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CITRUS CULTURE IN VICTORIA.

(*Continued from Page* 642.)

PART VII.—PACKING, CURING, AND MARKETING.

By S. A. Cock, Orchard Supervisor, Bendigo and Northern District.

The success of marketing depends on the care and attention bestowed on the picking, handling, and packing. Oranges are picked as they ripen, and none but ripened fruit should be picked. Clean, bright-coloured, firm fruit, of even character, put up in an attractive manner, command the best prices. Oranges should be cut off the tree, not pulled, as pulling may tear or damage the rind. The fruit should be carefully gathered and handled to prevent bruising, and placed in boxes, and the boxes placed in a thoroughly ventilated shed, and allowed to remain for three or four days. Under this treatment oranges go through a process of sweating, which allows the surplus moisture to escape, and renders the rind tough and pliable; it also shows up all bruises, spots, and imperfections of the fruit. If packed straight from the tree, sweating and heating will result, and set up decay. After sweating in the boxes the fruit should be carefuly graded, and put up according to its size, colour, and condition; and the cases should be branded according to the degree of perfection and size, "Special," "Fine," "Bright." "Special" oranges should be of extra large and uniform size, very thin-skinned, smooth, and of the finest colour. "Fine" should be large and uniform in size, bright in colour, smooth, with thin skin. "Bright" should be of uniform size, good colour, and free from blemish or discoloration of smut. The remainder of the crop should be graded according to size, and marketed without any special brand. Culls, green, immature, and imperfect fruit should never be marketed. Cases should be branded with the varieties they contain, also the number of fruits. Marketing, as practised now by the individual grower, is not the best method. Combination and packing under a special brand and grade is preferable. If packing individually, growers should have proper stencil

plates, with their name, orchard, district, variety, and grade; also number, thus—

on end of the case only. In packing great care and attention is necessary, and if grading machines are not used, one orange should be used as the standard for each case. The cases at present used are the single case, 26 inches long by 6 inches broad by 14¼ inches deep, inside measurements, clear of division, 2,223 cubic inches, or one Imperial bushel; also the export case, 18 inches long by 8¾ inches broad by 14 inches deep, no division, 2,237 cubic inches. *The latter case* should be more generally used, and should not be made of unseasoned wood; *too much loss is already sustained, in apple export, by moisture from the green wood extending to the fruit and wrapping-paper during transit over long distances, and setting up decay.* Cases made from well-seasoned pine wood are the best. In packing for export or special grades, the fruit should be wrapped separately, and packed on the numerical system of packing, known as the diagonal pack. This is preferable to the layer system, where fruit is packed in rows one immediately over the other, as it brings each fruit over the space between the two, gives more elasticity to the pack, and prevents injury in transit to a large extent, as the fruits are dovetailed one against the other and immovable; it also allows of more fruit to the pack. The fruit should be firmly packed, and the size regulated, so that the last layer stands about ½ inch or ¾ inch above the top of the case; the lid should then be placed on the case, and held in position, and the fruit carefully pressed at one end of the box, and the lid nailed, and the other end afterwards treated similarly; this allows the centre to bulge, and does not press the fruit, which carries without bruising. The sizes at present packed are from 48 to 140 for Washington Navels. In the long bushel case very large Navels run only to 48; they are generally badly packed. The better case for large Navels is the export case; it allows of more compact and equal packing. The size preferred for local market is from 75 to 120 to the case. For export, 75 to 100 to the case is preferred. For ordinary oranges, packing in the long-bushel case, what is known as the *double six, with a five centre, and double five, with a four centre, is* preferred. This means six long and six deep on the sides, and five long and five deep in the centre, or 16 dozen to the case; or five long and five deep on the sides, and four long and four deep in the centre, or 11 dozen to the case.

Lemons should not be allowed to ripen on the tree. The fruit should be picked when it has reached the size desired, viz., 2½ inches diameter; this is the size preferred by the trade. The fruit should be cut from the tree, and the stem cut close to the fruit, with a secateur. The fruit should be handled as carefully as eggs. Pickers should wear gloves, as

long finger nails scratch the skin of the lemon. Lemons should be picked green, or at the first appearance of a change of colour from green to yellow. Lemons ripening on the tree may exceed a marketable size; they also lose quality, and become coarse. Lemons, when picked, should be carefully washed in clean water, and thoroughly dried with a soft rag; or they may be sponged—this is done to remove all dust and dirt. They are then cured according to the requirements of the market. If required immediately, they are placed in a dark room to sweat, and the temperature raised to about 90 deg. Fahr., and pails of water placed about the room to keep the air moist and prevent shrivelling of the fruit, and in four or five days the lemons should be of a good yellow colour. They can also be placed in a dark room—a cellar for preference—and a damp, close bag thrown over the top of each case; this brings about a similar result to the former method, but is not so satisfactory, as the lemons ripen unequally. If not required for immediate use, the lemons should be picked and stored in boxes, placed away for two or three

Plate 39.—Mediterranean Sweet Orange trees, 12 years old, showing average type of tree and fruit packing, 11 dozen to the long bushel case.

weeks in a well-ventilated shed, having a temperature of not more than 70 deg. Fahr. or less than 60 deg. Fahr., in order to dry the moisture out of them. The fruit should then be carefully wrapped in tissue-paper, and placed on trays 3 feet by 2 feet by 3 inches deep, with a cleat on each end; this allows for plenty of air circulation. The trays are stacked one on the other. The temperature should then be kept at not more than 60 deg. Fahr. or less than 50 deg. Fahr. The shed should be well ventilated and dry, and the fruit should not be allowed to heat or sweat. The lemons should be overlooked at intervals, and any decaying fruits removed, as they cause the adjacent sound fruits to decay. Another method is to pick the fruit from the tree, and store it into racks which are fitted under open-sided sheds, and the temperature regulated by side covers, which can be adjusted to weather conditions, both night and day.

Early picked lemons cure the best. Excesses of temperature must be avoided. Stacking fruit in piles should not be practised. Properly

regulated ventilation is essential, and lemons will keep for months. Our main crop of lemons treated under these conditions must become a payable one, as they will come into use in the heat of summer, and command *high prices.*

Lemons should be picked before irrigation, or, if rain falls, wait for several days. Pick over the trees at fortnightly intervals when the fruit is dry, and when the fruit is picked do not leave it exposed in the sun. Lemons should be carefully placed in the picking baskets, not dropped in. Picking baskets should be padded. After curing, and in packing for market, unwrap the fruit, and re-wrap and grade according to size. Brand the cases according to the grade, "First" or "Second." "First" grade lemons should be of uniform size, with waxy golden skin, and without a blemish. "Second" grade should be of good colour and sound. Great care should be used in packing, and every lemon in the "First" grade should be wrapped. The number of lemons to the case should be stencilled on the case.

The prospect of the industry is remarkably good.

PRODUCTION FOR SEASON 1911-12.

State.	Lemons.	Oranges.
	bushels	bushels
Victoria	65,833	48,982
New South Wales	256,433	946,196
Queensland	3,529	474,025
South Australia	47,176	220,988
Western Australia	16,317	76,552

AREA OR NUMBER OF TREES, 1910-11.

Victoria.	Lemons.	Oranges.
Bearing	47,880	44,190
Non-bearing	20,070	44,403
Approximate estimate of trees planted, 1912	10,000	40,000

COMMONWEALTH TRADE.

—	Production, 1910-11.	Imports, 1911.	Exports.	Net Imports, 1911.	Approximate Consumption.
	bushels	bushels	bushels	bushels	bushels
Oranges and lemons ..	1,927,125	39,430	1,205	38,225	1,965,350

VICTORIAN TRADE.

tion ..	...	...	500,000 bushels
1911-12	...	..	114,815 ,,
	Deficiency	...	*385,185* bushels

The big margin for local consumption will take a long time to make up. The low average yields of orange and lemon trees can be explained by the fact that the *great majority of them are young and just coming* into production. This fact, and the large planting that is being carried on, must eventually force the producer into the export market. That market is open to him in the Northern hemisphere, both in Great Britain, Europe, and America. Oranges should be, and can be, landed in London and New York in July, and a regular supply kept up from then until October. At the time Victorian oranges would land in the places mentioned, those markets are depleted of European and Californian oranges. South Africa and West Australia are nearer ports to the markets of the Northern hemisphere; they are also citrus-producing countries, and are competing for the markets, but prices are remunerative, and the population of Great Britain, Europe, and America increasing.

Spain, Italy, Turkey, Egypt, and the Canary Isles are the chief producers of citrus fruits for the European markets. The imports of oranges into the United Kingdom in 1911 was 259,000 tons. Cape Colony sent 15,000 cases from June to September, and obtained an average price of 12s. per case for a case of 12 inches by 12 inches by 26 inches with centre divisions. Prices have, however, ranged as high as 20s. a case. Victoria has never attempted to export oranges. Apple exporters in this State are satisfied with 10s. a case for export apples. Orange trees are more prolific than apples, and are more constant in their bearing habits. Assuming the total cost, packing, cases, freight, and charges, to amount to 6s. per case, there remains from 10s. a profit of 4s. per case, and even at that price the orange orchard must be a profitable concern. These prices are low as compared with prices at present obtained, and, while prices are high locally, exporting will hardly be favoured by the producer. The expansion of the industry will, however, force it on the grower, and it is time to begin and obtain entry into these oversea markets, and gradually build up a trade which is capable of large expansion. There are thousands of acres of citrus-producing country in Victoria. Oranges can be produced as cheap here as anywhere in the world. Land is low-priced, injurious frosts almost unknown, and water cheap. Trees are prolific, and the fruit unexcelled as regards quality and colour. Small quantities produced, and realizing high prices, do not tend to general consumption. Large quantities produced regularly, and commanding payable prices, place the fruit within reach of all classes, and thereby increase consumption. We have not yet exported lemons to the oversea markets, but there is a large trade to be opened up in America, Great Britain, and Europe.

America imports annually about 60,000 tons of lemons. The European demand is an increasing one, and the room for expansion in production in the Mediterranean countries limited. Victorian lemons should be able to enter these markets in June without much danger of loss in transit, and with every prospect of remunerative prices.

In exporting combination is a necessity. Fruit should be sent under a district brand, and the grading, packing, and general get-up of the package of the very best. Shipments should be sent through proper channels for distribution, and supplies should be regular and increasing.

Washington Navels and the Navel types will be the most profitable oranges to export, and lemons of the Lisbon variety. In citrus, as well as other branches of fruit culture, it is not wise to grow too many varieties; a better market is assured by producing a quantity of a given kind.

(To be continued.)

BEE-KEEPING IN VICTORIA.

(Continued from page 588.)

By F. R. Beuhne, Bee Expert.

XVIII.—BEESWAX.

"Beeswax has its origin in the nectar or honey consumed by bees and transformed by them into fatty matter by a process of digestion and secretion. It is an organic, not a mechanical production, and issues in the form of scales from between the ventral plates of the abdomen of the worker bee." (T. W. Cowan, Wax Craft, page 45.)

The production of wax by the honey bee is *in a certain ratio to that* of honey; thus, bees in trees or box hives yield, on the average, one *pound of wax to twenty pounds of honey. With the introduction of the* bar frame hive, and the method of extracting the honey from the combs and returning them to the hive to be refilled with honey by the bees, the ratio of wax to honey has been considerably altered and stands at 1 to 80. In other words, the production of extracted honey for the same weight of wax is four times that of the primitive method of cutting out the combs to obtain the honey. As a result, the price of honey has declined while that of wax has advanced during recent years. The wax is the product of a transformation of the honey or nectar when retained in the body of the bee for a time under certain conditions. Many attempts have been made to turn surplus honey into wax by feeding it back to the bees, but none have proved successful from a commercial point of view. While, therefore, the proportion of wax to honey cannot be profitably increased, so far as its production is concerned, there is room for much improvement in the methods of obtaining the wax from the combs, in the handling, refining and marketing.

Thousands of pounds of beeswax are annually thrown away, or burned with old black brood combs, because the old-fashioned method of boiling the combs in a bag submerged under water fails in obtaining more than a mere fraction of the wax contained in them. New comb consists entirely of wax, and is white or yellow in colour, according to the flora from which the bees obtained the nectar converted into wax. When brood is reared in the cells the comb first becomes brown and, after a time, black, tough, and heavy. Each bee larva, before changing to the chrysalis stage, spins a cocoon, and as generation succeeds generation in the same cells old brood comb contains numbers of these in each cell, one inside the other; but, although the appearance of the comb is entirely changed, the original wax cells are still there. When old brood

comb is dissolved by boiling in water each of the cocoons set loose by the melting of the comb becomes coated with liquid wax which clings to the fibrous material of the cocoons, and but little will rise to the surface when boiled in a bag kept under water.

To obtain all the wax, or at least the maximum from old combs, pressure is required—something of the nature of a cheese press. The press shown in the illustration (Fig. 1) is a stout wooden box securely bolted together and lined with tin; inside of this is a slatted grating and bottom, leaving a chamber of 10 x 10 inches (12 inches deep) into which an ordinary sugar bag is inserted. The old comb is dissolved by boiling and poured into the bag, the latter is then folded down, the press block put on, and the screw gradually worked down. Water and wax escape by the outlet into a separating tank which retains the wax, but allows the surplus water to escape.

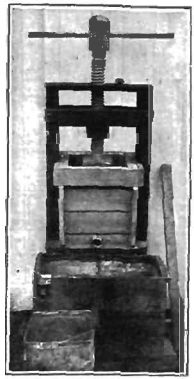


Fig. 1.—Wooden Wax-press.

Fig. 1 shows the press complete, excepting that a board should be fastened across the top of the uprights with a hole to guide the screw, so that it works evenly and steadily. The uprights should either be securely fastened to the floor of a little platform or braced to the wall by stays at the top. The frame consists of two uprights, about two feet eight inches long, made of 6-inch x 2-inch timber, with cross piece of similar dimensions at the top, and a floor piece 12 inches wide near the bottom, the four being mortised and bolted together at the intersections, the screw block being slightly let into the cross piece and bolted. The screw is a 2-inch wooden carpenter's bench screw. The body of the press is made of ⅞-inch shelving, blocked or dove-tailed together at the corners, and measures 11⅜ in. x 11⅜ in. inside by 12 in. deep. The bottom is fitted into the body flat on the underside: the upper-side has an incline of 1 inch from the sides to the groove in the centre, which latter inclines towards the outlet in front, as shown in Fig. 2. A frame 3 inches wide runs round the top of the body, bracing it together, and projecting upwards by 1 inch over the top edge of the body, forms a rabbet ⅞ inch x 1 inch. The whole body is lined with tin inside, the groove terminating in a spout. Figures 3, 4 and 5 show the fittings inside the lining. Fig. 4 is the bottom of the grating, made of pieces of wood ⅞ inch thick and 1 inch deeper in the centre than at the ends, to correspond to incline of the bottom of the body, on the lining of which they rest. They are ½ inch apart, and slats ⅞ inch wide by ⅝ thick, set 3-16th apart, are nailed crossways on to the top of them as shown in Fig. 4.

Fig. 3 shows the four sides of the grating, each of which is unconnected with the others, and consists of slats ⅝ inch x ⅝ inch, set 3-16th apart, nailed on to a piece 1 inch x ⅝ at top, which rests on the rabbet

at top of body, when inserted in the latter. A doubled piece of tin in a sawkerf made endways into the slats connects them at the bottom without obstructing the passage of the liquid pressed.

Fig. 5 is the press block, made of a piece of hardwood, with stout iron handle, which is raised and a lever put through when the block is to be lifted. A board ¾ inch thick and measuring 10 inches x 10 inches (which is the clear measurement inside the grating), fastened to the hardwood block, has slats the same as the sides of the grating.

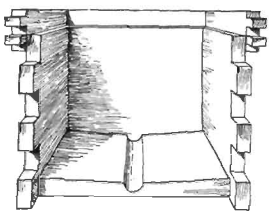


Fig. 2.—Cross Section of Press Box.

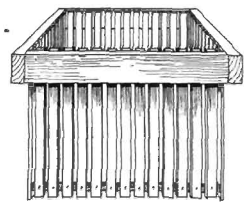


Fig 3.—Inner Slatted Sides of Press Box.

For pressing honey out of cappings or comb, a piece of hessian sufficiently large to lap over double when the press is full, is tucked into the grating. If there is any difficulty in getting the pressed cake out of it it is overcome by drawing out one or two of the sides of the grating.

For pressing wax from combs, press cakes or refuse, it is best to use a bag, just fitting inside the grating. The bag should be of good hessian

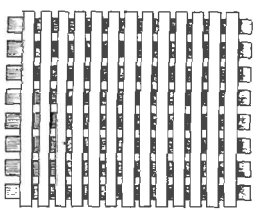


Fig. 4a.—Top view of Bottom of Press Block.

Fig. 4b.—End view of Press Box

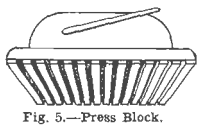


Fig. 5.—Press Block.

or similar material, with a square bottom like a woolpack. The wax should be boiled up with water, and before the first lot is poured into the press, the bag should be inserted and boiling water poured in to prevent the wax adhering to the bag and woodwork when it cools. When fully pressed down unscrew, lift out the press block, shake up and fold the bag afresh, and press again, or pour in more if there is but little

refuse. The liquid wax and water run into a receptacle standing under the spout, and are separated by means of a separating tank described further on.

There are several types of wax presses, and while a wood-slatted one, as the one described, is preferable, its construction requires a certain amount of skill and handiness with tools not possessed by every bee-keeper. A press made almost entirely of metal is obtainable from dealers in bee-keepers' supplies. Fig. 6 is the press ready to set up; also two moulds for wax cakes at the back. In Fig. 7 the different parts are shown.

The amount of wax obtained from old black combs by means of a press, as compared with the old method, is as three to one, while the time occupied is but one-tenth, and the wax obtained is ready for market if drawn off into suitable cooling vessels, such as the moulds shown in Fig. 6.

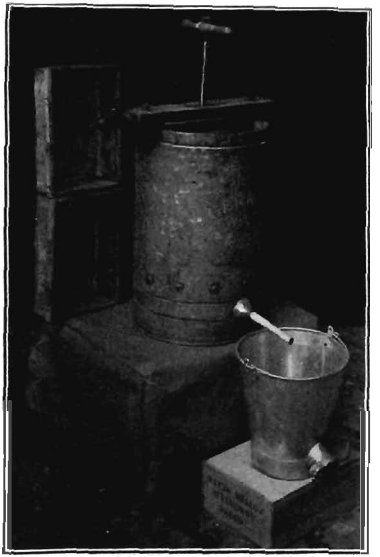


Fig. 6.—Metal Wax Press, set up.

About 75 per cent. of the wax sold by produce salesmen is depreciated in value through having been wrongly treated at the apiary. Wax should never be overheated; it should always be melted or boiled with water. Wax boiled in rusty tins or iron vessels has a dirty brown appearance; contact with galvanized iron or zinc turns it grey, copper green. Bright, new tin or tinned copper vessels are the only ones which do not affect the colour and character of wax. Even the oldest comb will produce wax of a clear yellow or orange colour if properly treated. The size and shape of the blocks of wax seen on the market also leaves much to be desired. The moulds used by many bee-keepers are buckets, old milk-dishes, kerosene tins, wash-tubs, &c., into which the wax has been poured, and left to set quickly in contact with the metal instead

of on hot water. The result is that the dirt, which will pass even through the finest strainer, is diffused all through the lower part of the wax instead of being in a separate layer, which can be scraped off. Quick cooling results in unsightly cracks and clinging to the moulds. Wax is often sent to market in bags, and the fibre and dust adhering to it still further spoil its appearance. Blocks or cakes should not be larger than 20 lbs.; 10 or 12 lbs., however, is the best weight.

Better attention to the saving, proper handling, and marketing of bees-wax would well repay the bee-keeper, and add considerably to the total annual value of production.

Fig. 7.—Metal Wax-press showing parts.

When an apiary has been in existence for a number of years it becomes necessary to replace some of the old black brood combs. This should be done every season — whenever an opportunity offers to withdraw them from the brood-chamber. They should then be replaced with new ones.

A Langstroth comb, if built on a full sheet of foundation, contains about 2 ounces of wax when new, but somewhat more after it has been in use for some years, as the bees add wax after the foundation is first drawn out. When very old combs are boiled down for wax, not more than eight should be put into each tin with three gallons of water, otherwise the mass becomes too stiff and difficult to press clean of wax. Sometimes, hundreds of combs have to be cut out and boiled down and a great number of vessels would be required to hold the water and liquid wax coming from the press until the wax is set, unless it is skimmed off while hot, which is tedious work.

By the use of a separating tank, wax and water can be separated automatically, the wax being retained in the tank while the waste water,

if not too thick and black, can be used for boiling down more combs or else at once disposed of. Waste water from boiling down combs or water containing honey should not be thrown out so that bees have access to it, but should be buried; apart from any risk of spreading disease it may start robbing or stinging.

This separating device (Fig. 8) consists of a plain box lined with tin. One corner of the lining is covered by an L-shaped piece of tin soldered to the side and end, open on top and reaching only to within half an inch of the bottom, with an outlet stud through the end board

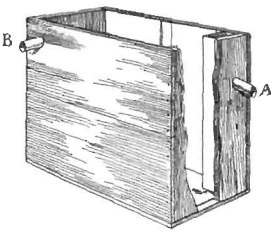


Fig. 8.

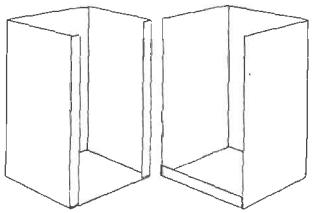


Fig. 9. Fig. 10.

Fig. 8.—Separating Tank. Figs. 9 and 10.—Lining of Tank.

of the case about four inches from the top. At the opposite corner of the case is another outlet stud two inches from the top.

Before allowing the wax to run into the tank from the press, sufficient hot water should be poured in to cover the end of the enclosed corner so as to prevent the wax escaping into it. After several lots of boiled comb have been put through the press, the wax and water will have risen in the tank to the level of the outlet tube A, and from now an amount of water, equal in weight to the water and wax coming from the press, will run over by tube A.

As wax is considerably lighter than water, it does not displace water by its own volume, and therefore rises in the main body of the tank as

it accumulates until it reaches the wax outlet tube B. This is best kept corked till it is desired to draw the wax into moulds or a cooling vessel, when by opening the wax tube B and closing the water outlet A the whole of the accumulated wax flows over when more liquids run into the tank from the press or sufficient hot water is poured into it.

A serviceable tank of this description can be made out of a kerosene case and two tins by any one able to use a soldering iron. Cut the tops out of the kerosene tins, close to the rim, and hammer back the cut edges. Then cut the side out of one tin, as shown in Fig. 9, and the other as in Fig. 10; put the tins into the case, straighten out the pieces left for lapping over in Fig. 9 and the bottom piece in Fig. 10; then solder together. Withdraw the lining from the case, cut the holes for outlets A and B into lining and case, reinsert the lining and solder on the studs (which should be at least one inch in diameter) and the angle piece covering A. The work is then completed.

This receptacle, if emptied and wiped dry after use, will last for many years, as wax has a protecting influence on tin. It will save a great deal of labour by dispensing with skimming and remelting; water will also be economized, an important consideration to bee-keepers who are located in dry districts.

(*To be continued.*)

QUALITY IN POTATOES.

Potatoes of any variety are subject to vary considerably in composition according to the conditions of growth. Climate, soil, and manure have each an effect upon quality. The criterion in judging potatoes is the percentage of starch and dry matter which they contain. Poor potatoes are watery. A dry season and a light soil give better quality tubers than the opposite conditions. The kind of manure used has also an influence, and *Bul. II. of the W. of Scot. Agric. Coll.* sums up the results of three years' investigations on this subject. The analyses were confirmed by cooking tests. Nitrogenous manures alone, without phosphates and potash, lowered the quality. Stable manure, being rich in nitrogen, also gave poorer quality than no manure, and this effect was more marked in a dry season, presumably because the stable manure also made the soil moister by comparison with the no-manure land. Phosphates, such as superphosphate, improved the quality either alone or in mixtures. The same was true of potash manures. Of the different potash manures, the sulphate gave better quality than the muriate in each of some twenty tests. The good quality potatoes keep best during storage. For practical purposes, quantity must be sought as well as quality, and, to obtain the maximum result in cropping, a half, rather than a full, dressing of stable manure is recommended, this half-dressing being supplemented by a small dressing of superphosphate and sulphate of potash, with a little sulphate of ammonia added where the land is not in too good heart.

CENTRAL RESEARCH FARM, WERRIBEE.

Farmers' Field Day.

[Extracts from the report in the *Werribee Shire Banner*, 9th Oct., 1913.]

The farmers of the State responded splendidly to the invitation of the Government to attend the First Annual Field Day at the Central Research Farm, Werribee, on the 26th September. Advantage was taken of the gathering together of agriculturists at the Royal Show to introduce to them the latest work being undertaken in their interests by the Department of Agriculture. From Mildura and Orbost, Casterton, and Tallangatta, the Goulburn Valley, and the Wimmera there was an adequate representation of farmers engaged in wheat growing, irrigation, dairying, and other phases of agriculture. The local farmers, led by the President (Mr. John Ball), and Secretary (Mr. Tyzack), of the Werribee Agricultural Society, turned up in large numbers, and helped the Department materially in supplying vehicles for the con-

Fig. 1.—The Hon. Geo. Graham, Minister of Agriculture, welcoming the visitors.

venience of visitors. There was also present an interested sprinkling of commercial men, government officials, and parliamentarians, on the goodwill of the latter of whom depends the supply of the sinews of war for the carrying on of the enterprise. And, after the inspection, when the 650 visitors were gathered in the implement shed, enjoying a cup of afternoon tea, there was general agreement as to the satisfactory work already accomplished on the farm, and as to the likelihood of the experimental work in course of progress being of very great benefit to agriculture.

To judge from the remarks heard while mingling with the crowd during the afternoon, it was apparently realized that the Government had entered on a project destined to be of real value to the farming community, and to which the farmers of the State might look for real and practical guidance in the improvement of generally practised methods.

The Minister of Agriculture (The Hon. Geo. Graham, M.L.A.), in welcoming the visitors at the entrance gate to the farm, said he wished to impress upon those present that it was only a little over twelve

months since the Department of Agriculture had obtained possession of the farm. The land was about the worst in the district, and was practically worn out; some parts of it had been growing hay for close on thirty years without a rest. It was intended that this was to be the principal Research Farm of Victoria. This was the only site to meet all the requirements that could be obtained within a reasonable distance of Melbourne. It was not the best land, but it had the advantage that research, both dry and irrigation farming could be carried on, and it was easily accessible to farmers from all parts of the State. The progress made would be seen as the years rolled by. It was intended to make this event an annual affair so that those interested in agriculture would be able to visit the farm and see the development and progress of it.

Fig. 2.—Dr. Cameron intimating the Route of Inspection.

He felt certain that when they had looked over the farm, and had seen the experimental work that had been laid out, they would recognise that the Government was doing the right thing.

The officer they had taking charge of the work (Mr. Richardson) had the three qualifications required to make it a success, viz., agricultural scientific knowledge, practical agricultural knowledge, and, on the top of that, enthusiasm in his work. Mr. Richardson was ably supported by Mr. Wilson, the Farm Manager, who was also an enthusiast who had his heart and soul in the work. All the work performed on the farm had been done under the direct supervision of Dr. Cameron, the Director of Agriculture.

It had been intended that Mr. Richardson, Agricultural Superintendent, should explain the plots as they went along. Unfortunately he had been taken ill early in the week, and, though present, was not at all well. Dr. Cameron would step into the breach and explain the work being carried out.

Dr. Cameron explained the route the inspection would take, and gave an outline of the work done at the farm up to the present time. He addressed the gathering at various points during the inspection. Mr. H. C. Wilson, Farm Manager, also gave short addresses as the tour proceeded, and the Field Stewards, amongst whom thirty of the local farmers were prominent, explained the crops and plots to groups and knots of farmers who separated from the main body.

Most interest was concentrated on the permanent rotation field, the grading for irrigation, the green manurial tests, the permanent fertilizer field, the barley varieties, the top-dressing of natural pasture, the grass-seeding experiment, the lucerne plots—both experimental and commercial, the wheat breeding and cereal seed selection areas, and the bulk wheats for seed distribution.

Fig. 3.—Visitors spreading out.

On the conclusion of the inspection, the Honorable the Speaker (Sir Frank Madden, M.L.A.), in proposing a vote of thanks to the Minister for arranging the trip, endorsed what had been said about the worn out land. Some portions of this farm really needed forty years' rest to enable it to recover its fertility. However, the Government was going to treat it by true farming methods, whereby even now it could be seen that it was commencing to give a return. The peas and legumes was a crop that would be a credit to any place. If it was his crop he would roll it down and plough it in. The great need of worn out land was the provision of humus which could be restored by the ploughing-in process.

He had always desired to do what he could for the benefit of Victorian agriculture. The starting of this farm was a step in the right direction. He trusted the Government would not be frightened by the cost of this experiment work, because, although it might be costly in the beginning, it would teach the farmers of the State what could be done by modern science, and would return its cost to the State one-hundred fold. Nature must be assisted by giving back something for

what had been taken away. He trusted that the experiments now being carried on would be continued for many years.

The Hon. George Swinburne, in seconding the vote of thanks to the Minister, said that the future prosperity of the State depended upon what the men on the land could produce. If they wanted to get everything possible out of their land while maintaining its fertility, they must have education, research and experiments. It all cost money, and there might be doleful times coming when the Treasurer might not have much money and might be inclined to cut down the estimates for this farm. It was necessary for every farmer to demand that the Government shall spend money in research in order that they should be able to get the best out of the land. The prosperity of the State came out of the land. If they were not enthusiastic, or if they did not believe in scientific experiments, they did not believe in what was going to make this State. He was not in Parliament now, and he would say this, that science could do far more for the country than legislation could. He had said it before he went into Parliament, and he said it now. The more

Fig. 4.—Dr. Cameron explaining the Fertilizer Trials.

enthusiasts they had for developing the farming industry the better. In conclusion, he said it behoved the farmers of the State to see that this farm was continued.

Mr. E. A. Dahlenberg (Pimpinio) said that the visit had been an eye-opener to him. It was his first time on the farm, and what he had seen that day on this worn-out land proved that science could do a great deal for the farmer. It showed that science was what they would have to work on in future. The Government should stand to this farm, and the farmers should stand behind the Minister for Agriculture, and demand that the farm be kept on. He would like to see the farm again at harvest time. They had only 4 inches of rain since the crops were put in. It had been a dry season, and if they could do this on 4 inches of rain it was a testimony to good cultivation beforehand, and it would be valuable and interesting to farmers to see how the crops that were looking so well that day would turn out at harvest time. The farmers could do a lot at present, but scientific farming could help them to do more. Soil that was worn out years ago was now growing better crops

than before. He congratulated the Department of Agriculture for undertaking this work, and trusted that the Government would stick to this Research Farm and keep it on, so as to be an education and a lesson to the farmers throughout the State.

Mr. A. Rodgers, M.P (Vectis East), said he did not agree with the statement that farmers were not going to get anything from politics in future to assist agriculture. The House to which he belonged had now before it a very important measure for the establishment of an Agricultural Bureau. He wished to compliment Mr. Graham, and the Ministry upon the interest taken in the matter of agricultural advancement. There was a time when the scientists or theorists, as they were then called, were not welcome, but that time was gone. As far as Victoria was concerned, he would say that the popularity of the Agricultural Department was largely due to the strenuous and ardent work of Dr. Cameron and his staff. The Director had always been ready to come to the seat of trouble, and if there was any difficulty in the district they had no trouble in getting Dr. Cameron, or the members of his staff. He ventured to say that the Director had taken more interest

Fig. 5.—Afternoon tea at the Implement Shed.

in agriculture than any scientist before him in Victoria. When the Federal Parliament took on consideration of the Agricultural Bureau Bill it was not with the object of in any way overriding the splendid work carried out by the State Departments, but to co-ordinate with the present system, and to get the best brains the world has got to put at the disposal of the agriculturists.

Mr. G. M. Prendergast, M.L.A., said he looked upon the establishment of a farm of this kind as a novel experiment. He had opinions concerning it he would like to see realized in the future, but was not hopeful. As far as it went at present this farm was of very little value to the practical farmer, and any knowledge that might be gained, after it had been gained, might only benefit the Werribee district.

The Werribee Estate had been Government property for many years, but settlers held aloof from it. He would like to see a realization of the dreams of the gentlemen working upon this land. If it led to a settlement of the estate there would be no one more thankful to Dr. Cameron than he. If the amount of money spent on experiments had

been spent in ploughing the land and making it fit for the agriculturists to go on to, it would soon return money for the expense.

He believed Dr. Cameron, whose education had led him to work in this direction, had certain ideas in his mind. He hoped Mr. Graham, who held the purse, would be able to find the funds to keep it going.

In conclusion, he hoped the farm would be a success, and that the dreams would be realized, but he could not help thinking that, if the Government put some ploughs in, and spent the money that way, and put the people on the land, they would be doing more good for the country.

Dr. Cameron, replying to Mr. Prendergast's remarks, said that a small portion of the farm only had been seen. If they had gone further afield they would have seen that the plough had been put in to some purpose. There were 117 acres of seed wheat for distribution amongst farmers, and 160 acres of oats for hay, and 40 acres of silage crops, that they had not seen. There were also 280 acres of land into which the plough had been this winter. On the question of the benefits

Fig. 6.—Grading Operations at Central Research Farm. **Throwing up Banks with Check Banker.**

of this farm to settlers who were taking up blocks, he might say that it was in the records of the Lands Department that, of the sixty odd applicants for land on the irrigation blocks on the Werribee Estate, forty-two of them had been induced thereto by what they had seen of the results already achieved on this farm.

On the question as to whether this farm was going to be of any use to any other part of this State, he wished to point out that the rainfall of the Werribee district was the same as that of the Wimmera and Goulburn Valley. The chemical composition and physical character of the soil was the same. There was no part of the State where an experimental farm could be established, the results from which would be more likely to be of general benefit to the State than Werribee. Furthermore, they had the authority of the Agricultural Superintendent, Mr. Richardson, that the results of the wheat breeding and various other research work being undertaken, will be of value to the whole State.

His advice to the farmers of Victoria, which was the same as Mr. Plain, M.L.A., had given the other day after an inspection of the farm,

was to watch the results at Werribee. As a practical farmer in the district, Mr. Plain's opinion on such matters was of high value.

Mr. John Ball (President of the Werribee Agricultural Society) said it gave him very much pleasure to see so many farmers from different parts of the State present that day. He had travelled through the State as much as any man present, and, perhaps, a bit further and oftener than the gentleman who made the remark about the experiments

Fig. 7.—Smoothing the Check Banks.

only benefiting the Werribee district. As far as Werribee was concerned, they had had less rain this year than any other part of Victoria. It was the first time he had been on the farm, though his colleagues had been over it a few days ago. They told him when they returned that they were astonished. He had been more than pleased with what he had seen that day. He did not think he had ever seen plots laid out better, and it was a credit to the man who drove the

Fig. 8.—Finishing the Check Banks.

drill. He wished to endorse what had been said about the exhausted character of the land. It was about the worst block, from an agricultural point of view, on the whole of the Werribee estate.

He wished to state that at any time any of those present, or other farmers, wished to visit the farm, if they notified the Werribee Agricultural Society, they would be pleased to drive them out to the farm.

Mr. Graham, in acknowledging the vote of thanks, stated he was very pleased at the large response to the invitation to visit the farm that day. He had told them when they were entering the farm that they were going on to a barren piece of land, and the local farmers had intimated, through Mr. Ball, that it was one of the worst pieces of land in the district. That was one reason why he wanted them to see this farm at the start. He sincerely trusted, and fully hoped, that the ladies and gentlemen present that day would live to see the project carried through as it had been designed. He could assure Mr. Prendergast that the experiments would be for the benefit of the whole of Victoria, and even Australia. The time has come when slip-shod farming had to be stopped, and when the farmer would have to bring science to his assistance.

Regarding the statement that agriculture was on the decline in Victoria, the Minister said that an effort had been made to prove it by comparing a bad season with a good season. A comparison of five year-periods from 1899 to the present would show that there was a steady

Fig. 9.—View showing Disposition of Check Banks.

increase in the area under cultivation, and that the wheat yield had nearly doubled itself in ten years. He had the figures with him, and would quote them now—

From—	Average Acreage under Cultivation. Acres.
1899–1903	3,699,931
1904–1908	4,177,691
1908–1913	5,096,628

From—	Average Wheat Yield. Bushels.
1898–1902	13,472,664
1902–1907	21,550,842
1907–1912	29,810,749

He could quote a number of other figures to show that the dairying industry was progressing in the same way.

The Hon. James Cameron, M.L.A., in proposing a vote of thanks to the men employed on the farm, said that what they had seen that day was a credit to the workmen, and had shown that the men took great

interest in their work. He felt sure that every one on the farm would only be too pleased at all times to show visitors everything that was going on.

Mr. Robert Stanley, said he wished to propose a vote of thanks to Dr. Cameron for the work he had done. They all would agree that under Dr. Cameron's administration live stock had improved. It was only an enthusiast that could make it a success, and that Dr. Cameron was doing.

Dr. Cameron, in reply, said that for himself he required no thanks, but, on behalf of the staff and the men who had worked together to bring the farm to what it was, he thanked them most sincerely. Whatever might happen in the future, this year's work would stand to the credit of Mr. Wilson as long as he lived. Twelve months ago this land had hardly a fence on it. It was now a properly laid out farm divided up into thirty paddocks. As they could readily understand many times throughout the year emergencies had had to be met, and on these occasions the best in Mr. Wilson was always brought out. Things that looked almost impossible to do Mr. Wilson always seemed able to get done. So far as the men on the place were concerned, each and every one of them had worked with a will. On top of all this there had been a keen, never-flagging interest on the part of Mr. Richardson. The design of the experimental work had all been laid out by him.

What they had seen had not been brought about without a great deal of thought and worry, and much midnight oil had been spent over it, too, but throughout there had been a loyal co-operation on the part of the departmental staff for which he was thankful.

He was delighted with the magnificent turn up of farmers that day, and grateful for the many appreciative references that had been made, and he trusted that the hopes that had been expressed as to the benefits that might be expected to follow on the development of the farm would be realized.

CHARACTERISTICS OF GERMAN WHEAT.

Capacity to yield well and at the same time produce flour of superior strength may be compatible qualities, but as a rule these qualities will not be intensified in the same variety of wheat. In the *Monthly Bulletin* (Jan., 1913) of the International Institute of Agriculture the first collective report of the German Experiment Station for Cereal Testing is summarized: "The extensive data resulting from the examination of 26 varieties of wheat showed that local varieties were much superior to intensively selected ones in bread-making properties, while very inferior in yield. Usually, good baking local wheats have the higher gluten content. When mixed with other wheats, the selected highly productive varieties lose their defective properties, and generally produce flour and bread of good colour." If a certain proportion of strong wheat in his flour is necessary to the baker, and if strong wheats characteristically yield less per acre, then wheat of this class should fetch a higher price on the market than soft wheats, and the need for systematic milling and baking tests with the different varieties in order to obtain information on their bread-yielding properties is emphasized.

PREVENTION OF POTATO BLIGHT.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

The following is a reprint of a leaflet published by the Department of Agriculture and Technical Instruction for Ireland. It shows the benefit of spraying for "Potato Blight." As will be seen, the experiments extended over a period of six years, and, as we in Victoria have only *sprayed for one season, the Irish experience* will be of benefit to growers should Irish Blight again break out. With that object in view, the "*Leaflet*" *is now reproduced. It is necessary to bear in mind* that the Irish season is the reverse of our own.—EDITOR.

The experience of recent years has conclusively proved that the loss caused by potato blight can be, to a great extent, prevented by spraying —an operation which has now come to be regarded as an essential part of the work connected with the successful cultivation of the potato crop. The reports received by the Department from a large number of districts show that those who take the trouble to carry out the work properly are abundantly rewarded, while those who neglect to spray suffer heavy loss both in the quantity and quality of the crop.

The following Table shows the results of spraying experiments carried out at the Department's Agricultural Stations during the years 1900-5 inclusive:—

—	No. of Tests.	Mixture used.	Average Total Yield per Statute Acre.		Average Increase per Statute Acre from Spraying.
			Sprayed.	Unsprayed.	
			tons cwt.	tons cwt.	tons cwt.
1900	3	Sulphate of copper and lime ..	10 9	7 16	2 13
	3	Sulphate of copper and washing soda	11 16	7 16	4 0
1901	3	Sulphate of copper and lime ..	13 18	12 4	1 14
	3	Sulphate of copper and washing soda	14 6	12 4	2 2
1902	3	Sulphate of copper and lime ..	12 17	10 11	2 6
	3	Sulphate of copper and washing soda	13 6	10 11	2 15
1903	3	Sulphate of copper and lime ..	12 0	10 18	1 2
	3	Sulphate of copper and washing soda	12 3	10 18	1 5
1904	3	Sulphate of copper and lime ..	9 11	8 18	0 13
	3	Sulphate of copper and washing soda	10 12	8 18	1 14
1905	3	Sulphate of copper and washing soda	11 6	8 6	3 0
Average	15	Sulphate of copper and lime ...	11 15	10 1	1 14
	18	Sulphate of copper and washing soda	12 5	9 15	2 10

The Department wish to urge upon all farmers who have not already provided themselves with sprayers, the necessity of at once taking measures to obtain them, and to have their potatoes sprayed in good time.

Agricultural Societies could in many cases purchase horse sprayers or hand machines, and hire them out to members, with great advantage to all concerned.

SPRAYING MIXTURES.

The Department recommend either of the following two mixtures, viz.:—

1. Sulphate of Copper and Washing Soda.*
2. Sulphate of Copper and Lime.

Farmers should insist upon being supplied with pure materials only, and are strongly urged to buy the sulphate of copper and washing soda and to prepare their own mixtures.

PREPARATION OF MIXTURES.

I.—Sulphate of Copper and Washing Soda.

(Burgundy Mixture.)

This mixture is made in the following proportions:—

2 lbs. sulphate of copper of 98 per cent. purity.
2½ lbs. washing soda of 98 per cent. purity.
10 gallons clean water.

In most cases farmers use a paraffin barrel of forty gallons capacity for preparing the mixture. For this amount four times the above quantities will be required, namely:—

8 lbs. sulphate of copper.
10 lbs. washing soda.
40 gallons water.

The preparation of the mixture should be set about in the following manner:—

Thoroughly wash out the barrel and pour into it thirty-five gallons of clean water. The 8 lbs. of sulphate of copper should then be put into a canvas bag or tied up in a piece of canvas cloth, and put into and moved about in the water in the barrel until the crystals are dissolved. This operation can be more quickly accomplished if the crystals of sulphate of copper have been previously ground.

Having prepared the solution of sulphate of copper, next dissolve the 10 lbs. of washing soda in five gallons of water in a separate vessel. Then pour the washing soda solution slowly into the copper sulphate solution in the barrel, stirring continuously. The mixture should then be ready for use.

Note.—*Even when the above conditions are accurately carried out the mixture may not give the best results, owing to differences in the strength of the sulphate of copper and of the washing soda. Those who wish to get the best results should dip a piece of blue litmus paper in the prepared mixture. If the paper becomes red, more washing soda should be dissolved and added in small quantities at a time to the preparation, and with continuous stirring, until a fresh piece of paper dipped in the mixture remains blue. One pennyworth of litmus paper, which may be obtained from any chemist, is sufficient for a large number of tests.*

* Washing soda is also known as carbonate of soda.

II.—Sulphate of Copper and Lime.

(Bordeaux Mixture.)

This mixture is made in the following proportions:—

2 lbs. sulphate of copper of 98 per cent. purity.
1 lb. unslaked lime of the best quality.
10 gallons clean water.

Or, if a forty-gallon paraffin barrel of the mixture is to be prepared, four times the above quantities will be required, namely:—

8 lbs. sulphate of copper.
4 lbs. lime.
40 gallons of water.

To prepare this mixture proceed to dissolve the sulphate of copper exactly as has been described for No. 1 Mixture, viz., dissolve the 8 lbs. of sulphate of copper in thirty-five gallons of water in the paraffin barrel.

Having prepared the solution of sulphate of copper, next prepare the milk of lime. For this purpose procure a wooden tub holding five gallons, and also a bucket. Put into the bucket 4 lbs. of good freshly-burned unslaked lime. Sprinkle it with sufficient water to change it to a powder. Then add sufficient water to fill the bucket. This, when it has been well stirred up, will make a thin milkly fluid. Pour this into the tub, and add thereto sufficient water to cool the mixture and to bring the quantity up to five gallons. After being thoroughly stirred it may be slowly poured through a fine sieve, such as is usually sold with the spraying machines, into the barrel containing the copper sulphate solution. The contents of the barrel should be continuously stirred while the milk of lime is being added to it.

The mixture should then be of a bluish colour and ready for use, but in order to secure the best results the blue litmus paper test should also be applied to it. If the paper turns red a further quantity of milk of lime should be prepared, and added in small quantities at a time to the mixture until fresh paper put into the solution remains blue. It should then be applied with as little delay as possible, and the mixture should be well stirred each time before the sprayer is filled.

GENERAL OBSERVATIONS.

The following points should be kept in mind:—

1. Sulphate of copper dissolves very slowly in cold water. If at all convenient it will be found better to dissolve the material in hot water, and then add the required quantity of cold water. The same remarks apply to washing soda.

2. There is no harm in dissolving sulphate of copper and washing soda or lime in separate vessels and holding the solutions over for several days, but once the solutions are mixed together the mixture should be applied IMMEDIATELY. If held over even for one day it deteriorates rapidly, and is then much more readily washed off the plants by rain.

3. All the vessels coming in contact with the sulphate of copper should be of wood and not of metal.

4. It will save much time and annoyance if every possible precaution is taken to have the mixture free from grit, or any other foreign matter

which would stop the nozzles of the sprayers. For this reason the water used should be strained through a piece of canvas or other suitable cloth.

5. The milk of lime or washing soda solution should always be poured into the sulphate of copper, and not conversely.

6. Effective stirring in every stage of the operation is essential to success.

7. Sulphate of copper is poisonous, therefore the vessels in which sulphate of copper mixtures have been prepared should not afterwards be used to hold food or water for consumption.

8. The addition of soot, treacle, or other materials to spraying mixtures is not recommended.

Advantages of using the Sulphate of Copper and Washing Soda Mixture.

The Department recommend the use of washing soda in preference to lime for the following reasons:—

1. The spraying mixture adheres longer to the foliage of the plants, and is not so readily washed off by rain.

2. The mixture can be more easily prepared.

3. The nozzles of the machine are not so liable to become stopped with grit or refuse material. If washing soda is used and the mixture is carefully made, there should be no sediment.

APPLICATION OF THE MIXTURE.

Spraying should be done before signs of disease are observed in the crop. It is therefore desirable that the first dressing should be applied from the middle to the end of June, before the disease appears. The actual date of the first spraying will depend upon the season, *i.e.*, the prospects of an early appearance of blight, and upon the development of the crop. A second spraying should be given about two or three weeks after the first application, as in that interval a large quantity of foliage will have developed, and a considerable portion of the original dressing may possibly have been washed off by rain. A third dressing may sometimes be advisable, especially in a wet season.

The best results can only be obtained when a sufficiently high pressure is maintained in the sprayer for the mixture to be forced out as a very fine spray; by this means the foliage can be completely covered, and there is little waste through the mixture falling on the ground.

Spraying should be done during dry weather. If rain should fall heavily soon after spraying, examine the foliage, and if the mixture has been washed off to a considerable extent, spray again. Spraying should be suspended when it is raining.

Quantity per Acre.

The quantity of the mixture to be applied per acre for one spraying is approximately as follows:—

For an average crop of potatoes with fully-developed foliage, about 100 gallons per statute acre, equal to 162 gallons per Irish acre. For a crop of potatoes with a small amount of foliage, a somewhat less quantity will suffice.

The quantity of raw materials required to spray properly one statute acre with 100 gallons of liquid is as follows:—

20 lbs. sulphate of copper.
25 lbs. *washing soda.*

45 lbs. Total.

CARE OF SPRAYER.

The external bearings of the spraying machine should be frequently oiled, but care should be taken not to let any of the oil get upon the rubber parts of the machine. The machine should be well washed out with water immediately after use, thoroughly cleaned and dried and the *pump oiled before being put away.*

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND.
April, 1912.

THE CARE OF CREAM.

For the factory manager to turn out a first grade butter he requires the help of the farmer. The cream must be delivered in the best order possible, and some useful reminders in handling cream are supplied by the *New Zealand Jour. of Agric.* Cleanliness in the dairy is an essential condition. Cream cans are returned washed, but it is very necessary that they should be thoroughly cleansed and scalded again at the farm before use. For separating, a special room should be provided, at least *30 yards to windward of the milking shed, have a concrete floor,* be provided with good drainage, well ventilated, and have a good supply of water. The milk should be separated as soon as possible, and while the animal heat is in the milk. The cream should at once be cooled to the lowest possible temperature; and, as the water required is small, this should present no serious difficulty. Under no circumstances should cream from one skimming be mixed with cream from another skimming unless it has first been well cooled. The most unsatisfactory of all *suppliers is the man who places the cream can under the separator and* does not touch it again till it has received the cream from several milkings. This is a most potent cause of defects. It is also advisable to provide a trough of cold water in which to stand the cream cans, and the cream should be occasionally stirred to reduce the temperature and break up the froth which collects on the surface. The cans should be covered with a light cheese-cloth to keep out dust, and this cloth should be washed and dipped in boiling water each time it is used. *The separator should be cleaned by dismantling each time after use,* scalded and placed in a sweet atmosphere until again required. The cans should be protected from sun while waiting for the factory cart or during transit. Reference has been made in these notes to the desirability of paying for cream according to condition, and it is said *that in New Zealand the general adoption of this system, which will* do much to raise the quality of butter exports, is near at hand. It is not stated whether the grading of cream will be compulsory.

STANDARD TEST COWS.

QUARTERLY RETURN OF CERTIFICATED STANDARD COWS FOR THE PERIOD ENDED 30th SEPTEMBER, 1913.

Since the First Annual Report on the Government Certification of Standard Cows, which appeared in the September issue of the *Journal* of this Department, fourteen cows have completed the term required by the regulations. Of this number eleven have attained the standard, and certificates in respect of such will, in due course, issue.

The following are the individual returns:—

F. CURNICK, Malvern (JERSEY).

Completed since last Report, 2; Certificated, 2.

Name of Standard Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk 1st Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.
Peerless of Melrose III...	2817	9.10.12	20.10.12*	273	13¾	6,352½	5·09	323½	368¾
Waverley Lass ..	2792	4.10.12	20.10.12*	273	14½	6,788½	4·86	329¾	376

* Weights *not available sooner.*

P. E. KEAM, Heidelberg (JERSEY).

Completed since last Report, 4; Certificated, 1.

Name of Standard Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk 1st Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.
White Star	2795	6.12.12	13.12.12	273	5	4,774½	6·13	256½	292½

C. GORDON LYON, Heidelberg (JERSEY).

Completed since last Report, 2; Certificated, 2.

Name of Standard Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk 1st Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.
†Silver Audrey ..	1378	11.12.12	18.12.12	273	14½	4,962¼	5·3	261½	298
†Silver Pride ..	1387	17.12.12	24.12.12	273	15¼	4,950	4·7	232¾	265

† Heifer.

DEPARTMENT OF AGRICULTURE (RED POLLED).

Completed since last Report, 5; Certificated, 5.

Name of Standard Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk Last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.
†*Birdseye*	Not yet allotted	3.10.12	10.10.12	273	8	4,351½	5·75	250½	285½
Cuba	..	7.10.12	14.10.12	244	2	6,288½	4·03	269	306⅝
Kentucky	..	18.10.12	25.10.12	266	5	6,249½	4·09	256	291⅝
Egypta	..	28.10.12	4.11.12	273	19	6,304½	4·27	269½	307
†Goldleaf	..	5.11.12	12.11.12	273	14	6,437½	4·79	308½	351½

† Heifer.

F. J. STANSMORE, Pomborneit (AYRSHIRE).

Completed since last Report, 1; Certificated, 1.

Name of Standard Cow.	Herd Book No.	Date of Calving.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk Last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Estimated Weight of Butter.
					lbs.	lbs.		lbs.	lbs.
Kathleen of Glencira ..	1732	18.12.12	25.12.12	273	11	6,003½	3·75	225½	256⅝

Four additional herds have been entered during the quarter, making a total of nineteen, which are now under supervision. The following are the herds referred to:—

	Breed.	Cows in Test.	Probable Number.
C. D. Lloyd, "Urandaline," Glencira road, Caulfield	Jersey	2	4
A. W. Jones, St. Albans	Jersey	3	6
J. G. Bjorkaten, "Mayfield," Seymour	Ayrshire	13	20
Wood Bros., Glencira road, Caulfield	Jersey	2	2

On the evening of 22nd September, a meeting of the owners of all herds, which were under the test, was held to discuss the regulations and certain alterations which, during the progress of the year, had been suggested. All participating in the scheme were represented, and considerable enthusiasm was shown in the results achieved to date.

*It was found that, so far as both the herd-owners and the Depart*ment were concerned, the regulations had operated in a satisfactory manner. Two important points were carefully considered, namely, the raising of the standard and the branding of calves the progeny of certificated cows. It was unanimously decided to suggest that the standard under Regulation 11 should be raised; and after considerable discussion,

r agreed that the regulation should be amended to read:—

in the case of cows commencing their first lactation period, and being then under three years of age, 175 lbs butter fat;

in the case of cows commencing their first lactation period, and being then over three years of age, 200 lbs butter fat;

in the case of cows commencing their second lactation period, and being then under four years of age, 200 lbs.

"(*d*) in the case of cows commencing their third, or any subsequent lactation period, or being then over four years of age, 250 lbs.* butter fat."

In respect of the branding of calves, it was agreed that, for the future, all calves, the progeny of cows entered for certification, should be suitably branded or tattooed as soon as possible after birth in order to insure identification. In order to give effect to this, Regulation 4 will be amended to read:—

"Any cow entered for certification, and any calf the progeny of such cow, may be branded in such manner as to insure identification, and all standard cows will be marked on the inside of an ear with the Government tattoo mark, and an identification number."

*The suggestion of the meeting of herd-owners was that the standard in this sub-class should be raised to 275 lbs. butter fat. The Minister of Agriculture, however, fixed the standard at 250 lbs.

THE BENEFIT OF LEGUMES—

It is a well known fact that a vigorous leguminous crop such as peas or clover enriches the land in nitrogen, and that another crop, say wheat or oats, following in rotation will benefit from the nitrogen residues. Recent investigations show, however, that the cereal may derive benefit from the legume even when both are growing at the same time. In the *Jour. Agric. Sci.*, vol. 3, experiments are described bearing this inference. Oats were grown in quartz sand in small pots placed in larger pots also filled with quartz sand, but growing peas. The inner pots thus grew oats only, and the large outer pots peas only, and in both cases all the necessary plant foods were added except nitrogen. The inner pots were of two kinds. Where they were of glazed ware the oats showed the effects of nitrogen hunger, but where they were of the ordinary porous pattern the oats grew vigorously. In the latter case it is believed that soluble nitrogenous matters diffused through the inner pot from the peas growing outside. Confirmation of these results under field conditions seems to be conveyed in a recent bulletin issued from Cornell University. Here also the legume seemed to supply available nitrogen to grass or oats growing along with it at the same time. Thus timothy grown with lucerne contained in its dry matter 15.56 per cent. of crude protein, but without lucerne it had 12.75 per cent. Similar results were got from timothy with and without clover, while oats also contained more protein grown in a mixture than as a pure crop. While these results point to an earlier benefit from the legume upon other crops than had been supposed, it would be insufficient in practice to grow, say, clover with oats instead of giving nitrogenous manure where the oats require this. The greatest benefit from a leguminous crop will be found not upon the crop growing at the same time, but upon the next crop which follows after it is harvested or ploughed in.

SPARROVALE FARM.

By J. S. McFadzean, Senior Dairy Supervisor.

In the *Journal of Agriculture* for August, 1907, under the heading of "A Farm in the Making," an account was given of the reclamation work which the Geelong Harbor Trust had then entered upon in regard to the swamp lands lying adjacent to the Barwon River, between Geelong and the sea. As the progress made since then has demonstrated the practicability of a scheme, which, from a dairying stand-point, was then supposed to be somewhat problematical, the facts relating thereto will be found interesting. In an undertaking such as this, which necessitates years of work before a stage of progress is attained that can be regarded as definite, it is almost certain that some difficulty will arise that will call for more than ordinary confidence on the part of the management if it is to be faced with equanimity; and the present instance is a striking example of this. There were problems here confronting the Trust when it entered upon the dairy-farming part of the scheme, which time alone could decide; but these have been solved, unforseen difficulties have been surmounted, and reverses have been met with determination; till now the Trust, and its farm manager, Mr. Baird, can look back at these several uphill battles, and feel that success is assured.

The wisdom of the Trust's Commissioners embarking on this swamp improvement work was questioned by many; but outside those directly in touch with the Harbor Trust's work there were very few who had a grasp of the situation. The actual reclamation of the land was a comparatively simple matter, and, if carried out, it was easy to forsee that the grazing value of the area dealt with would be immeasurably increased. Cultivation, however, would require much more work to be done than was necessary for grazing; and whether the cost of clearing, draining, breaking up, and grading would be repaid by cropping was a matter not so easily estimated. Still no one could dispute that, if lucerne could be grown on these flats successfully, their value, from a dairying stand-point, would be greatly enhanced; and the results which have been attained in this direction are beyond the most optimistic anticipation. As the land was drained and broken up, maize, oats, and barley were each tried as first crops; and English barley has proved the best for this purpose. In a previous report it was mentioned that over some portions of the area sown the first crop of maize had not grown well, and this was attributed to excess of salt in those places. Later trials showed that where English barley was used as a first crop the portion of the area remaining unproductive from this cause was invariably less than when either oats or maize was sown, showing that, so far as salt in the soil was to be considered, the barley was the hardier crop. Even with barley there has been as much as a 10 per cent. reduction from the possible results, owing to the presence of salty patches; but under irrigation these places grow smaller after each flooding, and on the land first broken up, and now established in lucerne, there is no sign of these unfertile patches.

After barley, either oats or maize is sown; and, following on this, the land is prepared for lucerne. The barley crops are sown as soon after

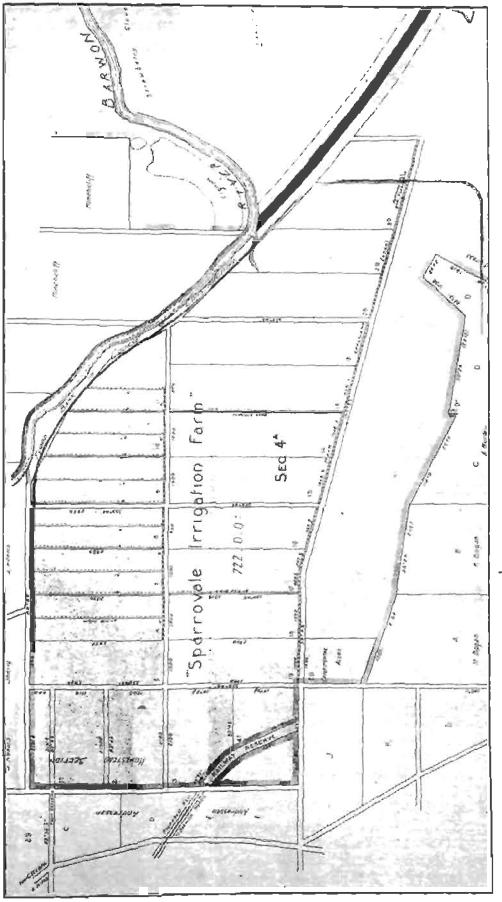


Fig. 1.—Plan of Sparrovale Farm.

April as possible, as the early-sown crops have always given the best results; and, under favorable weather conditions a return of at least 35 bushels per acre is expected. With oats a 2-ton hay crop is looked for; and when the lucerne has reached well into its second year, over 6 tons of hay per acre per annum is possible from it. Two and a half tons of lucerne hay was the actual weight cut from a measured acre in one instance, and in the warmer weather 5 tons of green lucerne per acre is looked on as the average cutting from a second-season crop. The Peruvian, Turkestan, and French Province varieties have all been given trial. The last-named has proved rather the slowest grower during its first year; the Turkestan and Peruvian being about equally prolific during that time; but, once established, the French Province has made the best headway, and the results obtained from this variety warrant the statement that 8 tons of hay per year can be cut from an established crop of French Province lucerne under favorable conditions. In the colder months the Peruvian has made by far the best growth; and in the early spring the French Province is the slowest to move; but as soon as the warmer weather sets in this latter makes up for lost time, and, for the year, will give the heaviest return in fodder; the drier years being especially conducive to its prolificacy. The amount of seed used is about the same with all varieties, viz., 12 lbs. per acre; but the greatest care is always taken to have the land worked down into a condition that will give the seed every chance to grow.

The whole of these flats on Sparrovale can be watered from the river at a running cost of 1s. per acre each watering. As a rule three waterings are all that is necessary, but five would carry the lucerne through the driest year; and, as about 5 inches of water at a time is sufficient to carry the crop through to the next cutting, the cost of the water would approximate 2s. 6d. per acre-foot. With this land secure from floods a yield of 6 tons of lucerne hay per acre would be a very conservative estimate, and, placing its value even as low as £3 5s. per ton, the return possible is sufficiently satisfactory to allow the most pessimistic critic to answer with safety the question whether this land is worth reclaiming. When inspected in July of this year there were 173½ acres in barley, 105 acres in oats, and 99½ acres in lucerne; while 25 acres of barley and 47 of lucerne were yet to be sown. All the crops above ground were growing well, and the hay paddocks were being grazed off in rotation, and, taking the crops, stock, and general appearance of the Sparrovale farm throughout as it then stood, no dairy farmer could desire a more prosperous outlook.

During the initial experiments that were made here to prove that this land possessed the inherent qualities which would warrant its reclamation being made absolute, there were two occasions on which the river overflowed the levee bank, and, on the water receding, it left the farm lands smothered with silt. The first of these misfortunes occurred in August, 1909, and the second in September, 1911. Only those who have had a similar experience can realize what it means to have cultivation and grazing land under water for days on this lower Barwon land, for the deposit left by these floods is a thick, slimy mud. This, on drying, usually breaks into hard cakes several inches across, taking months to weather down; consequently a lot of time will always

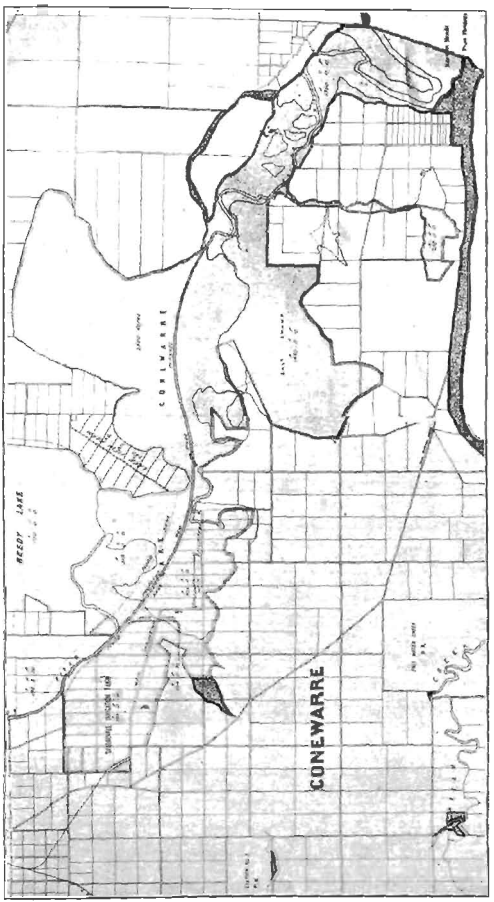


Fig. 2.—Lower Barwon Swamp Lands.

elapse before the grass will again form a sward, as fresh surface roots have to form before the stalks will properly develop. To have crops and grass land buried in mud, and the cultivation land soaked through in these early spring months, means the loss of a whole season's fodder, to say nothing of the labour expended up to that stage; and that the Sparrovale farm has successfully weathered two such calamities within six years is in itself strong evidence of the possibilities which await it when this reclamation work is completed, which, so far as can at present be seen, should be about the close of 1914.

The levee bank surrounding Sparrovale is now only sufficient to protect the farm from ordinary floods, and, in order to exclude what are known as big floods, the bank will require to be raised at least another 6 feet higher. It is now 9 feet above sea-level; and, as 13 feet is the limit of the highest flood recorded in this locality, the Trust feel that with a bank 2 feet above this the farm may be considered out of danger.

Fig. 3.—New Channel across Island Bend.

One part of the reclamation scheme which the Trust has always had in mind, and which was set down for attention as soon as Sparrovale was completed, was the opening up of a new course for the river to Lake Connewarre, across a bend which it now takes, south of Reedy Lake, forming what is known as "The Island," on the eastern boundary of the farm. Making a detour of more than half a circle, the river here takes in an area of 518 acres of land which it overflows with every freshet. This circuitous course is also largely responsible for much water being forced at such times across the opposite bank of the river into Reedy Lake, covering the 1,750 acres of grazing land contained therein. As shown in Fig. 3 the opening up of this new river-channel is now in progress. The earth as it is removed by the "Grab" crane is being trucked direct to the levee bank at the southern boundary of the farm. (See plan Fig. 1.) This cut is now some 26 feet wide, or about one-fifth of the breadth the channel will be when completed, while

the length of the cutting necessary is about 120 chains; and the water depth therein is to be 6 feet. The river at the top of this channel is some 20 feet deep, and it is anticipated that the scour will soon deepen this channel when the river is turned into it. With the completion of this cutting it is estimated that the material removed will have raised the levee bank round the whole of the Sparrovale river frontage to the height required to render the farm lands proof against flooding thereafter.

Fig. 4.—Pumping from Main Effluent Drain into Lake Connewarre.

It is also intended to construct a lock at the lower end of this channel to keep back the sea water which, through it, would otherwise have access to the river. As formerly mentioned (*Journal of Agriculture*, August, 1908) the tidal flow through Connewarre is now kept out of the river by a recently built, though somewhat temporary, breakwater at Reedy Lake, thereby superseding the original and substantial stone structure some 4 miles further up, where the railway line crosses the river, which was built in 1841. It is, therefore, essential that, in opening up this new channel for the river, provision should be made for maintaining the exclusion of the salt water; as, besides the commercial value of the river as represented in its use for stock-watering

and irrigation purposes, this fresh water is a valuable asset to the many tanners, fellmongers, and factory firms carrying on business on the river side, and, to give the sea water access to this part of the river now, would be a serious drawback to these trades.

The windmill and pumping plant, shown in Fig. 4, is situated at the end of the main effluent drain which, by means of the underground drainage system established here (and described in 1908), collects all surplus water from Sparrovale and delivers it to this point. Looking seawards from the farm the plant stands to the right of the new channel, and the water of Conewarre can be seen in the picture above the bank over which the drainage from the effluent is pumped. This combined windmill and oil-engine pumping plant can remove over 3,000 gallons of water per minute to the lake beyond.

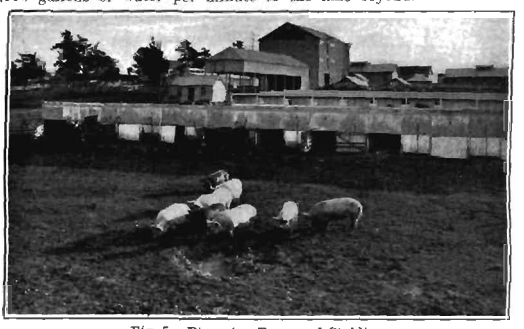


Fig. 5.—Piggeries, Barn, and Stabling.

Reference to the plans of these swamp lands (Fig. 2) will show that the levee bank, running down from the river and channel, is continued south of the pumping plant for some distance, and then it turns due west into "Hurley's" block, which is part of "The Wyllies" farm. This portion of the levee bank is known as the "Lake" bank, and besides protecting the Sparrovale lands on this side from the waters of Lake Conewarre, it also safeguards some 160 acres of "The Wyllies" which is owned by the Harbor Trust, and leased to Mr. Eric McKenzie.

In August of last year there was a flood in the river which the levee bank held safely, but, twenty-four hours after it had reached its limit opposite the farm, and when it had actually fallen some 6 inches on the bank at that point, the water in passing through Conewarre to the ocean, was met by a spring tide and heavy sea which prevented it getting away. A strong south-westerly wind caused this water to overlap the lake bank, and, before any danger was thought of from that quarter, some 100 acres of Sparrovale and the Wyllies were under water. The overflow was soon checked by the farm staff when discovered, but it

took three days' pumping to remove the water, and it is this bank which, in consequence, is being given first attention to in the disposal of the earth from the new channel, to strengthen it against any such recurrence arising from a combination of the elements.

Turning from the reclamation work towards the homestead the cultivation work is seen making satisfactory progress. Ploughing, breaking down, grading, sowing, &c., is all done by the students, and these young farmers are making good use of their opportunities here, and are turning out very creditable work in every section. As the land is brought under *cultivation, the adjoining roadways are being planted with shelter trees,* and this has been done with the main farm road well on towards the river. Those first planted out closer up to the homestead have made good progress, and already add considerably to the appearance of the farm, as well as affording both shelter and shade.

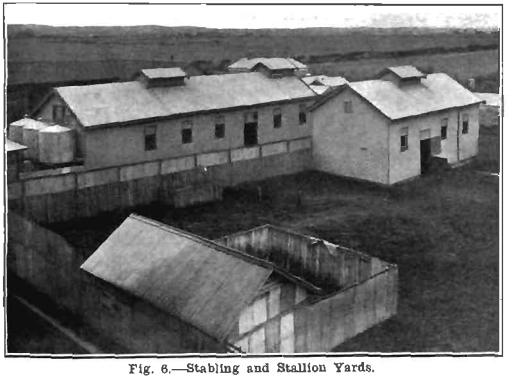


Fig. 6.—Stabling and Stallion Yards.

Some photographs of the farm steading, reproduced here, will give an idea of how it is laid out. Coming up from the lucerne paddocks along the northern boundary the bull pens and yards are the first of the buildings; next to these are the piggeries; then the stallion yards, the stabling, the smithy and implement shedding, and beyond this the garden and manager's residence lie in this order. To the left or south of the stallion yards stands the barn and silo shedding, which encloses the two 350-ton silos, and where the chaffing, grinding, and mixing of the feed is done. Looking from the door on the third floor of the silo shed, in a north-westerly direction, Geelong is seen in the distance; and closer in, and above the roof of the stabling, the engine and trucks engaged in distributing the pipes for the Geelong sewering scheme come under notice. The door on the opposite side of this building overlooks the milking shed, behind which are the calf pens and poultry runs, sur-

rounded by young trees; while through the branches of the pines the workmen's cottages may be seen, and the back of the dairy buildings is at the right of this picture. As will be observed from this and the interior views, the milking shed is a well-lighted and substantial, and yet economically built structure. It is 108 feet long by 30 feet wide, having a double row of 25 bails, with feed gangway between. It is 14 feet high over the gangway, with the shed roofing sloping from 10 feet to 7 feet from the ground. The tramway which conveys the fodder to the milking shed also carries the milk from the shed to the dairy, where it is raised by a hoist to the vat above the cooler. In Fig. 10 the feed truck is seen standing on the turntable; and this roadway also carries a line of rail over the rise past the calf pens to the feeding sheds. The next picture (Fig. 11) shows the front of the dairy, the refrigerating chamber being in the lower part of the brick building.

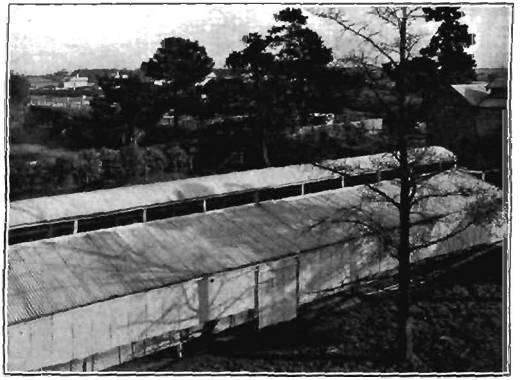


Fig. 7.—Overlooking the Milking Shed.

The milk, from the vat above the hoist, passes down over two brine coolers in succession, which allows of a 9-ft. fall for aeration; thereby both eliminating all risk of fodder odors remaining in the milk, and reducing it to the required low temperature before forwarding it from the farm. Below the dairy buildings the engine shed and upper and lower stabling are situated. Trees shelter the approach to the dairy; while at each side of the roadway buffalo grass has been planted, and has grown into a thick mat, and by this means, as far as possible, dust is prevented from being blown about near the dairy. Across a double roadway, which is also protected by trees and grass borders, and opposite to the last-mentioned line of buildings, are the students' dining-room, the employés' quarters, and implement sheds (Fig. 12), with the smithy and wheelwright's shop at the bottom of this quadrangle; and the tram line from the river runs to this latter shedding. Also surrounded by

shelter trees and small lawns, the office buildings, students' quarters, and manager's residence, are grouped between the employés' quarters and the road, which forms the western boundary of the farm. Altogether a better arranged home steading it would be hard to find.

In the description of this farm in the 1908 article reference was made to the necessity for the Trust possessing high land adjacent to that which it was proposed to reclaim to be used as a working base. The site of the Sparrovale home steading was actually the only high ground owned by the Trust at the outset, and the buildings thereon were planned so that from them the whole of Sparrovale could be worked when ultimately brought under cultivation. For similar purposes the "Lake View" and "The Wyllies" farms were purchased; as each of these is favorably situated as a base for reclaiming and working exten-

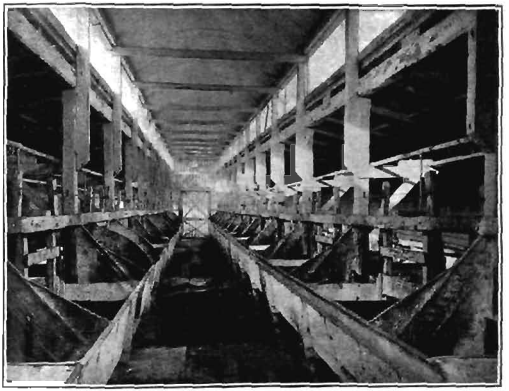


Fig. 8.—Interior of Milking Shed, looking East.

sive areas of swamp land around it. Looking at the plan of Sparrovale, as shown in Fig. 1, the homestead buildings and yards occupy blocks 1 and 1a; No. 2 is the grazing paddock for the pure herd; part of No. 3 is in oats, and the rest in barley; No. 5 was being broken up; Nos. 4, 6, and 18 are in oats; 7, 8, 9, 10, 11 are the lucerne blocks, and 14, 15, 16, 17, and 19 are in barley. The other plan (Fig. 2) shows the situation of the whole of these lower Barwon swamp lands from the old breakwater to the sea. To the west of them, and along the south runs the road to the well known holiday resorts and fishing grounds of Bream Creek and Barwon Heads, while to the north-east lies the Queenscliffe-road.

Dairying is the most profitable branch of agriculture that such a large area of irrigable land within 50 miles of Melbourne could be used for, more especially as the situation and train service allow of the fresh

milk being forwarded to the city twice daily. During the autumn and winter months the city retailers frequently have difficulty in obtaining a full supply of milk; and those who can uphold their daily yield from the herd within reasonable range of a stated average quantity during these months find no difficulty in placing their milk at full market rates the year through. To keep up a regular supply through these colder months necessitates extra care being given to the cows, and the Trust has made full provision for the welfare of the stock at all seasons. The cultivation land will produce the fodder; the silos and barn allow for its conservation; there is a good water supply—pumped from the Barwon River and piped to troughs all through the farm; and there are feeding sheds and shelter belts for the further comfort of the cattle. The one other factor to successful dairying lies in having good cows, and here also the management of the farm has been systematic.

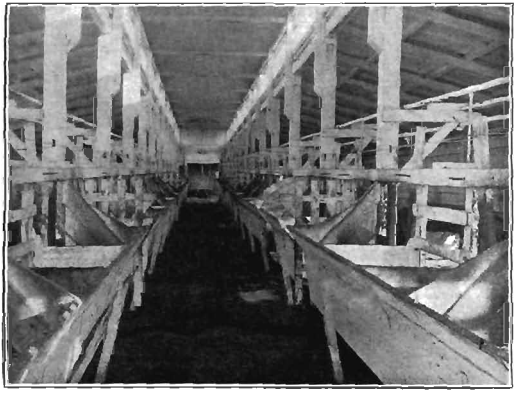


Fig. 9.—Interior of Milking Shed, looking West.

It was mentioned in the 1908 report that pedigreed Ayrshire bulls selected from good milking strains were in use, and that a few high-class heifers of this breed had also been purchased with the intention of later on building up a pure herd. The general herd was bought in lines of springing heifers as procurable; and a system of selecting the best from these was initiated. It was soon apparent that the number of really profitable cows obtainable by purchasing in the open market was but a very small percentage of the whole; and, instead of increasing the herd, it was gradually reduced in number by culling, and it is now being kept up to its present numerical standard solely by heifers bred on the farm.

There are many obstacles to the speedy establishment of a large herd of profitable milking stock even by breeding, and especially where

the milk, largely required for a regular trade supply, limits the amount available for calf raising. At least one year will pass while the quality of each cow is being determined, and some four or five years will elapse before it can be ascertained which of the bulls are throwing the best milking stock. There is then the possibility of some misfortune causing the loss of a very valuable bull, perhaps even before his quality has been discovered and made best use of; and, as every dairyman knows only too well, if a cow meets with an accident it is more often a good animal that suffers than one which could better be spared. In some cases everything may go smoothly, and the herd may be quickly improved in quality, while the owner takes all the credit to himself for his good judgment and knowledge of stock, but more often the grading up of a herd is a work beset with many difficulties, and productive of many disappointments.

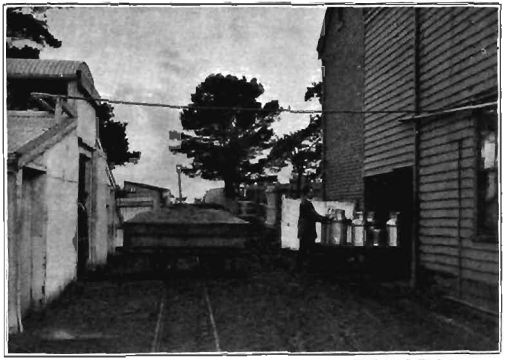


Fig. 10.—Tramway to Feeding Shed, Milking Shed, and Dairy.

In the establishment of the Sparrovale herd the manager, Mr. Baird, has by consistent attention to detail achieved most satisfactory results to date. From heifers, the breeding and milking qualities of which were unknown, he has, by systematic culling and breeding, built up as creditable a herd of crossbred cows of this number as I have seen; and, with the breeding and milk-producing capabilities of all the stock now well under observation, each year's work must, in the future, show still further progress. The herd is divided into three sections. At the date of inspection the No. 1 herd contained seventy-four cows and heifers in the flush; the No. 2 herd of forty-nine cows is composed of those that are giving about 5 or 6 quarts of milk daily; while the twelve cows that were drying off are known as the No. 3 herd. The milking time is arranged so that the flush cows are in the shed, as nearly as possible, at the same hour in the mornings and evenings; the others coming in before and after them at alternate milkings. The keeping of

the herd thus divided according to the amount of milk they are producing has also the advantage of allowing of certain variations in the feeding being practised on this basis. The cows have all a herd number; and from this the age, breeding, or date of purchase, periods of lactation, and yield for any year in milk and butter fat of all the milking stock can be given at a moment's notice by the card system of cataloguing; and they show some very interesting results.

Some spring and autumn seasons are more favorable for milk production than others; and, with dairymen, these are known as good milk seasons, or the reverse. When these months are characterized by mild weather the milk yield will be the best the cows are capable of. The grass grows quicker and lasts longer; and, no matter how well cows are hand fed, if they have access to grazing as well, their milk production will be

Fig. 11.—**Dairy Buildings and Stabling, lower down.**

largely controlled by the weather. With the Sparrovale herd the dry autumn of 1912 was responsible for a reduction in that year's total gallon yield from that of 1911 of 26 gallons per cow. Again, the splendid autumn of the present year has brought the average of the first six months up to 34 gallons per cow more than that of the same period in 1912; and this with an average of two cows less per week in milk during these months of this year. In 1910 the average for the herd was a little over 400 gallons, but during that year fifty-four Sparrovale-bred heifers came into profit, and their influence is shown in the 1911 returns. In that year the herd was reduced in number by fifty-five head, but the total weekly loss in milk amounted to barely 23 gallons, while the average yearly return was raised from 400.9 gallons to 519.2 gallons per cow. Each of the farm bred heifers, therefore, was about equal to two of the cows that were culled out that year. The dry autumn of the

next year, 1912, was responsible for a reduction in the average yield by 26 gallons per cow; but, as showing how such seasonal variations affect the general milk production, and consequently raise the selling price, it may be mentioned that the nett returns from the milk sold during this drier year of 1912 were £1 1s. 10d. per cow better than those of 1911.

The average yield of 519 gallons for 176 cows during 1911 is a very satisfactory one to have been *reached at this stage of the farm's development*, and this was the total number of cows on the farm during that year. The average number milked weekly throughout that year was 139; but, as all have to be fed and handled, and all either have or should have taken part in the production of that total of 91,425 gallons, it is the total number of cows on the farm which must be taken into consideration when making the average gallon estimate. Among a large herd of such comparatively recent formation as this is, there is certain to be still much variation in the milking capacity of the individual cows; and the following list, showing the yields that have been obtained from the cows now in the Sparrovale herd, is another example to support the many that have been previously published in this *Journal* in demonstrating the benefits to be derived from herd testing:—

One cow has given 1,102 gallons in a calendar year.
One cow has given 990 gallons in a calendar year.
Five cows gave 850 gallons and over in a calendar year.
Nine cows gave 800 gallons and over in a calendar year.
Thirteen cows gave 750 gallons and over in a calendar year.
Thirteen cows gave 700 gallons and over in a calendar year.
Eighteen cows gave 650 gallons and over in a calendar year.
Nineteen cows gave 600 gallons and over in a calendar year.
Twenty-three cows gave 550 gallons and over in a calendar year.
Twelve cows gave 500 gallons and over in a calendar year.
Eight cows gave 450 gallons and over in a calendar year.
Fifteen cows gave 400 gallons and over in a calendar year.
Four cows gave 350 gallons and over in a calendar year.
One cow gave 300 gallons and over in a calendar year.
Four cows gave 266 gallons and over in a calendar year.

The balance of the herd are heifers which had been in profit from two to twenty-nine weeks, and these had averaged 15½ gallons of milk each up to the end of December, 1912.

The cow at the top of this list—herd No. 380—is a crossbred, dark-red with white back stripe and hind shanks, and is shown in the centre of the group in Fig. 13. She has the sturdy, well-filled frame which characterizes the good doer; and on her appearance alone she would bring a high price in the metropolitan dairy cattle market. Her average yield for the past three years has been 842 gallons; which, at 10d. per gallon, shows a gross return of £35 per year.

Among the heifers, two that came in at the beginning of the year (and whose records are included in the list of cows given) continued in profit the whole twelve months, giving 780 gallons, and 629 gallons for the year. The three longest in milk of those mentioned at the bottom of the list have given respectively 457 gallons in twenty-nine weeks, 467 gallons in twenty-seven weeks, and 493 gallons in twenty-seven weeks. Looking through the returns for the early part of 1913 it was seen that these three heifers completed their first lactation period with an average of 623 gallons, and there appeared every prospect

of more than half the heifers now in the herd clearing 600 gallons on their first milking.

In Fig. 14 the pure bred cows are shown. As mentioned, all of these are Glen Elgin bred Ayrshires; and the records of several of them place them well in the front rank of the Sparrovale milking stock. These cows are now working under the Government herd-testing scheme which is being carried through by this Department in connexion with all herd-book cattle, and their official records bid fair to justify the breeder's claim that they are "dairy" bred as well as pure bred.

The Ayrshire bulls that have been used on Sparrovale were purchased from the Glen Elgin, Gowrie Park, and Glen Arthur studs, and the bull "Statesman" (now dead), from the last named herd, has left some heifers which give special promise as milkers.

The pure bred heifers (Fig. 15) that have been raised from the Glen Elgin cows are a nice lot of typical Ayrshires of fine dairy quality, and

Fig. 12.—Implement Shed and Employes' Quarters.

their future work is looked forward to with interest. Recently another young bull has been purchased from Mr. W. P. Brisbane's Gowrie Park herd, sired by the champion Lessnessock, from Ida of Gowrie, a cow of exceptional dairy quality as regards both yield and test.

The supplying of milk to the metropolis has practically eliminated the pig-raising and fattening, which, in the farm's early stage, was a prominent branch of the work. There is now almost no separated milk to spare for this, and only two pens of breeding pigs are kept; and these are just about the number that can be fed on waste vegetables and kitchen refuse; so that their keep is no actual cost to the farm. One pen is of Berkshires and the other of Middle Yorkshires; the former containing a Stewart (Trafalgar) boar and five sows of R. Madden's strain; and the latter, a Jenkin's (Korrumburra) boar with five sows of G. Madden's breeding. They are a nice shapely lot, of quality well above the average, and their progeny find ready sale in the district.

The regular disposal of the fresh milk also necessitates that calf-raising must be limited to the lowest number possible; while, on the other hand, experience had demonstrated that the improvement of the herd, or even its maintenance at its present standard, could only be attained through *stock* bred on the farm. In order, therefore, that calf-rearing should be made as *profitable as possible it becomes* imperative that only the progeny of the best cows be raised, and it is then that the value of keeping milking records —such as Sparrovale can show—becomes fully recognised, for the trouble of collecting them is being repaid many times over in each season's heifers.

The useful term of a dairy-cow's life varies considerably under different conditions, but eight years would *probably be a reasonable average to allow* when estimating what provision must be made for replacing them. Many will continue to milk *profitably* for several years over this, and, with an exceptionally good animal, it would not be wise to dispose of her as long as she would breed; but, to allow for all contingencies, it is advisable that, at least, one heifer be raised each year *to every seven cows in the herd.*

There are sixty cows in this Sparrovale herd that have records of over 650 gallons for the year; or seventy-nine that have cleared the 600-gallon mark. All milk from a cow over 300 gallons can be set down as profit; for, as a rule, it will take *300* gallons to pay her owner for feeding and milking her. On this basis a cow giving 600 gallons is worth three that give only *400 gallons per year*; and, as a mother of a heifer for future use in the herd, her value is comparatively even much higher than this. What *then is the* actual value of a well bred heifer from a cow capable of giving over 650 gallons per year? Any farmer *supplying*

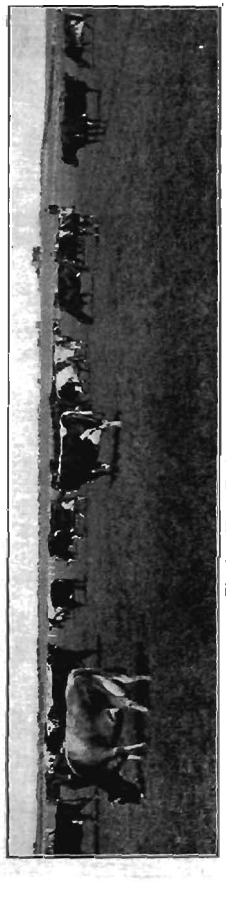


Fig. 13.—No. 1 Herd Grazing down Oat Crop.

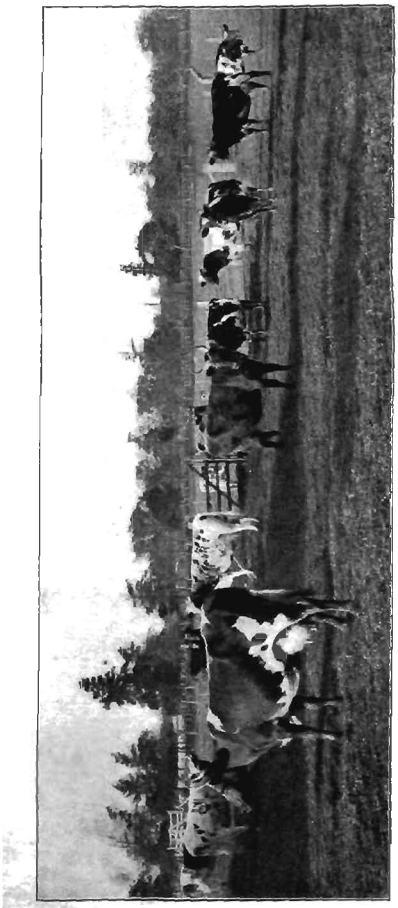


Fig. 14.—Pure-bred Ayrshire Cows.

milk to the Melbourne retail trade would be glad to buy them as springers at £10 a head, or even at a fair advance on this when in profit; while the actual cost of raising and calving them would be covered by at most £7. This would allow of £3 worth of new milk being given to each calf; and every care being taken of it after weaning; and, where the building up of a profitable herd is in progress, calf-raising from 600-gallon cows becomes extremely profitable work even at this high-rearing estimate. It does not require much experience in buying dairy stock to show that heifers of this class are seldom to be met with, and that the only way to get good cows is to breed them; yet there are hundreds of farmers dairying with cattle that do not profit them more than £2 per head each year, and who say they can see nothing in herd-testing to warrant the work. It is the absence of systematic herd-testing and calf-raising that makes dairying show so little profit on many farms.

The whole of Sparrovale impresses the visitor with the thoroughness with which the dairy-farming work is being carried out. The cultivation paddocks, with the crops flourishing there, form the basis of a heavy milk yield by supplying the wants of the stock at all seasons. The herd is in splendid condition throughout, and is being improved in quality yearly, and the pure stock stud is now well enough established to ensure that there will be no need to go off the farm for breeding stock in the future. The market for the milk is a constant one; for its quality, the care taken in handling it, and the reliability of the supply, ensure a satisfactory sale for it at all seasons.

There is no doubt that the Geelong Harbor Trust has worked Sparrovale on sound lines, and by it the larger project of reclamation has been more than justified. Land that, even if cleared, could at best be valued at not more than a 4s. per acre grazing rental, has, by the construction of a levee bank and draining, been proved capable of producing a return so far in advance of this that it is almost beyond com-

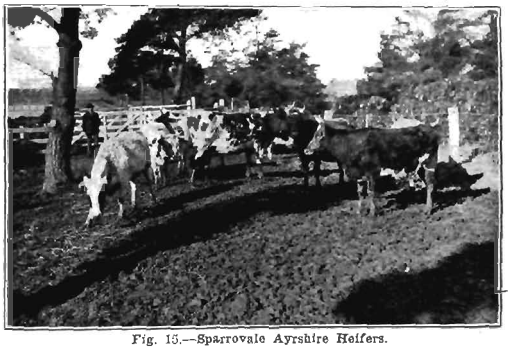


Fig. 15.—Sparrovale Ayrshire Heifers.

parison. There are several thousand acres adjacent to Sparrovale which are capable of being similarly improved, every acre of which represents so much increased prosperity possible to the district. More land under cultivation means more food produced, and more money in circulation; and, so far, there appears no obstacle to the possibility of the whole of Reedy Lake, Upper Conewarre, and the South Barwon commons, representing a total of over 3,000 acres, being brought under immediate reclamation, and raised to a standard of productiveness equal to the land on Sparrovale. In 1908 there was held to be, perhaps, more than a semblance of doubt as to the practicability of this scheme, but that stage is passed. Sparrovale has proved the Geelong Harbor Trust to have ventured successfully, or to have judged wisely and acted deliberately, according to whatever aspect the scheme is considered from. In any case, the result has been as forecasted in my previous report, and the financial possibilities of the project have been fully demonstrated.

NOTE ON WHEATS COMPETING FOR PRIZES.

Royal Agricultural Show, Melbourne, 1913.

By A. E. V. Richardson, M.A., B.Sc., Agricultural Superintendent.

At the September Royal Show an important change was made in the allocation of the prizes for farmers' wheat competitions by the Royal Agricultural Society.

Prizes were offered for four distinct classes of wheats, namely, High Strength Red, High Strength White, Low Strength White, and Macaroni. These four classes comprise practically all varieties in general cultivation in the State. The classification of the sections in accordance with the above scheme served to direct attention to the importance of milling and baking qualities of wheat.

Under existing conditions of marketing wheat in this State, very little encouragement is given to farmers to produce prime samples, since practically the whole harvest is sold on a fair average quality basis—a system of marketing which makes for mediocrity in the quality of the product. Much improvement would naturally follow if the existing mode of marketing were replaced by a system of selling wheat by reference to permanent standards of quality. Even less encouragement is given to the farmer to grow varieties of high milling and baking excellence for many of these varieties do not, under ordinary conditions of culture, yield as well as the commoner varieties. Certainly, there are limited areas in the wheat districts of Australia where the high quality wheats are the good yielders, and in such instances these are profitable varieties to grow. In certain cases, too, millers are willing to pay a premium for wheats like Bobs, Comeback, and Cedar, and this premium has amounted to as much as 3d. to 6d. per bushel.

JUDGING THE WHEATS.

In judging the wheats entered for competition, consideration was given, not only to the general appearance and weight of the samples, but also to the milling and baking qualities of each variety. These latter qualities were determined by milling each variety in the departmental flour mill, and baking the flour in an electric oven. Only in this manner was it possible to separate, with certainty, samples which were very similar in general appearance.

In the four classes there were twenty-four entries. Competition was keenest in the Low Strength White Class, in which sixteen entries were received. The most popular varieties submitted in this section were Yandilla King, Dart's Imperial, and Purple Straw.

In awarding the prizes, points were given for the following:—Weight per bushel 15, general appearance and condition of sample 15, ease of milling and flour yield 10, colour of flour 10, strength of flour 20, percentage of gluten 12, quality and texture of the loaf 18 points—total, 100 points.

The weight per bushel was obtained by filling a standard bushel measure with the grain under standard conditions. The colour of the flour was determined by the well-known Pekar's Test. The strength of the flour was estimated by determining the water absorption capacity of

the flour, and the percentage of gluten by the well-known *washing* process, confirmed by a Kjeldahl estimation for nitrogen. The quality of the bread was gauged by taking into consideration the weight, volume and pile of the loaf. The working methods for securing this data have already been discussed in this *Journal*.*

LOW STRENGTH WHITE CLASS.

In the Low Strength White Class the competition was very keen. The first prize was awarded to Entry 4642—a fine, bright sample of *Dart's Imperial Wheat, grown by C. F. Schultz and Sons, Dimboola, on* fallowed black soil. The seed used was 1 bushel per acre, superphosphate 45 lbs. per acre, and the yield 30 bushels per acre. The weight per measured bushel—68.6 lbs., was exceedingly high, the general appearance and condition of the sample very good, and the strength, *gluten content of flour, and the weight and volume of bread very satis*factory for a wheat of its class. The total points awarded were 86½.

The second prize was awarded to Entry No. 4635, a bright sample of Dart's Imperial, grown by P. Moller, Dimboola, on chocolate soil. The seed (1 bushel per acre) was sown with 50 lbs. of superphosphate, and the yield was 30 bushels per acre. The weight per bushel was 67.6 lbs., and the colour of the flour excellent. The points awarded were 84½.

The *third prize was awarded to Entry 4641—King's Early, grown* by Johann B. Schultz at Arkona. The points awarded were 83½.

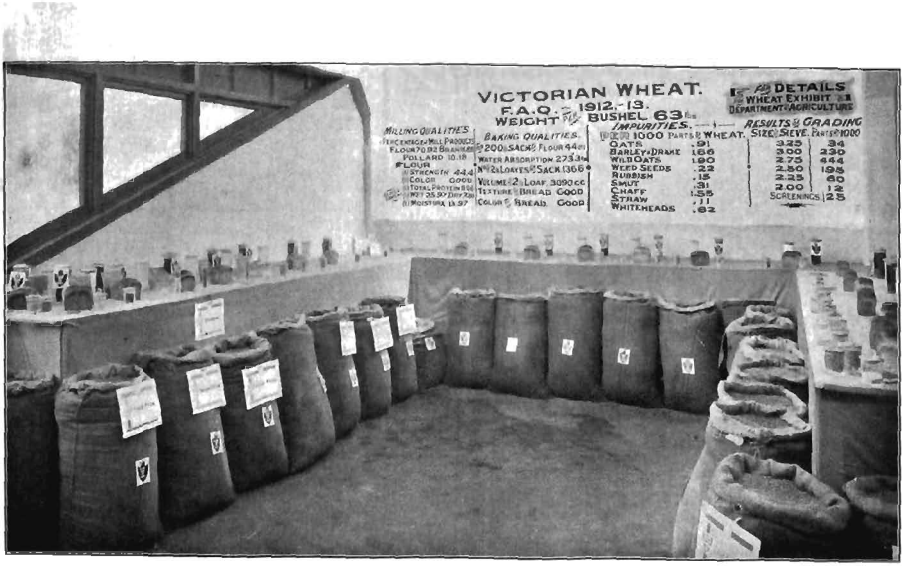
Table I. gives a synopsis of points awarded to each of the wheats submitted for competition. In the brackets under the headings, "Bushel Weight," "Strength," and "Gluten Content," the actual figures obtained have been included.

TABLE I.

LOW STRENGTH WHITE WHEATS.

Entry Number.	Bushel Weight.	General Appearance.	Ease of Milling and Flour Yield.	Colour of Flour.	Strength of Flour.	Gluten per Cent.	Weight, Volume, and Texture of Loaf.	Total
Maximum Points ..	15	15	10	10	20	12	18	100
4642 ..	(68.6) 15	13	7	7	(47.2) 17	(8.38) 10½	17	86½
4635 ..	(67.6) 13	13	7½	10	(44.0) 14	(8.52) 10½	16½	84½
4641 ..	(68.7):15	12	6½	9	(45.0) 15	(7.84) 10	16	83½
4633 ..	(68.1) 14	10	9	5	(44.0) 14	(8.58) 10½	16½	83
4634 ..	(66.6) 11	12	10	9½	(45.4) 15½	(7.35) 9½	14½	82
4632 ..	(68.6) 11	10	8½	9	(45.4) 15½	(9.04) 11	15	80
4627 ..	(67.4) 13	11	6	9	(42.8) 13	(10.09) 12	16	80
4629 ..	(66.2) 10½	11	7	9	(45.0) 15	(9.51) 11½	15½	79½
4640 ..	(66.6) 11	11½	6½	10	(44.80) 15	(7.70) 9½	15½	70
4630 ..	(66.1) 10½	10	7	9	(45.40) 15½	(7.82) 10	16½	78½
4628 ..	(66.7) 11	10	7½	9	(44.20) 14	(9.36) 11½	15½	78½
4631 ..	(66.4) 11	9½	8	5	(44.20) 14	(8.26) 10½	16	74
4636 ..	(66.0) 10½	6	6	9	(42.0) 12	(6.92) 9	17	69½
4639 ..	(65.5) 9½	8½	9½	5	(44.20) 14	(5.91) 8	13	67½
4638 ..	(64.4) 7½	9½	8½	8½	(41.40) 11½	(6.54) 8½	15	67
4637 ..	(64.6) 7½	8	7	5	(41.0) 11	(5.91) 8	15	61½

* *Journal of Agriculture of Victoria*, October, 1913, pp. 625–629.



FARMERS' WHEAT COMPETITIONS, ROYAL AGRICULTURAL SHOW, MELBOURNE.

It may be said by way of explanation of this table, that the commercial value of a flour depends on its colour, strength, and gluten content, and that the value of a wheat for milling is determined by its bushel weight, its general condition, and also by the amount of high-class flour it will produce. Consequently, in making comparisons of the value of wheats, these factors have been taken into account.

The colour of the flour is very important to the miller, and his constant aim is to produce a flour which will yield, on baking, a loaf of snow-white colour. The consuming public have got into the habit of judging the quality of bread by its colour. That is the reason why dark-coloured bread, such as is made from certain macaroni wheats, is objectionable, although, of course it does not follow that the dark bread is less nutritious than white bread. One of the reasons why Australian wheat is so highly prized on the English market is that it yields, on milling, a flour of excellent colour, and is, therefore, of the greatest value in blending with the darker, but stronger and more glutenous, foreign wheats.

By the "Strength of the flour" is meant the amount of well-piled bread of suitable crumb and texture obtained per sack of flour. There are difficulties in measuring this, and, in practice, the strength is usually determined by the number of quarts of water absorbed by a 200-lb. sack of flour, in order to make a dough of a consistency fit for baking. Thus, a flour with a strength of 50 means that a 200-lb. sack will absorb 50 quarts of water in the process of doughing.

The gluten is, of course, one of the most important constituents of the flour. The nutritive value of the bread largely depends on the amount of gluten present. Moreover, it has important influence on the baking quality of the bread. There must be a sufficient quantity of gluten present in the flour to retain the gas produced during fermentation, and the quality of the gluten must be such as to confer elasticity on the dough. The gluten content of the exhibits varied very widely, and the amount present was generally low. The flour of each sample was made into dough and baked, and the volume, weight, texture, and quality of the loaves were obtained.

HIGH STRENGTH RED.

TABLE II.

HIGH STRENGTH RED WHEAT.

Entry Number.	Bushel Weight.	General Appearance.	Ease of Milling and Flour Yield.	Colour of Flour.	Strength of Flour.	Gluten per Cent.	Weight, Volume, and Texture of Loaf.	Total
Maximum Points ..	15	15	10	10	20	12	18	100
4622 ..	(68.25) 14	15	8	7	(57.60) 20	(9.71) 11½	17	92½
4623 ..	(66.4) 10	10	9	5	(43.0) 8	(9.78) 11½	14	67½

In the *High Strength Red Class* there were only two entries, and one of these should properly be included in another section—Low Strength Red. The prize was awarded to Entry No. 4622, with a magnificent

sample of hard red wheat—Cedar—of exceptional strength and milling quality. The sample was extremely uniform, of high bushel weight (69.5 lbs.), very attractive in appearance, and gave a loaf of good pile and texture. The winning wheat was grown by Mr. W. H. Scholz, of Gilgandra, New South Wales, on red loamy soil. No manure was sown with the seed, which was sown at the rate of 30 lbs. per acre. The yield was 25 bushels per acre.

HIGH STRENGTH WHITE.

Three entries were received for this section, and though the varieties appeared to be similar, considerable differences were observable in the behaviour of the samples in the mill and in the oven.

The First Prize was awarded to Entry No. 4625, with a total of 90 points. This sample weighed extremely well (68.6 lbs. per bushel), and gave a good yield of strong flour of excellent baking quality. The variety was *Comeback*, grown by Mr. J. B. Schultz, at Arkona, on red loamy soil, and gave the fine yield of 35 bushels per acre, on soil manured with 50 lbs. of superphosphate per acre.

The Second Prize was awarded to a sample of Comeback grown by *C. F. Schultz and Sons, of Dimboola.* This wheat also gave a good yield of strong flour. It was raised on fallowed black soil, and gave a yield of 37 bushels per acre, with 45 lbs. of superphosphate.

TABLE III.

HIGH STRENGTH WHITE WHEATS.

Entry Number.	Bushel Weight.	General Appearance.	Ease of Milling and Flour Yield.	Colour of Flour.	Strength of Flour.	Gluten per Cent.	Weight, Volume, and Texture of Loaf.	Total
Maximum Points ..	15	15	10	10	20	12	18	100
4625 ..	(69.1) 15	13	10	9	(53.0) 16	(7.86) 10	17	90
4626 ..	(68.0) 13	13	10	8½	(54.0) 17	(8.76) 10½	14	86
4624 ..	(66.6) 11½	10	8	5	(53.0) 16	(8.06) 8	15	73½

MACARONI WHEAT.

Three entries were received in this class, but the standard of quality was not high. Entry No. 4620 lost points for containing an admixture of bread wheat. The amount of bread wheat present in this sample accounts for its comparatively high baking qualities. The prize was awarded to Entry No. 4619—a sample of "Velvet Don," grown by Mr. W. H. Scholz, Gilgandra, New South Wales. Its chief characteristics were comparatively high bushel weight, fine appearance, high flour yield, and flour strength. This wheat was grown on red, loamy soil, and yielded at the rate of 24 bushels per acre without any manure. Seed used per acre, 30 lbs.

The Second Prize was awarded to Entry No. 4621, "Indian Runner," grown by W. Clark, Angle Vale, South Australia. The wheat and flour of this variety gave a high protein content.

TABLE IV.

MACARONI WHEATS.

Entry Number.	Bushel Weight.	General Appearance.	Ease of Milling and Flour Yield.	Colour of Flour.	Strength of Flour.	Gluten per Cent.	Weight, Volume, and Texture of Loaf.	Total
Maximum Points ..	15	15	10	10	20	12	18	100
4619 ..	(66.6) 13½	13	10	5	(47.10) 17	(10.06) 7	13	78½
4621 ..	(66.1) 13	11	7½	5	(47.20) 17	(12.02) 10	14½	78
4620 ..	(66.25) 13½	10	7½	6	(46.0) 15	(10.47) 7	16	74½

CHAMPION PRIZE OF AUSTRALIA.

The Champion Prize of Australia was awarded to Mr. W. H. Scholz's sample of Cedar, which won in the High Strength Red Class. This was easily the best wheat exhibited in all sections. Its high bushel weight, bright, extremely uniform, attractive appearance, and its exceptional milling quality, combine to make it stand out prominently from all other varieties shown.

TABLE V.

CHAMPION PRIZE OF AUSTRALIA.

Entry Number	Bushel Weight.	General Appearance.	Ease of Milling and Flour Yield.	Colour of Flour.	Strength of Flour.	Gluten per Cent.	Weight, Volume, and Texture of Loaf.	Total
Maximum Points ..	15	15	10	10	20	12	18	100
4622 ..	(68.25) 14	15	8	7	(57.60) 20	(9.71) 11½	17	92½

An interesting contrast is afforded by comparing the results obtained from the Champion sample with those obtained by averaging the sixteen low strength white wheats entered for competition, and with the Victorian F.A.Q. sample for 1912-13. Table VI. shows this comparison:—

TABLE VI.

Variety.	Bushel Weight.	Yield of Flour.	Strength of Flour.	Protein Content of Wheat.	Gluten Content of Flour.	Percentage of Weeds, Smut, Rubbish, &c.
	lbs.	%	Quarts per 200lb. sack.	%	%	%
Cedar	68.8	73.03	57.6	11.43	9.71	Nil
Average of 16 samples of low strength wheats	66.7	71.08	44.1	10.39	7.98	Undetermined
Victorian F.A.Q. sample 1912–13	63.0	70.92	44·8	10.68	7.81	.74

It will be observed that, in yield of flour, strength of flour, protein content of wheat, and gluten content of flour, the average of the sixteen samples of low strength white agree closely with that of the F.A.Q. sample. The superiority of Cedar stands our prominently.

THE FRUIT TRADE OF VICTORIA.

ITS PRESENT STATUS FROM A COMMERCIAL STAND-POINT.

PART X.—PACKING—*continued.*

(*Continued from page* 563.)

By E. Mocking, Senior Fruit Inspector.

A PLEA FOR THE INTRODUCTION OF THE DIAGONAL NUMERICAL SYSTEM OF PACKING APPLES—*continued.*

When the case has been properly packed, the top should show a bulge of about 1½ inches. The top is fastened by nailing a

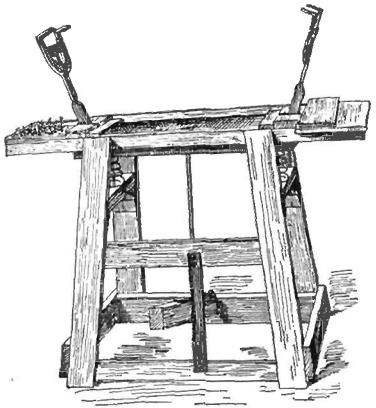


PLATE IV. (*a*).

Box press used in America.

cleat at one end and then pressing the top to the other end of the case where it is fastened by another cleat. The pressure thus brought upon the fruit should reduce the bulge on top by one-half, and, of course, cause a bulge of corresponding dimensions on the bottom of the case. The bulge in a properly packed case should thus be about ¾ of an inch both top and bottom. To obtain the bulge the case must, of course, be packed on a stand or table constructed with a space sufficiently large to permit the bulging

of the bottom when the pressure used in fastening the top is applied. For fastening the case, special box presses are used in America. One type of these is illustrated in Plate IV., and is taken from "Bulletin No. 19." Dairy and Cold Storage Commissioner Series, Ottawa, Canada. This press may be constructed of hardwood as follows:—Legs, four pieces, 2 inches by 4 inches, 2½ feet long. Bed pieces, 4 feet long by 12 inches wide. The cross cleats are arranged to allow the case to project ¾ of an inch at each end. The clamps, which can be made by a blacksmith, should pass through the lower plank, to which they are attached by an iron pin running through the clamp and plank. The pressure is brought upon the top of the case by the foot lever, and the springs serve to release the case after nailing has been completed.

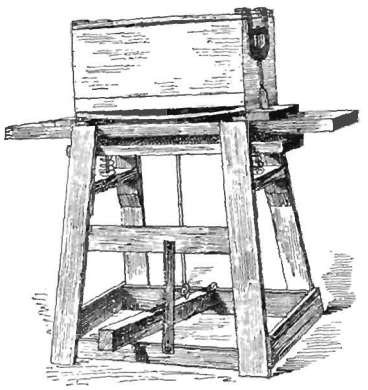


PLATE IV. (*b*).

Box press showing box in position.

The cleats for fastening the tops of the case should be soaked in water before being nailed, as this allows the nails to be driven easily and prevents splitting of the cleats. The type of nail recommended is the 2½-inch "Special Wire Nail," which can be obtained wholesale for 22s. 6d. per cwt. The notches in this nail prevent the tops and bottoms from bursting away during transportation. This nail costs 1s. 6d. per cwt. more than the ordinary nail, but the advantage which its use gives in forming a secure package, justifies the slight extra expense. Four of these nails are sufficient to secure each cleat.

THE IMPORTANCE OF THE BULGE IN PROPERLY PACKED CASES.

In the United States of America and Canada it is considered of the utmost importance that the bulge should approximate the dimensions

mentioned above, as this indicates that the fruits have been correctly graded, and have been packed with sufficient tightness to minimize jolting during transportation. For example, if the bulge is below the correct size it indicates that the fruits selected have been of a smaller grade than should have been chosen in conformity with the pack, or that the case has been incorrectly packed in other respects. If the bulge is excessive, it indicates either that the fruits have been selected in a grade which is too large for the pack aimed at, or that they have been incorrectly placed either on their sides or ends, as the case may be. The chief advantage which is claimed for the bulge is that it acts as a cushion against jolts, and also that, on account of the thinness of the wood used for the tops and bottoms, the shrinkage of the wood takes place with the shrinkage of the fruits. The pressure is thus kept on the fruits enabling the tightness of the pack to be maintained much better than would be done if rigid wood were used for the tops and bottoms.

In packing to obtain the correct bulge, the expert packer packs the apples in such manner that the bulge results as a natural consequence,

Fig. (a). PLATE V. Fig. (b).

Packed cases showing (a) correct bulge and (b) excessive bulge.

as the sides and ends of the case are too rigid to permit any "give." It therefore follows that when the apples are packed with the necessary tightness, the lateral pressure which is brought to bear is transferred to the top and bottom of the case. The spaces at the ends of the case also being larger than the spaces in the middle, cause the apples in the middle rows to bulge in a vertical direction.

The illustrations in Plate V. show cases with (*a*) the correct bulge, and (*b*) an excessive bulge in packed Canadian cases. In stowing the cases for transportation purposes, they are, of course, stacked on their sides or ends. The tops and bottoms have therefore to carry no weight. For convenience in packing, the Canadian case, being wider and shallower than the Australian case, affords the packer much greater accessibility to his work. In the Canadian case the pack is tightened by gradual pressure, whereunder bruising of the fruit is avoided, whereas in the Australian case the case is "dumped" to secure the necessary tightness, thus bruising, in most instances, the top and bottom tiers.

The following schedule shows the different packs used for packing fruit in the Canadian case under the numerical system.

SCHEDULE OF DIFFERENT "PACKS" USED FOR PACKING FRUIT IN THE UNITED STATES UNDER THE NUMERICAL SYSTEM.

Approx. Diameter of Apple.	2 × 2 "Packs"					4 tiers to case. Apples to Case.
3¼ inches	3 × 4 = 12	rows of	3 + 2	rows of	4 = 6 + 8 = 14 × 4 =	56
3¼ "	4 × 4 = 12	"	4 + 2	"	4 = 8 + 8 = 16 × 4 =	64
3½ "	4 × 5 = 12	"	4 + 2	"	5 = 8 + 10 = 18 × 4 =	72 } 3½ tier
3¾ "	5 × 5 = 12	"	5 + 2	"	5 = 10 + 10 = 20 × 4 =	80
3¾ "	5 × 6 = 12	"	5 + 2	"	6 = 10 + 12 = 22 × 4 =	88 }
3¾ "	6 × 6 = 12	"	6 + 2	"	6 = 12 + 12 = 24 × 4 =	96
3¾ "	6 × 7 = 12	"	6 + 2	"	7 = 12 + 14 = 26 × 4 =	104 } 4 tier
3¾ "	7 × 7 = 12	"	7 + 2	"	7 = 14 + 14 = 28 × 4 =	112 }
3 "	7 × 8 = 12	"	7 + 2	"	8 = 14 + 16 = 30 × 4 =	120
	3 × 2 "Packs"					5 tiers to case.
3 inches	4 × 5 = 12	rows of	4 + 3	rows of	5 = 8 + 15 = 23 × 5 =	113 } (*)
2¾ "	5 × 5 = 12	"	5 + 3	"	5 = 10 + 15 = 25 × 5 =	125 } 4 tier
2¾ "	5 × 6 = 12	"	5 + 3	"	6 = 10 + 18 = 28 × 5 =	138 } (*)
2¾ "	6 × 6 = 12	"	6 + 3	"	6 = 12 + 18 = 30 × 5 =	150 } 4½ tier
2¾ "	6 × 7 = 12	"	6 + 3	"	7 = 12 + 21 = 33 × 5 =	163 } (*)
2½ "	7 × 7 = 12	"	7 + 3	"	7 = 14 + 21 = 35 × 5 =	175 }
2½ "	7 × 8 = 12	"	7 + 3	"	8 = 14 + 24 = 38 × 5 =	188 } (*)
2½ "	8 × 8 = 12	"	8 + 3	"	8 = 16 + 24 = 40 × 5 =	200 } 5 tier
2½ "	8 × 9 = 12	"	8 + 3	"	9 = 16 + 27 = 43 × 5 =	213 } (*)
2½ "	9 × 9 = 12	"	9 + 3	"	9 = 18 + 27 = 45 × 5 =	225 }

NOTE.—The packs marked thus (*) do not work out with mathematical accuracy. The reason of this is that, in order to obtain the proper pack for these packs, the same number of apples cannot be placed in each tier. Each alternate tier, therefore, contains one apple less than the adjacent tier. For instance, in the 7 × 8, 3 × 2 pack, the first tier would contain three rows of 8, plus 2 rows of 7 = 24, plus 14—a total of 38 apples to the tier. The second tier would contain 3 rows of 7, plus 2 rows of 8 = 21, plus 16—a total of 37 apples to the tier, and so on throughout the case. The first, third, and fifth tiers would, therefore, contain 38 apples each, and the second and fourth tiers would contain 37 apples each. As the two latter mentioned tiers would contain two apples less than the first, third, and fifth tiers, we would get a total of 188 apples to the case, instead of 190, which should be the number if all the tiers contained an equal quantity of apples. Plate 3 will serve to illustrate how the apples are arranged in this pack, and will also serve as an index to the manner in which all packs containing alternating numbered tiers are adjusted.

(To be continued.)

VERY large mangels may contain only 6 per cent. of dry matter, while in quite small roots the dry matter may amount to 15 per cent. Potatoes do not deteriorate in quality as they increase in size.

A GOOD dairy fodder contains in small quantity certain stimulating substances valuable for their physiological effects rather than as supplying nourishment or energy. Non-protein nitrogen compounds, salt, and certain aromatics come under this head. Their action is obscure.

PERSEVERANCE is the bridge by which difficulty is overcome.

IN pasturing lucerne it must not be overstocked, as the animals will injure the crowns, and the plants will die.

STATISTICS.

Rainfall in Victoria.—Third Quarter, 1913.

Table showing average amount of rainfall in each of the 26 Basins or Regions constituting the State of Victoria for each month and the quarter, with the corresponding monthly and quarterly averages for each Basin, deduced from all available records to date.

Basin or District.	July.		August.		September.		Quarter.	
	Total.	Average.	Total.	Average.	Total.	Average.	Total.	Average.
	points.	points.	points.	points.	points.	points.	points.	points.
Glenelg and Wannon Rivers	196	330	377	299	370	308	943	937
Fitzroy, Eumerella, and Merri Rivers	259	362	397	320	378	323	1,034	1,005
Hopkins River and Mount Emu Creek	163	245	295	254	371	280	829	779
Mount Elephant and Lake Corangamite	151	233	280	240	289	276	720	749
Cape Otway Forest ...	305	400	566	399	483	405	1,354	1,204
Moorabool and Barwon Rivers	191	228	298	240	262	261	751	729
Werribee and Saltwater Rivers	122	195	190	206	158	253	470	654
Yarra River and Dandenong Creek	123	315	330	297	225	338	678	950
Koo-wee-rup Swamp ...	199	309	359	316	233	354	791	979
South Gippsland	250	305	329	375	300	417	879	1,157
Latrobe and Thomson Rivers	192	311	396	334	238	389	826	1,034
Macallister and Avon Rivers	50	156	155	210	64	208	269	574
Mitchell River	60	226	176	197	63	266	299	689
Tambo and Nicholson Rivers	64	206	155	175	118	237	337	618
Snowy River	123	301	282	239	267	310	672	850
Murray River	74	215	142	188	201	188	417	591
Mitta Mitta and Kiewa Rivers	161	444	361	318	322	327	844	1,089
Ovens River	169	464	352	337	352	343	873	1,144
Goulburn River	107	297	225	252	190	252	522	801
Campaspe River	137	273	201	239	228	269	566	781
Loddon River	110	192	165	191	224	192	499	575
Avon and Richardson Rivers	70	164	140	171	205	179	424	514
Avoca River	95	190	147	178	241	179	483	547
Eastern Wimmera	92	246	199	239	280	249	571	734
Western Wimmera	137	244	209	211	393	226	739	681
Mallee District	32	140	50	142	166	146	248	428
The whole State	122	252	226	233	245	250	593	735

H. A. HUNT,

Commonwealth Meteorologist.

EXPORTS FROM THE STATE FOR THREE MONTHS (1st JULY–30th SEPTEMBER, 1912 and 1913.

(NOT INCLUDING WOOL, HIDES, AND OTHER PRODUCTS, THE INSPECTION OF WHICH IS NOT UNDER GOVERNMENT SUPERVISION.)

Description of Produce.		Quantities.		Values.	
		1912.	1913.	1912.	1913.
				£	£
DAIRY PRODUCE—					
Butter	lbs.	1,325,291	2,069,730	66,264	103,486
Milk and Cream	cases	556	1,484	1,397	3,710
Milk (dried)	,,	650	7,200	812	9,000
Cheese	lbs.	12,542	28,460	287	652
Ham and Bacon	,,	13,200	27,212	385	793
				69,145	117,641
POULTRY	head	10,875	18,750	2,175	3,750
MEAT—					
Mutton and Lamb	crcs.	11,077	331,847	5,538	165,023
Beef	qrs.	2,699	4,580	6,747	11,450
Veal	cres.	80	1,208	120	1,812
Pork	,,	..	..	..	..
				12,405	179,185
RABBITS AND HARES	pairs	676,176	1,025,808	28,174	42,742
TALLOW	cwt.	31,997	58,183	45,759	84,250
GRAIN AND FLOUR—					
Wheat	centals	734,710	644,769	270,643	203,680
Oats	..	6,034	9,024	2,283	2,846
Flour	,,	407,564	403,390	184,345	167,985
Maize	,,	246	41	129	17
				457,400	374,528
FODDER—					
Chaff	bags	27,046	30,845	6,934	5,632
,, (compressed)	bales	17,337	32,091	4,821	5,789
				11,755	11,421
POTATOES—					
Oversea	bags	277	899	194	153
,,	cases	..	186	..	28
Interstate	bags	125,305	255,519	86,817	48,957
				87,011	49,138
ONIONS—					
Oversea	bags	478	5,447	646	2,566
,,	cases	..	63	..	21
Interstate	bags	13,303	26,940	14,858	12,785
				15,504	15,372

EXPORTS FROM THE STATE FOR THREE MONTHS (1st JULY–30th SEPTEMBER), 1912 AND 1913—*continued.*

Description of Produce.		Quantities.		Values.	
		1912.	1913.	1912.	1913.
		£	£	£	£
FRUIT—					
Fresh	cases	4,660	0,991	2,329	4,904
Dried	,,	7,325	3,958	14,650	6,996
Canned	,,	2,803	2,103	5,806	4,206
				22,785	16,196
SUNDRIES—					
Honey	lbs.	7,906	10,861	274	374
Jams	,,	244,405	310,131	8,832	4634
Seeds	pkgs.	82	310	246	930
Plants, Shrubs, &c.	,,	412	381	412	381
				9,764	6,219
Grand Totals—3 Months, 1912		..	..	761,877	..
,, ,, ,, 1913		..	..	900,542	..

R. CROWE,
Exports Superintendent.

THIRD VICTORIAN EGG-LAYING COMPETITION, 1913-14.

MONTHLY REPORT ENDING 14TH OCTOBER.

The sixth monthly report of the above competition is as follows:—

The weather, during the past month, has been mild, but two or three of the days were rather warm, a difference in the outside temperature of the pens of 21 degrees for two days in succession being shown.

The output of eggs for the month was 8,838, as compared with 8,612 eggs last month.

The leading pen J. H. Gill (Pen 23) has now a grand total of 838 eggs, whilst C. J. Beatty (Pen 11) and E. A. Lawson (Pen 65) 760 eggs each are equal for second place; the third, Thirkell and Smith (Pen 48) has 758 eggs to its credit.

Food.—The morning mash was similar to that of the former month with the exception of one part oaten pollard and additional green stuff. On several occasions raw onions were cut up fine and mashed into the pollard. Grain consisted of wheat, except during cold winds and wet weather, when equal parts of wheat and maize was fed. Green food, at midday, consisted of grass, thistle, and green lucerne chaff, which were also fed in the morning mash.

Broodiness is becoming more pronounced as the warm weather advances; several of the birds from the pens of the heavy breeds had to be removed for this reason, caused no doubt by the sudden change into warm weather.

The general health of the birds is excellent, all being bright and vigorous. Egg production is well maintained.

The rainfall, spread over eight days, registered 104 points.

THIRD VICTORIAN EGG-LAYING COMPETITION, 1913–14.

Commencing 15th April, 1913.

CONDUCTED AT BURNLEY HORTICULTURAL SCHOOL.

No. of Pen	Breed.	Name of Owner.	Eggs laid during Competition.			Position in Competition.
			April 15 to Sep. 14.	Sep. 15 to Oct. 14.	Total to date—6 months.	
23	White Leghorns ..	J. B. Gill	685	153	838	1
11	.. ..	C. J. Beatty ..	609	151	760	2
65	.. ..	E. A. Lawson ..	613	147	760	
34	.. ..	Thirkell and Smith ..	613	146	758	4
61	.. ..	Jno. Campbell ..	604	140	744	5
8	.. ..	J. S. Spotswood ..	607	146	753	6
8	.. ..	E. H. Bridge ..	597	149	746	7
10	.. ..	T. A. Pettigrove ..	578	150	728	8
31	.. ..	W. G. Swift ..	572	143	715	9
35	.. ..	Moritz Bros. ..	551	150	701	10
50	.. ..	A. H. Mould ..	551	142	693	11
24	.. ..	J. F. Bradley ..	551	139	690	12
7	.. ..	B. McKenzie ..	532	157	689	13
21	.. ..	A. Ross	548	140	688	14
49	.. ..	M. H. Noye ..	536	142	678	16
37	.. ..	C. H. Buust ..	532	135	667	16
46	Black Orpingtons ..	T. W. Coto ..	552	111	663	17
66	White Leghorns ..	W. Featherstone ..	520	138	658	18
32	.. ..	E. Hanbury ..	510	143	653	19
40	.. ..	Geo. Edwards ..	506	145	651	20
20	.. ..	C. B. Bertelsmeier ..	503	146	649	21
5	.. ..	G. W. Robins ..	493	151	644	22
29	.. ..	B. Reis	499	136	635	23
43	.. ..	Morgan and Watson ..	495	132	627	24
63	.. ..	A. Sellars	486	141	627	
2	.. ..	R. W. Pope ..	485	140	625	26
41	.. ..	Walter Percy ..	485	136	621	27
24	.. ..	Reilfern Poultry Farm	470	145	615	28
58	.. ..	Stranks Bros. ..	478	137	615	
47	.. ..	W. McMaster ..	487	126	613	30
13	Black Orpingtons ..	T. S. Dellimore ..	479	123	602	31
67	White Leghorns ..	C. Hepburn ..	459	140	599	32
38	.. ..	M. A. Monk ..	469	129	598	33
45	.. ..	D. Goudie	457	137	594	34
59	.. ..	Cowan Bros. ..	450	143	593	35
14	.. ..	S. Hammatord ..	449	138	587	36
25	Black Orpingtons ..	King and Watson ..	455	125	580	37
18	White Leghorns ..	R. Rowlinson ..	433	135	568	38
3	.. ..	S. Bussumb ..	433	134	567	39
42	.. ..	A. Stringer ..	415	149	564	40
33	.. ..	South Yan Yean Poultry Farm ..	414	148	562	41
52	.. ..	W. G. Osborne ..	428	132	560	42
27	.. ..	A. Sinclair	415	135	550	43
62	.. ..	G. A. Gent ..	406	138	544	44
12	.. ..	A. H. Padman ..	393	148	541	45
22	.. ..	B. Mitchell ..	407	130	537	46
55	.. ..	P. H. Killeen ..	426	108	534	47
60	.. ..	Sebaefer Bros. ..	386	145	531	48
53	Black Orpingtons ..	A. Greenhaigh ..	393	136	529	49
44	White Leghorns ..	W. A. Rennie ..	384	136	520	50
57	.. ..	Gleadell Bros. ..	369	146	515	51
54	.. ..	J. McAllan	377	130	507	52
51	Black Spanish ..	W. H. Steer ..	368	136	504	53
36	White Leghorns ..	A. J. Jones ..	362	138	500	54
28	.. ..	E. Waldon	350	137	487	55
29	.. ..	S. Brundrett ..	330	144	474	56
19	.. ..	W. H. Dunlop ..	351	119	470	57
17	R.C.Brown Leghorns	S. P. Giles	357	110	467	58
30	Black Orpingtons ..	Jas. Ogden ..	315	143	458	59
64	Golden Wyandottes	C. L. Starman ..	317	139	456	60
60	Black Spanish ..	Watson and Rushworth	283	143	426	61
15	White Leghorns ..	J. Shaw	284	126	410	62
4	.. ..	J. A. Brigden ..	261	130	391	63
9	White Leghorns ..	Sylvania Stud Farm ..	227	138	365	64
		Totals	29,360	8,838	38,198	

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.R.H.S., Principal, School of Horticulture, Burnley.

The Orchard.

Pests.

As a preventive against codlin moth, the trees should be kept well sprayed with arsenate of lead. It has been definitely ascertained that *this is the best remedy, and all other mixtures should be discarded in* its favour. Its permanent qualities, combined with an effective killing strength, render this mixture invaluable; at the same time, it is easily mixed, and so very few brands leave any sediment, that the work of spraying is now reduced to a minimum.

If the spraying is careful and thorough, no bandaging need be carried out. The time spent in bandaging would be far better employed in an extra spraying. The first spraying should have been given at the time of the falling of the petals; the second spraying, owing to the rapid expansion of the fruit, should be given a fortnight later. After that, the grower must use his own judgment as to the necessity for *subsequent spraying. If the moths be at all prevalent, other sprayings* will be quickly necessary.

For the cherry slug, arsenate of lead may be used, except where the *cherries are approaching ripeness; hellebore, lime, or tobacco water* should then be used.

The work of cultivation, ploughing, and harrowing should be com*pleted immediately. It is always advisable to have the land well tilled* before the dry weather sets in.

All crops for green manure should now be under cover; and, if the *orchard soil is at all heavy or sticky, the grower should make up his* mind to grow a cover crop next season, in order that this condition may be reduced.

*The orchard should be kept free from weeds, not only for the conser*vation of moisture, but to do away with all hiding places of the Rutherglen fly, cut worm moths, &c.

General Work.

Grafted and newly planted trees should be frequently examined, and *given an occasional watering and overhead spraying to encourage their* growth, and to prevent loss of moisture from the foliage. It is also advisable to mulch young trees with a light grass or straw mulching, not *too rich in animal manure.*

The disbudding of unnecessary shoots, and the pinching back or stopping of growths, to prevent them being unduly prolonged, may now be carried out. This work is particularly important on young trees. Graft ties should be examined, and the ties cut wherever any growth is being made. Where the grafts are likely to make any long growth, they should be well staked and tied.

Citrus trees may be planted out, watering and mulching them after planting.

Vegetable Garden.

Celery may be now sown for winter crops. French beans should be largely sown. Cucumber, melon, and pumpkin, and all seeds of this family may now be sown in the open. Where these plants are already growing, the longest and strongest runners should be pinched back to throw the strength into the flowering and lateral growths. Watch these plants for mildew, and use sulphur freely wherever present, especially on young plants.

Peas, lettuce, radish, and turnips, cabbage, and sweet corn seeds may be sown this month. Seedlings from former sowings may be planted out, and it may be well to dip the whole plant in water before planting. This greatly assists the young plant while taking hold of the soil in its new location.

Frequent waterings and frequent cultivation will now be necessary, and all weeds must be hoed or hand weeded out; mulching with stable manure will greatly assist the plants.

A few beds should now be deeply worked, adding a liberal dressing of stable manure. These plots will then be ready for the celery, cabbage, and other seeds planted during the month.

Tomato plants will now require constant attention, watering, staking, and thinning, and pinching back of the laterals.

Flower Garden.

Hoeing, surface cultivation, watering, and mulching are the principal necessities for the flower garden this month. One hoeing is worth half a dozen waterings. Keeping the soil surface loose and providing an earth mulch for the plants is far more beneficial, and far less weakening than excessive waterings, to which the garden plants are so frequently subjected in summer. It is safe to say that a greater number of plants are lost in summer through excessive watering than through the absence of water. Further, the light sprinklings which are so frequently given in hot weather rarely reach the roots of the plant, and only serve to cake and harden the soil, resulting in a further loss of moisture by capillary attraction.

If not already planted out, all bedding and foliage plants should now be in their places in the garden—included amongst these are begonias, salvias, alternantheras, iresines, &c.—while annuals for autumn flowering should now be sown.

All bulbs, corms, and tubers that have ripened their foliage may be removed from the beds, after the foliage has died, and stored in a cool place till next season. Precautions should be taken against damp, which will cause the bulbs to decay.

Herbaceous plants, such as perennial phlox, delphiniums, campanula, as well as gladioli, will all be benefited considerably by liberal waterings of liquid manure, or by mulching with well-rotted manure. Whenever necessary, these should all be staked.

Dahlias and chrysanthemums for early flowers should now be planted.

REMINDERS FOR DECEMBER.

LIVE STOCK.

HORSES.—*Stabled Horses.*—Over-stimulating and fattening foods should be avoided. Give water at frequent intervals. Rub down on coming into the stables overheated. Supply a ration of greenstuff, if available, to all horses, or bran mash once a week with 3 or 4 packets of Epsom salts. *Brood Mares.*—Those with foals at foot should be well fed. *Early Foals* may, with advantage, be given oats to the extent of 1 lb. for each month of age daily.

CATTLE.—Provide succulent fodder and plenty of clean water and shade. *Limewash the cowbails, it helps to keep down flies. Provide "lick" in trough,* consisting of salt 20 lbs., bone meal 20 lbs., and sulphate of iron, ½ lb. *Continue giving milk at blood heat to calves. Be careful to keep utensils clean,* or diarrhœa will result. Do not give too much milk at a time for the same reason. Give half-a-cup of limewater in the milk to each calf. Let them have a good grass run or lucerne. Dehorn all dairy calves.

PIGS.—*Sows.*—Supply those farrowing with plenty of short bedding in well-ventilated sties. Those with litters old enough may be turned into grass run. *All* pigs should be given a plentiful supply of clean water. Read articles on *breeding and feeding in Journals for April, 1912, and June, 1913.*

SHEEP.—To ensure an even lambing, ewe flocks should all be of one breed, or *as near as possible one cross. See that a sufficient number of rams run with the* ewes for six weeks. In cases of non-pregnancy, this period admits of the ewes coming in season the second time whilst with the rams. Merino and fine comeback ewes have been in season for some weeks, whilst crossbred (*i.e.*, first cross) will now begin to come on. Coarse three-quarter-bred ewes, and any approaching the white or black-faced British breeds, will not be in season until towards February. Ewes carry their lambs "four months, four weeks, four days," or, roughly, five months.

POULTRY.—Add a little pearmeal to morning mash and give less bran. Feed *equal parts wheat and heavy oats at night. Supply plenty of green food—at this* time, lettuce is invaluable. Discontinue salts and condiments. Avoid salt meat of any description. Put Douglas mixture in drinking water when required. Keep ample supplies of sand, ashes, &c., in pens, and moisten same. This will enable the birds to keep themselves cool and clean. Top off geese, ducks, and cockerels for the Christmas markets. Hens will do better this month by having free range. Remove all male birds from flocks, as infertile eggs will keep longer and command a higher price.

CULTIVATION.

FARM.—Cut hay in late districts. Cut oats and barley in early places. Finish planting potatoes. Put in late maize for fodder, also millet and imphee. Plough fire-breaks where required. Get stackyard and stages ready for hay.

ORCHARD.—Keep the surface loose and free. Suppress weeds. Spray as often as necessary for codlin moth and pear slug. Mulch and spray young trees and grafts with water in the early morning during hot weather.

VEGETABLE GARDEN.—Keep the surface hoed, and allow the plants plenty of moisture. Stake, pinch out, manure, and water tomatoes. Pinch back long runners of pumpkin and melon family. Sow autumn and winter varieties of cabbage and cauliflower. Plant out seedlings in cool weather. Sow French beans. Cease cutting asparagus beds, and top-dress with manure.

FLOWER GARDEN.—Plant out dahlias and gladioli for autumn blooming. Lift *and store spring flowering bulbs. Stake, tie, and train growing plants.* Sow zinnias and asters. Layer carnations, capellas, daphnes, &c. Water well and *keep the surface loose.* Keep rose beds fairly dry.

VINEYARD.—Inspect young grafted vines (field or bench) and carefully remove any scion roots. Tie up young vines. Beware of cut worms on young vines—See *Journals* for July, 1911, and September, 1913. Tying up of bearing vines, if practised, should be completed early in month. Avoid excessive and indiscriminate topping, far too frequent in Victoria. Scarify, if soil is not sufficiently loose, and after heavy rain. Look out for oidium and repeat sulphurings on first appearance of disease.

Cellar.—Fill up regularly and keep cellars as cool as possible.