marjoram, Pot** (Origanum vulgare)—**Labiatæ**	—	leaves	—	—	—	—	—	—
20. **Marjoram, Sweet or Knotted** (Origanum Majorana)—**Labiatæ**	—	leaves & shoots	—	—	—	—	—	—
21. **Mint** (Mentha viridis)—**Labiatæ**	—	—	leaves	extract	leaves	—	—	—
22. **Parsley** (Carum petroselinum)—**Umbelliferæ**	leaves	leaves	leaves	—	—	—	—	—
23. **Purslane** (Portulaca oleracea)—**Portulacaceæ**	—	—	—	—	—	leaves	—	—
24. **Rampion** (Campanula rapunculus)—**Campanulaceæ**	—	—	—	—	—	roots & leaves	—	—
25. **Rosemary** (Rosmarinus officinalis)—**Labiatæ**	—	leaves	—	—	—	—	—	extract
26. **Rue** (Ruta graveolens)—**Rutaceæ**	—	leaves	leaves	—	—	—	—	—
27. **Sage** (Salvia officinalis)—**Labiatæ**	—	leaves	—	—	—	—	—	—
28. **Saffron** (Crocus sativus)—**Iridaceæ**	—	—	—	fl'r parts	fl'r parts	—	—	—
29. **Savory, Summer** (Satureia hortensis)—**Labiatæ**	—	leaves & shoots	—	—	—	—	—	—
30. **Savory, Winter** (Satureia montana)—**Labiatæ**	—	do.	—	—	—	—	—	—
31. **Sorrel, Round-Leaved** (Rumex scutatus)—**Polygonaceæ**	—	—	—	—	—	leaves	—	—
32. **Tansy** (Tanacetum vulgare)—**Compositæ**	—	leaves	—	—	—	—	—	—
33. **Tarragon** (Artemisia dracunculus)—**Compositæ**	—	leaves	—	—	—	—	—	—
34. **Thyme, Common** (Thymus vulgaris)—**Labiatæ**	—	leaves & shoots	—	—	—	—	—	—
35. **Thyme, Lemon** (Thymus serpyllum vulgaris)—**Labiatæ**	—	do.	—	—	—	—	—	—
36. **Wormwood** (Artemisia Absinthium)—**Compositæ**	—	—	—	—	extract	—	extract	—

ORCHARD SPRAYS

REGULATIONS AND STANDARDS

By P. H. THOMAS, Chief Horticulturist

ONE of the most costly items in the production of fruit crops is the necessary protection against insect and fungus pests which orchardists now have to provide in practically all districts.

During recent years a number of new pests have appeared, and to-day the control problem has become more difficult, involving the adoption of a carefully considered programme, in which a number of chemical preparations are combined and applied at different periods throughout the season. As the orchard pests have increased in number, so have the proprietary specifics for dealing with them, and the grower to-day has choice of a very wide range of brands for which each vendor claims especial merits.

Whilst the grade names adopted by the manufacturers for their specifics are legion, analyses of the products reveal that the constituents are practically confined to such chemicals as arsenate of lead, lime, sulphur, copper sulphate, oil, together with certain vegetable extracts. Realising the importance of effective pest control to the producer, it has recently become apparent that the general policy of spray trials should be supplemented by an effective supervision of the different pesticides which are offered for sale, and with this object in view, an Act has been passed by Parliament giving the necessary powers for such supervision.

The Regulation under this Act will be enforced this season, These in effect make it necessary for all "Dealers" in pesticides to register with the Department of Agriculture on or before the 1st July each year, and supply on a special form the following particulars:—

1. Their name and place of business.
2. A list of the pesticides offered for sale, stating the trade name and manufacturer.
3. A complete analysis of each pesticide, showing the active constituents which are water soluble.
4. A copy of the label affixed to each package.
5. The standard weight and volume of packages.

A registration fee of 5/- for each pesticide is prescribed, but the total fee paid in any year by a "dealer" is not to exceed £1.

The initial registrations are now being made and the work is proceeding satisfactorily. However, it is opportune to mention certain aspects upon which misunderstandings have arisen, with a brief explanation of the procedure adopted.

Under the Stock Medicines, Fertilisers, and Pesticides, Act. a "dealer" is defined as "Any person who carries on business as a manufacturer, importer, seller of, or dealer in pesticides as the case may be, for the purpose of trade".

In Tasmania very few sprays are manufactured, and practically the whole of the pesticides used are imported from the Mainland or from Overseas. For this reason, registration will be practically confined to vendors who import from these sources. In order to facilitate adminstration the dealer may arrange with the manufacturer to supply to the Department of Agriculture the analyses of the pesticides stocked, together with copies of the labels affixed to packages. Where this course is followed it will only be necessary to furnish a return of the pesticides handled (as detailed (1) and (2)), endorse the form to the effect that the analyses are as stated by the manufacturer and sign.

The general quality of sprays has improved during recent years, chemical research is being extended, and owing to the keen competition the inferior article soon loses its place in the market. However, the new regulations supplemented by inspectorial work and periodical analyses which will be made will ensure that the different pesticides are not below the prescribed standards.

The analyses supplied will also enable more reliable advice to be given in respect to spray combinations, and the possibility of any harmful reactions that may prove injurious to foliage, whilst the particulars declared on the label will assist the grower in assessing spray values, safeguard against deterioration, and ensure that the weights and volumes are as represented.

The introduction of these regulations and their necessary observance may cause a certain amount of inconvenience to the trade in the initial stages. It is felt, however, that the majority of those concerned realise the necessity for such action, and will cooperate with the Department of Agriculture in their administration so that the producer may obtain the full benefit of the new service.

ABORTION-FREE HERDS

As at 30th June, 1938

THE following herds have been declared free of Contagious Abortion in accordance with the requirements of the scheme for certifying herds.

Northern District and Flinders Island

Owner	Address
Ashley Home for Boys	Deloraine
Badcock, B. M.	"Willow Vale," Whitemore
Badcock, F. R., and Sons	Whitemore
Badcock, H.	Hagley
Badcock, L. A.	Whitemore
Barker, A. C.	Lemana Junction
Barker, F. T.	Ravenswood
Beardwood, T. J.	Peel Street, Prospect
Blundstone, Estate J. E.	(Whitemark Herd) Flinders Is.
Davie, J. L.	Blue Rocks, Flinders Island
Foster, R. J. L.	"Pleasant Banks," Evandale
Gardner, H. R., and Sons	Relbia
Gladman Bros.	Carrick
Gowans, W. C.	Glengarry
Green, S. G.	Penquite
Hall, E. G.	"Alanvale," Launceston
Hamilton, R. W. L.	Ranga, Flinders Island
Hammond, G.	Blue Rocks, Flinders Island
Harley, C. D.	Whitemark, Flinders Island
Haworth, H.	Ranga, Flinders Island
Heazlewood, H. R.	Whitemore
Heazlewood, Roy K.	Whitemore
Heazlewood, Tas. A.	Hagley
Hingston, S. J.	"Rosaville," Whitemore
Iles, Mrs. E. T.	Whitemark, Flinders Island
Lansdell, Mrs. Elsie	Bracknell
Mackenzie, E. E.	Ranga, Flinders Island
Martin, W.	Ranga, Flinders Island
Masters R.	Hagley
Mathews, S.	Whitemark, Flinders Island
Morton, R.	Emita, Flinders Island
Paterson, J. W.	Longford
Prewer, H. W.	Whitemore
Relbia Farm and Dairy Co.	Relbia
Reynolds, H. B.	Relbia
Scott, B.	Hagley
Scott, H. Barclay, and Sons	Whitemore
Scott, R. B.	Hagley
Smith, H. N.	Hagley
Stuart, L. A.	"Valmont," Whitemore
Thompson's Estate	"Wingaroo," Emita, Flinders Island
Walker, J.	Whitemark, Flinders Island
Wells, H. Lucadou	"The Moat," Carrick
Welsh, W.	Whitemark, Flinders Island
Willis, V.	Whitemark, Flinders Island

North-Eastern District

Beswick, A. M.	Branxholm
Beswick, R. D.	Derby
Briggs, A. H.	"The Grange," Scottsdale
Briggs, C. H.	"Cloverlea," Scottsdale
Daft, E. F.	Lietinna
Dilger, A. C.	Herrick

Owner	Address
District School Farm	Scottsdale
Edwards, J. C.	Derby
France, A., and Sons	Ringarooma
Geale, Mrs. G. B.	Jetsonville
Gill, V.	Minstone Road, Scottsdale
Goss, L. V.	West Scottsdale
Haines, H. C.	"Cranleigh," Ringarooma
Hookway, H. H.	Scottsdale
Jessup, A. V.	Springfield
Johnson, J. F. and G. M. L.	"Queechy," St. Helens
Loosmore, T. C.	Scottsdale
McKenzie, F. R.	Winnaleah
Mervyn Bræ Stud	Scottsdale
Priestley, Tas. R.	North Scottsdale
North-Eastern Soldiers' Memorial Hospital	Scottsdale
Ranson, F. W.	Derby
Ranson, J. S.	Branxholm
Robinson, H. A.	New River, via Ringarooma
Salier, H. G.	"Vine Grove," Scottsdale
Smith, Eric J.	Springfield
Steel, L. J.	Falmouth
Treloggen, D.	St. Helens
Treloggen, J. W., and Sons	St. Helens
Wadley, R. J.	Springfield
Williams, J. H.	Springfield

Circular Head District

Freeman, G. J.	Montumana
French, H. R.	Montumana
King, F.	Forest
Lee, L. S.	Roger River
Mackay, Prof. J. H.	Roger River
Malley, E. R.	Roger River
March, Mrs. A.	Lileah
Marshall, D. H.	Roger River
Medwin, C.	Montumana
Medwin, G.	Montumana
Ollington, W. L.	Forest
Ollington, W. W.	Forest
Reasons, A.	South Forest
Spinks, L. K.	Lileah
Stone, J. T.	Roger River
Waters, G.	Forest
Wyllie, A.	Forest

North-Western District

Beveridge, H. C., and Sons	New Ground
Bovill, H. Y.	"Thornhill," East Devonport
Briggs, G. H.	Glance Creek
Cannon, S. L.	Gunn's Plains
Cocker, C. L.	Lower Barrington
Coombe and Bedlington	Forth
Corbett, A. J.	Penguin
Dicker, W. T.	Yolla
Duniam, R. M.	Mt. Hicks
Gladwell Bros.	Elliott
Harding, W. T.	Somerset
Hiscutt, J. T.	Howth
Kuipers, Capt. D.	Wynyard
Lakin, G. M.	Gawler
Lambert, J. D.	Latrobe
Lambert, K. T.	Merseylea
Littlejohn, Mrs. H.	Penguin

Owner	Address
Loane, N. E.	Wesley Vale
Lockwood, H. C.	West Kentish
McKenna, A.	Spalford
Mackenzie, R. G.	Somerset
Marriott, H.	Yolla
Midgley, A.	Penguin
Moles, H.	Penguin
Morse, R. V.	Yolla
Parsons, G. H.	Thirlstane
Perkins, V.	"Calthorpe," Latrobe
Robotham, H. V.	"Rothstock," Ridgley
Roebuck, Newcombe	"Alfriston," Native Plains
Rockliff, H. V.	Riana
Sadler, B. T.	"Rannoch," East Devonport
Roberts Thomson, W. E.	Wynyard
Townsend, A. W.	Ridgley
Travers, J. A.	Sulphur Creek
Trethewie, F. E.	Lower Mt. Hicks
Wells, J. L.	Upper Mt. Hicks
Wing, S. E.	Preston
Yaxley, J. B.	Mt. Hicks

Southern District

Allanby, C.	Bream Creek
Alomes, Mrs. V.	Bream Creek
Bryan, J. R.	Copping
Calvert, A. D.	Granton
Calvert, M. M.	Cambridge
Clifford, Frank G.	Kellevie
Cooley, H. S.	Bream Creek
Corney, G.	Campania
Dodridge, S.	Cambridge
Dransfield, W.	Copping
Eyles, E.	Waterworks Road, Hobart
Featherstone, F.	Sorell
Featherstone, G. J.	"Belmont," Sorell
Fergusson, F. C.	"Brooklyn," Penna
Fisher, James E.	Oatlands
Hanslow, G. T.	"Green Fields," Cambridge
Hills, G. and F.	"Braeside," Cambridge
Lachlan Park Hospital	New Norfolk
Lewis, N.	Cambridge
Lucas, H. E.	Kingston
Mays, L.	Waterworks Road, Hobart
Meredith, D. O.	Plenty (Box 634B, G.P.O.,
McLeod, T. B.	Richmond
Reed, G. E.	Richmond
Rumney, B. L.	Lower Sandy Bay, Hobart
Shoobridge, H. W. and A. G.	Bushy Park
Smith, W. J.	Copping
Steele, R.	West Hobart
Tatnell, T.	Bream Creek
Taylor, M. K.	Brighton
Watchorn, J. B.	Kingston
Wilson, F.	Waterworks Road, Hobart

CHILD WELFARE NOTES

By OLIVE M. GREEN, Sister-in-Charge, Baby Health Clinic, **Launceston**

Weighing the Baby

THE weight of a child is our best all-round method of estimating the state of nutrition, and the little human being should be weighed, measured and supervised throughout his first vital years of life. Growth, of course, is essential, being one of the laws of life, and something is wrong if an infant fails to gain, or loses weight, over a considerable period, without apparent cause. If he is more than 10% below the average weight for his height and age, we call the child undernourished and certainly he should not be allowed to remain in this state of malnutrition. The causes should be ascertained and if possible removed.

Some babies, and toddlers too, are overfat and consequently overweight for their age and height. That is not desirable either for perfect growth. The overfat, wrongly-fed baby has no resistance and at any time during babyhood will prove his unfitness should he fall a victim to disease. Certain foods have too much sugar or starch in their composition, and this defect tends to produce fat heavy babies who may look alright, but sugar and starch will not build bone and muscle. Growth founded on a wrong basis is not maintained indefinitely.

How much should Baby Weigh

The average normal baby is about 7½lbs. at birth. There is usually an initial loss during the first few days, and at the end of a fortnight or three weeks he will have regained his birthweight. The curve of the normal line shows that for the first three months of life the baby gains six to eight ounces per week; the second three months, four to six ounces per week; from six to nine months about three ounces weekly, and from then onwards two ounces. He doubles his birthweight at six months, and trebles it at one year.

Roughly speaking, the average gain during the first year is about 13lbs.; the second year six to seven lbs., and during the third and fourth year about three lbs.

A baby who is very small at birth may gain more rapidly than the normal weight and a baby bigger at birth often marks time, gaining less rapidly than his smaller brother. Height, racial and hereditary conditions must be taken into consideration when weighing the baby, as well as his bony construction. For instance tall parents are likely to have tall sons and a baby inches higher than the normal one will probably weigh some pounds heavier.

How to Weigh Baby

Baby should be weighed once a week or fortnight, always at the same time of day if possible, and not just after a meal. At home, he can more easily be weighed when he has been undressed for his bath. If using grocer's scales have them well balanced, with a towel in the scroop or basket, before putting baby in. See he is as comfortable as possible and engage his attention in order to keep him as quiet as you can. If using a spring-balance scales, keep a special towel to which loops of tape have been sewn at the corners. These ordinary grocer's scales with balance and weights are suitable for home use, or a good spring balance with a hook. Clock-face scales are not reliable because every movement of the baby alters the reading. For the older children, use a good reliable platform scales, with bar and balance. A tape measure tacked to the wall will serve as a measuring rod. The older children should be measured without shoes and weighed without coats, shoes or any extra outer clothing and as far as possible the same type of clothing should be worn at each weighing.

Advantages of Regular Weighing

1. The mother is reassured by the child's steady progress, and a contented mother means a contented baby, and both are responsible for a happy home.

2. Serious illnesses often come on gradually, and their presence is not apparent until the condition is well established, but the trouble is sure to be recorded on baby's chart. Careful inquiry into the cause of stationary weight, or loss of weight may save baby from a serious illness, and is a positive guide as to correct feeding.

3. A record of weight from birth onwards is most useful, if at any time illness assails the infant. His previous progress is clearly outlined for the doctor to see at a glance.

Disadvantages of Weighing Baby

There are some disadvantages about weighing the baby every week, and these should always be taken into consideration.

Firstly:—Gain in weight is not everything. Babies fed on an ill-balanced diet may show an unhealthy gain in weight on which the parents may be misled. The tendency is for these wrongly-fed infants to lose weight later on, when also the imperfect development of bones, muscles, teeth and digestive organs makes itself apparent.

Secondly:—Failure to gain in weight is not necessarily a serious condition. When considering baby's weight chart, it is necessary to take into consideration the special conditions pertaining to the special baby. For instance, weight may be gained very rapidly during the first few months of life, and during later months there will be a corresponding slackening off in the rate of growth. This is not necessarily abnormal.

A Note of Warning

Weight should always be considered in relation to height as well as age in determining whether the child is up to the average standard.

It is well not to consider the weight for one week only, but pin your faith on the fortnightly or monthly gain. Of course a steady gain in weight week by week is ideal, but there is no need to worry over slight irregularities, such as might be expected during teething, weaning, a cold or temporary upset, changing of food and so forth. Gain in weight may be more rapid in the autumn and spring months, and slower in winter and mid-winter.

After the first birthday the child takes more exercise, and so the weekly gains are decreased and one ounce per week is the normal increase.

Adequate diet, sunshine and fresh air, and all the other essentials for good health will ensure proper growth and good nutrition in childhood, and "as the twig is bent, so will the tree grow".

NORMAL WEIGHT AND HEIGHT CHART

At Birth	....	7¼lbs.	in weight	....	19 to 21 inches in height
6 months	....	15lbs.	,,	....	24 inches
1 year	....	21lbs.	,,	....	28 inches
2 years	....	28lbs.	,,	....	34 inches
3 years	....	32lbs.	,,	....	37 inches
4 years	....	36lbs.	,,	....	40 inches
5 years	....	39½lbs.	,,	....	42 inches
6 years	....	48lbs.	,,	....	46 inches

MANGOLDS FOR SUPPLEMENTARY FEEDING

Plan Now for the Planting of the Crop

Mangolds are capable of giving very high yields and a large store of excellent winter feed can be secured from a comparatively small area, well put in and adequately tended. Supplemented with hay they are an ideal food for cattle, but can be fed to all kinds of stock, including sheep, horses and pigs.

To get really high yields the land should be in the highest possible state of fertility, have adequate depth of soil, and be able to retain moisture. Ploughing should have been done early and frequent cultivation is required from now onwards to conserve moisture and keep down weeds.

Sowing can take place in September or October. About 6 lbs. of seed per acre is required and the depth of planting should be about one inch. Heavy manuring is advisable, and, where possible, a good dressing of well rotted stable manure should be supplemented with a generous application of artifical fertilisers; 2cwt. of super, plus 1 or 2 cwt. of bonedust, 1 cwt. of sulphate of ammonia and ½ cwt. of sulphate of potash should prove a suitable dressing.

The rows should be intercultivated thoroughly and often after the plants are well up, to conserve moisture and keep down weeds. Such work will be well repaid, indeed it is essential, and, in view of the value of the crop, does not represent an unduly expensive item.

The roots should not be grazed but pulled and stored until mature. Fresh mangolds are comparatively innutritious and are apt to cause scouring and urinary troubles.

Agronomy Division

SOFT TURNIPS FOR AUTUMN AND WINTER SHEEP FEED

Soft turnips properly put in can be successfully grown on most farms, and are a valuable supplementary feed for sheep in the usually lean periods of autumn and winter. They increase the carrying capacity of the property at its lowest period, are cheap to grow and have the advantages of consolidating the soil and adding to its fertility. Further, they will usually fit in well with any system of farm management.

Turnips for autumn feeding should be sown in September on well prepared land, rolled prior to sowing. The seed should be sown no deeper than 1 inch at the rate of 8 to 10 lbs. per acre, and if the stand is too thick can be thinned satisfactorily by harrowing the crop before the plants are more than 2 inches high. If the seed is mixed with super. before sowing, it should be sown shortly afterwards and not left overnight in the drill, as long contact with manure is liable to impair the germination.

Turnips for winter use should be sown early in December and should be put in under the best circumstances so as to bring them successfully through the dry part of the summer. High soil fertility is not essential but the land should be capable of retaining moisture, and as much should be conserved in it as possible by thorough working of the fallow during the spring and early summer. The best land is new ground or that which has been broken out of good turfy pasture.

Suitable varieties of soft white turnips are:— Imperial Green Globe, Purple Top Mammoth and Lincolnshire Red.

Turnips are not a recognised fattening food but sheep will fatten on them slowly if they are given some hay or chaff in addition.

Agronomy Division

PASTURE SEEDS BELOW STATED QUALITY—PURCHASERS' REDRESS

Under Section 14 of the Seeds Act, a purchaser may return to the seller any seeds of the species listed in the schedule which are not of the quality stated in writing by the seller, as required by the Act. They may be returned, subject to certain conditions outlined below, whether delivery has been accepted or not, and the purchaser may recover from the seller in Court any expense incurred.

The conditions which must be observed by the purchaser are as follows:—

He must. 1. Notify the seller within three days of accepting delivery, by telegram or registered letter, of his intention to have the seed tested.

2. Draw three separate samples of the seed and deliver or forward by registered post one to each of the three following:—

   a. The seller.

   b. The Officer in charge of the Seed Testing Laboratory, Department of Agriculture, Launceston.

   c. An Officer of the Department of Agriculture. (i.e., The District Agricultural Officer).

This action must be taken within seven days of acceptance of delivery of the seed, and the sampling must be done in accordance with Section 7 and Sub-sections of the Regulation under the Act, which specify the method of sampling and the amount of seed required for one sample.

Should a test of the sample sent to the seed testing laboratory show that the seller's statement is untrue in any particular or that the purity or germination of the seed is less by more than the percentage prescribed as permissable, the purchaser may take action as outlined above.

Seed-Testing Station

POTATO SEED IMPROVEMENT

At the Tewkesbury Potato Seed Station, crop results are again encouraging. A good season, coupled with comparative freedom from virus in stocks of both Bismarks and Brownells has been responsible for gratifying yields, and the output will probably exceed that of any previous year from a similar acreage.

At one stage, in spite of dusting with "Borodust", serious loss from blight seemed inevitable. The leafage had suffered to a considerable extent when an examination showed that quite good returns might still be secured if the blight spores could be prevented from reaching the tubers already developed. It was then decided, for the dual purpose of heading off the disease and securing the advantages of immature seed, to kill off all top growth over fairly wide areas by spraying with a 12 per cent solution of Suphuric Acid.

It has now been amply shown that, had this not been done, many of the tubers would have been oversized and more or less unsuitable for the purpose intended. As it is, the yield throughout will probably be 7-8 tons per acre, with little rejection for type and with a negligible loss through blight, particularly in the Brownells.

One point which will be noticed, however, is a slight variation in the skin colour of the tubers. This has been caused by the destruction of the top growth before full maturation. Immature tubers are naturally rather pink in comparison with the normal colour of fully developed specimens. In seed stocks however, this implies an advantage rather than a disadvantage.

Agronomy Division

[Registered at the General Post Office, Hobart,
for transmission by Post as a Periodical]

Vol. IX—No. 4
(New Series)

1st November, 1938

The Tasmanian Department of Agriculture

THE TASMANIAN

JOURNAL OF AGRICULTURE

Published by Direction of
The Hon. the Minister for Agriculture

Edited by
A. H. WOODFORDE

Published Quarterly

Price, 6d.

The Tasmanian Journal of Agriculture

CONTENTS

For Index to Advertisements, see end of Book

The Tasmanian

Journal of Agriculture

Vol. IX Tasmania, 1st November, 1938 No. 4

Editorial

Weeds in Relation to Farming Economy

WEEDS have long been a problem in agriculture. Farmers of all periods have recognised them as a menace and have given unremitting attention to their suppression. Despite every effort, however, there has been a steady encroachment of weeds on farming land until, to-day, there are few properties on which the problem of control does not exist in some degree, whether the plants concerned are of a noxious character or of the less harmful cornfield type. In many cases there is a tendency for established areas to increase in both extent and density of plant population. On some properties noxious plants have become so widely and so densely established that the question of control hinges on cost rather than choice of methods.

It is probable that weeds, considered from every angle, are among the most costly of all the pests to which agriculture is subject. It was estimated, and is officially recorded in England that before the War they were responsible for an annual loss to the farmers of Great Britain of £16½ millions. At first sight this would appear to be an incredibly large sum. It must be remembered, however, that the loss occasioned by weeds is not only the direct and most obvious one represented by reduced crop yields. There are other contributory sources which in the aggregate are probably of even greater significance. Among these are the spoiling of farm produce by its admixture with weedy materials growing in the crop, the high cost of controlling weeds, and the depredations of insect pests and disease organisms which are often freely harboured by weed plants.

There is probably no more apt example of the harm done by weeds and the manner in which certain types of plants may seize control of the land than that presented by the Skeleton Weed position in New South Wales. This weed appears to be of little consequence in other countries, but in New South Wales, within the last twenty years it has developed from a few stray plants observed on some of the farms into a serious pest. It is described by Judd and Carn in the Agricultural Gazette of New South Wales as "the most insidious and drastic menace with which wheat farmers have ever had to contend." In 1935 hundreds of acres of cereals could not be harvested owing to the density of Skeleton Weed growth. Weed invasion of this nature constitutes a very real menace, and one which is likely to prove very costly unless effective control measures are quickly developed and put into operation.

Fortunately, we have no weed problem in Tasmania comparable with this. There are, however, many farms on which noxious weeds are tending to get out of control and to become a menace to neighbouring properties, and, in fact, to farm lands in general. Probably the greatest danger is from areas on which such weeds as Californian Thistle and Ragwort are established. There is a distinct need that owners or occupiers of properties on which such weeds are growing should take what steps they are able to bring them within effective control. The position in regard to Californian Thistle is, in some cases, admittedly one of great difficulty. Some areas are so extensive as to make control a matter of considerable expense and labour. Steps can, however, be taken to prevent the thistles from seeding, especially near boundary fences and rivers, and to prevent the plants from obtaining a foothold on clean paddocks.

The present status of noxious weed control in Tasmania in many instances leaves something to be desired. There is a need for concerted action to keep weed pests at least confined within the present boundaries of infestation. Administration of the Act providing for the control of proclaimed weeds is a function of the municipal councils, but at present there is no provision for prescribing the correct methods of dealing with the various weeds or for the co-ordination of inspectorial work. There should be uniformity of action in compelling landholders to adopt necessary control measures. The Government has realised the needs of the position and a Bill is now being prepared which, if it obtains the sanction of Parliament, should place the administration of noxious weed control on a much improved footing. One of the principal features of the Bill is to give the central authority power to take action should any municipality not realise the necessity of effective measures being taken to protect clean farms from the risk of infection from a farm where practically nothing is being done to cope with the situation. This will provide for effective co-ordination of the inspectorial services and, in addition, will give municipal councils the advantage of close co-operation with a technical officer with an intimate knowledge of weed plants and of the best means of dealing with them.

The multiplication and perpetuation of weeds is encouraged by certain cropping systems, especially those under which similar types of non-intercultivated crops are grown repeatedly in the same fields and occupy the land for the same period year by year. The majority of weed plants are heavy seeders. Moreover, they have a special adaptation for the conditions under which farm crops are grown, and thrive best under those conditions. Many of them mature their seeds and shed them on the ground before the crops are harvested, thus continually reïnfecting the land. Typical examples of this are Charlock and other weeds of the cabbage family so prevalent in our farm crops, and Wild Oats. Charlock seeds and those of a number of other species retain their germinating capacity for long periods, even when buried deeply in the soil, and because of this, especially where successive crops of weeds have shed yearly crops of seeds, a fresh growth of undesirable plants can be expected to appear whenever the land is turned over, even though this may be after several years in grass.

The continuous growing of cash crops year by year on the same land has, in the past, been a conspicuous feature of Tasmanian agriculture, and it can hardly be a matter for surprise that many hundreds of acres of fertile cultivation land on which such methods have been employed are now so heavily infested with weeds that crops are seriously affected in both yield and quality. In many instances the species concerned are annuals and easily eradicated, but the soil is often so heavily impregnated with seeds that fresh crops of weeds are continually recurring and the effect is consequently much the same as that of longer-lived species.

It can hardly be doubted that much of the present position with regard to weeds is primarily the result of using impure seeds. Farm seeds frequently contain weed impurities which are not easily detected by casual and inexpert examination, but careful scrutiny by a person trained in botanical seed analysis may reveal a significant quantity. In view of the large numbers of seeds which one weed plant may produce, even a small percentage of impurities in agricultural seed may, within a comparatively short time, give rise to a serious degree of weed invasion.

The position with regard to unclean farm seeds is probably better to-day than at any time in the past. Farmers generally are more aware of the risks of haphazard selection of their requirements, and there is an increasing tendency to select only the best lines procurable—an attitude which has automatically brought about an improvement in the standard of the commercial seed supply. Plentiful quantities of inferior seed are, however, still available from various sources, of which the most common is probably the farmer-vendor who sells his seed crops privately. Much seed of this class is often very inadequately cleaned and may contain many weed impurities, the quantity and significance of which, however, may be quite unrealised by the grower. "Farmers'" seed, or seed offered by any other than a reputable seedsman, should never be sown without careful prior enquiries and examination and, if necessary, submission to the official seed-testing station of the Department for analysis.

Articles have from time to time appeared in this Journal referring to the analytical services which are available to all farmers at the seed-testing laboratory which is located at the Launceston offices of the Department. Readers are referred to these articles for detailed information on the subject. It is pointed out, however, that the submission of a sample for examination may be the means of avoiding seed capable of causing serious trouble. There is no difficulty in submitting any number of samples for analysis, and the trifling charge involved cannot reasonably be regarded as a deterrent to the fullest utilisation of the service.

Pasture Experiments at "Woodford," Campbell Town

By R. A. SHERWIN, Chief Agronomist, and E. F. FRICKE, Agronomist

1: SUPERPHOSPHATE TOP-DRESSINGS ON A SUBTERRANEAN CLOVER PASTURE

IN 1933 an area of Subterranean Clover pasture which had been established two years previously was selected on the property of Mr. Geo. Muirhead, "Woodford," seven miles from Campbell Town. The area is typical of the better light sandy loam soils of the Midlands which are in many cases in process of improvement by the introduction of Subterranean Clover with superphosphate.

The average annual rainfall at Campbell Town is 22.8 inches. With the exception of October, the monthly averages for the eight months period of useful rainfall for Subterranean Clover—April to November inclusive—are almost two inches per month. The October figure is 2¾ inches. The average total rainfall for this eight months period is 16.5 inches, but deviations up to two inches from the average frequently occur. The rainfall for the period of this experiment is shown in Table 1.

TABLE 1

Rainfall in Inches at Campbell Town, 1933-38

	Annual Rainfall	Useful Rainfall Sub. Clover April-November
1933	21.71	16.44
1934	21.83	15.39
1935	25.32	16.51
1936	18.75	14.63
1937	21.06	9.51
Average for 5-year period	21.73	14.5
Average for 22 years	22.81	16.5
Average Deficiency per annum	1.08	2.0

From this table it will be seen that the useful rainfall is not in exact proportion to the total rainfall. For the period of the experiment both were below the average, but the useful rainfall for Subterranean Clover was two inches below its average, while the total rainfall was only one inch below its average.

The experiment was designed to determine the response in Subterranean Clover pasture growth from the application of superphosphate in various quantities. An area of one acre was fenced and within it an area 2½ chains square was subdivided into 25 square plots each ½ chn. x ½ chn.

Five manurial treatments replicated five times were allotted to the plots in the form of a "Latin square," and on each plot a closed quadrat of 50 sq. links in area was placed.

Sheep were turned on to the area from time to time. When the ungrazed herbage inside the quadrats reached 4 to 6 inches in height, the surrounding pasture was closely grazed and the herbage inside the quadrat was cut and weighed. Before commencing cutting, an estimate was made of the proportion of grasses, clovers and weeds. The quadrat was then moved on to a fresh position and the cut herbage spread out on a hessian and wire screen on top of the quadrat and allowed to become air dry. This practice was necessary owing to the wide variation found in the moisture contents of the herbage cuts from different plots.

From three to six cuts were made during the year, according to the vigour of the growth, the lowest number being recorded in the last season (1937) when grass grubs were prevalent.

The manurial treatments were as shown in Table 2—the 3-cwt. and 4-cwt. dressings being omitted in alternate years after 1935.

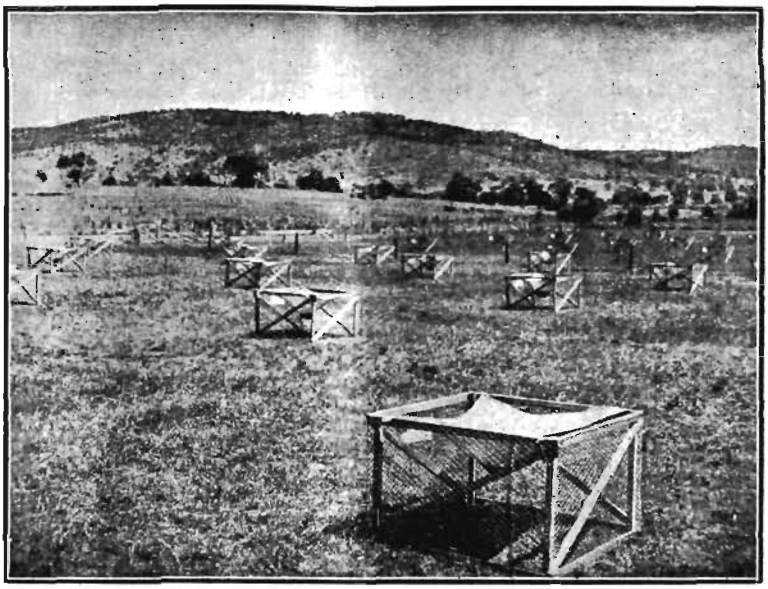
TABLE 2

Effect of Various Quantities of Superphosphate on Yield of Air-dry Herbage Cut from Grazed Subterranean Clover Pasture over Five Years

Quantity of Super per acre	Proportionate Production of Air-dry Herbage. Mean of 5 plots				
	1933–4	1934–5	1935–6	1936–7	1937–8
Nil	1.0	1.0	1.0	1.0	1.0
1 cwt.	3.2	3.8	1.8	2.0	2.8
2 cwt.	5.0	5.8	1.9	2.0	2.8
3 cwt.—1st, 2nd and 4th years	7.6	6.7	1.9	2.3	2.7
4 cwt.—1st, 2nd and 4th years	9.3	6.8	1.9	2.2	3.2

The outstanding result shown in this table is the large response from the heavy dressings of superphosphate in the first year of application. In the second year the 4-cwt. dressing is not significantly greater than the 3-cwt. dressing, but both are above the 2-cwt. dressing. In the third year these two heavy dressings were omitted and production remained at the 2-cwt. level. In the fourth year the 3-cwt. and 4-cwt. dressings were again applied with small increases over the 2-cwt. dressing. In the fifth year, when they were again omitted, only the 4-cwt. dressing produced an increase from the previous year over the 2-cwt. dressing.

Botanical analyses of the herbage were made on each occasion by the percentage estimation method. These showed wide fluctuations throughout each season. The chief species present were Subterranean Clover and Soft Brome Grass, with smaller quantities of Danthonia and Silver Grass, and scattered plants of White Clover, Yorkshire Fog, Brown Top, Ryegrass, Kentucky Blue Grass and Cocksfoot, and the following weeds: Flatweed, Spear Thistle and Sorrel.



QUADRATS ON THE "WOODFORD" EXPERIMENTAL AREA

In general there were no great differences in composition between the plots treated with the various quantities of superphosphate. The differences between these and the no-manure plot were very marked, as shown in the following table.

TABLE 3

Estimated Percentage Composition of Herbage Cut from Quadrats in Late Spring, Mean of 5 Plots

Dressing of Superphosphate	27/11/35			8/12/36			3/11/37		
	Grass	Clover	Weeds	Grass	Clover	Weeds	Grass	Clover	Weeds
Nil	30	40	30	47	45	8	13	76	11
1 cwt.	33	58	9	68	28	4	14	83	3
2 cwt.	36	58	6	69	26	5	15	80	5

This table shows the marked superiority of the manured plots in regard to desirable species. The percentage of grasses and clovers is higher and that of the weeds is much lower. The difference is largest in 1935. In the latter years, the no-manure plots show a distinct improvement in composition in relation to the manured plots. This is ascribed to a transference of fertility from the top-dressed plots by means of sheep droppings. Comparison between the individual years is not possible from these analyses as the cuts were not made at the same time each year. The percentage of grass on all treatments is lowest in the cut made earliest in the season (1937) and highest in the cut made latest in the season (1936). The clover content of all treatments shows the reverse trend, being highest in the cut made earliest in the season.

This experiment was conducted on a pasture which consisted of a good stand of Subterranean Clover in its third year of establishment.

Under similar conditions, on the property of Mr. R. Oldrey at Rokeby, confirmatory results were obtained in the early years after establishment of Subterranean Clover.

It is therefore recommended that if an increased production of clover is required rapidly, heavier dressings than the normal 1 cwt. of superphosphate should be applied to recently established Subterranean Clover pasture.

The advantages of such increased clover growth are threefold.

1. It should ensure surplus growth in the spring, thus enabling the saving of pasture hay.
2. The denser and taller growth of Subterranean Clover reduces the weed content of the pasture.
3. It should hasten the building up of the nitrogen supplies of the soil, thus enabling the earlier introduction of Ryegrass, or other perennial grasses.

The smaller responses to the 2-cwt. dressings in the latter years correspond to years of much lower useful rainfall for Subterranean Clover. It is likely that with normal rainfall in these years the response to dressings of 2-cwt. and over would have been greater. The results in these years should, therefore, be regarded as applying to districts somewhat drier than Campbell Town or to situations drier than the plots at "Woodford."

The fact that larger responses to the heavier dressings occurred in the higher rainfall years suggests that even greater responses would be obtained in districts with a higher rainfall than Campbell Town.

The manuring of Subterranean Clover pasture, into which perennial grasses have been introduced, is being investigated in a separate experiment at "Woodford," the results of which will be given in a later article of this series.

THE SEED-BED FOR PASTURE

The seed-bed for grass should be warm and moist, firm, fertile, and free from weeds. Young plants cannot develop a good root-growth in an open, dry soil. A grass-seed bed can rarely be too firm, and examples of the importance of firmness are to be seen in every newly-sown paddock—at the gateways—on headlands—in drill-wheel marks and horses' hoof-marks.

A first-class seed-bed can be secured only by well-judged, timely cultivation. All deep working should be completed to allow of a fallow period of six to eight weeks before sowing. During this interval between the final deep cultivation and sowing, only light cultivation should be carried out. This reduces the loss of moisture and commences the firming process.

Land intended to be sown to pasture in the coming autumn should, therefore, have its final ploughing now; this to be followed by harrowing at about fortnightly intervals, which will assist in compacting the seed-bed, conserving moisture and eradicating weeds.

EXTENSION SERVICE

Wild White Clover

By R. A. SHERWIN, Chief Agronomist

WHITE CLOVER must have been one of the earliest clover introductions to Tasmania, but apart from some small fertile swamp areas and some of the Lake country it does not occur naturally to any marked extent. From remarks that are passed by some of the older members of the farming community, it would appear that White Clover was much more prevalent at the beginning of the century than it is to-day. There may be two reasons for this. White Clover will not stand continued overgrazing by rabbits on land where the fertility and the rainfall are just on the margin of the clover's requirements. This might account for its decrease in unprotected country, while on the farming land it is possible that the gradual lowering of the fertility has given a soil on which White Clover will not thrive except under favourable conditions of management.

TYPES OF WHITE CLOVER

Much of the clover sown in Tasmania has been of the White Dutch type. This is not a perennial, but if soil moisture conditions are satisfactory it re-establishes fairly readily from seed. It grows well in seasons with a good spring rainfall, when it may be very prevalent, but in seasons when the spring and summer are comparatively dry it is much less evident. Consequently, its production is too irregular for it to be of any real value for permanent pastures, and it can be recommended for use in very few instances.

The perennial type is known as Wild White Clover, and at present there is seed of two strains available in commercial quantities. The principal English type is the Kentish Wild White Clover, and the other type can, for the purposes of description, be called the Certified New Zealand White Clover. The Kentish is low growing and very persistent, but it is not as productive as the New Zealand strain, which is more robust and vigorous. Most of our seed in recent years has come from New Zealand, and we have very little of the Kentish strain in Tasmania.

The Wild White and White Dutch Clovers can usually be distinguished in the field by close observation of the creeping stems or stolons. The Wild White Clover roots at frequent intervals along the stem, and in this way the plant is able to spread. The White Dutch Clover seldom roots from the stem and its only means of spread is by seed.

What are the habits and particular merits of Certified White Clover? Under suitable conditions it is a perennial producing a large amount of high quality feed. It thrives well in association with grasses and, like other clovers, it is capable of building up the nitrogen supply of the soil which results in the greater production of grass herbage. White Clover responds very well to phosphatic manuring, and it is worth mentioning that the best strains of the clover give the greatest responses.

White Clover commences its flush growth in September or October, depending on its location, and its growing period in districts with low summer rainfall is usually a month longer than that of Subterranean. With good summer rains its growth is continuous. The best New Zealand strains have superior winter growth, and several instances have been noted in Tasmania where its winter production has been considerably superior to that of Subterranean Clover. Further, it has the advantage of maintaining a better sward, for, unlike the latter, it does not leave the pasture comparatively open for two to three months during which time weeds may gradually obtain a foothold, to the ultimate detriment of the pasture.

CERTIFICATION OF WILD WHITE CLOVER

As mentioned previously, most of our seed in recent years has come from New Zealand, where both the Wild White and the White Dutch Clovers were originally introduced. Several years ago it was realised that there was a wide variation in the productivity and permanence of the plants and that, under different conditions of management, distinct types of clover had evolved. In New Zealand tests were commenced of the various strains which occurred throughout the country. Those areas that measured up best for productivity and permanence became eligible for certification and the seed produced was called Mother Seed. Owing to its limited supply it is used for establishing other areas used mainly for the production of what is termed Certified Permanent Pasture Seed. As its name implies, it is used primarily for the establishment of pastures for grazing purposes.

The Department of Agriculture has followed the New Zealand lead and has introduced a seed certification scheme. At present any areas sown with New Zealand or Tasmanian Certified White Clover are eligible for registration at the time of sowing and certified seed may be produced from them provided it comes up to the necessary standards.

Another class of certified seed is now on the market in New Zealand called Certified Pedigree White Clover. This has originated from the best of the single plants which have been tested out by the New Zealand authorities and constitutes an improvement on what was previously available. Other countries and States are also testing out the various strains of White Clover within their borders, and as the seed becomes available it is being tested out at the Cressy Research Farm.

The Tasmanian Certification Scheme depends on the registration of areas sown by farmers, the field inspection of the growing crop, and a laboratory test of the seed, known as the Picric Acid Test. This test is proving of very real value in distinguishing seed of the various strains.

SUITABILITY OF CERTIFIED WHITE CLOVER TO TASMANIAN CONDITIONS

For the first few years of extended use of Subterranean Clover in Tasmania it was considered that White Clover should be sown only on the heaviest and dampest land, and that Subterranean would do better on nearly all other types of soil. However, since the better class White Clover seed has been available there is evidence that White Clover may be preferable on many soils which have been considered Subterranean soils. As yet we have not had enough experience of White Clover on all classes of soil to be able to specify White Clover and Subterranean Clover soils. The sowing of White Clover is certainly justified on the more fertile soils of the State which have a rainfall of 28 inches or more, while trial sowings are definitely worth while where the rainfall is 24 inches or more, and on the lighter soils where Subterranean Clover does not grow as well as might be expected. It is hoped that on soils where the latter fails to establish, White Clover will grow reasonably well and ease the pasture problem. A limited number of trials indicate that this hope may be fulfilled.

On soils where both Subterranean and White Clovers do comparatively well it may be desirable to have paddocks of each, for their two growing periods do not coincide and consequently it is possible to extend the growing season as well as supplying a variety of diet. Their mixture in the one pasture is not preferred on account of their competition with each other. The one most suited to the particular conditions of soil, climate and management can be expected to suppress the other in time. Such a sowing might be justified for testing purposes.

ESTABLISHMENT

White Clover can be sown in the early autumn or spring with equally good results, provided the soil preparation is thorough. The seed-bed requires to be fine on top and well consolidated below. Usually it is sown in association with Ryegrass or Cocksfoot, and in either case it can be drilled or broadcasted, then harrowed lightly. White Clover cannot be sown deeply without the risk of a poor strike, so that the maximum covering should not be more than an inch. Some farmers have found it best to sow Ryegrass comparatively deeply first and then broadcast the White Clover and cover lightly. On many soils rolling to give thorough consolidation is very important in obtaining good establishment. In the case of soils which do not have the tendency to run together and cake after rains, rolling can safely be the last operation, but where the risk of caking occurs rolling should be followed by light harrows or should be confined to the pre-seeding stage. The usual seeding is between one and two pounds per acre.

It is becoming increasingly evident that heavy seedings of grass with any of our clovers are not desirable where permanent pastures are required on land which is not in the best heart. Usually heavy seedings of Ryegrass produce well in their first season, due to the preceding fallow providing an adequate supply of nitrogen. The heavy growth of grass in the first year frequently inhibits the growth of clover, consequently the nitrogen supply of following years is below requirements until the clover has been able to assert itself. This may take two or more years, and during that time the pasture appears lifeless, particularly in the winter period, and the production is considerably below what might be expected. This can usually be avoided by seeding the grass lightly and so reducing its competition with the clover. Thus the fertility is built up fairly rapidly and the pasture improves from the start. The lighter seedings of Ryegrass can be expected to thicken up as the clover raises the fertility.

MANAGEMENT

The proportion of White Clover or Ryegrass produced from an established pasture can be affected very considerably by the grazing management. Both species require to be spelled at the beginning of their growing period if they are to grow to their fullest extent during the ensuing season. However, the time at which they start growth is not the same. White Clover is usually three to four weeks behind Ryegrass in coming into production in the spring. If Ryegrass is spelled at the start of its growing season its root and leaf systems are developed at the expense of the clover, and in consequence it is most likely to prove dominant in the pasture in the following season. However, the opposite tends to be the case if the Ryegrass is grazed hard early and the pasture spelled when the clover is ready to grow. Hard grazing is necessary to give these results, while light grazing cannot be expected to influence the composition.

It should be the aim of the farmer to obtain, if possible, a sward containing just sufficient clover to feed the grass. In the early years of a pasture on land with depleted fertility it will probably be desirable to encourage the clover at the expense of the grass, but this policy should be reversed gradually as the pasture develops. Seasonal and other conditions influence very largely the actual management, but the farmer can usually put into practice a measure of what is the ideal and so ultimately obtain the type of pasture he is aiming at.

MANURING

White Clover responds well to superphosphate, the optimum dressing of which depends primarily on the type of soil and the rainfall. The time of application is also important. In districts where a certain amount of winter growth can be expected, the aim should be to encourage it at that season by applying the manure in February or March. Where winter conditions are so severe that little growth can be expected at that time, application should be in July or August to stimulate the spring and summer production.

SUMMARY

From the foregoing the following may be summarised as of major importance:—

1. Of the types of White Clover of which seed is available, the Tasmanian or New Zealand Certified Permanent Pasture White Clover is recommended for use in permanent pastures. Under suitable conditions it is a good quality, high producing and permanent pasture plant.

2. White Clover has demonstrated its ability to produce better than Subterranean Clover on some poorer classes of soil.

3. Greatest production from White Clover can be expected on heavy soils with good summer rainfall.

4. Shallow sowing is desirable.

5. Light rather than heavy sowings of Ryegrass are desirable in association with clover on land where fertility is not high.

6. The proportion of clover or grass in the pasture can be affected by grazing management.

Factors Affecting the Setting of Fruits

By P. H. THOMAS, Chief Horticulturist

AT THIS season enquiries are frequently received from orchardists concerning the failure of certain of their fruit varieties to set and bear fruit. Information is sought as to the cause of this unsatisfactory condition and suggestions for remedial treatment are requested.

The bearing and setting of fruits is capable of being influenced by a number of different factors, some of them extremely complex. Some of the conditions responsible for poor yields can be avoided or influenced by treatment or management, others are beyond human control. In this article consideration is given to factors which commonly result in sterility or partial cropping.

The main factors affecting fruit setting may be roughly classified into five main categories, namely, meteorological, pathological, nutritional, sexual, and agencies affecting pollination.

METEOROLOGICAL CAUSES

Weather conditions experienced at the time of blossoming are perhaps the most important factor affecting the setting of fruits.

When a period of calm, warm sunny weather synchronises with the blossoming of any particular fruit, a good set is assured. Rain with cold wind is prejudicial to effective pollination, limiting the activity of bees and other insects, whilst excessive humidity will prevent pollen from ripening and reaching the fine condition necessary for its dissemination. Frosts are also responsible to a large extent for crop failure, especially amongst the early blossoming drupe fruits such as cherries, plums and apricots. Frost injury may be prevented by the artificial heating of areas by means of orchard burners with which the atmospheric temperature is kept above the danger point, but no economic treatment can be recommended to combat the effects of cold, wet, windy weather.

PATHOLOGICAL CAUSES

Fungus and insect pests are often directly or indirectly responsible for serious injury to flowers during the blossoming period. During recent years in Tasmania this has been particularly noticeable in our pear varieties, many of which have been affected by the black spot fungus at this stage.

The fungus attacks the stalk, sepals and portions of the flower, thereby inhibiting development and generally causing injury or death of buds and flowers. Powdery Mildew is also responsible for the loss of numerous blossom buds in heavily infected orchards.

The brown rot fungus is often very troublesome during the blossoming period of apricot and other stone fruits, although it is seldom found on apples and pears. In each instance the recommended preventive fungicidal sprays applied at the correct period should protect the blossoms from infection. Tasmanian orchardists are indeed fortunate in not having to combat the disease known as Fire-blight that is prevalent in U.S.A. The bacteria of this is spread very largely by the honey bee and other insects during the blossoming period, making the problem of control exceedingly difficult.

Amongst the insect pests thrips must be considered the most important. Here again Tasmanian growers have not suffered to the same extent as their competitors. This insect attacks the floral organs, destroying the pistil and stamens. In Western Australia and Victoria thrips have been responsible for almost the entire destruction of fruit crops in some districts. The species causing the injury are found in this State, but fortunately climatic conditions are generally unfavourable to its operations.

Other insect pests such as pear mite, aphids, red spider and tortrix caterpillars cause a certain amount of injury during fruit setting, but none of these have yet proved to be of economic importance in this respect.

NUTRITIONAL CAUSES

Experiments have demonstrated that in many cases fruit setting is materially affected by the lack or over-supply of plant foods. The age and condition of the tree is most important and deserves careful consideration. Varieties differ considerably in their growth and cropping habits. For example, Democrat has a very sparse foliage and prolonged period of fruit development; Dunns, French Crab and London Pippin are biennial croppers; the main commercial varieties such as Sturmer, Cleopatra and Jonathan crop regularly.

The formation of healthy fruit buds is largely dependent upon a proper balance being maintained between the carbohydrate and nitrogen content of the tree, and if this balance is upset production is affected.

Any treatment such as the excessive use of nitrogenous fertilisers or severe pruning, both of which cause undue stimulation and increased vegetative growth, may affect the development of fruit buds, whilst over-cropping and lack of the requisite plant food will often produce unhealthy blossoming and eventually result in biennial cropping.

Pruning is closely related to nutrition and in many cases the producer is meticulously adopting methods of pruning which are opposed to the manurial programme. Thus we often see vigorous trees severely pruned and receiving heavy applications of nitrogenous fertilisers. The resulting crops are generally sparse and the fruit is oversized. In other instances light pruning may produce heavy crops, and unless thinning is carried out in conjunction with heavy fertiliser applications cropping in alternate years may result.

Unsatisfactory pruning methods give rise to a surprising number of partial crop failures. This is particularly evident in some species of apple, peaches and pears where the pruning has been conducted more on the lines of an annual grooming than an aid to fruit bud formation, and a large proportion of the bearing wood is regularly shorn off to improve the tree's general appearance.

Inadequate drainage is another cause which frequently affects the setting of fruit crops.

Excessive rains occurring at or previous to blossoming may saturate the soil to the extent that the newly developed capillary feeding roots commence to die off or decay. This results in a partial cessation of growth during a critical period. In some cases fruit setting only is affected, whilst if the period of growth cessation is prolonged a sap fermentation may result which ultimately causes death or serious injury to the tree.

SEXUAL CAUSES

Most growers who have made only a cursory study of fruit setting will realise the important relationship between the fruit and the seed; in fact, the edible flesh that is produced is dependent almost entirely on seed formation.

Seed formation can only take place where pollination has occurred. The importance of effective pollination will thus be fully appreciated; and amongst the adverse causes influencing setting ineffective pollination is perhaps the most general in our pome, drupe and berry fruits. The deciduous fruits grown in Tasmania may, for the purposes of this discussion, be divided into two classes, namely, those which are self-fertile and those which require cross-fertilisation.

Varieties which are self-fertile bear perfect flowers possessing normal male and female organs, the pollen of which is functional.

Pollination in such varieties may occur as a result of natural flower development or be assisted through the agency of insects.

The value of such varieties lies in their being able to produce crops when planted in large areas and there is not the necessity to introduce other varieties for cross fertilisation.

The necessity for cross fertilisation of certain varieties is due to a number of causes; the flowers of some fruits are imperfectly formed and normal fertilisation cannot take place. This is especially evident in some varieties of strawberries whose flowers are almost entirely pistillate or staminate. In some species the pollen produced is often sterile, which prevents either self-pollination or the fertilisation of other varieties. A peculiar phase of these species is that they are highly receptive to cross fertilisation from a compatible variety, and where this occurs produce heavy crops of fruit.

Sterility as the result of incompatibility is very prevalent amongst apples, pears, plums and cherries.

In the early stages of the development of the fruit industry, the demands of the market were not nearly so well defined as in later years, and almost any fruit of medium quality with a fairly attractive appearance would sell readily. Under such conditions the planter exercised a wide range in the choice of varieties for his orchard, incidentally providing greater chances for effective cross fertilisation in self-sterile kinds. As the industry developed the retail trade and consumers learned to know the value of different species and the planting trend became confined to these.

Under such conditions large single blocks of popular fruit species were sometimes planted, and it was at this stage that the necessity for effective cross-fertilisation became apparent if regular and profitable crops were to be produced.

The orchardist to-day generally realises the necessity for providing ans of cross-fertilisation, especially in certain pome and drupe fruits, l during recent seasons many intending planters have availed themves of the information collated by the Horticultural Division of the partment of Agriculture on this subject before setting out new areas. simple method of testing areas in which imperfect fertilisation is pected as the cause of unfruitfulness is to carefully select a number trees and artificially cross-fertilise limbs on each with a variety of ssoms at approximately the same period. This can either be permed by hand or by placing sprays of blossoms in jars of water susided from the main limbs. By this method an indication can first obtained regarding the compatibility of each of those selected with ue variety.

During the ensuing season grafting or budding of the kind that has proved most effective to ensure the necessary cross-fertilisation can be undertaken. In planting large areas the general practice where two or three varieties are to be grown is to arrange the planting in alternate rows of four. This also gives facilities for harvesting, spraying, and any particular treatment.

Where large blocks of one or two varieties are necessary the general practice is to plant the pollinators at regular distances throughout the area, which will enable effective cross-fertilisation of the trees in their vicinity to take place.

AGENCIES AFFECTING CROSS POLLINATION

Contrary to general belief, it has been found that wind is not an influential agent in the pollination of most deciduous fruits.

The work is mainly performed by insects, of which the bee is the most important. Honey bees work best at the higher temperatures—60° to 70° Fahr.—and on cold, wet days, even though the trees may be in full blossom, and in close proximity to varieties suitable for cross-fertilisation the set of self-sterile kinds will be affected.

It will be seen that although bees are a necessary adjunct to fruit-setting in every orchard, under certain conditions when weather is unfavourable they cannot be entirely relied on to effect the necessary cross-fertilisation. It is opportune at this juncture to discuss briefly the general spray programme in its relationship to fruit setting.

Every encouragement should be given to the bees to work amongst the flowers during the blossoming period. Growers generally realise the importance of this and refrain from applying sprays, between the pink and petal fall stages of development, which may act as deterrents to the bees.

During recent years propagators have directed research work towards evolving fruit varieties that do not require pollination in order to produce their fruits. Some notable examples of this are the navel orange, certain persimmons and seedless grapes.

At present in apples, pears, apricots, plums, cherries and the different berry fruits, the general policy is to give preference to commercial varieties which are self-fertile.

From a grower's standpoint the pollination problem may be summarised as follows:—

Select commercially popular varieties that may be grown in blocks without interfering with production.

If this is not possible, ensure that the general lay-out of the orchard permits effective cross-fertilisation.

A good pollenizer should possess three main qualities—the pollen must be viable, it must be compatible in cross-fertilisation with the variety it is intended to pollinate, and the two varieties should have blossoming periods that synchronise or overlap.

LIME FOR THE SOIL

Lime is an essential ingredient of the soil on account of the important part it plays in both plant and animal nutrition. On lime-deficient soils plant growth is generally backward and livestock are subject to constitutional weakness and such diseases as rickets.

Apart from its manurial value, lime plays an important part in correcting certain soil conditions which militate against successful cropping. The following are the principal ways in which its use is beneficial in this connection:—

1. It makes stiff soils more friable, thus allowing of a finer condition of tilth and promoting the penetration of air and moisture to the roots of the plants; even a light dressing is very beneficial.

2. It neutralises acids formed by the decay of organic matter and sweetens land that has become sour from long stagnation; ploughing and cultivation only would take much longer to accomplish this. If drainage is faulty this must be corrected before results can be expected from the application of lime.

3. It assists in checking the growth of certain weeds.

4. Combined with proper conditions of temperature and moisture, it promotes and maintains the production and activity of the desirable bacterial soil organisms which play their part in preparing and making available the food for pasture and fodder plants.

5. It encourages leguminous plants in their ability to draw nitrogen from the air, by promoting the growth of the special species of bacteria which form nodules on the roots of these plants. All clovers and other leguminous plants, established on soils where a deficiency of lime exists, have few or no nodules on their roots and a corresponding inability to draw nitrogen from the air.

EXTENSION SERVICE

Dairy Cattle Breed Type and Production

By J. T. ARMSTRONG, Chief Dairy Officer

THE Herd Recording year under the Australian Official Pure-Bred Dairy Cattle Production Recording Scheme closed on June 30th, and the report is now in the hands of the printer and should be available shortly.

Extracts from the report are published in this issue of the Journal and should not only prove of interest to stud breeders and dairymen generally, but should provide plenty of room for thought.

The production figures of many of the cattle give rise to speculation as to the amount of progress that has been made in the breeding of pure-bred dairy cattle during the 160 years or so since the first Dairy Cattle Herd Society was founded.

This was the Jersey Herd Society, which opened a Herd Book in 1866, and which was followed in 1878 by the Guernsey Herd Book and by other Herd Societies which have opened their books during more recent periods.

There is room for thought as to whether modern breed societies have not lost sight of the ideals of the founders of the earlier societies and whether, by making a fetish of show-yard standards rather than by concentrating on production records, they have not forsaken the substance for the shadow.

The underlying purpose behind the formation of the Herd Societies undoubtedly was to evolve a type of cattle which would not only be heavy producers themselves, but which would in turn throw high producing progeny; but, unfortunately, we find that after a century and a half of breeding we have many pure-bred dairy cattle whose production records compare unfavourably with those of many grade cattle.

Earlier breeders were under a handicap from which modern breeders are—or at least should be—free, and that is that, during the formation of the earlier societies there was no reliable method of accurately assessing a cow's production of butterfat, nor did the earlier breeders possess any knowledge of the more modern science of genetics.

They had as their guide only the practice which had been followed so successfully by breeders of beef cattle, and the knowledge that the majority of heavy producing cattle conformed to a certain physical type.

Just as breeders of beef cattle set as a standard the ideal type of beef animal and attempted to breed to that type and discarded from the stud any animals showing variation from that type, breeders of dairy cattle set as a standard of excellence the type towards which the majority of heavy producers conformed, with minor variations between breeds as to size, colour, shape and set-on of horns, etc., and attempted, by breeding to that type, to evolve a strain of cattle which would all be heavy producers.

Unfortunately, however, experience has amply demonstrated that, with dairy breeds, type and production are not directly correlated as they are with beef breeds, and we find many splendid specimens of the prescribed dairy type which are poor producers, whilst some of the best producers depart very considerably from the accepted type.

Many breeders—both stud breeders and owners of grade herds—have found, to their sorrow, that because a bull wins many championships in the show ring, it does not necessarily follow that his daughters are good producers, and it would appear, from the value which is placed on the finer points required under show ring standards, that pure-bred dairy cattle are being bred more for their appearance than for their productive capacity.

The aim and object of the breeding of dairy cattle is, after all, to produce cattle which will yield satisfactory quantities of milk and butter-fat, rather than to produce animals which are merely symmetrical in appearance and pleasing to the eye of the keen breed fancier, and the sooner more dependence is placed on the productive capacity of the breeding stock, and less on the finer points demanded by show ring standards, the sooner will improvements in yields be recorded.

We find already that grade herd owners have realised the variation which exists between breed type and productive capacity and are now looking to the records of cattle recorded under the Official Herd Recording Scheme, rather than show ring performances, when selecting a herd sire. Already the herd average of many grade herds is far in excess of that of many pure-bred herds, and during the past few years there has been a far greater increase in the average production of all grade cattle under test than in the average of pure-bred cattle recorded.

Possibly one of the factors operating to the disadvantage of pure-bred records is the belief prevalent amongst stud breeders—particularly amongst breeders just founding studs—that until they get a certain number of pure-bred cattle in the herd they cannot afford to cull.

If herd owners appreciated the fact that they are endeavouring to build up a herd of productive cattle and realised that the only time they can really afford to cull is when the herd is small, a real improvement in yields would soon be obvious.

The usual practice for a breeder when founding a stud is to purchase, say, half-a-dozen heifers from an established breeder. Usually the purchaser is working with a limited capital and cannot afford a price sufficiently high to tempt the vendor to part with heifers from his best cows. The young breeder therefore usually puts in as foundation members of his stud heifers which their breeder did not consider quite good enough for him to keep in his own herd. But as a heifer's value as a producer cannot be definitely determined from her appearance and pedigree, the purchaser may find that of the six he purchased he has one or two quite good animals, and he is almost sure to find that he has one or more which are valueless so far as production is concerned.

If the low producers are culled, and the breeder's choice of a sire has been a wise one, the heifer calves reared should be good dairy cattle; but if he does not cull during the first few years, and breeds from all the stock purchased and gradually replaces his grade cattle with pure-bred stock, he will eventually find that he then cannot afford to cull since such a large proportion of his herd are direct and close descendants of the inferior stock he originally purchased, the majority of which will have inherited from their dams the factor or factors for low production.

Then again there is cause for speculation as to what happens to pure-bred cattle which are culled from the various stud herds by reason of the fact that they failed to reach a reasonable standard of production, or because their dams were poor producers and the breeder had a sufficient number of heifers from better cows to meet his own requirements.

Grade cattle disposed of for these reasons often find their way to the butcher, but pure-bred stock too often are purchased by dairymen at relatively high prices, their purity of breeding being advanced as a sales argument, and from these culls the purchaser breeds up a herd of pure-bred dairy cattle.

The widespread belief that there is some intensive value in a cow because she is pure-bred has done much to hold back improvement in the production of stud cattle, and breed societies have fostered this belief in order to provide a remunerative market for culled cattle. Eventually this propaganda must react adversely against the breed societies.

Registration in a stud book is of absolutely no value to a dairyman unless purity of breeding is linked with high production, and the only practicable basis for breeding pure-bred dairy cattle is to set production as the standard of excellence rather than breed type.

Turning back to the figures contained in the Pure-Bred Report, we find that of the 474 cattle tested from 49 herds, the average production was 299.4 lbs. of butterfat—just one-tenth of a pound more than the average production of pure-bred cattle in 1928, and the last season was a good one so far as climatic conditions were concerned.

Dissecting production into various ages, we find that 181 mature cows were recorded, and the standard for mature cows is 350 lbs. of butterfat; the average of those tested was 330.2 lbs.—approximately 20 lbs. below the standard; 77 cows exceeded the standard, and 104 cows were below standard.

Twenty-six senior 4-year-olds were tested, their standard being 330 lbs. of fat; the cattle tested averaged 325.5 lbs. of fat—approximately 4½ lbs. below the standard; 14 cows exceeded the standard and 12 were below.

Forty-seven junior 4-year-olds were recorded. Standard, 310 lbs. of fat. The cattle recorded averaged 315.5 lbs., or 5½ lbs. above the standard; 29 cattle exceeded the standard and 18 were below.

Forty-eight senior 3-year-olds were recorded. Standard, 290 lbs. of fat. The cattle recorded averaged 309 lbs., or 19 lbs. above the standard; 30 were above standard and 18 were below.

Sixty junior 3-year-olds were recorded. Standard, 270 lbs. The cattle recorded averaged 278.9 lbs., or nearly 9 lbs. above the standard; 36 were above the standard and 24 were below.

Forty-two senior 2-year-olds were recorded. Standard, 250 lbs. The cattle recorded averaged 271 lbs. of fat, or nearly 21 lbs. above the standard; 28 were above standard and 14 were below.

Seventy junior 2-year-olds were recorded. Standard, 230 lbs. of fat. The cattle recorded averaged 227.2 lbs., or nearly 3 lbs. below the standard; 32 cattle were slightly above the standard and 38 were below.

Grouping the various ages, we find that 246 of the cattle recorded exceeded the standard required for their respective ages, and 228 were below the required standard. In other words, nearly 50 per cent. of the cattle tested failed to reach their standard.

The junior 2-year-olds were particularly disappointing, since it is usually considered easier for a junior 2-year-old to make the standard than it is for the older cattle, and it is from the junior cattle that our herds must be built up.

It is hoped that members of the various breed societies will study well the records contained in the Pure-Bred Report and endeavour to determine what factor or factors are responsible for the fact that the pure-bred average to-day is just what it was ten years ago, and that, of the cattle submitted for recording as pure-bred dairy cattle, only 50 per cent. reached the standard required.

Grade herd owners look to stud breeders for bulls with which to effect further improvement in the productive capacity of their herds, and with the improvement many grade herd owners have already effected they are finding it increasingly difficult to find a suitable herd sire.

It is suggested that the failure of so many pure-bred cattle to reach their standard is attributable to—

1. That too much attention has been paid to the finer points of show ring standards and insufficient attention to the productive capacity of the cattle.
2. That cattle which have failed to reach their standard have been retained in the herd instead of being culled; this factor is one to which breeders just founding studs should pay particular attention.
3. Purchase of culled cattle as foundation members of new studs.
4. Overstocking on some properties or insufficient fodder for the herd at some season of the year, particularly a lack of succulent green feed at the end of summer and early autumn.
5. The almost general use of sires which have not been proved, i.e., whose daughters have not been recorded and proved producers.
6. An unfortunate choice when selecting a herd sire.
7. Lack of proper care and attention.

Not all these factors (with the possible exception of the first and fifth, which are very general in their incidence) are operative in every stud, but they are all factors which tend to depress the State average production.

The Invermay Bug

By J. W. EVANS, Entomologist

IN occasional seasons vast swarms of small brown and black bugs appear in gardens in Launceston, usually during January, and cause considerable damage to a wide variety of vegetable and ornamental plants, and feed, in addition, on ripening fruit.

In the past these insects have been known as Rutherglen Bugs. The true Rutherglen Bug (**Nysius vinitor,** Berg.), which occurs in every State of the Commonwealth, though known as a sporadic pest in all the mainland States, has never been recorded as injurious in Tasmania. The Invermay Bug (**Nysius turneri,** Ev.), which is very similar in appearance and habits to the Rutherglen Bug, is confined to Tasmania. It is probably well distributed within the State, but is known as a pest only in the Launceston district.

LIFE HISTORY AND HABITS

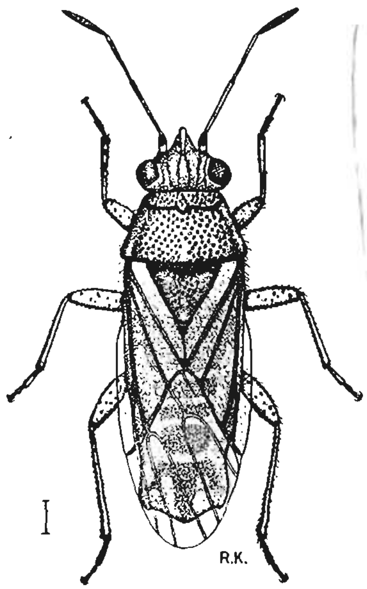
The winter is passed in the adult stage, the insects sheltering under clods of earth and dead vegetation. Egg-laying takes place in early spring, eggs being laid in soil, in the glumes of grasses, and in the flower heads of composite flowers. On hatching the bugs are wingless. There are five immature stages, between each of which moulting of the entire skin takes place. The winged, adult stage is usually reached late in December.

In their nymphal or immature stages the insects seldom wander far from their food-plants, but when their wings are developed they display great activity and may travel considerable distances in search of food.

BREEDING AREAS AND CAUSES OF OUTBREAKS

The swamps of the flood-plain of the River Tamar have been reclaimed in the neighbourhood of Launceston, thus creating an environment particularly favourable to the Invermay Bug. Two plants are dominant on the reclaimed area, a composite with yellow button-like flowers (**Cotula coronopifolia**) and a salt-bush (**Atriplex spatula**). In addition various grasses (**Poa sp., Polypogon sp.** and **Holcus lanatus**) occur. The insects are associated principally with the composite, in the flower heads of which they lay their eggs. They do not feed on the salt-bush. When during the summer months the plants on which the bugs have been feeding begin to die, or when the insects become so numerous as to result in competition occurring for the available food, a proportion of those that have reached the adult stage invade adjacent gardens in large numbers and feed on such plants as are present.

It is improbable that the Tamar Valley is the only locality within the State where favourable plant associations occur for the reproduction of the Invermay Bug, yet no records of severe outbreaks have been received from elsewhere in Tasmania. An explanation to account for the fact that this insect is a serious pest solely in one district must be sought in an examination of local climatic factors. In a map of Australia published in 1936, Davidson divided the continent and Tasmania into a number of bioclimatic zones. These zones are areas in which the essential elements of climate that affect the physical environment of insects have been assessed. The zone on this map, in which Launceston is situated, extends about ten miles south of the town and embraces the Tamar to within ten miles of the Coast. It also extends about two miles west of the river and fifteen miles east. In this zone, during the six summer months from November to April, for two months only does the precipitation (rainfall)-evaporation ratio exceed 0.5 All the rest of the State, with the exception of an area in the south-east, is included in zones that have a precipitation-evaporation ratio greater than 0.5 for from four to six months of the summer period. Thus it is suggested that the explanation sought lies in the comparative dryness of the Tamar Valley for four of the six months of summer.



THE INVERMAY BUG

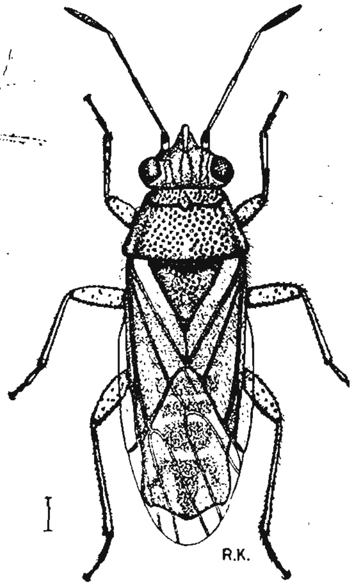
ECONOMIC IMPORTANCE

The Invermay Bug is, as is suggested by its name, an insect that feeds by suction. Numerous bugs feeding on a plant on a hot day, when the transpiration rate of the plant is high, result in the wilting, and finally shrivelling, of the apical leaves. Although a very wide range of plants may be selected for feeding purposes, certain ones such as dahlias appear to be particularly attractive to the insects. Of vegetable crops, turnips and potatoes are often most seriously damaged, and whilst many ripe and ripening fruits may be infested, peaches would appear to suffer greatest injury.

CONTROL

There is only one method by which this pest might become permanently suppressed. This would entail the changing of the plant association of its principal breeding sites in the immediate vicinity of Launceston, thus creating an environment unfavourable for its reproduction.

number of bioclimatic zones. These zones are areas in which the essential elements of climate that affect the physical environment of insects have been assessed. The zone on this map, in which Launceston is situated, extends about ten miles south of the town and embraces the Tamar to within ten miles of the Coast. It also extends about two miles west of the river and fifteen miles east. In this zone, during the six summer months from November to April, for two months only does the precipitation (rainfall)-evaporation ratio exceed 0.5 All the rest of the State, with the exception of an area in the south-east, is included in zones that have a precipitation-evaporation ratio greater than 0.5 for from four to six months of the summer period. Thus it is suggested that the explanation sought lies in the comparative dryness of the Tamar Valley for four of the six months of summer.



THE INVERMAY BUG

ECONOMIC IMPORTANCE

The Invermay Bug is, as is suggested by its name, an insect that feeds by suction. Numerous bugs feeding on a plant on a hot day, when the transpiration rate of the plant is high, result in the wilting, and finally shrivelling, of the apical leaves. Although a very wide range of plants may be selected for feeding purposes, certain ones such as dahlias appear to be particularly attractive to the insects. Of vegetable crops, turnips and potatoes are often most seriously damaged, and whilst many ripe and ripening fruits may be infested, peaches would appear to suffer greatest injury.

CONTROL

There is only one method by which this pest might become permanently suppressed. This would entail the changing of the plant association of its principal breeding sites in the immediate vicinity of Launceston, thus creating an environment unfavourable for its reproduction.

Of recent years it has been the custom to burn off the vegetation on the reclaimed land at Invermay for the express purpose of destroying the insects prior to their dispersal. It is probable that such a measure confers but little benefit, as by the time the plants are sufficiently dry to burn, most of the bugs will have developed wings and made their escape.

This is a particularly difficult pest to control; unlike insects with biting mouth-parts, it cannot be destroyed with the aid of stomach poisons such as lead arsenate, and contact insecticides such as nicotine-sulphate, if applied in spray form will only kill those bugs actually covered by the spray. Spraying therefore serves little purpose, as even if numerous bugs are killed they will be but a small proportion of those available to re-infest treated plants as soon as they are dry. Smudge fires give temporary relief and serve to drive the bugs away, and some degree of control may be attained by the use of derris dusts. The dust should be applied fairly liberally, with the aid of a dust gun, to those plants which it is desired to protect. This treatment will drive off the bugs already established on the plants and will serve to protect them from further severe attack for a period of from two to four days. Derris may be used with safety on all plants.

REFERENCES

Davidson, J., 1936: Bioclimatic Zones in Australia; **Trans.** Roy Soc. S. **Aust.**, *60, 88.*

STAGE OF CUTTING RYEGRASS FOR SEED

There is often a tendency to reap ryegrass too soon in the fear that a loss in yield will be sustained due to shaking. The effect of this procedure is to get a sample which may be unnecessarily green, light in weight and low in germination.

The top grains ripen first and are usually smaller than those at the bottom of the head. The best samples are obtained by withholding the reaping until the top grains are ripe enough to be fairly readily shaken out when a small bunch of heads are swung against the hand. A prevalent method of testing encountered is to pull the heads through the clenched hand. If portion of the seeds strip out this is considered to indicate cutting time. This is not the best test because seeds will strip out in this way when they cannot be knocked out in the method described above.

If a slight loss of the top seeds is sustained in handling the crop, it will be compensated by the proper filling of the lower ones and the resultant yield and sample should return the optimum in revenue.

Allowances must, of course, be made for the prevailing weather conditions and the length of time estimated to be taken to reap the area, but the above can be regarded as a basis on which individual decisions can be modified.

It should be noted that the present Tasmanian standard of ryegrass bushel weight is several pounds lower than that of the Mainland and New Zealand. Only occasionally do we obtain lines weighing 27 or 28 lbs. per bushel It is of considerable importance that Tasmanian growers should use any possible means of increasing the weight of their seed. The stage of cutting is one factor which can have considerable bearing on bushel weight.

EXTENSION SERVICE

Leaf Rust of Stone Fruits

PUCCINIA PRUNI — SPINOSAE (Pers.)

By J. O. HENRICK, Plant Pathologist

IN the Tamar Valley and the districts around Hobart this disease affected nectarines and early varieties of peaches during the last season.

Although in England it is considered of little economic importance, this must not be taken as true also of Tasmania. Indeed, observations over the last two seasons point to the possibility of the disease becoming a serious factor, not only in peach and nectarine, but also in apricot and plum areas, in a suitable season, if steps are not taken to cope with it.

The fungus infects leaves, shoots and fruit of the peach and nectarine, the leaves and fruit of the apricot, and the leaves of the plum.

The seriousness of the disease lies in the fact that leaf infection causes premature leaf-fall and may be so great as to bring about complete defoliation. As a result the tree becomes weakened and more susceptible to attacks of other fungi, and the fruit is reduced in quantity and size, depending on the earliness and percentage of defoliation. With peaches and nectarines the fruit may be badly blemished.

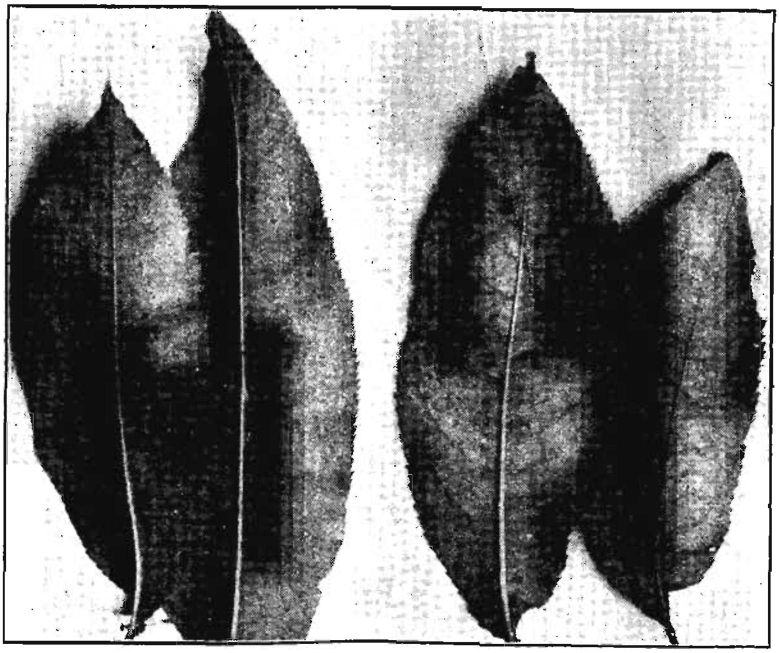


FIG. I
UREDOSORI ON UNDER SIDE OF LEAVES
Left: Nectarine. Right: Peach.

SYMPTOMS AND LIFE HISTORY

In early summer the upper side of leaves show pale areas, which when examined on the under side, appear as small bright yellow spots with orange-brown centres (Fig. I). These contain the spores (**uredospores**) which can affect the leaves of any stone fruit in the vicinity, being carried by wind, rain splash and insects, but cannot affect the anemone. In late autumn a second type of spore is produced which is capable of infecting anemones but not stone fruits. Once an anemone has been infected by a teleutospore the fungus spreads through all parts of it and the underground portions (root stock) become permeated by a perennial mycelium. **The plant seldom flowers and is only a source from which stone fruits will be attacked in early summer.**

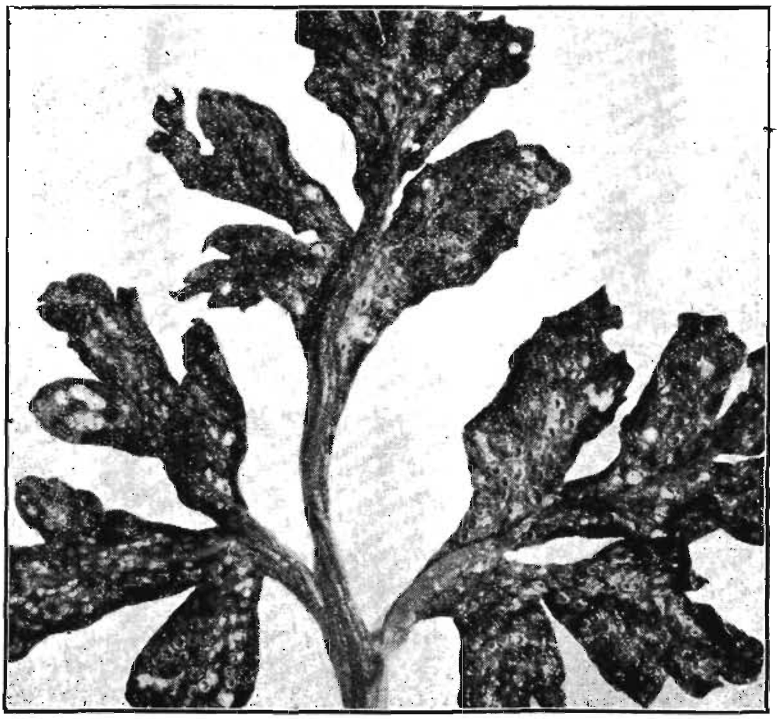
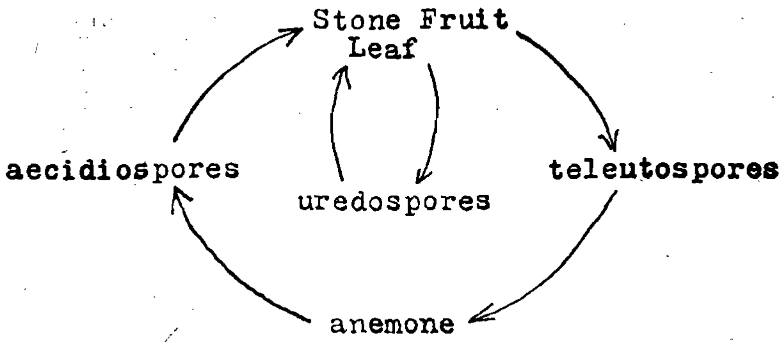


FIG. II
UNDER SIDE OF ANEMONE LEAF, SHOWING NUMEROUS CRATER-LIKE ÆCIDIA

From early spring onwards the leaves of an infected anemone rootstock may be seen to be distorted and pale, and on examining the underside numerous crater-like areas will be noted (Fig. II). These are filled with brownish spores (**aecidiospores**) which can infect stone fruits.

With peaches and nectarines depressed circular spots are formed on the fruit, which later exhibit a reddish border, and small cracks appear on twigs. Both are sources of infection.

LIFE CYCLE



CONTROL MEASURES

The following programme of hygiene and spraying will be found to give good results:—

(a) After the fruit has been picked, spray with lime sulphur, 1 in 60.

(b) In late autumn, in winter or after pruning, bury all fallen leaves, etc., by ploughing or by hoeing where the use of the plough is not practicable.

(c) Burn all prunings of peaches and nectarines, as they may be carrying cankered areas.

(d) At late dormant period or first sign of bud movement spray with lime sulphur 1 in 10 or Bordeaux Mixture 6-4-40. (This will also be the first spraying for Brown Rot).

(e) From early spring onwards keep a close watch on any anemones in the garden, and at first sign of yellowing, dwarfing or twisting remove the whole plant and burn.

GENERAL

Apricot production is an important line of orcharding in districts in close proximity to Hobart, and the fruit, although of the same varieties, is vastly superior in quality to that produced in the rest of the Commonwealth. Dieback is causing concern to growers, so before it is too late every effort should be made to prevent leaf-rust from taking its toll of the industry.

ERRATUM

RATE OF SEEDING OF SOFT TURNIPS

An article entitled "Soft Turnips for Autumn and Winter Sheep Feed" appeared in the last (August) issue of the Journal—page 171, in which the rate of seeding was inadvertently given as 8-10 lbs. per acre. This should read "8-10 ounces per acre."

All-Australian Export Porker and Baconer Carcase Competitions

AWARDS IN SECOND SERIES

THE Secretary of the Australian Meat Board has made available the schedule of points awarded by the judges in the second series of the All-Australian Porker and Baconer Carcase Competitions which were judged in London in June of this year.

The judges' placings were:—

PORKER COMPETITION (possible points, 115)

Place	Entrant	State	Breed	Points (Average of Three Carcases)
First	Wickham and Candy, "Wara," O'Halloran Hill	South Aus.	Canadian Berkshire x Canadian Berkshire	79.12
Second	Malcolm G. Bayliss, Maleny	Qu'nsland	Large White x Large White	77.39
Third	Kingston Pig Farming Co., Kingston	Qu'nsland	Large White x Large White	74.49

BACONER COMPETITION (possible points, 125)

Place	Entrant	State	Breed	Points (Average of Three Carcases)
First	Anthony Vigano, South Morang	Victoria	Large White x Large White	81.33
Second	Inspector - General of Hospitals, Bedford Park	South Aus.	Large White x Large White	79.74
Third	Otto F. Haach, Beenleigh	Qu'nsland	Tamworth x Middle York	79.20

Chief Agents
ROYAL INSURANCE COMPANY

Established 1831

R & SONS LTD.

Branches and Agencies: LAUNCESTON, BURNIE, STANLEY

...res: MOONAH

ore Stock
H. C. Nickolls)

:GULAR SALES
at

.L TOWN	OATLANDS
:LAND	CAMPANIA
ALE	TUNNACK
'OK	NUBEENA
.LE	KOONYA
LL	MELTON
ID	

asses Store
and for
e

Engineering
(Hugh Cruickshank)

Manufacturers of Automatic Pumping Plants, Case - Planing Machines, etc.

Repair Work of all Description, including Oxy and Electric Welding

Agents for Ball-Bearing Coy. of Aust.—
Ball Rollers, Timken Bearings

GRASS & CLOVER SEEDS
WIRE, NETTING, &c.

(G. E. Mather)

Our Seeds grow Good Will as well as Good Crops.

Tested varieties are the Seeds that will bring Success, Prosperity and Profits. We have on hand all varieties of the highest germination and purity.

Full stocks are available of No. 8, 10 and 12 Galvanised and Barbed Wire, all sizes of Netting and Cyclone Fencing.

New and Second-hand Chaff Bags, Corn Sacks, Potato Sacks and Sewing Twine on hand.

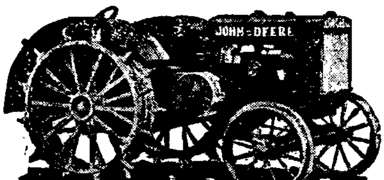
"LISTER"
Diesel and Petrol Stationary Engines.

Also in Marine Diesel

"GARDNER"
Diesel Engines in Stationary, Marine & Truck Conversion Types.

BALTIC SIMPLEX MILKING PLANTS and Dairy Machinery.

"John Deere" Tractors



For Farming, Orchard or Power Purposes

ECONOMY—Burns Diesel Fuel Oil, cutting working costs 33 per cent.

SIMPLICITY—Only two cylinders—few moving parts.

The most power—for the longest time—at the lowest cost.

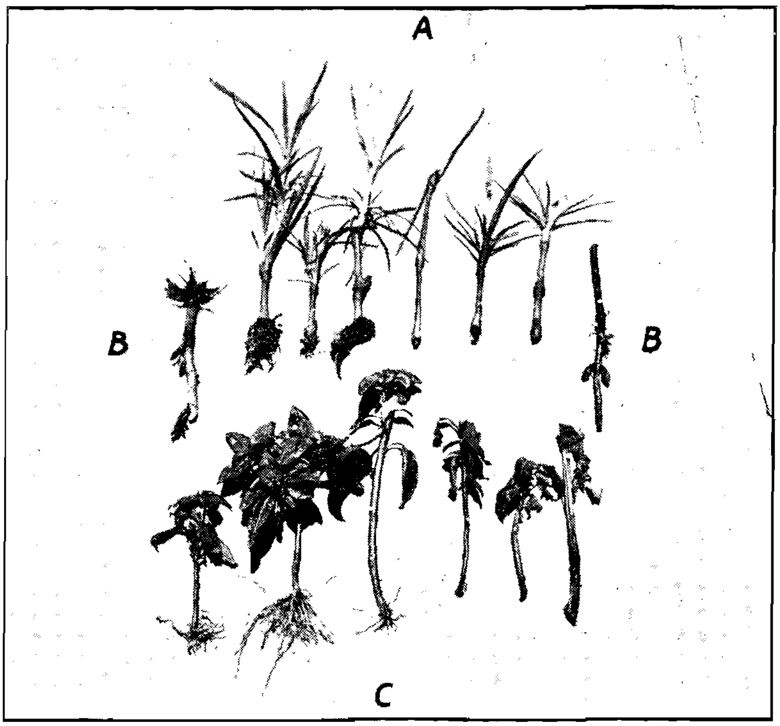
'CTION SALES at the Railway Yards. Correspondence Invited.

Propagation by Cuttings

INDUCEMENT OF GROWTH AND ROOT DEVELOPMENT BY CHEMICAL TREATMENT

By T. D. RAPHAEL, Horticulturist

ALTHOUGH it has been known for some time that it was possible to induce or stimulate the development of roots in softwood cuttings by steeping them, prior to planting, in solutions containing small percentages of certain highly active chemicals known generally as plant hormones, it is only of recent years that the commercial possibilities of these have been exploited. Similarly, corm and bulb producing plants and roots have been successfully treated in various ways for the rapid multiplication of buds and offsets, and leaf cuttings responded in certain other plants. Hardwood cuttings respond less readily, but it is likely that with certain modifications and further research work, they will be found more responsive to the treatment.



A—CARNATION CUTTINGS. Left: Treated. Right: Untreated.
B—HYDRANGEA (inverted). Left: Treated. Right: Untreated.
C—ANTIRRHINUM. Left: Treated. Right: Untreated.

The chemicals now recognised of importance in this direction were suggested to plant physiologists in the first place by isolations made from such substances as urine, peat moss and vegetable tissue. It is a matter of common knowledge, too, that there is an indirect growth stimulus from certain animal excreta and organic composts, quite out of proportion to the manurial food values contained therein. This is said to be caused by small quantities of chemicals grouped under the name of auximones, and several chemical preparations reputed to contain these substances are already on the market.

To return to root production, however, the most exhaustive and useful tests from the practical grower's point of view have been conducted by the Wisley Laboratories during the past few years, where well over 100 varieties of plants have been tested, and the work is still progressing. The most successful chemicals employed were a-Naphthalene Acetic Acid, b-Indolyl Acetic Acid, and Indolyl Butyric Acid; as an illustration of the potency of these, the ideal strengths of application vary from one part in ten thousand to one part in fifty thousand, according to the subjects treated. Greater strengths often not only stop bud and root development, but may cause direct damage to the tissue.

Unfortunately, these chemicals are difficult to obtain, and the care in preparation, together with the accuracy necessary, have deterred commercial growers from trying them out individually. Recently, however, several chemical manufacturers have placed convenient preparations on the market under trade names, and, generally speaking, results produced from their use have been encouraging.

Information regarding a few trials carried out with the preparation "Hortomone A" may be of interest as an illustration. This is recommended at a general strength of one part in 320, the cuttings prior to planting being placed in the solution for from 16 to 24 hours, after which they are removed, rinsed in water and planted immediately. As was anticipated, results with hardwood cuttings were mainly of a negative nature, and it was obvious that some modification of the strength used and time of intake would be necessary, both with these and with certain softwood cuttings, before the best results can be obtained. Nevertheless, as will be seen from the illustration, carnations, antirrhinums and hydrangeas responded readily, and at the end of five weeks from planting had developed roots and were making leaf growth, whereas the untreated material had done little more than callus. Ageratum also responded well, but ericas, cupressus and many hardwood subjects have not given results to date and so far show no difference to the untreated controls.

The above notes are presented with the object of indicating the nature of the substances above referred to and their possible uses from a commercial standpoint.

Developments along the lines indicated are likely to make rapid strides in the near future, and additional commercial preparations of both plant hormones and auximones will doubtless come on the markets as knowledge in respect to these increases.

REFERENCE

Tincker, M. A. H.: Journal R.H.S., Vol. 63, 5.

Farm Building Construction

By J. TILT, Agronomist

No. 4: AN IMPLEMENT SHED

SOME few months ago an implement shed was erected at the Cressy Research Farm. This shed has proved quite efficient in operation and, as the cost is reasonable and the design fairly simple, it was thought that the plans would prove of interest to the farming community.

The shed is 77ft. by 24ft. and capable of holding sufficient implements for working a good-sized farm, but the plan can be adapted to suit any particular farm by altering the number of bays. In one corner of the building a small lock-up tractor compartment is provided which will be found extremely convenient if a tractor is part of the farm equipment. A special tractor garage is a considerable asset. In it oil, tools, spares, etc., can be kept together and maintenance work can be carried out in comfort and convenience. If this compartment is not required for a tractor it could be lengthened and used for a garage, or omitted altogether.

Both ends of the building and three bays along the side exposed to the prevailing wind and weather are weatherboarded. Implements that are not used very often can be placed in the corner nearest the tractor compartment, where they are well protected. Hinged flaps of plain galvanised iron are hung in the open bays to protect the implements from the weather and can be hooked back to the rafters to permit the passage of implements or horses.

The spacing of the posts at 22ft. centres along the centre line of the shed increases the holding capacity considerably, as even wide implements such as drills can be manoeuvred about in the shed and worked up close together.

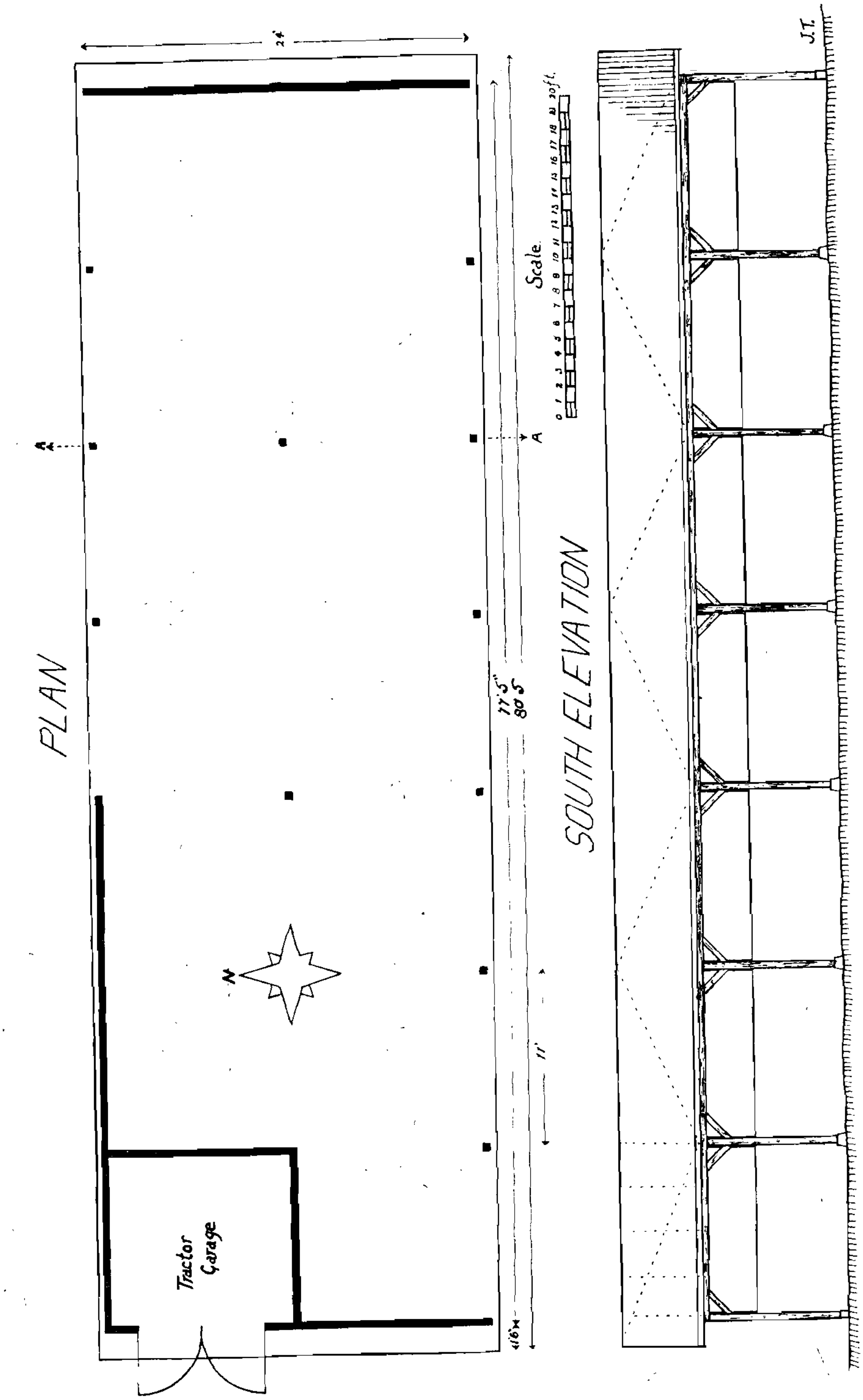
A detailed description of the shed is as follows:—

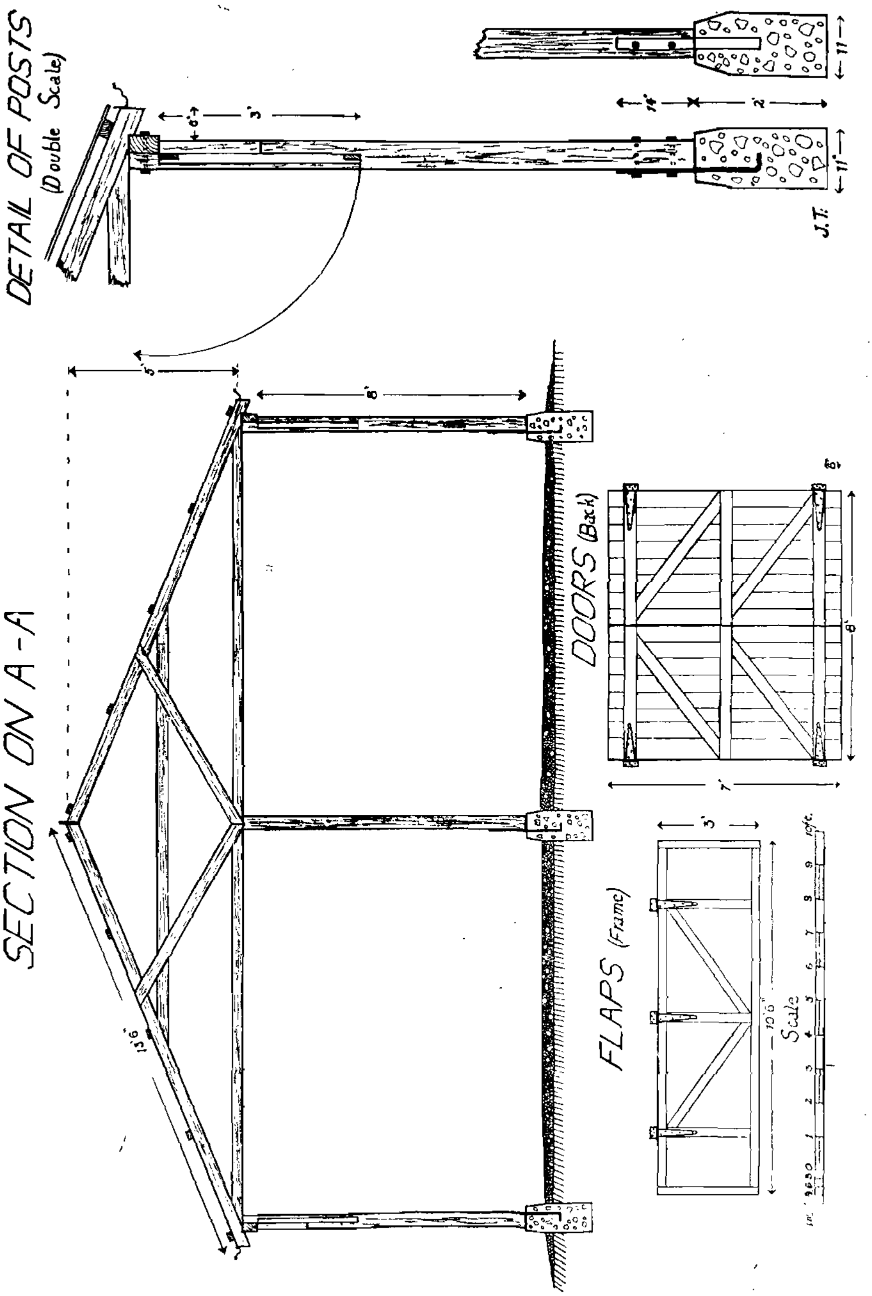
FOUNDATIONS

The foundation wall for all weatherboarded sections is of concrete, 5 inches thick with 8in. footings and 9 inches above ground level. For the posts the foundation consists of 11in. square concrete blocks let well into the ground and bevelled at the top with a length of 2in. x ½in. bar iron let into it as shown in the plans. The posts are bolted to this bar with two ½in. bolts. This method of securing the posts is superior to dowelling with, say, ¾in. round iron, as the latter would give the building little resistance to an upward thrust such as it would encounter on the leeward side in a strong wind.

WALLS

Eastern End.—This portion of the shed is weatherboarded, and the studs are of 4in. x 2in. timber placed at 1ft. 10in. centres. Both base plate and top plate are of 4in. x 3in. hardwood, and the former is dowelled to the concrete foundation. The weatherboarding is carried through to the roof.


PLAN
SOUTH ELEVATION
Scale
20 ft.
24'
77'5"
80'5"
11'
A
A
N
Tractor Garage
J.T.



Western End.—This is similar to the eastern wall, except that provision has been made for double doors 7ft. high and 8ft. wide giving access to the tractor compartment. This door is made of 6in. x $\frac{3}{4}$in. tongued and grooved pine, with ledges and braces of 4in. x 1in. dressed hardwood.

South Wall.—This side of the shed is entirely open, and the supporting posts are of 5in. x 5in. hardwood. They are placed 11 feet apart and are bolted to the iron bar set in the concrete foundation blocks. A 5in. x 3in. beam on its edge is let two inches into the posts and bolted with an 8ft. clearance from the top of the concrete. This beam is strengthened by brackets of 4in. x 2in. hardwood fixed to the posts as shown in the south elevation plan. The hinged flaps, of which mention was made earlier, are 3ft. x 10ft. 6in. in size, and are constructed of plain galvanised iron secured to a frame of 3in. x 1½in. dressed hardwood. They are hung from the horizontal beam to open inwards and are secured at the bottom to the posts with small padbolts. When it is desired to raise the flaps for the purpose of moving implements in or out they can be held up by a hook of ¼in. round iron hung from the rafter above. The face of the flap is set two inches in from the face of the post to allow for the bracket referred to above.

North Wall.—Three of the bays on this side are weatherboarded, while the remaining four are open in similar fashion to those on the south side. The tractor compartment, which is located in the north-western corner, is divided from the remainder of the shed by 3½in. x ½in. hardwood lining secured to studs two feet apart.

ROOF

The pitch of the roof is 1/5 and the rafters are 13ft. 6in. long, cut from 4in. x 2in. hardwood, and spaced at slightly less than 3ft. centres, so that there are four rafters to each bay and a rafter over each post. The roof is braced with 4in. x 2in. timber from each intermediate post as shown in the cross section A-A. Each pair of rafters has a 14ft. length of 4in. x 2in. timber as a collar to prevent the sideways thrust from the roof being carried on to the walls. Diagonal bracings are also fixed from the top of the intermediate posts in both directions to the ridge plate as shown by the dotted lines in the south elevation. The overhang of the roof is six inches. Two rows of 7ft. iron are used along each side, and with a rafter length of 13ft. 6in. this gives an overlap of six inches. The ridge plate is of 7in. x 1in. hardwood and the purlins are of 3in. x 1½in. timber spaced approximately 3 feet apart.

The materials required, allowing a reasonable amount for loss in cutting where necessary, are as follows:—

TIMBER

Sawn Hardwood—

5in. x 5in.	15/9ft.
5in. x 3in.	11/11ft.
4in. x 3in.	20/12ft. (top and base plates)
7in. x 1in.	6/14ft. (ridging)
4in. x 2in.	28/16ft. (56 8ft. studs)
	110/14ft. (62 rafters, 27 rafter ties, gable studding and roof braces)
3in. x 1½in.	850 running ft. (purlins)
3in. x 1in.	6/14ft. (wall braces)

Dressed Weatherboards—2,000ft. second grade

Hardwood Lining Boards—700ft. 3½in. x ½in. T. and G., second grade (tractor compartment)

T. and G. Lining—6in. x ¾in.—16/8ft. (tractor compartment door)

Dressed Seasoned Hardwood—

7in. x 1in.	4/15ft.	(barge boards)
3in. x 1½in.	44/12ft.	(frame of flaps)
4in. x 1in.	5/9ft.	(door frame)

HARDWARE

Corrugated Galvanised Iron, 26 gauge—176 sheets

Plain Galvanised Iron, 26 gauge—22 sheets 6ft. x 3ft.

Spouting—30 lengths 5in.

Spouting Brackets—60 to fit 5in. spouting

Ridging—15 lengths of 14in.

Down Pipe—4 lengths of 3in.

Carriage Bolts—5 dozen 6½in. x ½in.

Pad Bolts—2 dozen 6in.

Bar Iron—11 pieces of 2in. x ½in, each piece 2ft. 6in. long with a right-angle bend 3in. from one end and two 9/16in. holes bored 3in, and 10in. respectively from the other end

Cement—15 bags

Gravel—4 cubic yards

The cost of these materials at the time of erection was as follows:—

	£	s.	d.
Sawn Hardwood	17	0	0
Weatherboards	13	10	0
Hardwood Lining, T. and G. Pine, and all Dressed Hardwood	9	0	0
Plain Galvanised Iron	4	9	0
Roofing Iron	28	12	0
All other Hardware, including Cement	13	8	0
Paint	3	0	0
Gravel	0	10	0
Labour	24	0	0
	£113	9	0

These costs are for a first-class job, capable—provided it has an occasional coat of paint—of giving useful service for many years. There is no wood touching the ground, and all woodwork exposed to the weather is painted. However, the figures could be lowered in some respects without reducing the quality of the building to any extent.

The labour employed in the building of the shed constructed on the departmental farm at Cressy was one carpenter and a carpenter's labourer. As the job is a fairly straightforward one, it could be done reasonably well by a farmer with some knowledge and experience of building at a time when other farm work was not pressing. A considerable saving in outside labour costs could thus be effected. Costs could also be reduced by using semi-seasoned sawn weatherboards instead of the dressed ones, as the former can be obtained for approximately half the price of the latter. Again, the framework for the flaps could be made of undressed timber provided it was thoroughly seasoned. The cost of the 5in. x 5in. posts was £2, and of the concrete blocks, iron bars and bolts another £2. This expense is well justified as it avoids setting the posts in the ground, where they would have a limited life and be difficult to renew.

A shed of this type would have a life of 50 years or more, so that the annual depreciation would be only £2/6/-. The maintenance costs would be painting at approximately five-year intervals at a total cost of £2/10/-, or 10/- per annum. The interest at 4 per cent. on the capital outlay is £4/12/- for the first year, so that the first annual cost is £7/8/-. Thereafter the annual cost will be slightly and progressively less each year owing to reduction in interest as the capital cost is lowered by depreciation. When the present costs of farm implements are considered, there is no doubt that their protection is well worth the few pounds a year that a shed of this type would cost.

IS USE OF COVER CROP NECESSARY IN PERMANENT PASTURE ESTABLISHMENT?

It is not by any means essential to use a cover crop in permanent pasture establishment if the sowing is done early on a firm, well fallowed and prepared seed-bed. Probably the majority of the best pastures are those that have been sown alone and early, generally not later than the first week of March. There are several hundred acres of registered ryegrass areas in the North Midlands that bear testimony to this.

The cover crop is largely a matter of individual farm expediency, and the position arises that on many properties, for various reasons, pasture has to be laid down by means of underseeding the hay or grain crop. The results obtained are reasonably successful on the whole, and quite often leave little to be desired.

Wherever the management permits, however, permanent pasture should be established by sowing early and alone or with a very light cover (e.g., a pound of rape or not more than three-quarters of a bushel of oats) such as will increase the quantity of winter and spring feed without injuring the growth of the pasture plants. Heavy covers, even if grazed out, lessen the quantity of plant food available and by their naturally stronger growth have a smothering effect resulting in the final sward being thin and open.

EXTENSION SERVICE

Late Blight of Celery

(SEPTORIA APII-GRAVEOLENTIS (Dorogin)

By J. O. HENRICK, Plant Pathologist

DURING the last season a leaf-spot severely attacked several celery beds in the environs of Launceston, and in one case completely destroyed the crop.

On enquiry of this particular grower he stated he had noticed slight signs of the trouble in the previous four seasons, but had taken no steps to obtain information regarding it.

Examination of the spots and spores places the disease as that described by Cochran (1) as the "small-spot type" of Septoria.

SYMPTOMS

The first indications are small light yellow areas showing up on the lower outer leaves and gradually spreading on to the leaf stalks and stems of the plant. These infected areas later assume a greyish-brown appearance and are seen to be densely studded with small pin-point black bodies (**pycnidia**), some of which are also present in the immediately surrounding tissue. A leaf, typical of the badly affected crop, is shown in the accompanying plate.

CONTROL MEASURES

In order to plan satisfactory control measures it is essential to be conversant with the method of carry-over of the disease.

The fungus is carried over the winter in—

(a) diseased plant refuse, and

(b) the seed coat, where seed has been produced by infected plants.

It is recorded that the spores on the seed remain alive for more than two years, whereas those in refuse die under twelve months (2).

From the foregoing it will be seen that three phases of control are necessary—

(i) Land hygiene
(ii) Seed treatment
(iii) Growing crop protection.

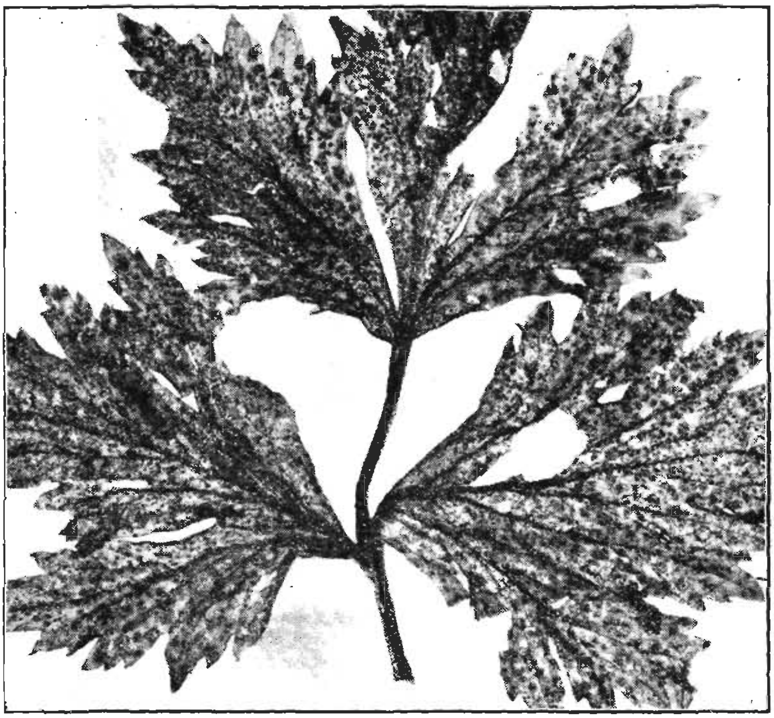
(i) **Land Hygiene—**

(a) All infected leaves that have been cut away should be destroyed by burning.

(b) At the end of the season all refuse should be gathered up and burnt.

(c) Area should be well drained.

(d) Rotate crops. The disease attacks only wild and cultivated celery and celeriac.



BADLY AFFECTED LEAF, SHOWING NUMEROUS PYCNIDIA

(ii) **Seed Treatment.**—This phase is only necessary where it cannot be guaranteed that seed is from a healthy crop. Every effort should be made to obtain clean seed, as the various methods recommended for seed treatment cause a considerable reduction in germination percentage.

The three methods of treatment recommended are—

(a) Dipping in corrosive sublimate 1 in 1,000 (1 oz. in $6\frac{1}{4}$ galls. of water) for 15 minutes; or

(b) Steeping in formalin solution, 1 part commercial formalin to 400 parts of water, for three hours; or

(c) Steeping in hot water at 118° Fahr. for 30 minutes and then rinsing in cold water.

Whichever method is used, the seed should be planted while still damp.

(iii) **Growing Crop Protection.**—During the growing season the crop should be sprayed with Bordeaux Mixture (6-4-40). Every part of the plant, under surface of leaves as well as upper surface, should be covered with the fungicide.

(a) Commence treatment when the plants are in the seed-bed, giving the first application when about 1 inch tall, and the second a day or so before transplanting.

(b) When the growing plants are 6 inches high spray again, following up with two more sprayings at 10 to 12-day intervals.

Where the disease has been severe, one season of carrying out the above programme should do a lot towards clearing up "carry-over" and in future years control would consist in attending to land hygiene and using clean seed.

REFERENCES

(1) Cochran, L. C., 1932: A Study of Two Septoria Leaf Spots of Celery. Phytopath. 22: 791-812.

(2) Chupp, Charles, 1925: Manual of Vegetable Garden Diseases. Macmillan Coy., N.Y.

Pethybridge, G. H., 1914: The Possible Source of the Origin of the Leaf-Spot Disease of Cultivated Celery. Journ. Roy. Hort. Soc., Vol. 40, pp. 476-480.

ARTHRITIS IN LAMBS

Every year many flocks experience lameness in a certain number of the lambs. The lambs show evidence of stiffness in one or more joints and may lose condition in bad cases. This lameness is caused through infection with the lamb arthritis bacillus, a germ which appears to be fairly common in the soil of some areas. While the majority of cases recover, there are usually a few permanent cripples left as a result of the trouble.

Infection occurs either through the navel or marking wounds as a rule, though it is possible that some cases arise as a result of the ingestion of the germ with the food.

Prevention consists of cleanliness of instruments and surroundings at marking time, an important point being the avoidance of regular yards, etc., for this operation.

Marking should be carried out in a temporary pen erected in the corner of a paddock well away from sheep camps, etc. During the operation all instruments should be kept in a disinfectant solution such as lysol when not actually in use.

Where the infection occurs before marking, the only method of combating infection is to treat the navel of all new-born lambs with a disinfectant such as tincture of iodine. The latter method is, of course, impracticable on most large properties unless losses are serious enough to warrant the trouble involved.

ANIMAL HEALTH SERVICE

The Official Australian Pure-Bred Dairy Cattle Production Recording Scheme

ANNUAL REPORT, SEASON 1937-38

By J. T. ARMSTRONG, Chief Dairy Officer

DURING the 1937-38 year 474 dairy cattle from 49 herds completed their lactation periods under the official section of the Pure-Bred Herd Recording Scheme, as against 483 cows from 47 herds for the previous year.

The average production per cow was—

Milk, 6,168 lbs.; Average Test, 4.67%; Butterfat, 299.4 lbs.

or an increase of 11.2 lbs., not quite 4% over the previous season's average of 288.2 lbs. of butterfat per cow, and, in view of the particularly favourable seasonal conditions, it is considered that this average is attributable rather to the season than to any appreciable increase in the productive capacity of the cows recorded.

The following table, setting out the number of cows recorded and their average production of butterfat, shows that the year's average is the highest since the 1931-32 season, but that it is below the yields recorded in 1927-28, 1929-30.

Year	No. of Cows	Average Butterfat Production
1928-29 ---- ----	234	299.3 lbs.
1929-30 ---- ----	271	318.2 ,,
1930-31 ---- ----	219	337.6 ,,
1931-32 ---- ----	240	294.0 ,,
1932-33 ---- ----	263	296.6 ,,
1933-34 ---- ----	290	261.3 ,,
1934-35 ---- ----	273	280.6 ,,
1935-36 ---- ----	412	273.4 ,,
1936-37 ---- ----	483	288.2 ,,
1937-38 ---- ----	474	299 4 ,,

List of Leading Cows in Each Class

Class	Name of Cow	Herd Book No.	Owner	Milk Lbs.	Av. Test	B'fat Lbs.
ture Cows	Melton Vale Blossom	31275	Stuart, L. A.	8,692	6.53	568.0
. 4-yr.-old	Crendon Eminent Sybil	47789	Barnett, N. R.	9,849	5.26	518.8
. 4-yr.-old	Frogmore Eliza	10897	Fergusson, F. C.	9,960	4.26	424.4
. 3-yr.-old	Allan Water Honey	46993	Champion, A.	8,450	5.53	467.9
. 3-yr.-old	Palmerston Volunteer's Hope	54652	Cowie, A. E.	8,353	4.97	415.7
. 2-yr.-old	Palmerston Volunteer's Bud	NYA	Oliver, A. J.	7,081	5.29	375.2
. 2-yr.-old	Rannoch Silver Linda 10th	54913	Sadler, B. T.	6.537	5.00	327.0

Herd Summary

Herd Owner	Breed	Average Milk Per Cow (lbs.)	Test, %	Average But'fat Per Cow	Mature	Four Year-old	Three Year-old	Two Year-old	Total No of Cows
Stuart, L. A.	J	7.983	5.79	462,8	10	1	2	1	14
Barnett, N. R.	J	8,374	5.08	426.2	2	1	3	1	7
Robotham, H. V.	Fries.	11,542	3.33	383.6	5	—	1	1	7
McDonald, J.	J	7,693	4.94	380.7	2	—	—	—	2
Scottsdale School Farm	J	7,293	5.12	373.6	4	—	1	1	6
Kuipers, Capt. D.	J	6,558	5.68	373.0	3	1	2	1	7
Champion A.	J	6,406	5.48	351.2	2	2	12	3	19
Treloggen, J. W., & Sons	AIS	8,965	3.90	349.7	8	4	5	4	21
Wing, S. E.	Ayr.	7,711	4.51	348.4	3	1	2	1	7
Oliver, A. J.	J	6,704	5.16	346.4	—	—	1	2	3
Steel, L. J.	AIS	8,666	3.98	345.1	10	2	4	1	17
Heazlewood, T. A.	J	5,508	5.99	330.4	—	—	1	—	1
Fergusson, F. C.	AIS	7,794	4.19	327.1	2	5	6	1	14
Cowie, A. E.	J	6,488	5.01	325.6	9	3	8	4	24
Gardner. H. R., & Sons	AIS	7,906	4.09	324.0	2	2	4	1	9
Relbia Farm & Dairy Pty. Ltd	J	6,108	5.30	323.9	7	4	4	4	19
Lambert & Roebuck	J	5,874	5.44	320.1	3	2	1	2	8
Mackenzie, R. G.	AIS	7,986	3.99	319.4	4	2	2	6	14
McDonald, Mrs. C. W.	AIS	7,289	4.27	311.6	2	—	—	—	2
Chisholm, R. F.	J	5,311	5.77	306.8	2	1	—	—	3
Bovill, H. Y.	AIS	7,651	3.96	303.6	4	2	4	1	11
Perkins, V.	J	5,825	5.20	303.2	—	4	3	7	14
Lansdell, Mrs. E.	J	6,493	4.62	300.4	6	—	3	3	12
Procter, C. A.	J	5,665	5.29	299.7	3	3	1	3	10
Ashley Home	Ayr.	7,271	4.02	292.6	2	2	—	2	6
Paterson, J. W.	RP	6,757	4.28	289.4	—	3	1	—	4
Sadler, B. T.	J	5,386	5.36	289.1	3	1	4	6	14
Midgley, A.	AIS	6,595	4.26	281.4	2	—	—	—	2
Lambert, J. D.	J	5,416	5.19	281.1	2	1	1	2	6
Waters, G. L.	J	5,086	5.49	279.3	2	—	—	4	6
Green, S. G.	Ayr.	6,483	4.28	277.9	5	—	2	3	10
Percy, A.	J	5,335	5.07	270.5	6	7	3	14	30
Scott, H. B.	Ayr.	6,727	3.97	267.5	2	1	2	—	5
Loane, N. E.	RP	6,297	4.23	266.4	—	2	2	1	5
Beveridge, Mrs. E. E.	AIS	6,538	3.99	261.5	2	1	—	3	6
Blundstone, J. E. (Est.)	RP	6,256	4.13	258.9	7	4	—	2	13
Hall, E. G.	Ayr.	6,838	3.76	257.7	5	—	2	1	8
Grindrod, J.	J	4,767	5.35	255.4	22	3	5	9	39
Mervyn, Brae Stud	J	4,749	5.36	254.9	2	—	2	3	7
Thompson, J. H. (Est.)	RP	5,776	4.16	240.3	4	1	5	3	13
Harding, W. T.	J	4,460	5.34	238.6	3	1	3	3	10
Von Stieglitz, H. W. L.	AIS	4,916	4.21	207.3	1	2	—	2	5
Lachlan Park Hospital	AIS	5,391	3.84	207.2	4	—	—	1	5
Foster, R. J. L.	Ayr	4,995	4.08	204.1	4	4	4	2	14
Wells, H. L.	AIS	4,915	4.05	199.2	2	—	1	1	4
Smith, E. J.	Ayr.	4,204	4.25	179.0	1	—	1	—	2
Shoobridge, H. W. & A. G.	Ayr.	3,915	4.26	166.9	1	—	—	—	1
Gladman Bros.	RP	3,755	4.38	164.5	5	—	—	2	7
"The Croft"	J	2,720	5.84	158.8	1	—	—	—	1
					181	73	108	112	474

List of Cows in Order of Merit

MATURE COWS

Standard: *350* lbs. Butterfat

Name of Cow	Breed	Herd Book *Number*	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
ton Vale Blossom	J	31275	Stuart, L. A.	7.10	29.10.36	8,692	6.53	568.0
ton Vale Gladys	J	31277	Stuart, L. A.	8.1	2.9.37	9,869	5.64	557.2
·tha Vale Maggie h	AIS	12518	Treloggen, J. W., and Sons	5.11	29.8.37	13,123	4.10	538.6
na May	J	42362	Stuart, L. A.	5.5	26.10.36	8,880	5.97	531.0
ton Vale Lucy	J	31278	Stuart, L. A.	7.0	10.10.36	8,759	5.96	522.1
ton Vale Charm	J	31276	Stuart, L. A.	7.10	5.11.36	8,136	6.40	521.0
n Water Mina	J	38477	Champion, A.	6.8	16.9.37	8,514	6.03	513.9
nstock Lorraine	Fries	4249	Robotham, H. V.	5.3	9.9.37	15,237	3.35	511.6
›ia *Betsy*	J	34917	Barnett, N. R.	9.3	2.1.37	9,710	5.07	492.4
nerston Beauty	J	45620	Stuart, L. A.	5.2	2.11.36	7,961	5.99	477.5
·nach Fortuna	J	42066	Scottsdale Sch'l Farm	6.0	22.9.37	8,697	5.46	475.1
nerston Maid 4th	J	41484	Cowie, A. E.	7.2	2.9.37	8,811	5.37	473.2
tone Jumper 2nd	AIS	F. Vol. 1	Steel, L. J.	8.0	25.8.37	11,514	4.06	467.4
tone Betty 2nd	AIS	F. Vol. 1	Steel, L. J.	10.4	15.1.37	10,516	4.37	459.9
luan Queen	J	43439	Stuart, L. A.	5.1	21.9.37	7,722	5.95	459.5
.artha Vale Linda 3rd	AIS	3290	Treloggen, J. W., and Sons	8.11	15.8.37	13,109	3.48	457.3
airhill Pearl 5th	AIS	10730	Mackenzie, R. G.	7.0	30.8.37	10,586	4.31	457.2
annoch Stylish Belinda	J	34966	Kuipers, Capt. D.	6.2	15.9.37	7,599	5.92	450.0
:ronach Fortuna	J	42066	Scottsdale Sch'l Farm	5.1	30.9.36	8,168	5.49	449.2
nstone Sophie 6th	AIS	8341	Bovill, H. Y.	6.1	1.10.36	11,201	4.00	448.5
almerston Hawthorn 5th	J	41482	Cowie, A. E.	6.11	14.8.37	8,732	5.04	440.8
nstone Daphne 15th	AIS	10615	Steel, L. J.	5.0	25.9.37	10,989	3.97	436.3
llan Water Golden Gem 2nd	J	38680	Champion, A.	5.9	30.9.37	8,612	5.05	435.5
annoch Silver Linda 3rd	J	28341	Sadler, B. T.	8.9	21.6.37	7,683	5.63	433.0
easant Banks Betsy	J	54782	Barnett, N. R.	5.2	19.11.36	8,842	4.89	432.4
alma Pride	J	42364	Chisholm, R. F.	6.3	31.3.37	7,235	5.97	432.2
alma Bell	J	31294	Stuart, L. A.	8.5	25.8.37	6,828	6.29	430.0
airhill Belle 2nd	AIS	10726	Mackenzie, R. G.	9.0	31.8.37	10,736	3.99	428 8
·ogmore Galatea	AIS	8342	Fergusson, F. C.	6.3	25.3.37	9,557	4.47	427.8
ill Farm Squaw 5th	AIS	3224	**Bovill, H. Y.**	8.0	12.9.37	10,617	4.02	426.9
alinga Dodger 3rd	RP	5053b	Blundstone, J. E. (Estate)	5.10	27.3.37	9,006	4.67	421.2
annoch Linda 3rd	J	34440	Kuipers, Capt. D.	7.1	19.4.37	6,808	6.17	420.7
astone Daphne 6th	AIS	8359	Steel, L. J.	7.10	4.9.37	11,130	3.76	419.5
othstock Mercedes Fobes	Fries.	4250	Robotham, H. V.	6.4	11.9.37	12,742	3.24	413.7
uan Duet	J	43436	Stuart, L. A.	5.1	18.9.37	9,012	4.58	413.0
annoch Rosebud's Duchess	J	34960	Sadler, B. T.	6.2	7.7.37	6,622	6.17	409.1
arnbank Queen Fobes	Fries.	3399	Robotham, H. V.	8.10	16.4.37	11,460	3.57	409.1
uan *Lady Lil 2nd*	J	43437	Stuart, L. A.	5.10	26.9.37	8,049	5.07	408.5
·lbia Freda	J	41748	Relbia Farm and Dairy Pty. Ltd	5.11	20.9.37	7,885	5.16	407.1
westoft Golden Lily	J	25088	Relbia Farm and Dairy Pty. Ltd.	9.3	21.9.37	7,449	5.37	400.0
.ll Farm Rosemaid	J	34941	Relbia Farm and Dairy Pty. Ltd.	6.0	12.10.36	6,856	5.77	396.2
.nnoch Belle	J	25182	Waters, G. L.	9.11	5.9.37	6,807	5.80	395.1
artha Vale Red-wings	AIS	12524	Treloggen, J. W., and Sons	5.9	4.9.37	11,706	3.36	393 5
lmerston Maud	J	28273	Cowie, A. E.	7.6	15.7.37	7,358	5.33	392 4
ttle Mt. Starlight	J	40747	Lansdell, Mrs. E.	5.4	22.3.37	7,368	5.31	391.7
astone Flyer 2nd	AIS	F. Vol. 1	Steel, L. J.	8.11	6.8.37	9,558	4.09	391.7
lmerston Muse 2nd	J	50044	Cowie, A. E.	5.1	15.8.37	7,404	5.28	391.2
eyleigh Queenie .7th	AIS	16744	Wells, H. L.	5.7	1.8.37	9,852	3.94	389.1
llefaire Blonde's Beljoynette	J	47186	Harding, W. T.	5.3	1.2.37	5,876	6.61	388.8
vengrove Lucette	J	40709	Lambert & Roebuck	5.11	26.8.37	7,367	5.21	384.5
artha Vale Moss 4th	AIS	12521	Treloggen, J. W., and Sons	5.11	3.9.37	9,612	3.99	384.3
nnoch Starlight's Vallette	J	25191	McDonald, J.	8.9	28.3.37	7,767	4.94	383.7
thstock Mercedes Fobes	Fries.	4250	Robotham, H. V.	5.6	16.10.36	11,594	3.30	382.8
astone Hetty 2nd	AIS	3269	Steel, L. J.	5.11	15.10.36	9,252	4.13	382.6
.tle Mt. Princess Ariel	J	40715	Lansdell, Mrs. E.	5.6	2.11.36	8,046	4.75	382.3

MATURE COWS (continued)

Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
Pelerine Rose 18th	AIS	13273	Gardner, H. R., and Sons	5.9	24.8.37	8,443	4.51	380.8
Martha Vale Maggie 4th	AIS	8384	Treloggen, J. W., and Sons	6.11	10.9.37	7,967	4.76	379.8
Alanvale May	Ayr.	25711	Hall, E. G.	5.11	8.9.37	10,038	3.78	379.5
Hillbrow Adeline	J	34459	McDonald, J.	7.0	14.5.37	7,619	4.95	377.7
Lowestoft Holly	J	28309	Relbia Farm and Dairy Pty. Ltd.	8.3	3.11.36	7,323	5.15	377.5
Stronach Ariadne	J	46260	Scottsdale Sch'l Farm	6.6	14.5.37	7,581	4.94	374.8
Enstone Sophie 6th	AIS	8341	Bovill, H. Y.	7.0	7.9.37	9,697	3.85	374.2
Enstone Rennie 2nd	AIS	10631	Treloggen, J. W., and Sons	5.11	28.8.37	9,273	4.00	371.4
Palmerston Hope	J	45631	Cowie, A. E.	6.2	22.9.37	8,130	4.52	367.8
Enstone Beauty 2nd	AIS	F. Vol. 1	Steel, L. J.	8.11	6.8.37	8,781	4.17	366.2
Enstone Arabelle 2nd	AIS	3265	Steel, L. J.	6.3	14.11.36	10,236	3.57	365.5
Martha Vale Maggie 3rd	AIS	8383	Treloggen, J. W., and Sons	7.11	28.8.37	7,905	4.58	362.8
Stronach Venus	J	34451	Scottsdale Sch'l Farm	7.4	1.4.37	7,591	4.77	362.4
Coraville Floss	J	31261	Lambert, J. D.	6.11	30.9.36	6,339	5.67	359.8
Inglis Melba	J	48752	Percy, A.	5.0	14.9.37	7,567	4.75	359.8
Glen Vina Tulip	J	39850	Procter, C. A.	7.0	22.6.37	7,420	4.84	359.6
Moola Venus 2nd	Ayr.	20548	Wing, S. E.	9.9	19.9.37	8,092	4.44	359.3
Relbia Becky	J	34427	Relbia Farm and Dairy Pty. Ltd.	7.1	26.11.36	6,242	5.74	358.8
Enstone Beauty 3rd	AIS	10609	Treloggen, J. W., and Sons	5.0	8.9.37	8,045	4.46	358.8
Olive Dale Jubilee	Ayr.	25332	Green, S. G.	6.6	17.5.37	7,303	4.89	357.4
Palmerston Heather	J	28268	Cowie, A. E.	7.5	1.3.37	7,197	4.94	355.6
Rannoch Silver Linda 5th	J	34962	Lambert & Roebuck	6.0	14.8.37	6,135	5.73	352.0
Rannoch Stylish Bess	J	34967	Sadler, B. T.	5.4	28.9.36	6,243	5.59	349.1
Inglis Model	J	34947	Percy, A.	5.11	30.7.37	7,632	4.54	346.5
Little Mt. Carnation	J	44918	Cowie, A. E.	5.0	25.11.36	7,077	4.85	343.3
Rothstock Pauline	Fries.	4923	Robotham, H. V.	8.11	21.8.37	10,838	3.16	343.1
Inglis Jess	J	34945	Percy, A.	5.11	16.8.37	7,197	4.69	338.1
Cawthorne Mabel 7th	AIS	3254	Midgley, A.	7.10	24.8.37	7,281	4.64	337.9
Nalinga Dinah	RP	4020b	Blundstone, J. E. (Estate)	8.7	27.3.37	8,450	3.99	337.8
Olive Dale Della	Ayr	15379	Green, S. G.	12.6	7.3.37	8,429	3.95	333.2
Wingaroo Sylvia	RP	2763aa	Thompson, J. H. (Estate)	6.5	18.12.36	7,993	4.16	332.9
Hiawatha Queen	Ayr	27379	Green, S. G.	10.6	17.5.37	7,875	4.22	332.7
Pelerine Daphne 7th	AIS	13257	Bovill, H. Y.	5.7	16.3.37	8,006	4.11	329.2
Rostherne Winnie	J	25126	Grindrod, J.	10.0	7.7.37	6.488	5.04	327.5
Rostherne Golden Queen	J	46047	Grindrod, J.	5.8	8.7.37	5,978	5.44	325.1
Mervyn Brae Dainty 2nd	J	45155	Mervyn Brae Stud	6.2	31.7.37	7,237	4.48	324.7
Tasman Wattle	Ayr.	24400	Ashley Home	6.6	13.4.37	8,014	4.05	324.7
Rostherne Dream	J	46045	Grindrod, J.	5.0	20.7.37	6,713	4.82	324.1
Moola Vesta	Ayr.	24132	Wing, S. E.	5.11	14.10.36	7,076	4.57	324.0
Moola Princess	Ayr.	25267	Wing, S. E.	5.0	21.10.36	7,811	4.12	322.1
Pelerine Dolly 6th	AIS	3233	McDonald, Mrs. C.W.	7.2	5.10.36	7,635	4.20	321.0
Glen Vina Rosebud	J	39849	Procter, C. A.	6.10	2.2.37	6,664	4.89	319.8
Rannoch Vanity	J	34974	Waters, G. L.	6.0	10.9.37	6,126	5.21	319.2
Springbanks Daisy 2nd	AIS	14056	Beveridge, Mrs. E. E.	6.1	9.9.37	7,248	4.38	317.6
Rotherne Choice Lass	J	34884	Grindrod, J.	6.10	26.6.37	6,603	4.80	317.0
Tasman Enid	Ayr.	25511	Ashley Home	5.8	30.8.37	7,389	4.27	315.6
Mill Farm Hyacinth 7th	J	28311	Relbia Farm and Dairy Pty. Ltd.	8.2	24.12.36	5,264	5.99	315.5
Alanvale Wildflower	Ayr.	26898	Hall, E. G.	5.10	26.10.36	8,266	3.80	314.9
Relbia Lola	Ayr.	22031	Green, S. G.	8.6	17.4.37	6,786	4.63	314.6
Enstone Pride 8th	AIS	3279	Gardner, H. R., and Sons	6.3	7.11.36	8,271	3.76	311.6
Coraville Matilda	J	52361	Lambert, J. D.	7.9	1.8.37	6,219	4.99	310.9
Enstone Success 8th	AIS	16322	Fergusson, F. C.	5.0	28.9.37	7,991	3.86	308.8
Rostherne Parva's Delight	J	28293	Grindrod, J.	9.0	15.9.37	5,036	6.09	307.0
Wingaroo Kindness	RP	4058b	Thompson, J. H. (Estate)	5.0	8.10.36	6,845	4.48	306.8
Rostherne Cream Maid	J	46044	Grindrod, J.	5.9	16.6.37	5,622	5.41	304.4
Little Mt. Princess Ariel	J	40745	Lansdell, Mrs. F.	6.4	11.9.37	6,841	4.43	303.4
Pelerine Daphne 9th	AIS	13259	McDonald, Mrs. C.W.	5.5	15.4.37	6,943	4.35	302.2
Mervyn Brae Buttercup	J	45154	Mervyn Brae Stud	5.10	4.7.37	5,008	6.01	301.4
Nalinga Marjorina	RP	5229d	Blundstone, J. E. (Estate)	7.5	7.4.37	7,981	3.77	301.1

MATURE COWS (continued)

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
115.	Inglis Dairymaid	J	40282	Percy, A.	5.3	19.6.37	5,486	5.48	300.7
116.	Rostherne Daisy	J	34388	Grindrod, J.	7.9	31.5.37	4,540	6.53	296.5
117.	Rostherne Lovely Chance	J	46052	Grindrod, J.	5.8	31.5.37	6,305	4.68	295.4
118.	Palmerston Mystic	J	45632	Cowie, A. E.	5.2	3.10.36	5,873	5.02	295.1
119.	Rostherne Mayflower	J	46054	Grindrod, J.	6.0	30.5.37	5.935	4.87	289.6
120.	Rostherne Parva's Surprise	J	34392	Grindrod, J.	7.8	27.5.37	5,441	5.31	289.2
121.	Coraville Dorothy	Ayr.	21253	Scott, H. B.	8.1	4.10.36	7,742	3.70	283.8
122.	Rostherne Queenie 5th	J	46058	Grindrod, J.	5.0	15.9.37	5,369	5.33	286.6
123.	Rannoch Stylish Leaf	J	34968	Kuipers, Capt. D.	6.0	20.9.37	5,439	5.25	285.6
124.	Hillstead Firefly	J	34397	Harding, W. T.	7.9	26.7.37	5,808	4.87	283.1
125.	Palmerston Rose	J	25109	Cowie, A. E.	9.4	27.12.36	6,664	4.24	282.9
126.	Little Mt. Dolly	J	34411	Lansdell, Mrs. E.	7.11	6.7.37	5,740	4.92	282.4
127.	Little Mt. Daisy	J	28304	Lansdell, Mrs. E.	9.8	10.3.37	6,613	4.27	282.3
128.	Springbanks Daisy 2nd	AIS	14056	Beveridge, Mrs. E. E.	5.2	23.10.36	6,933	4.03	279.5
129.	Nalinga Merle 2nd	RP	3438aa	Blundstone, J. E. (Estate)	8.0	25.6.37	7,541	3.68	278.1
130.	Palmerston Daisy	J	19165	Grindrod, J.	12.6	5.9.37	4,691	5.91	277.4
131.	Rostherne Barwin	J	46041	Grindrod, J.	5.2	9.7.37	5,050	5.47	276.3
132.	Palmerston Dulcie	J	20971	Grindrod, J.	11.9	15.6.37	5,282	5.13	271.3
133.	Rostherne Surprise 2nd	J	46062	Grindrod, J.	5.1	31.10.36	4,756	5.69	270.8
134.	Rostherne Queenie 3rd	J	34393	Grindrod, J.	8.0	16.7.37	4,760	5.68	270.5
135.	Fairhill Beauty 5th	AIS	10725	Mackenzie, R. G.	6.0	3.9.37	7,448	3.60	268.7
136.	Enstone Dolly 5th	AIS	16305	Lachlan Park Hospital	7.0	19.10.37	5,937	4.52	268.6
137.	Rostherne Wendy	J	34888	Grindrod, J.	6.8	31.5.37	5,468	4.90	267.9
138.	Inglis Gem	J	28320	Percy, A.	7.11	12.10.36	5,985	4.43	265.5
139.	Pleasant Banks Sunset	Ayr.	25359	Foster, R. J. L.	5.7	22.5.37	6,244	4.23	264.3
140.	Inglis Duchess	J	34424	Percy, A.	6.7	19.5.37	5,740	4.59	263.7
141.	Rostherne Silver Maid	J	28295	Grindrod, J.	8.9	1.8.37	5,180	5.05	261.7
142.	Rostherne Duchess	J	28291	Grindrod, J.	8.0	28.9.36	4,774	5.43	259.4
143.	Wingaroo Zeabelana 2nd	RP	3077a	Thompson, J. H. (Estate)	6.2	4.12.36	6,222	4.14	257.4
144.	Coraville Dairymaid	Ayr.	21250	Scott, H. B.	8.0	6.10.36	7,483	3.41	255.8
145.	Springbanks Daisy	AIS	18631	Von Stieglitz, H. W. L.	9.8	15.6.37	5,648	4.52	255.3
146.	Hiawatha Peggy	Ayr.	27378	Green, S. G.	7.6	23.8.37	6,298	4.04	254.8
147.	Rannoch Stylish Valinda	J	41720	Lambert & Roebuck	5.0	27.6.37	5,212	4.86	253.7
148.	Rostherne Silvermine	J	46061	Grindrod, J.	5.7	16.4.37	4,866	5.19	252.6
149.	Fairhill June	AIS	YA	Mackenzie, R. G.	5.1	12.9.37	6,081	4.00	243.3
150.	Alanvale Sincerity	Ayr.	23410	Hall, E. G.	8.11	2.9.37	6,792	3.57	243.0
151.	Rostherne Maid	J	24735	Grindrod, J.	10.9	15.7.37	5.165	4.66	240.8
152.	Enstone Jill 3rd	AIS	8371	Lachlan Park Hospital	5.2	6.11.36	6,030	3.97	239.7
153.	Bracknell Queen	J	28303	Lansdell, Mrs. E.	11.11	1.4.37	5,586	4.28	239.6
154.	Mill Farm Lady Cerise 37th	J	45165	Harding, W. T.	5.0	26.9.37	4,146	5.55	230.3
155.	Hawthorn Maid	RP	2490c	Gladman Bros.	7.8	30.9.36	4,545	5.06	230.0
156.	Glen Vina Queenie	J	25163	Procter, C. A.	8.8	1.1.37	4,315	5.31	229.4
157.	Wingaroo Zaarana	RP	2359a	Thompson, J. H. (Estate)	8.8	8.11.36	5,823	3.91	228.1
158.	Alanvale Wallflower	Ayr.	26897	Hall, E. G.	5.10	28.9.37	6,501	3.49	227.2
159.	Enstone Snowy 2nd	AIS	F. Vol. 1	Lachlan Park Hospital	8.3	16.11.36	5,978	3.80	227.1
160.	Newstead Stately 12th	AIS	18628	Midgley, A.	9.8	24.10.37	5,910	3.80	224.9
161.	Alanvale Saidie 2nd	Ayr.	26895	Hall, E. G.	6.4	6.12.36	5,604	4.00	224.2
162.	Quantock Coombe Fanchette	Ayr.	24238	Foster, R. J. L.	9.0	20.9.37	5,768	3.84	221.9
163.	Gleneira Daisy Bell	Ayr.	14462	Foster, R. J. L.	11.10	28.10.36	5,484	3.91	214.5
164.	Relbia Sheila	J	34432	Relbia Farm and Dairy Pty. Ltd.	8.7	12.1.37	4,523	4.63	209.7
165.	Nalinga Mary 2nd	RP	NYA	Blundstone, J. E. (Estate)	6.1	11.8.37	4,730	4.02	190.2
166.	Enstone Daphne 4th	AIS	17837	Lachlan Park Hospital	7.11	15.10.36	6,050	3.65	185.4
167.	Coraville Dawn 2nd	Ayr.	27042	Smith, E. J.	5.0	23.8.37	4,252	4.31	183.6
168.	Enstone Easy 2nd	AIS	3268	Steel, L. J.	7.1	20.9.37	5,442	3.36	183.3
169.	Karong Maid 3rd	RP	2585d	Gladman Bros.	10.11	22.8.37	4,323	4.02	174.9
170.	Gala Rosedale Primrose	RP	3651a	Gladman Bros.	5.7	10.8.37	4.562	3.83	174.9
171.	Strathavon Fancywork	Ayr.	26733	Shoobridge, H. W. and A. G.	5.2	27.12.36	3,915	4.26	166.9
172.	Rostherne Vera	J	28296	Grindrod, J.	8.11	11.8.37	2,979	5.42	161.5

MATURE COWS (*continued*)

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
173.	Olive Dale Daisy	Ayr.	23148	Foster, R. J. L.	7.4	8.2.37	3,819	4.19	160.1
174.	Mill Farm Golden Lily	J	34934	"The Croft"	6.8	29.5.37	2,720	5.84	158.8
175.	Nalinga Dinah 3rd	RP	6128b	Blundstone, J. E. (Estate)	5.1	9.10.37	4,010	3.94	158.2
176.	Valma Ruby	J	42365	Chisholm, R. F.	6.4	26.3.37	2,289	6.22	142.4
177.	Thornleigh Nanette 4th	AIS	14709	Wells, H. L.	7.8	25.9.37	3,156	4.47	141.3
178.	Nalinga Marjorina 3rd	RP	6211d	Blundstone, J. E. (Estate)	5.0	16.8.37	3,401	4.10	139.6
179.	Woodburn Prudence	RP	1540aa	Gladman Bros.	10.11	13.9.37	3,352	4.00	134.2
180.	Enstone Snowy 3rd	AIS	F. Vol. 1	Steel, L. J.	7.11	3.8.37	3,345	3.74	125.1
181.	Hawthorn Maid	RP	2490c	Gladman Bros.	8.11	18.12.37	2,574	4.43	114.2

Average for Mature Cows

Milk, 7,153 lbs. Test, 4.61% Butterfat, 3,302.2 lbs.

. EXTENDED TEST, 365 DAYS

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1.	Waipiko Best	J	51059	Barnett, N. R.	5.9	20.7.36	11,758	6.97	820.6
2.	Fairhill Primrose 2nd	AIS	17831	Mackenzie, R. G.	8.0	2.9.36	12,725	4.37	557.2
3.	Wingaroo Sylvia	RP	2763aa	Thompson, J. H. (Estate)	6.5	18.12.36	9,946	4.18	416.6

SENIOR 4-YEAR-OLDS

Standard: 330 lbs. Butterfat

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1.	Crendon Eminent Sybil	J	47789	Barnett, N. R.	4.10	11.8.37	9,849	5.26	518.8
2.	Enstone Dolly 10th	AIS	10618	Steel, L. J.	4.11	20.8.37	9,829	4.65	457.5
3.	Fairhill Bluebell	AIS	10727	Mackenzie, R. G.	4.10	23.8.37	10,076	4.31	535.1
4.	Rannoch Linda 5th	J	41703	Kuipers, Capt. D.	4.10	30.6.37	8,261	5.22	431.4
5.	Enstone Olga 3rd	AIS	10628	Treloggen, J. W., and Sons	4.11	2.9.37	10,143	4.11	417.1
6.	Martha Vale Smutty 4th	AIS	12525	Treloggen, J. W., and Sons	4.11	4.10.36	10,545	3.49	368.3
7.	Moola Pearl 2nd	Ayr.	26580	Wing, S. E.	4.10	16.9.37	7,935	4.53	359.7
8.	Calthorpe Mignonette	J	39173	Perkins, V.	4.11	16.10.36	7,428	4.83	358.8
9.	Inglis Biddy	J	34944	Percy, A.	4.11	16.10.36	7,704	4.63	357.1
10.	Wingaroo Needfull	RP	3956a	Paterson, J. W.	4.10	4.9.37	9,030	3.78	341.9
11.	Wingaroo Dable 4th	RP	3944a	Loane, N. E.	4.10	16.7.37	7,444	4.55	338.7
12.	Martha Vale Linda 4th	AIS	8382	Treloggen, J. W., and Sons	4.11	26.10.36	9,618	3.49	336.6
13.	Martha Vale Jessie 5th	AIS	17313	Treloggen, J. W., and Sons	4.10	3.9.37	8,629	3.88	335.0
14.	Palmerston Hester	J	45630	Cowie, A. E.	4.11	26.10.36	6,271	5.31	333.2
15.	Tasman Boronia	Ayr.	26769	Ashley Home	4.7	15.5.37	8,699	3.68	320.1
16.	Melton Vale Bess	J	49485	Percy, A.	4.10	12.3.37	6,395	4.94	316.2
17.	Enstone Zenda 3rd	AIS	10640	Gardner, H. R., and Sons	4.10	25.8.37	7,243	4.13	299.4
18.	Inglis Charm	J	48751	Percy, A.	4.9	7.7.37	6,116	4.86	297.6
19.	Wingaroo Celia 2nd	RP	3940a	Paterson, J. W.	4.9	20.7.37	5,883	4.72	277.7
20.	Inglis Queen's Baby	J	48756	Percy, A.	4.9	28.7.37	5,627	4.85	273.2
21.	Nalinga Meg	RP	4434aa	Blundstone, J. E. (Estate)	4.8	28.5.37	5,683	4.12	234.3
22.	Nalinga Jewel 2nd	RP	NYA	Blundstone, J. E. (Estate)	4.11	21.8.37	5,721	3.99	228.7
23.	Easternside Lily	AIS	10478	Bovill, H. Y.	4.6	15.3.37	6,173	3.61	222.8
24.	Inglis Tilly	J	NYA	Percy, A.	4.9	20.7.37	4,566	4.87	222.5
25.	Springbanks Viola 2nd	AIS	NYA	Von Stieglitz, H. W. L.	4.10	30.11.36	5,304	3.88	206.1
26.	Pleasant Banks Agnes	Ayr.	27607	Foster, R. J. L.	4.11	22.9.37	4,548	3.88	176.8

Average for Senior 4-Year-Olds

Milk, 7,489 lbs. Test, 4.34% Butterfat, 325.5 lbs.

JUNIOR 4-YEAR-OLDS

Standard: 310 lbs. Butterfat

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1.	Frogmore Eliza	AIS	10897	Fergusson, F. C.	4.5	21.2.37	9,960	4.26	424.4
2.	Cluan Perfection	J	43438	Stuart, L. A.	4.2	22.11.36	5,358	7.85	421.0
3.	Enstone Lily 6th	AIS	16310	Fergusson, F. C.	4.0	7.9.37	8,797	4.43	390.0
4.	Nalinga Cherry 3rd ...	RP	5228d	Blundstone, J. E. (Estate)	4.1	3.8.37	8,148	4.69	382 8
5.	Enstone Warra 2nd	AIS	10639	Gardner, H. R., and Sons	4.2	3.12.36	8,231	4.57	376.5
6.	Rannoch Magnificette	J	45861	Sadler, B. T.	4.2	25.7.37	6,699	5.60	375.6
7.	Calthorpe Salome	J	47528	Perkins, V.	4.0	15.9.37	6,729	5.57	375 3
8.	Allan Water Vamp 3rd	J	47300	Champion, A.	4.0	23.9.37	6,304	5.95	375.2
9.	Enstone Minnie 7th	AIS	16311	Fergusson, F. C.	4.2	2.10.37	9,744	3.80	370.3
10.	Glen Vina Dahlia	J	48270	Procter, C. A.	4.5	24.6.37	7,013	5.20	365.2
11.	Glen Vina Silvy 3rd	J	48276	Procter, C. A.	4.4	29.8.37	6,286	5.77	363.1
12.	Allan Water Mascotte 5th	J	46997	Champion, A.	4.0	22.9.37	6,868	5.28	362.7
13.	Melton Vale Jean	J	49489	Percy, A.	4.4	27.3.37	6,805	5.29	360 3
14.	Relbia Trixie	J	41755	Relbia Farm and Dairy Pty. Ltd.	4.4	12.2.37	6,876	5.19	357.0
15.	Glen Vina Gloria	J	48271	Procter, C. A.	4.3	13.9.37	7,028	5.04	354.5
16.	Coraville Golden Queen	J	47743	Lambert & Roebuck	4.1	31.8.37	6,817	5.16	351.9
17.	Wingaroo Lovely	RP	4935a	Loane, N. E.	4.0	26.8.37	8,561	4.10	351.7
18.	Enstone Daphne 18th	AIS	10616	Steel, L. J.	4.4	23.8.37	8,888	3.95	351.3
19.	Relbia Dove 2nd	J	45898	Relbia Farm and Dairy Pty. Ltd.	4.0	10.11.36	7,452	4.68	349.1
20.	Valma Winsome	J	46567	Chisholm, R. F.	4.2	6.4.37	6,409	5.39	345.9
21.	Pelerine Pansy 7th ...	AIS	17715	Mackenzie, R. G.	4.0	25.9.37	7,867	4.31	339.6
22.	Frogmore Viola 2nd	AIS	10899	Fergusson, F. C.	4.1	10.10.36	8,098	4.14	335.2
23.	Rostherne Duchess 2nd	J	46046	Grindrod, J.	4.1	9.10.36	5,618	5.93	333.2
24.	Relbia Jenny	J	41749	Relbia Farm and Dairy Pty. Ltd.	4.2	5.11.36	6,105	5.40	330.0
25.	Rannoch Rose 3rd	J	45867	Lambert & Roebuck	4.1	28.7.37	5,491	5.92	325.5
26.	Pelerine Dolly 13th	AIS	17714	Fergusson, F. C.	4.1	13.9.37	6,961	4.59	319.6
27.	Calthorpe Sybil	J	43301	Perkins, V.	4.5	10.5.37	6,113	5.18	316.8
28.	Palmerston Misty	J	50043	Cowie, A. E.	4.0	18.11.36	7,114	4.44	316.2
29.	Palmerston Volunteer's Faith	J	54646	Cowie, A. E.	4.0	5.9.37	7,551	4.17	314.8
30.	Coraville Rita	Ayr.	27045	Scott, H. B.	4.1	4.10.36	6,738	4.46	301.1
31.	Rannoch Silver Maid 6th	J	45872	Lambert, J. D.	4.2	3.9.37	5,161	5.80	299.5
32.	Wingaroo Gealda 3rd	RP	3948a	Thompson, J. H. (Estate)	4.1	9.10.36	7,997	3.72	297.5
33.	Relbia Lassie	J	41752	Relbia Farm and Dairy Pty. Ltd.	4.2	15.12.36	5,715	4.99	285.7
34.	Tasman Snowdrop	Ayr.	26771	Ashley Home	4.3	15.2.37	6,990	4.03	282.3
35.	Rostherne June	J	46051	Grindrod, J.	4.3	23.9.37	5,459	5.14	281.0
36.	Inglis Bluebell	J	48750	Percy, A.	4.0	18.10.36	6,246	4.49	280.4
37.	Nalinga Topnotch 5th	RP	4750a	Blundstone, J. E. (Estate)	4.4	21.8.37	6,687	4.08	273.0
38.	Calthorpe Lady Viola	J	43299	Perkins, V.	4.3	11.1.37	5,214	4.99	260.4
39.	Rostherne Some Chance	J	50493	Grindrod, J.	4.0	15.9.37	4,718	5.45	257.3
40.	Easternside Duchess	AIS	10476	Bovill, H. Y.	4.3	16.6.37	5,859	4.00	234.5
41.	Pleasant Banks Biddy	Ayr.	28765	Foster, R. J. L.	4.1	1.9.37	5,590	4.15	232.0
42.	Springbanks Rose 2nd	AIS	NYA	Von Stieglitz, H. W. L.	4.3	30.12.36	5,784	3.97	229.9
43.	Wingaroo Peach	RP	5070b	Paterson, J. W.	4.0	19.9.37	5,353	4.27	228.6
44.	Pelerine Daphne 10th	AIS	13260	Beveridge, Mrs. E. E.	4.2	26.10.36	5,400	3.90	211.0
45.	Pleasant Banks Agnes	Ayr.	27607	Foster, R. J. L.	4.0	24.10.36	5,133	3.86	198 5
46.	Pleasant Banks Bonny	Ayr.	28767	Foster, R. J. L.	4.0	7.10.37	4,347	4.11	178.6
47.	Hillstead Ryebread ...	J	48713	Harding, W. T.	4.0	22.10.36	3,548	4.56	161.8

Average for Junior 4-Year-Olds

Milk, 6,634 lbs. Test, 4.75% **Butterfat, 315.5 lbs.**

SENIOR 3-YEAR-OLDS

Standard: 290 lbs. Butterfat

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1.	Allan Water Honey	J	46993	Champion, A.	3.11	22.9.37	8,450	5.53	467.9
2.	Moola Mona 2nd	Ayr.	27549	Wing, S. E.	3.11	25.8.37	9,178	4.72	433.4
3.	Crendon Better	J	47787	Barnett, N. R.	3.10	25.9.37	7,819	5.49	429.3
4.	Melton Vale Mulberry	J	49491	Stuart, L. A.	3.11	7.9.37	6,888	5.91	407.2
5.	Crendon Charm	J	56956	Barnett, N. R.	3.8	31.7.37	8,201	4.95	406.7
6.	Palmerston Volunteer's Molly	J	58893	Stuart, L. A.	3.10	20.9.37	7,578	5.32	403.5
7.	Palmerston Volunteer's Maid	J	54653	Cowie, A. E.	3.8	25.6.37	7,332	5.44	399.0
8.	Little Mt. Silver Girl	J	44919	Lansdell, Mrs. E.	3.11	1.10.36	7,814	4.89	382.8
9.	Fairhill Opal	AIS	NYA	Mackenzie, R. G.	3.10	23.8.37	9,517	3.97	378.5
10.	Allan Water Silk	J	NYA	Champion, A.	3.10	18.8.37	7,125	5.11	364.1
11.	Fairhill Pep	AIS	NYA	Mackenzie, R. G.	3.11	31.8.37	9,396	3.82	359.7
12.	Frogmore Betty	AIS	16468	Fergusson, F. C.	3.11	24.3.37	9,546	3.73	356.4
13.	Allan Water Millie	J	46998	Champion, A.	3.11	23.9.37	6,999	4.94	346.3
14.	Stronach Echo	J	59545	Scottsdale Sch'l Farm	3.7	20.9.37	6,573	5.24	344.5
15.	Easternside Rosebud	AIS	10479	Bovill, H. Y.	3.10	15.8.37	8,913	3.85	343.3
16.	Enstone Snowy 6th	AIS	10634	Gardner, H. R., and Sons	3.11	28.7.37	8,578	3.92	336.2
17.	Pelerine Rose 21st	AIS	17716	Fergusson, F. C.	3.6	28.2.37	8,193	4.09	335.3
18.	Allan Water Dream	J	46988	Champion, A.	3.10	10.8.37	6,079	5.44	331.2
19.	Palmerston Merle	J	50042	Cowie, A. E.	3.11	4.11.36	5,203	6.25	325.6
20.	Calthorpe Rosalie	J	47527	Perkins, V.	3.11	25.8.37	5,767	5.63	324.9
21.	Calthorpe Jennifer	J	47526	Perkins, V.	3.11	20.8.37	6,021	5.30	319.5
22.	Salem View Queen 2nd	AIS	18000	Treloggen, J. W., and Sons	3.6	13.9.37	7,999	3.93	314.9
23.	Martha Vale Dolly 3rd	AIS	A. Vol. 4	Treloggen, J. W., and Sons	3.10	2.11.36	9,480	3.29	311.4
24.	Wingaroo Quorra	RP	5072b	Paterson, J. W.	3.10	10.9.37	6,764	4.57	309.5
25.	Allan Water Julia	J	46996	Champion, A.	3.8	25.5.37	5,436	5.58	303.8
26.	Allan Water Delight	J	51473	Champion, A.	3.10	20.9.37	5,198	5.77	300.4
27.	Little Mt. Buttercup	J	49212	Lansdell, Mrs. E.	3.10	30.7.37	7,103	4.21	299.7
28.	Ratho Canna	RP	4810a	Loane, N. E.	3.11	26.10.36	6,693	4.41	295.5
29.	Mervyn Brae Dainty Lass	J	54101	Mervyn Brae Stud	3.11	31.5.37	5,056	5.83	294.9
30.	Alfriston Silver Splash	J	46959	Lambert & Roebuck	3.9	25.7.37	5,100	5.75	293.6
31.	The Hill Silver 12th	AIS	14576	Gardner, H. R., and Sons	3.6	15.3.37	7,431	3.84	285.6
32.	Moola Pearl 2nd	Ayr.	26580	Wing, S. E.	3.11	11.10.36	6,270	4.53	284.6
33.	Palmerston Volunteer's Muse	J	54656	Cowie, A. E.	3.10	22.9.37	6,381	4.37	279.2
34.	Alne Bank Fairy 10th	AIS	8714	Treloggen, J. W., and Sons	3.9	1.9.37	6,830	4.06	277.5
35.	Rostherne Silvermine 2nd	J	50492	Grindrod, J.	3.9	7.9.37	4,887	5.56	271.9
36.	Parkview Faith 9th	AIS	17703	Steel, L. J.	3.6	11.3.37	7,530	3.56	268.3
37.	Pelerine Rose 20th	AIS	13275	Bovill, H. Y.	3.9	11.3.37	6,523	4.10	268.0
38.	Rostherne Golden Queen 2nd	J	50485	Grindrod, J.	3.8	15.9.37	4.530	5.58	252.8
39.	Palmerston Volunteer's Mary	J	50047	Cowie, A. E.	3.8	4.2.37	4,349	5.42	235.8
40.	Palmerston Volunteer's Silvy	J	54658	Cowie, A. E.	3.10	16.9.37	4,544	5.15	234.3
41.	Pleasant Banks Alison 2nd	Ayr.	27610	Foster, R. J. L.	3.9	1.4.37	5,208	4.26	221.9
42.	Alanvale Melodious	Ayr.	27996	Hall, E. G.	3.11	27.9.37	6,120	3.59	219.9
43.	Strathavon Winnie	Ayr.	NYA	Foster, R. J. L.	3.11	25.8.37	4,875	4.40	214.6
44.	Pleasant Banks Beauty	Ayr.	28761	Foster, R. J. L.	3.7	4.4.37	5,446	3.93	214.1
45.	Wingaroo Fancy 2nd	RP	4922a	Thompson, J. H. (Estate)	3.9	18.5.37	5,335	3.89	207.9
46.	Rostherne Maud 2nd	J	50490	Grindrod, J.	3.11	1.9.37	3,695	5.58	206.4
47.	Olive Dale Delphinium	Ayr.	NYA	Green, S. G.	3.6	13.5.37	4,746	4.30	204.4
48.	Wingaroo Nancy 2nd	RP	4938a	Loane, N E.	3.8	1.3.37	4,317	4.02	173.8

Average for Senior 3-Year-Olds

Milk, 6,646 lbs. Test, 4.65% Butterfat, 309.1 lbs.

JUNIOR 3-YEAR-OLDS

Standard: 270 lbs. Butterfat

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs	Test, %	Butterfat Lbs.
1.	Palmerston Volunteer's Hope	J	54652	Cowie, A. E.	3.1	25.10.36	8,353	4.97	415.7
2.	Palmerston Volunteer's Sybil	J	54659	Cowie, A. E.	3.3	14.11.36	7,386	5.34	394.5
3.	Enstone Roany 4th	AIS	16321	Steel, L. J.	3.2	19.10.36	9,036	4.13	373.5
4.	Relbia Tottie	J	45903	Relbia Farm and Dairy Pty. Ltd.	3.1	4.11.36	6,567	5.47	359.6
5.	Relbia Thora	J	45902	Relbia Farm and Dairy Pty. Ltd.	3.0	11.11.36	6,590	5.36	353.3
6.	Relbia Minx	J	45900	Relbia Farm and Dairy Pty. Ltd.	3.0	10.10.36	6,040	5.79	350.1
7.	Crendon Molly	J	NYA	Barnett, N. R.	3.3	7.8.37	7,336	4.69	344.0
8.	Palmerston Maid 5th	J	NYA	Oliver, A. J.	3.0	7.7.37	6,668	5.12	341.9
9.	Allan Water Honesty	J	51481	Champion, A.	3.0	22.9.37	6,237	5.47	341.2
10.	Bornholm Nonny	J	51902	Kuipers, Capt. D.	3.0	23.9.37	6,117	5.45	333.6
11.	Enstone Cherry 5th	AIS	16301	Steel, L. J.	3.1	12.10.36	8,033	4.13	332.5
12.	Hallston Fussy	J	48601	Heazlewood, T.	3.2	29.10.36	5,508	5.99	330.4
13.	Rothstock Ramona	Fries.	NYA	Robotham, H. V.	3.0	25.8.37	10,378	3.18	330.2
14.	Allan Water Nancy 4th	J	51484	Champion, A.	3.1	16.9.37	5,699	5.78	329.8
15.	Hiawatha Lady	Ayr.	NYA	Green, S. G.	3.4	6.7.37	7,465	4.40	328.8
16.	The Hill Empress 6th	AIS	14559	Gardner, H. R., and Sons	3.0	12.10.36	7,998	4.11	328.7
17.	Allan Water Dolores	J	51477	Champion, A.	3.4	12.9.37	5,304	6.15	326.6
18.	Cluan Joy Belle	J	52304	Kuipers, Capt. D.	3.2	13.6.37	5,630	5.79	326.1
19.	Allan Water Golden Gem 4th	J	48992	Champion, A.	3.0	5.10.36	6,284	5.18	325.7
20.	Allan Water Vivid	J	51486	Champion, A.	3.0	15.9.37	5,788	5.56	322.1
21.	Cluan Faith	J	52301	Perkins, V.	3.0	31.8.37	5,748	5.36	308.2
22.	Alanvale Snowdrift	Ayr.	29038	Hall, E. G.	3.2	28.9.36	7,532	4.03	303.9
23.	Enstone Sophie 11th	AIS	10637	Gardner, H. R., and Sons	3.3	27.11.36	7,596	3.99	303.5
24.	Inglis Pansy	J	53260	Percy, A.	3.4	10.9.37	5,594	5.36	299.9
25.	Enstone Minnie 7th	AIS	16311	Fergusson, F. C.	3.1	8.10.36	7,054	4.18	294.8
26.	*Mervyn Brae Silver Girl*	J	54103	Mervyn Brae Stud	3.0	7.9.37	5,910	4.93	291.6
27.	Rannoch Kanee	J	45866	Sadler, B. T.	3.0	15.10.36	5,166	5.56	287.5
28.	Rannoch Silver Linda 7th	J	45871	Sadler, B. T.	3.3	18.11.36	5.210	5.50	286.6
29.	Coraville Queenie	Ayr.	28202	Scott, H. B.	3.1	30.9.36	6,898	4.12	284.7
30.	Martha Vale Spot 6th	AIS	17322	Treloggen, J. W., and Sons	3.2	5.11.36	7,627	3.68	281.[illegible]
31.	Rostherne June	J	46051	Grindrod, J.	3.3	2.10.36	5,592	5.02	280.7
32.	Inglis Milk Maid	J	53259	Percy, A.	3.0	23.10.36	4,493	6.18	278.0
33.	*Levengrove Valentina*	J	49182	*Percy, A.*	3.0	1.3.37	5,287	5.25	273.0
34.	Glen Vina Lady 2nd	J	57366	Procter, C. A.	3.0	7.9.37	5.051	5.48	277.1
35.	Relbia Mavis	J	45899	Relbia Farm and Dairy Pty. Ltd.	3.0	8.11.36	4,436	6.19	274.6
36.	Martha Vale Model 5th	AIS	NYA	Treloggen, J. W., and Sons	3.1	15.10.37	6,531	4.16	271.7
37.	Little Mt. Dimple	J	49213	Lansdell, Mrs. E.	3.2	7.2.37	5,957	4.50	268.5
38.	Easternside Harriet	AIS	10477	Bovill, H. Y.	3.4	18.3.37	6,783	3.84	261.9
39.	Enstone Lily 6th	AIS	16310	Fergusson, F. C.	3.1	10.10.36	5,615	4.54	255.4
40.	Enstone Dolly 12th	AIS	10619	Fergusson, F. C.	3.3	5.11.36	6,252	4.05	253.1
41.	*Coraville Pearl*	*J*	*52363*	*Lambert, J. D.*	*3.2*	*4.10.36*	*5,037*	*5.02*	*252.9*
42.	Allan Water Dinkum Lass 6th	J	51475	Champion, A.	3.0	22.9.37	3,948	6.20	244.9
43.	Hillstead Bud	J	53212	Harding, W. T.	3.0	2.8.37	4,323	5.64	243.9
44.	Enstone Dolly 13th	AIS	16306	Fergusson, F. C.	3.1	6.11.36	5,874	4.10	241.3
45.	Rannoch Mignonette 8th	J	45864	Sadler, B. T.	3.1	29.10.36	4,778	4.99	238.4
46.	Hillstead Firefly 3rd	J	53213	Harding, W. T.	3.0	4.8.37	4,800	4.68	224.9
47.	Rannoch Silverleaf 3rd	J	45870	Sadler, B. T.	3.5	5.12.36	4,356	4.98	217.1
48.	Wingaroo Zefellana 2nd	RP	4958a	Thompson, J. H. (Estate)	3.0	14.7.37	5,123	4.22	216.6
49.	Hillstead Miss Blonde	J	53217	Harding, W. T.	3.1	1.9.37	3,921	5.43	213.1
50.	Rostherne Choice Lass 3rd	J	50482	Grindrod, J.	3.0	1.8.37	4,128	5.14	212.5
51.	Pleasant Banks Blanche	Ayr.	28766	Foster, R. J. L.	3.0	7.10.36	4,770	4.45	212.4
52.	Coraville Daisy 4th	Ayr.	NYA	Scott, H. B.	3.0	4.10.36	4,777	4.38	209.3
53.	Wingaroo Belladonna 2nd	RP	4915a	Thompson, J. H. (Estate)	3.0	17.5.37	5,265	3.92	206.6
54.	Enstone Jenny 7th	AIS	NYA	Steel, L. J.	3.5	24.10.37	5,114	3.86	197.5
55.	Palmerston Volunteer's Favourite	J	54648	Cowie, A. E.	3.2	12.11.36	4,030	4.84	195.3

JUNIOR 3-YEAR-OLDS (continued)

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
56.	Wingaroo Cheerful 2nd	RP	4917a	Thompson, J. H. (Estate)	3.1	14.5.37	4,719	4.02	190.0
57.	Wingaroo Kindness 2nd	RP	4980a	Thompson, J. H. (Estate)	3.3	16.5.37	4,020	4.45	179.2
58.	Alanvale Mada	Ayr.	29035	Smith, E. J.	3.0	19.9.37	4,157	4.19	174.4
59.	The Moat Nellie	AIS	NYA	Wells, H. L.	3.1	1.11.36	4,443	3.89	173.0
60.	Easternside Pansy	AIS	16227	Bovill, H. Y.	3.4	14.10.37	4,314	3.77	162.8

Average for Junior 3-Year-Olds

Milk, 5,844 lbs. Test, 4.77% Butterfat, 278.9 lbs.

EXTENDED TEST, 365 DAYS

1.	Enstone Daphne 19th	AIS	10617	Steel, L. J.	3.1	20.9.36	13,017	3.78	492.3

SENIOR 2-YEAR-OLDS

Standard: 250 lbs. Butterfat

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1.	Palmerston Volunteer's Bud	J	NYA	Oliver, A. J.	2.11	10.7.37	7,081	5.29	375.2
2.	Bornholm Lucy	J	51901	Kuipers, Capt. D.	2.9	18.9.37	6,055	6.00	363.8
3.	Allan Water Honey	J	46993	Champion, A.	2.11	27.9.36	6,266	5.79	363.2
4.	Crendon Better	J	47787	Barnett, N. R.	2.11	30.9.36	6,865	5.24	359.9
5.	Valma Maid	J	59854	Stuart, L. A.	2.11	22.9.37	6.034	5.96	359.9
6.	Moola Vale 2nd	Ayr.	29763	Wing, S. E.	2.10	24.8.37	7,615	4.67	355.7
7.	Palmerston Volunteer's Silvy	J	54658	Cowie, A. E.	2.10	30.9.36	6,312	5.34	338.1
8.	Allan Water Clotho 4th	J	51472	Champion, A.	2.11	8.9.37	6,939	4.86	337.3
9.	Martha Vale Daisy	AIS	17310	Treloggen, J. W., and Sons	2.10	30.9.36	8,358	4.01	335.5
10.	Fairhill Beryl	AIS	NYA	Mackenzie, R. G.	2.10	23.8.37	9,161	3.63	333.4
11.	Palmerston Carnation	J	NYA	Oliver, A. J.	2.10	21.8.37	6,363	5.06	322.3
12.	Alfriston Valette	J	51463	Lambert & Roebuck	2.10	31.8.37	5,872	5.40	317.4
13.	Little Mt. Silvermaid	J	53823	Lansdell, Mrs. E.	2.11	21.9.37	6,663	4.71	314.2
14.	Inglis Jean's Babs	J	53257	Percy, A.	2.9	4.8.37	4,848	6.44	312.3
15.	Alne Bank Princess 22nd	AIS	NYA	Treloggen, J. W., and Sons	2.8	4.9.37	7,782	3.93	306.1
16.	Fairhill Joan 3rd ...	AIS	NYA	Mackenzie, R. G.	2.11	27.8.37	7,780	3.89	302.8
17.	Calthorpe Beautiful ...	J	47524	Perkins, V.	2.9	5.12.36	6,144	4.86	298.7
18.	Cluan Snowflake	J	52306	Perkins, V.	2.7	22.3.37	5,625	5.29	297.8
19.	Rothstock Princess Marina	Fries.	NYA	Robotham, H. V.	2.11	29.7.37	8,546	3.45	295.0
20.	Calthorpe Columbine	J	47525	Perkins, V.	2.8	16.10.36	5,257	5.57	293.3
21.	Beverdale Viola 2nd ...	AIS	15664	Beveridge, Mrs. E. E.	2.8	10.5.37	7,585	3.83	291.2
22.	Parkview Mayflower 23rd	AIS	13241	Steel, L. J.	2.11	2.10.36	8,142	3.54	288.6
23.	Palmerston Volunteer's Fancy	J	54647	Cowie, A. E.	2.8	8.3.37	5,827	4.91	286.5
24.	Easternside Marina	AIS	16226	Bovill, H. Y.	2.10	13.8.37	6,077	4.41	268.5
25.	Wingaroo Beauty	RP	4913a	Thompson, J. H. (Estate)	2.7	22.5.37	5,489	4.84	266.1
26.	Alne Bank Beauty 19th	AIS	NYA	Treloggen, J. W., and Sons	2.6	25.9.37	6,171	4.10	253.1
27.	Fairhill Jessie 3rd	AIS	NYA	Mackenzie, R. G.	2.11	23.8.37	7,085	3.56	252.5
28.	Inglis Twinkle	J	57757	Percy, A.	2.7	22.3.37	5,310	4.72	250.9
29.	Wingaroo Quilt	RP	5071b	Gladman Bros.	2.7	8.5.36	4,930	4.92	243.0
30.	Rostherne Cream Maid 2nd	J	50483	Grindrod, J.	2.9	1.10.36	3,985	5.96	237.8

SENIOR 2-YEAR-OLDS (continued)

Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
31. Tasman Daffodil	Ayr.	28888	Ashley Home	2.6	24.11.36	5,698	4.09	233.2
32. Wingaroo Goldie	RP	5068b	Thompson, J. H. (Estate)	2.9	29.6.37	4,945	4.58	226.8
33. Melton Vale Welcome	J	54079	Percy, A.	2.7	22.10.36	3,998	5.39	215.2
34. Wingaroo Sylvia 2nd	RP	4514aa	Thompson, J. H. (Estate)	2.7	8.5.37	5,319	3.91	208.4
35. Rostherne Queenie 7th	J	55114	Grindrod, J.	2.10	2.9.37	3,100	5.89	182.7
36. Springbanks Rose 3rd	AIS	NYA	Von Stieglitz, H. W. L.	2.11	7.9.37	4,142	4.32	179.2
37. Hillstead Merle	J	53216	Harding, W. T.	2.8	4.8.37	4,287	4.16	178.3
38. Pleasant Banks Chloe	Ayr.	29844	Foster, R. J. L.	2.11	27.8.37	4,509	3.95	178.1
39. Ratho Noprena	RP	5673aa	Loane, N. E.	2.7	19.4.37	4,473	3.86	172.7
40. Pleasant Banks Coral	Ayr.	29849	Foster, R. J. L.	2.8	2.9.37	4,189	4.06	170.2
41. Alanvale Matron	Ayr.	NYA	Hall, E. G.	2.11	14.10.37	3,852	3.87	149.1
42. The Moat Janette	AIS	NYA	Wells, H. L.	2.7	18.8.37	2,211	4.23	93.6

Average for Senior 2-Year-Olds

Milk, 5,878 lbs. Test, 4.62% Butterfat, 271.6 lbs.

EXTENDED TEST, 365 DAYS

1. Beverdale Viola 2nd ...	AIS	15664	Beveridge, Mrs. E. E.	2.8	10.5.37	8,731	3.9½	**343.4**

JUNIOR 2-YEAR-OLDS

Standard: 230 lbs. Butterfat

No. Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1. Rannoch Silver Linda 10th	J	54913	Sadler, B. T.	1.11	28.8.37	6,537	5.00	327.0
2. Inglis Tipsy	J	NYA	Percy, A.	1.11	10.9.37	5,857	5.22	306.1
3. Relbia Dawn	J	54930	Relbia Farm and Dairy Pty. Ltd.	1.11	20.8.37	5,512	5.47	301.6
4. Rannoch Stylish Petal 3rd	J	54915	Waters, G. L.	2.1	3.7.37	4,721	6.22	293.9
5. Stornaway Pride	AIS	18114	Gardner, H. R., and Sons	2.0	10.9.37	7,368	3.98	293.7
6. Cluan Bella	J	52299	Perkins, V.	1.11	27.9.36	5,224	5.60	292.8
7. Allan Water Geraldine 3rd	J	NYA	Waters, G. L.	2.0	6.9.37	4,774	6.07	289.8
8. Martha Vale Linda 7th	AIS	17315	Treloggen, J. W., and Sons	2.0	9.10.36	7,819	3.69	289.0
9. Rannoch Dainty Magnificette	J	54888	Lambert & Roebuck	2.1	28.8.37	5,005	5.64	282.7
10. Allan Water Honey 2nd	J	56125	Champion, A.	1.11	4.9.37	5,663	4.96	281.1
11. Tasman Olive	Ayr.	28889	Ashley Home	2.0	19.2.37	6,840	4.09	280.0
12. Calthorpe Aldan's Gift	J	56685	Perkins, V.	1.8	14.9.37	5,636	4.88	275.2
13. Relbia Birdie 2nd	J	54929	Relbia Farm and Dairy Pty. Ltd.	1.10	10.10.36	5,239	5.20	272.9
14. Frogmore Viola 3rd. ...	AIS	16474	Fergusson, F. C.	2.1	9.12.36	5,480	4.88	267.6
15. Inglis Marge	J	NYA	Percy, A.	2.2	20.8.37	4,611	5.77	266.0
16. Glen Vina Patricia	J	57369	Procter, C. A.	2.3	5.7.37	4,529	5.83	264.2
17. Calthorpe Pandora	J	52126	Perkins, V.	2.5	14.8.37	5,313	4.95	263.3
18. Inglis Floss' Joy	J	NYA	Percy, A.	1.9	22.8.37	4,710	5.57	262.3
19. Calthorpe Marlene	J	NYA	Perkins, V.	2.0	12.9.37	5,332	4.87	260.1
20. Hiawatha Quality	Ayr.	NYA	Green, S. G.	2.0	10.10.36	6,378	4.05	258.4
21. Rannoch Dainty Valello	J	50346	Sadler, B. T.	2.1	2.10.36	4,568	5.64	257.7
22. Alne Bank Dawning								

JUNIOR 2-YEAR-OLDS (continued)

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
23.	Fairhill Hazel	AIS	NYA	Mackenzie, R. G.	2.1	24.11.36	6,529	3.91	255.9
24.	Inglis Tidy	J	NYA	Percy, A.	2.0	12.8.37	5,294	4.75	251.9
25.	Hillstead Beljoynette	J	53211	Harding, W. T.	2.2	15.5.37	4.008	6.40	248.6
26.	Rostherne Queenie 8th	J	55114	Grindrod, J.	2.1	15.8.37	4,031	6.09	245.5
27.	Little Mt. Silvermaid	J	53823	Lansdell, Mrs. E.	2.0	30.10.36	5,412	4.48	242.8
28.	Relbia Hawthorn	J	54932	Relbia Farm and Dairy Pty. Ltd.	1.11	31.10.36	5,064	4.76	241.0
29.	Inglis Dell	J	NYA	Percy, A.	2.0	3.9.37	4,471	5.36	239.8
30.	Glen Vina May	J	NYA	Procter, C. A.	2.0	20.10.36	3,966	6.03	239 3
31.	Stronach Damaras	J	59544	Scottsdale Sch'l Farm	1.10	2.8.37	5,152	4.57	235.8
32.	Melton Vale Mabel	J	54076	Lambert, J. D.	2.0	13.10.36	4,927	4.78	235.8
33.	Rannoch Stylish Linda	J	50354	Sadler, B. T.	2.1	10.11.36	4,668	4.90	229.2
34.	Risdonfens Hazel Dot	J	59206	Lambert, J. D.	2.5	11.10.36	4,815	4.73	228 2
35.	Inglis Zoe	J	57758	Percy, A.	1.8	25.2.37	4,361	5.21	227.3
36.	Glen Vina Rosebud 2nd	J	NYA	Procter, C. A.	2.5	20.5.37	4,380	5.13	224.9
37.	Rannoch Little Baby	J	54903	Sadler, B. T.	1.11	5.11.36	4.349	5.14	223.7
38.	Palmerston Patsy	J	58888	Cowie, A. E.	2.0	3.11.36	4,230	5.25	222.1
39.	Nalinga Vera	RP	NYA	Blundstone, J. E. (Estate)	2.4	28.8.37	5,063	4.33	219.5
40.	Hillstead Dewdrop	J	NYA	Waters, G. L.	2.4	24.9.37	4,910	4.43	217.7
41.	Little Mt. Juliet	J	53822	Lansdell, Mrs. E.	2.3	30.10.36	4,781	4.51	215.6
42.	Relbia Mist	J	54937	Relbia Farm and Dairy Pty. Ltd.	2.1	9.9.37	4,918	4.37	215.2
43.	Fairhill Jessica 3rd	AIS	NYA	Mackenzie, R. G.	2.3	24.11.36	5,068	4.23	214.8
44.	Lemon Grove Tulip 10th	AIS	17154	Beveridge, Mrs. E. E.	1.10	4.1.37	5,540	3.86	213.9
45.	Mervyn Brae Mermaid	J	NYA	Mervyn Brae Stud	2.3	25.9.37	4,056	5.25	213.2
46.	Hillstead Spotted Belle	J	53219	Harding, W. T.	2.1	22.12.36	3,890	5.48	213.2
47.	Rannoch Dainty	J	50344	Sadler, B. T.	2.0	29.9.36	4,527	4.66	211.2
48.	Rostherne Golden Queen 3rd	J	55107	Grindrod, J.	2.3	22.9.37	3,634	5.75	209.1
49.	Hiawatha Fairy	Ayr.	NYA	Green, S. G.	2.0	18.10.36	4,896	4.26	208.8
50.	Inglis Petal	J	NYA	Percy, A.	2.0	14.8.37	3,561	5.85	208.3
51.	Rannoch Dainty Pride	J	54889	Sadler, B. T.	2.0	25.12.36	4,009	5.06	203.1
52.	Rostherne Pretty Chance 2nd	J	55112	Grindrod, J.	2.2	24.12.36	3,891	5.19	201.9
53.	Fairhill Holly	AIS	NYA	Mackenzie, R. G.	2.2	29.11.36	4,472	4.51	201.8
54.	Nalinga Cherry 4th	RP	NYA	Blundstone, J. E. (Estate)	2.0	13.5.37	4,917	4.10	201.6
55.	Inglis Hope	J	57756	Percy, A.	1.7	24.2.37	3,570	5.52	197.1
56.	Rostherne Barwin 2nd	J	55102	Grindrod, J.	2.4	4.9.37	3,711	5.28	196.0
57.	Inglis Esma	J	NYA	Percy, A.	1.9	16.8.37	4,003	4.80	192.3
58.	Inglis Muse	J	NYA	Percy, A.	1.9	10.9.37	3,684	5.18	191.1
59.	Mervyn Brae Ranee Baby	J	NYA	Mervyn Brae Stud	2.0	11.9.37	3,184	5.97	190.2
60.	Hiawatha Dot	Ayr.	NYA	Green, S. G.	2.9	27.10.37	4,655	3.99	186.0
61.	Palmerston Miriam	J	58887	Cowie. A. E.	1.6	13.10.36	3,593	5.11	183.7
62.	Rostherne Vera 4th	J	55115	Grindrod, J.	2.4	21.12.36	3,535	4.98	176.3
63.	Rostherne Chance 3rd	J	55103	Grindrod, J.	2.1	20.5.37	2,850	6.06	172.8
64.	Mervyn Brae Ranee	J	NYA	Mervyn Brae Stud	2.0	2.9.37	2,793	6.04	168.7
65.	Springbanks Gardenia	AIS	NYA	Von Stieglitz, H. W. L.	2.0	22.8.37	3,704	4.48	166.2
66.	Hillstead Volunteer September	J	NYA	Waters, G. L.	1.9	20.9.37	3,181	5.04	160.4
67.	Inglis Folly	J	NYA	Percy, A.	1.7	25.2.37	3,360	4.69	157.6
68.	Enstone Milly	AIS	NYA	Lachlan Park Hospital	2.0	15.11.37	2,961	3.89	115.2
69.	Hawthorn Poppy	RP	5496aa	Gladman Bros.	2.0	20.9.37	1,998	4.08	80.5
70.	Rostherne Choice Lass 4th	J	55104	Grindrod, J.	2.4	30.9.37	1,557	4.67	72.8

Average for Junior 2-Year-Olds

Milk, 4,625 lbs. Test, 4.91% Butterfat, 227.2 lbs.

Abortion-Free Herds

As at 30th September, 1938

The following herds have been declared free of Contagious Abortion in accordance with the requirements of the scheme for certifying herds.

NORTHERN DISTRICT AND FLINDERS ISLAND

Owner	Address
Ashley Home for Boys	Deloraine
Badcock, B. M.	"Willow Vale," Whitemore
Badcock, F. R., and Sons	Whitemore
Badcock, H.	Hagley
Badcock, L. A.	Whitemore
Barker, A. C.	Lemana Junction
Barker, F. T.	Ravenswood
Barrett, S. D.	Flinders Island
Beardwood, T. J.	Peel Street, Prospect
Blundstone, Estate J. E.	(Whitemark Herd) Flinders I
Cook, A.	Flinders Island
Cowie, A. E.	Flowery Gully
Davie, J. L.	Blue Rocks, Flinders Island
Davey, A.	Flinders Island
Day, W. F.	Flinders Island
Dyson, C.	Flinders Island
Ferguson, K. D.	Flinders Island
Foster, R. J. L.	"Pleasant Banks," Evandale
French, J.	The Oaks
Gardner, H. R., and Sons	Relbia
Gladman Bros.	Carrick
Gowans, W. C.	Glengarry
Green, S. G.	Penquite
Hall, E. G.	"Alanvale," Launceston
Hamilton, R. W. L.	Ranga, Flinders Island
Hammond, G.	Blue Rocks, Flinders Island
Harley, C. D.	Whitemark, Flinders Island
Haworth, H.	Ranga, Flinders Island
Hay, P. G.	"Kentdale," Flinders Island
Heazlewood, H. R.	Whitemore
Heazlewood, Roy K.	Whitemore
Heazlewood, Tas. A.	Hagley
Hingston, S. J.	"Rosaville," Whitemore
Iles, Mrs. E. T.	Whitemark, Flinders Island
Jones, C. F.	St. Marys
Lansdell, Mrs. Elsie	Bracknell
Mackenzie, E. E.	Ranga, Flinders Island
Martin, W.	Ranga, Flinders Island
Masters R.	Hagley
Mathews, S.	Whitemark, Flinders Island
Morton, R.	Emita, Flinders Island
Napier, G. H.	St. Marys
Paterson, J. W.	Longford
Prewer, H. W.	Whitemore
Relbia Farm and Dairy Co.	Relbia
Reynolds, H. B.	Relbia
Scott, B.	Hagley
Scott, H. Barclay, and Sons	Whitemore
Scott, R. B.	Hagley
Smith, H. N.	Hagley
Stuart, L. A.	"Valmont," Whitemore

Owner	Address
Thompson's Estate	"Wingaroo," Emita, Flinders Island
Walker, J.	Whitemark, Flinders Island
Wells, H. Lucadou	"The Moat," Carrick
Welsh, W.	Whitemark, Flinders Island
Willis, V.	Whitemark, Flinders Island

NORTH-EASTERN DISTRICT

Beswick, A. M.	Branxholm
Beswick, R. D.	Derby
Briggs, A. H.	"The Grange," Scottsdale
Briggs, C. H.	"Cloverlea," Scottsdale
Cabalzar, R.	Pipers Brook
Daft, E. F.	Lietinna
Dilger, A. C.	Herrick
District School Farm	Scottsdale
Edwards, E. A.	Telita
Edwards, J. C.	Derby
France, A., and Sons	Ringarooma
Geale, Mrs. G. B.	Jetsonville
Gill, V.	Minstone Road, Scottsdale
Goss, L. V.	West Scottsdale
Haines, H. C.	"Cranleigh," Ringarooma
Hookway, H. H.	Scottsdale
Jessup, A. V.	Springfield
Jessup, H. J.	Scottsdale
Johnson, J. F. and G. M. L.	"Queechy," St. Helens
Jordon Bros.	Winnaleah
Loosmore, T. C.	Scottsdale
McKenzie, F. R.	Winnaleah
Mackenzie, T.	Pipers River
Mervyn Bræ Stud	Scottsdale
North-Eastern Soldiers' Memorial Hospital	Scottsdale
Priestley, Tas. R.	North Scottsdale
Ranson, F. W.	Derby
Ranson, J. S.	Branxholm
Robinson, H. A.	New River, via Ringarooma
Salier, H. G.	"Vine Grove," Scottsdale
Smith, Eric J.	Springfield
Steel, L. J.	Falmouth
Treloggen, D.	St. Helens
Treloggen, J. W., and Sons	St. Helens
Wadley, R. J.	Springfield
Williams, J. H.	Springfield

CIRCULAR HEAD DISTRICT

Freeman, G. J.	Montumana
French, H. R.	Montumana
King, F.	Forest
Lee, L. S.	Roger River
Mackay, Prof. J. H.	Roger River
Malley, E. R.	Roger River
March, Mrs. A.	Lileah
Marshall, D. H.	Roger River
Medwin, C.	Montumana
Medwin, G.	Montumana
Ollington, W. L.	Forest
Ollington, W. W.	Forest
Reasons, A.	South Forest
Stone, J. T.	Roger River
Waters, G.	Forest
Wyllie, A.	Forest

NORTH-WESTERN DISTRICT

Owner	Address
Beveridge, H. C., and Sons	New Ground
Bovill, H. Y.	"Thornhill," East Devonport
Briggs, G. H.	Glance Creek
Cannon, S. L.	Gunn's Plains
Chisholm, R. F.	Lower Barrington
Cocker, C. L.	Lower Barrington
Coombe and Bedlington	Forth
Corbett, A. J.	Penguin
Dicker, W. T.	Yolla
Duniam, R. M.	Mt. Hicks
Edwards, W.	Boat Harbour
Gladwell Bros.	Elliott
Harding, W. T.	Somerset
Hiscutt, J. T.	Howth
Lakin, G. M.	Gawler
Lambert, J. D.	Latrobe
Lambert, K. T.	Merseylea
Littlejohn, Mrs. H.	Penguin
Loane, N. E.	Wesley Vale
Lockwood, H. C.	West Kentish
Mackenzie, R. G.	Somerset
Marriott, H.	Yolla
Midgley, A.	Penguin
Moles, H.	Penguin
Morse, R. V.	Yolla
Parsons, G. H.	Thirlstane
Percy, A.	Wynyard
Perkins, V.	"Calthorpe," Latrobe
Robotham, H. V.	"Rothstock," Ridgley
Roebuck, Newcombe	"Alfriston," Native Plains
Rockliff, H. V.	Riana
Roberts Thomson, W. E.	Wynyard
Sadler, B. T.	"Rannoch," East Devonport
Townsend, A. W.	Ridgley
Travers, J. A.	Sulphur Creek
Trethewie, F. E.	Lower Mt. Hicks
Wellard, C. T.	Ulverstone
Wells, J. L.	Upper Mt. Hicks
Wing, S. E.	Preston
Yaxley, J. B.	Mt. Hicks

SOUTHERN DISTRICT

Allanby, C.	Bream Creek
Alomes, Mrs. V.	Bream Creek
Barnett, N. R.	"Woodstock," Huon
Bryan, J. R.	Copping
Calvert, A. D.	Granton
Calvert, M. M.	Cambridge
Clifford, Frank G.	Kellevie
Cooley, H. S.	Bream Creek
Corney, G.	Campania
Dodridge, S.	Cambridge
Dransfield, W.	Copping
Eyles, E.	Waterworks Road, Hobart
Featherstone, F.	Sorell
Featherstone, G. J.	"Belmont," Sorell
Fergusson, F. C.	"Brooklyn," Penna
Fisher, James E.	Oatlands
Hand, C. H.	Campania
Hanslow, G. T.	"Green Fields," Cambridge
Hills, G. and F.	"Braeside," Cambridge
Lachlan Park Hospital	New Norfolk
Lewis, N.	Cambridge

Owner	Address
Lucas, H. E.	Kingston
Mays, L.	Waterworks Road, Hobart
Meredith, D. O.	Plenty (Box 634B, G.P.O., Hobart)
McLeod, T. B.	Richmond
Reed, G. E.	Richmond
Rumney, B. L.	Lower Sandy Bay, Hobart
Shoobridge, H. W. and A. G.	Bushy Park
Smith, W. J.	Copping
Steele, R.	West Hobart
Tatnell, T.	Bream Creek
Taylor, M. K.	Brighton
Watchorn, J. B.	Kingston
Wilson, F.	Waterworks Road, Hobart

THE "VALLEYFIELD" WOOL TRIALS

AN OMISSION

In preparing the article dealing with the effects of improved pasture on super-Merino wool, which appeared in the last (August) issue of the Journal, the author inadvertently omitted to record an acknowledgment to the Electrolytic Zinc Company of Australasia Limited for the gift of superphosphate for top-dressing the improved pasture plots.

It is here desired to rectify this omission and to place on record the appreciation of the Department of this donation.

J. A. DUMARESQ

STAGE OF CUTTING OATS FOR HAY

When it is intended to reap a crop for oat sheaf chaff (commonly known as "hay" in Tasmania) every endeavour should be made to harvest before the grain ripens. The best quality chaff is that made from a crop cut when there is still a slightly green tinge remaining throughout the paddock. Subsequently the product should not be stacked until the grain has fully hardened in the stook. Such chaff will have a proportion of the food value stored in the stem and will be a far better stock fodder than that made from a fully ripe crop in which all the nourishment has left the straw and is concentrated in the grain.

To make hay (in its true meaning) from oats the crop is, of course, cut when quite green—the correct cutting time being when the grain is in the "milky" stage. In such cases the crop is handled as pasture hay, with mower and rake. If the oat crop is underseeded with pasture this is a method of dealing with it which, from a purely pasture viewpoint, is preferable to allowing it to go for chaff or grain.

EXTENSION SERVICE

Child Welfare Notes

By OLIVE M. GREEN, Sister-in-Charge, Baby Health Clinic, **Launceston**

BABY'S BED

EVERYONE knows that bad feeding ruins many babies, but few people realise the damage done by not ensuring a full and regular allowance of sound, unbroken sleep during infancy. When it is considered that baby spends, or should spend, from three-quarters to nine-tenths of his entire first few months of life in his cradle, one will begin to realise how important and necessary to undisturbed sleep and proper growth is the right kind of crib or cot. His sleeping place is going to influence his growth and development greatly all through infancy, but especially in the early months, when rapid growth is taking place.

The ideal crib to aim at is a light yet sufficiently strong one, and one that will offer no obstacle to free circulation of air and yet allow of sufficient warmth and cosiness when made up. It should be one that can easily be kept clean and sweet, and there should be no excessive ornamentation or curtains to gather dust and obstruct the free flow of pure air—baby's first need. The plain wicker cradle fulfils all these requirements admirably, being light enough to carry from one place to another (with baby in it if need be). Its light, open framework allows air to circulate all round the child, but if made up in the way suggested makes a nest for baby which is the essence of cosiness. Lastly, a brush or damp cloth may be used to keep it perfectly clean.

HOW TO MAKE UP THE IDEAL CRADLE

It is of the utmost importance to make baby's bed properly, the aim being to exclude draughts and to keep him really cosy and warm and yet allow freedom of movement. A badly made bed may be the cause of a serious illness from exposure and chill, and a well made one will help to build a straight body. It is perfectly simple to make up the crib in the best way, and this is how to do it—

1. Line the head end of the cradle with soft flannel, blanket, or some coloured wool and cotton material. In summer, netting, flowered organdie, butter muslin, etc., may be used instead of the flannel; it just serves to break any draughts. The head lining may be gathered slightly with a heading, or may be stretched round and tied at the back of the cot.

2. Throw a soft, fluffy, new blanket right over the empty cradle, letting the top come up to where baby's shoulders will lie. This is the enveloping blanket. A small single-bed blanket will do, but is rather large; about 2 yards by 1¼ yards is the most convenient size. There should be two blankets in reserve for washing purposes, and in case extra covering is indicated in a cold spell.

3. On the top of this blanket place a firm studded mattress, preferably made from horse-hair. This firm mattress is most important to ensure that baby's little spine lies in a straight position with no chance of sagging in the middle. It is equally important that this mattress does

not get soiled or stained in any way, otherwise an extra one will be needed for use whilst the soiled one is being remade and disinfected. The best solution is to cover the under firm mattress with a cosy chaff shakedown. Make this loose shakedown in a washing cover and fill with chaff winnowings. Ordinary chaff will not do; it must be the soft, light winnowings which are winnowed out by the threshing machines, or failing this, barley huskings are quite good. About 5 lbs. of chaff will make shakedown and pillow, and three yards of unbleached calico will be sufficient for the covering. Should either become soiled (and, unless baby is to sleep entirely on mackintosh, which is heating, such soiling is bound to occur sooner or later) it is easy to discard the chaff, boil the cover and refill. If a hot water bottle is required, it should be covered and placed beneath the chaff shakedown with the cork pointing to the foot of the bed, so that a well distributed heat without risk of burning is ensured.

4. Cover the mattress with a small blanket, tucked in neatly all round.

5. Place a strip of thin mackintosh or jaconet (the ideal is to have the smallest piece compatible with efficiency) across the middle of the bed and tuck in, to prevent rucking. A foot wide of this mackintosh should be sufficient. Cover with a rather wider strip of flannel or blanket, which can be changed whenever damp.

6. Make a cosy hollow in the chaff shakedown with your hand and put the small, thin pillow in position. The ideal material for the pillow is the same soft winnowings of chaff that is used for the shakedown. Large, soft pillows are enervating and actually dangerous.

7. Now place baby in his cosy nest and tuck his shawl or cuddling blanket round him, well up at the back of the neck and round the feet.

8. Next bring up one side of the big enveloping blanket and tuck it in on the far side of the cradle. Then bring up the other side and complete the envelope by tucking it in firmly all round.

9. Slip your hand inside the blankets and feel to make sure that baby has plenty of room to move round inside his cosy crib.

10. A small sheet may be tucked in round the top of the blankets to keep them from touching baby's face. Of course, if cotton sheets are used under the blankets, as for an eczematous baby, these keep the blankets cleaner for a longer time.

You now have baby in a portable nest or crib, cosy and warm, yet allowing him freedom to kick at will. Feel him sometimes when he is asleep, preferably his neck or arms and legs—not his feet and hands, which may be unreliable guides—and regulate his coverings accordingly.

A hand-knitted or crocheted openwork coverlet is a good choice for the winter, and a silk or cotton quilt, according to your fancy, may be used for the summer months. Eiderdowns are pretty, but are usually non-porous and thus devitalising to baby.

Care must be taken that the bed coverings are not too heavy or hampering, and that they do not come over the baby's mouth (also see that the nostrils are clean) so that there might be no sort of hindrance to his breathing the way Nature intended. The room must have a very free flow of pure, cool outside air through it day and night—in at one open window and out through a second window, open fireplace or open door. The window must be widely open; one or two inches is inadequate.

In conclusion, I would warn parents against the harmful habit of allowing the babe to sleep in bed with them. Never make a pram serve the purpose of a baby's cot, because there is bound to be constraint and limitation of movement. Further, a proper cot is more cleanly and free from stuffiness.