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IMPORTANT TO PROSPECTIVE COTTON-GROWERS.

The following instructive article, entitled "Striking Phases of the Cotton and the Mill Industry," which appeared lately in the "Manufacturers' Record," was republished in the "Cotton and Cotton Oil News" (Texas, U.S.A.) of 21st August last, and, as will be seen, it draws attention to the rapid increase of cotton consumption in the Southern States, the great increase in the world's demand for cotton, and the great need for building up new supplies in other parts of the world. What other part of the world presents a more favourable or vaster field for the cotton-growing industry than Queensland? We have tens of thousands of acres of splendid cotton soils, we have an ideal climate, just suited to the cotton plant, and long ago it has been proved that the yield of cotton per acre, in all parts of the State where it has been grown on a commercial

scale, is almost double that of any other cotton-growing country. Yet the British Cotton Growing Association passed by Queensland, and spent thousands of pounds sterling in establishing the industry in black labour countries. Had a very small proportion of this money been employed in establishing it in this State, Queensland would to-day have been an exporter of thousands of bales of cotton. Had cotton been planted instead of wheat during the past drought year, there would have been none of the losses then experienced by farmers. We repeat that in view of the certain shortage of cotton this season in the United States the prospects for growers in this State are excellent. It may incidentally be mentioned that a locally invented cotton-picking machine will probably be on the market by next picking season, trials having shown that it does its work well and rapidly, and it has the additional recommendation that it will be cheap as well as effective, and so within the reach of every cotton-grower:—

"The review of the cotton crop and consumption for the commercial year ended with July, 1916, contains more strikingly interesting facts than any review of any preceding crop. It shows that the Southern mills are now consuming over 4,000,000 bales of cotton a year, or more than 1,000,000 bales in excess of the consumption of American cotton in all other mills in the United States. While all mills outside of the South increased their consumption of American cotton by 387,000 bales over the preceding year, Southern mills recorded an increase of 884,000 bales, or an actual gain considerably more than twice as great as the gain in Northern mills.

"Another significant fact of world-wide interest is that American mills took 48 per cent. of our last year's cotton crop as compared with 39 per cent. in 1914. It is not to be wondered at, in view of this rapid increase in home consumption of American-grown cotton, that the English spinners are seriously alarmed at the outlook.

"Mr. J. A. Hutton, chairman of the British Cotton Growing Association, was recently quoted as calling attention to the fact that Lancashire is dependent upon America for nearly 84 per cent. of the cotton to feed its spindles, and that while the number of spindles has increased in the Lancashire district from 43,000,000 to 60,000,000 during the last twenty years, there has been a steady decline in the percentage of American cotton available for English mills.

" 'We are,' said Mr. Hutton, 'no longer obtaining the same proportion of the crop. In the period from 1890-95 Great Britain took 36·5 per cent. of the American crop and the Continent 30·5 per cent., while the United States' consumption was 31·1 per cent. For the period from 1910-15 Great Britain took 25·6 per cent. of the crop, a decrease of 9·9 per cent.; the Continent, 35·9 per cent., an increase of 5·4 per cent., while the United States' consumption was 37·1 per cent., an increase of 6 per cent.'

"After referring to the rapid increase of cotton consumption in American mills, Mr. Hutton added:

" 'The demands of the world for cotton are going to increase, and particularly in America, which country, thanks to the war, is now getting a very strong hold on the export trade. This means that every year, when

supplies are short, there is going to be a scramble for cotton, and we can be quite sure that America will not go short, and that Great Britain, as the next largest user, will be the largest sufferer.

" 'The situation is one to cause the gravest anxiety. I do not think one can exaggerate its seriousness. Unless we can build up new supplies in other parts of the world, I can see most serious losses facing the Lancashire cotton trade, and it may be that Lancashire will permanently lose a very large portion of our export trade. If that should happen, many of our mills will have to close, and a large proportion of the population must emigrate.

" 'We have, therefore, not merely to discover and develop new sources of supply, but we must also pay particular attention to the countries which can produce long staple cotton. The British Cotton Growing Association has fully proved that all the cotton Lancashire requires can be grown within the Empire. It is merely a question of time.'

"American cotton growers and manufacturers must bear in mind that, though England has for seventy-five years been endeavouring to expand cotton cultivation in other countries, in order to lessen its dependence upon the South, it will put into this work far more effort and expense in the future than it has ever done in the past. Heretofore it has been somewhat of an academic question, and, while leaders in the industry have been active in urging the growing of cotton in Africa and elsewhere, henceforth the energy of the whole Empire will be concentrated upon creating new sources of supply to meet the decreasing quantity from the South. Thus, this section will have a very much more active rivalry in the future in cotton production than it has had in the past. It should, therefore, by every means possible, increase the fertility of its soil, intensify and diversify its agriculture, with a view to raising at home its foodstuffs and to increasing its cotton production at a lower cost and, if necessary, on a smaller acreage. This is entirely feasible, and would, if carried out, materially assist the South in continuing its supremacy in the world's cotton production.

"Two items of exceptional interest in Colonel Hester's report are that the value of the cotton seed for the past year was 192,500,000 dollars, as compared with 92,000,000 dollars seven years ago, although the crop of that year was larger than last year's, and that the value of linters, which two years ago averaged from 1¾ to 2 cents per lb., increased during the past year to an average of over 6 cents per lb.

"The total value of last year's cotton crop, including seed, was 958,200,000 dollars, or, in round figures, nearly 1,000,000,000 dollars, gathered by the cotton-growers of the South for this royal staple.

"The consumption of linters in Northern and Southern mills amounted to 913,539 bales, as compared with 395,373 bales in the preceding year.

"During the year there was an increase of 460,066 spindles in the South, and there were at the close of the year 405,614 spindles in course of erection and being added to old mills.

"The year was one of great prosperity in the Southern cotton-mill industry. It atoned partly for the long years of depression, and placed this industry once more on a sound financial basis, free from some of the difficulties under which it laboured during the years of depression in the cotton-mill industry."

COTTON NOTES.

From American exchanges we gather the following information as to the condition of the present cotton crop and the prices ruling and prospective for cotton. The price offered for cotton-picking in Texas on 28th August reached the dollar mark for 100 lb., equivalent to ½d. per lb. Hundreds of pickers left town for the fields, and dozens of wagons were lined up on the streets waiting to be loaded. Many were unable to get pickers at this advanced price.

Cotton may go to 25 cents (over 1s.) per lb.

Further deterioration of the growing crop during August reduced the estimated final production by 1,116,000 bales, to a total of 11,800,000 bales, as against 16,000,000 bales in 1911 and 1914. The crop is unquestionably short, the result of a Gulf storm in South Texas, the boll weevil, incessant rains, &c.

The prospective average lint yield per acre is now 164 lb.

Good grades of cotton in Mississippi have been bringing 20 to 23 cents (10d.—11½d.) at Granville. Predictions of 30 cents. (1s. 3d.) per lb. are freely heard.

Four hundred bales of cotton marketed at Temple, Texas, realised nearly 40,000 dollars (about £8,000), or 100 dollars (£20) per bale. Two years ago the same amount of cotton would have brought about 16,000 dollars (£3,200). Farmers are jubilant over the high prices, and are selling as fast as they can get their cotton to market.

Events clearly forecast that there will be a tremendous demand for cotton as soon as the war ends.

England's outlook for cotton is ominous. The increasing consumption of American cotton by American mills is fraught with the greatest consequences to the spinning industry of the Old World, especially of England. Should the war last for another year, the American mills will be consuming two-thirds of the American crop, and American spinners will be satisfied before the needs of the Old World spinners.

Where is the cotton to come from during the next twenty years? The development of a new source of supply in some other country in the near future is extremely improbable.

Thus far from our American exchanges. The position is very clearly set down as regards future supplies for Great Britain. It has long ago been shown that Queensland can grow all the cotton required by the world if the rural population would take up the industry. Here we have no boll-weevil, no cotton-stainer or other pest. The boll-worm is easily controlled. We have no devastating hurricanes; we have an ideal climate from South to North and in the West for the cotton plant; we

have a quite sufficient rainfall for all the needs of the plant from sowing to picking time, and it may be even affirmed that cotton in a large portion of the State will grow and bear well all the year round. We also have a rural population, practically every one of whom owns his own farm, where heavy crops of various kinds are raised, some often failing owing to making heavier demands on cloud water than the clouds can supply, which is not the case with a cotton crop. We have an Agricultural Department which goes to the trouble and expense of importing the best varieties of cotton seed for gratuitous distribution; which offers cotton-growers a good advance on all seed cotton sent to the department's ginnery, with a guarantee to distribute all profits on the sale of the cotton amongst the suppliers. Yet the voice of the charmer falls on deaf ears. The farmers are conservative and stick to the standard crops, even although they may frequently fail, rather than do what the last generation did—produce a crop which defies adverse seasons, which requires small attention, and which will yield greater profit per acre than most crops which are usually produced.

If cotton were as extensively grown as it might and should be, oil-mills would soon be established, and cotton-spinning mills as well, thus adding two additional industries giving employment to large numbers of men and women. There is apparently a boom time ahead for the cotton industries, and we would advise farmers all over the State to take advantage of the chance now offered to obtain good seed, and devote at least 5 acres each to a cotton crop.

PLANTING POTATOES ON NEW LAND.

At the time when the Queensland potato crops were devastated by Irish blight, many held the opinion that if disease-free potatoes were planted on new land they would not contract the disease. In the "Journal of Agricultural Research," United States Department of Agriculture, 10th July, 1916, there is an article by O. A. Pratt, Assistant Pathologist of the Bureau of Plant Industry, on experiments with clean seed potatoes on new land in South Dakota. The writer of the article states that it has generally been assumed by plant pathologists that if disease-free potatoes were planted on new land, the resulting potatoes would be free from disease, and pathologists and potato-growers believed that in the new land just reclaimed from the desert there would lie a wonderful opportunity for the production of disease-free potatoes. It is found, after an investigation lasting one year, that planting clean potatoes on new land did not guarantee a disease-free production, and, second, that a smaller percentage of diseases might appear in the production when clean seed was planted on lucerne or grain land than when similar seed was planted on virgin or raw desert land. In these experiments all precautions were taken against planting diseased seed, and after cutting, the tubers were disinfected for one and one-half hours in a solution of mercury bichloride.

BROOM MILLET FOR PROFIT.

At a meeting of farmers at Clovass, N.S.W., writes "Town and Country," a discussion took place on the relative merits of broom millet and maize. One farmer considered 10 cwt. per acre of broom millet a good average crop for the district, but in some parts a yield of 15 cwt. had been recorded. Any soil that will grow good maize will grow millet, and should be cultivated for millet the same as for maize. The average price per ton for millet was £30. After harvesting the first crop, if the stalks were cut down, the second growth would, in his opinion, yield as well as the first, giving for the season a total of about 1 ton from an acre—a return of about £30 per acre.

The same journal also draws attention to the neglect of grading the hurl by the growers to their own disadvantage.

It should be the object of the grower to produce long, fine, straight brush, or "hurl," as it is called. This is generally effected by bending the heads over, when the weight of seed in maturing will cause the brush to lie close and straight. The turning must be done between the joints, because if done on the joints the stem will snap, and the head will die off. This operation is performed when the seed is beginning to fill out and the brush shows signs of spreading. The time to harvest will depend on the weather and the colour required. Manufacturers of brooms prefer a millet with a green tinge, and this is obtained by cutting when the seeds are in the "dough" stage. The brush is then fully developed, but the grain is soft. Bent brush is the least valuable. Colour is also a factor affecting the market price, and, as stated, brush baled ungraded —*i.e.*, broken, bent, and worn brush mixed indiscriminately—brings the lowest price in the market. Owing to these faults manufacturers find that it pays them better to pay £40 a ton for Italian millet than to use badly-grown, ungraded, discoloured local material at £25. The remedy lies in the growers' own hands.

A Southern journal, early in last October, stated that "prime long hurl was selling at £33 to £34 a ton, and only odd lots were £35; whereas a few weeks ago £35 was paid with fair freedom. Seconds were £26 to £31; short, crooked, and discoloured, from as low as £16. It is to be regretted that the get-up of a large percentage of the New South Wales broom millet for the wholesale market is faulty. This neglect means a monetary deduction from the cash returns to the farmer, and also tends to the disparagement of the reputation of New South Wales bales in the interstate markets. Letters to Sydney from Melbourne, Hobart, Launceston, Dunedin, Christchurch, and Auckland show that the importations of broom millet from the United States and Italy, from time to time, are largely due to the careful manner in which the bales from both these countries are graded and made up. Before the war, during seasons when this line was abundant in Italy, the names of the Italian senders had so good a repute in Sussex street that their parcels were accepted here on sight, without question, thus saving delay and expense in examining the bales. It is satisfactory that the few New South Wales growers who used to make false weight with earth, stone, millet-seeds,

and other rubbish, have ceased this practice; but a frequent lack of care in grading makes it necessary to pull to pieces many New South Wales bales destined for Victorian, Tasmanian, or New Zealand use, in order that the millet may be regraded. This grading, to be faithfully done, requires time, and it is opportune for New South Wales growers to note that the necessary time is not grudged by the United States or Italian farmers."

BONES FOR MANURE.

Bones, which when properly treated form a valuable fertiliser, may be readily reduced to powder without the aid of a crushing-mill. A simple plan is to pack the bones, layer by layer, with fresh wood ashes in a barrel, and keep the mixture moistened for some months. A quicker method is to boil the bones in an iron or copper boiler with strong caustic lye. The proportion of bones and lye to be used is, roughly, 15 parts by weight of bones to 5 lb. by weight of caustic soda, or 7 parts by weight of caustic potash dissolved in 15 parts by weight of water. The boiling should be done for two or three hours. But even without boiling, the bones will become disintegrated by being simply kept in the caustic liquor for about a week. Another method of softening bones is by mixing them in heaps with quicklime and loam. A layer of loam 4 inches deep is first spread, and on this is placed a layer of bones 6 inches deep, and above this a layer of quicklime 3 inches deep. The layers of loam, bones, and quicklime are repeated till the heap reaches a convenient height, when it is covered all over with a thick layer of earth. Holes are then bored in the heap from the top, and water poured down them to slake the lime. This mass will become hot, and remain so for two or three months, after which the bones will become friable, and the whole heap may then be mixed up and spread as manure on the land.

JUVENILE CORNGROWING COMPETITION, 1916-17.

1. This competition will be open to all under the age of eighteen years who are residents of the State of Queensland. An entrance fee of 2s. 6d. must be forwarded to the Under Secretary with the application to enter.

2. Applications to be enrolled in the competition, containing the following particulars, must reach the Under Secretary, Department of Agriculture and Stock, Brisbane, not later than 12 noon on the 28th October, 1916:—

(*a*) Full name and address. (Give christian names in full.)

(*b*) Date of birth. (Day, month, and year.)

(*c*) No. of Division in which applicant resides, and the name of the Dairy Inspector who supervises the locality.

3. The area to be devoted to the planting of the seed maize shall be one-tenth of an acre, selected seed for which will be supplied free of cost; but one parcel only will be supplied to each competitor during the period of the competition.

4. Each competitor shall have absolute freedom in his choice of ground, and in the methods he may adopt in preparing, planting, and cultivating his plot; but in no case shall a plot exceed one-tenth of an acre. Yields will be calculated, when judging, on the basis of this area.

The following table shows the length the rows must be to give the exact area according as four, five, six, or more rows are planted:—

Number of Rows 4 feet apart.	Length of Rows in Feet.	Number of Rows 4 feet apart.	Length of Rows in Feet.
4	272 feet 3 inches ..	8	136 feet 1½ inch
5	217 feet 10 inches ..	12	90 feet 9 inches
6	181 feet 6 inches ..	16	68 feet
7	155 feet 7 inches ..		

5. Each competitor will be required to keep a record chart showing the dates and particulars of the different stages of work, and these charts must be delivered, at the time of harvesting, to the officer appointed for superintending and verifying the yield, and this officer will post them on to Brisbane.

6. Within seven days from the verification of the yield from the crop, each competitor shall select, without aid from other persons, twelve uniform cobs of the maize from his crop, and forward them, with a letter of advice, to the Department of Agriculture and Stock, Brisbane. (The cobs should be packed in straw envelopes, commonly used in packing beer bottles, and then placed tightly in a case which should be labelled and branded with the initials of the competitor and the number allotted to his district.)

7. Competitors must notify the Dairy Inspector for the district of the date when the crop shall have matured and be ready for inspection. The maize must be thoroughly dry and ripe when harvested.

8. No competitor shall be allowed to employ or permit any labour upon the competition plot standing in his name, other than his own personal labour, excepting in relation to the driving of horses, for which, owing to circumstances, such help may be needed.

9. The competition will close on the 30th June, 1917, and the prizes will be allotted thus:—

The competitors will be grouped according to the following divisions:—

(1) The district supervised by—
Mr. F. B. T. Koch, Dairy Inspector, Beenleigh.
Mr. H. C. Gordon, Dairy Inspector, Harrisville.
Mr. R. K. Henderson, Dairy Inspector, Rosewood.

(2) The district supervised by—
Mr. C. C. Pickering, Dairy Inspector, care of Miss Macpherson, Montague road, South Brisbane.
Mr. R. G. Ridgway, Dairy Inspector, Ellerslie Crescent, Taringa, Brisbane.
Mr. R. Winks, Dairy Inspector, Gympie.
Mr. F. J. Watson, Dairy Inspector, Bundaberg.
Mr. W. S. Harding, Dairy Inspector, Esk.

(3) The district supervised by—
Mr. J. H. Barber, Dairy Inspector, Crow's Nest.
Mr. J. P. Carey, Dairy Inspector, Gatton.

(4) The district supervised by Mr. S. K. Crowther, Dairy Inspector, Kingaroy.

(5) The district supervised by—
Mr. J. J. Carew, Dairy Inspector, Russell street, Toowoomba.
Mr. L. Verney, Dairy Inspector, Newtown, Toowoomba.
Mr. J. R. D. Munro, Dairy Inspector, Warwick.

(6) The district supervised by Mr. C. Queale, Dairy Isnpector, Gayndah.

(7) The district supervised by—
Mr. J. Cattanach, Dairy Inspector, Dalby.
Mr. R. S. Sigley, Dairy Inspector, Roma.
Mr. W. R. Holmes, Dairy Inspector, Goondiwindi.

(8) The Central ditsrict of Queensland, including that supervised by Mr. H. T. Deighton, Dairy Inspector, Rockhampton.

(9) The Northern district of Queensland, including that supervised by—
Mr. G. A. Smith, Dairy Inspector, Mackay.
Mr. S. A. Clayton, Dairy Inspector, Yungaburra.

If there are more than ten competitors in any division, three prizes will be awarded for competition in that division; less than ten competitors, one prize only.

The prizes shall be of the following value:—First, £5; second, £2; third, £1.

No money prizes will be given, but each successful competitor will be allowed to select some article to the value of his prize.

The prizes awarded in any division may be increased in number and value by donations from persons, firms, or societies who may be interested in the competition.

10. Three special prizes of the value of £10, £5, and £3 will be awarded to the competitors who stand first, second, and third in the entire competition.

These prizes may be increased in number and value in the same way as indicated above in connection with the divisional competitions.

No prize will be awarded unless the yield of corn equals 20 bushels per acre. This stipulation may be waived under very exceptional circumstances in the case of a lower yield.

11. The aggregate points will be 100, and the judging will be based upon the following:—

(*a*) Quality of the maize produced.

(*b*) Yield of plot.

(*c*) Notes and records of plot.

12. The Director of Agriculture will be the sole judge of the competition, and his decision shall be final.

WILLIAM LENNON,
Secretary for Agriculture and Stock.

Brisbane, 1st October, 1916.

A HINT TO COMPETITORS IN THE CORNGROWING COMPETITION.

We fear it is rather late to make a few suggestions to the competitors in the corngrowing competition as to the preparation of the land for maize-planting. Still, it will be well for future competitors to bear in mind a few facts concerning the requirements of the maize plant. Experiments have shown that the roots will strike downwards as far as 8 ft., yet the main bulk of the roots generally develop at the depth of 8 in. In experiments made in the United States of America, it was found that a dense network of feeding roots, reaching from row to row, completely permeated the whole soil area below the cultivated portion, and that the fourth inch of soil contains a larger amount of roots than the 3 in. above it or the 4 in. below it, and nearly as much as both together. There are some who advocate deep cultivation, but the result of fifty-six tests at seventeen Agricultural Experiment Stations in America have shown an average increase of 42 per cent. resulting from shallow cultivation as compared with deep cultivation.

Some confound the expressions deep ploughing in the preparation of the land with after-cultivation. In the preparation of the land, on which the success of a corn crop largely depends, deep ploughing to a depth of 9 or 10 in., and subsoiling down to 18 in. or 20 in., is shown by the root system to be advantageous, the subsoil, of course, not being brought to the surface. Thus a reservoir of moisture is constructed for the future use of the roots. The ground having been thoroughly prepared should, in about August, be cross-ploughed and well pulverised with a strong cultivator set first to 8 in., and then crosswise to 10 or 12 in. deep. The main thing before planting is to secure a perfect tilth. For after-cultivation, there is nothing equal to a careful and thorough harrowing by means of lever harrows with the teeth slightly standing backward. If this work is properly done, not one young plant in a thousand will be injured, and all the rest will be greatly benefited, as the pulverisation of the soil at the young stems will facilitate the formation of roots, give increased circulation to them, and, consequently, quick, vigorous growth. Never be afraid to run the harrows over the young seedling corn. Later on, scarifiers may be used, but only at shallow depths. After this, the crop may be left to itself.

There are few plants which benefit more (or to which it is more necessary) by a well prepared seedbed than maize. Generally, the land is ploughed to a depth of 8 in., but after the plants are up, shallow cultivation, as we have shown, follows, the deep ploughing before planting being necesary to break up the subsoil and form a reservoir of moisture for the nourishment of the plants.

IMPROVEMENT IN COTTON VARIETIES BY SELECTION.

It has frequently been shown that, no matter how pure the seed of the cotton boll may be when first planted, yet variations will occur in the resulting crop, due to various causes, such as removal from a higher latitude to a lower, or *vice versa*, from a rich to a poorer soil, or the contrary; again, from a wet to a dry soil, or the other way about. Any of these changes may bring about a variation; in fact, changes of some kind are sure to take place, inasmuch as it is seldom that two plants resemble each other in all respects. Probably no one ever grew a dozen plants, even from one pod of seed, which all resembled each other without some difference, however slight. In cotton cultivation, it is important to obtain uniformity of the staple in regard to length, strength, and texture. A mixture of long and short staple, fine and coarse texture, weak and strong fibres, is detrimental to the prices ruling for good samples in the market.

On this subject of selection a very useful paper was read some time ago at an Agricultural Conference at Bundaberg by Mr. E. Grimley, which will bear reprinting, and which should be carefully read and noted by those who intend planting the new, pure varieties of seed imported this year by the Department of Agriculture and Stock.

WHAT IS SELECTION?

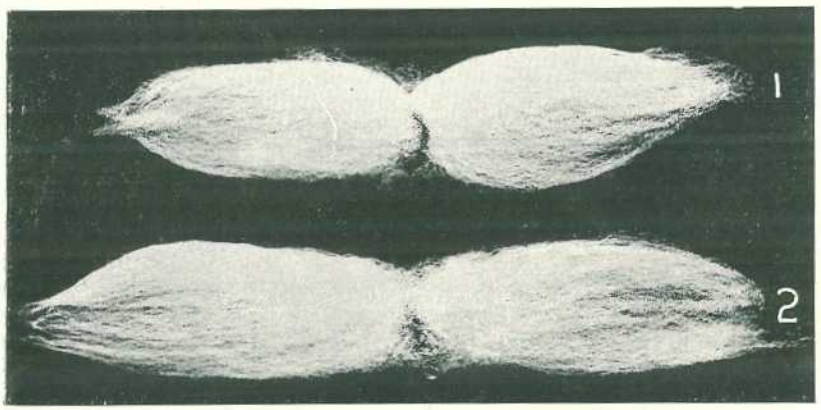
"It is taking advantage of the natural capacity of all plants to vary in some particular," or, as Darwin puts it, it is "the law of preservation of the favourable individual differences and variations, and the destruction of those which are injurious."

We will consider what are the main points which constitute a valuable crop of cotton—probably length of staple and quantity of lint per acre are the main points to be considered. Taking length of staple first—there are several points in judging the staple or fibre—not length alone. There is uniformity of length, silkiness, lustre, twist, and strength. All these have to be considered when judging which is the best form of fibre to perpetuate. Nearly every cotton plant will differ one from the other, some superior in one direction, some in another, and it will be by judging your mother plants by points, giving so many points for each degree of excellence, working up to your standard, that your ultimate choice will fall on that plant having the greatest number of points. As an example, I will give you some information gathered from American sources of results of experiments carried on towards the improvement of sea island cotton.

Gossypium Barbadense, getting its name from the island of Barbados, or, as it is popularly called, sea island cotton, is generally grown near the coast in the United States, not being suitable for growing in the interior, like *Gossypium herbaceum*, or uplands cotton; it was generally grown as a perennial, and for a long time was entirely unsatisfactory, giving but poor returns. However, by carefully selecting early-maturing seed and practically changing it from a perennial to an annual, by selecting the best seed, and by better cultivation, a new race has been evolved, and it was at this point, when American sea island cotton was the best in the world, that a gentleman named W. A. Clark determined to try and make a still further improvement in the quality of the staple,

and by applying the principle of selection he has so far succeeded that he is now obtaining as much as from 50 to 60 cents per lb., or 2s. 6d. to 3s., for his cotton, the usual price being from 25 to 30 cents per lb., or 1s. to 1s. 3d. His plan of operation was as follows:—He carefully went over his fields in a rough manner, marking each plant appearing to be superior to the others; later, each of these marked plants was subjected to a more careful examination in the field, and the number was reduced to five, and the bolls of fibre and seed were picked and reserved for future and more minute examination. Points were then given to each for its good qualities, and ultimately the palm was given to one plant; but before decision a sample of the fibre was sent to the manufacturer for his approval, who examined it microscopically, and reported thereon. A final decision having been made, the seed was planted at the right time, the seeds from a single plant being about 500 in number. The result of these 500 plants gave enough seed for 5 acres the following year, and the 5 acres the next year gave enough seed for the general crop.

The plants grown from the 500 original seeds were inspected and subjected to the same tests for further crops, it being found that any neglect to select caused a rapid decline in quality; in fact, there was a reversion to the original quality before selection, so that to keep up the quality the process must be continuous. This quality of cotton secures orders from the manufacturers direct, without being sent to the open market, and quotations for such do not appear in the trade lists. To give an idea of the advancement made by these experiments, I give a few illustrations:—



No. 1 is the ordinary sea island cotton, whilst No. 2 is the sea island improved by selection. You will notice that the staple in the selected cotton is much longer, but the other qualities, such as silkiness, softness, twist, and strength, cannot be reproduced. No. 3 is a sample of sea island cotton grown in Queensland, by which you will see that there is plenty of room for improvement by selection.

In choosing the mother plant for seed it is necessary to take into consideration not only the value of the staple, but also the general condition of the plant—its healthiness, its productiveness, its general all-round suitability—in other words, it is no use picking out one particular boll of exceptional merit and expecting that the seedling plants will resemble its parent; it being now an accepted fact that the seedlings will resemble the general characteristics of the parent, and not the characteristics of one boll or branch. I am now speaking of seedlings, but in the event of one branch showing a special character worthy of being perpetuated, it would be as well to strike that branch from a cutting, and if in the second year the character is forthcoming, to continue the process for four or five years, and in all probability the seed would then carry the character and become fixed, to use a gardening term.

Then, again, as to increasing the quantity per acre, which in its way can probably be made as profitable as improving the quality of the fibre. It is known that this is being done in the States, not only by high cultivation but by selection; certain seeds are enveloped by a larger amount of lint than others, and by careful selection these can be secured; this has been done to such an extent that the proportion of lint in sea island cotton is now as one to three, whereas before selection was brought into action it was one to five; then certain plants are very much more floriferous than others and naturally carry more lint—these can be marked and secured; it has also been found that the lower half of a cotton plant will give you seed which will give larger returns than the upper.

In dealing with the question of increasing the quantity per acre, I have left out of consideration the fact that there are some varieties of cotton now available which give greater returns than others; for instance, one variety of Egyptian cotton is shown to give 500 lb. to the acre, but how far this is attributable to the system of irrigation carried on in Egypt I do not know; moreover, this variety of cotton requires less irrigation than others. Is not that a point that can be utilised—a variety that does not require as large a rainfall as others might be grown in districts where the fall is light? It is also to be considered whether it would not be advisable to try to alter the maturity of the plant to an earlier or later period; for instance, a plant which will mature its crop before the rainy season sets in would be advantageous, or again, if the crop ripens after the rains are over, it would be a gain, as those who have grown cotton in the old days can remember only too well how the crops were spoiled by the rain, the seed in the boll beginning to grow and yellowing the lint, or if secured, the material fermented for want of proper drying.

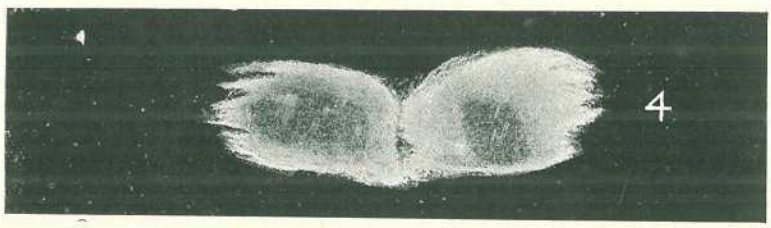
So far, this paper has dealt only with the improvement of cotton by the process of "selection," but there is still another mode of improving cotton, and that is by cross-fertilisation or hybridisation.

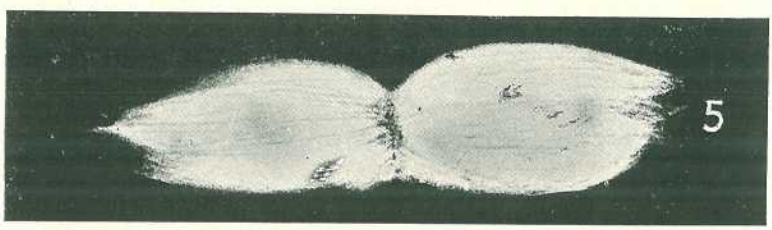
To quote from the Year Book of the Department of Agriculture of the United States, to which publication I am greatly indebted for information contained in this paper, "selection when used alone in the improvement of plants depends upon the adding up of small unimportant variations through many generations, which in the end may give marvellous results; but by this method the breeder has no means of forcing any change, but must be satisfied with slight variations and long-continued selection. However, when marked changes and new creations are desired, it is to hybridisation that attention must be turned. In the words of Henri de Vilmorin, "cross-breeding greatly increases the chance of wide variation, but it makes the task of fixation more difficult. It, however, gives the raiser the only means in his power to unite in one the qualities of two different plants while discarding the weak points."

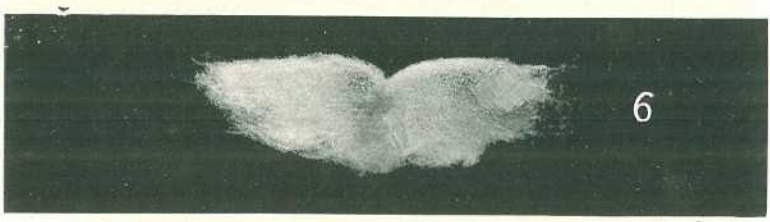
The attempt to produce a hybrid has been tried by the same Mr. Clark who carried on the selection improvements, and I will now give his experiences. It is obvious that it would be useless to endeavour to obtain a greater length of staple only to be spoilt by the saw gin used in uplands cotton. So Mr. Clark, knowing that a variety of uplands called "Peterkin" sometimes has bolls with free seed, or comparatively so, carefully watched for some of these seeds, and sowed them; the following year a larger proportion was free, and by selecting for four years he obtained seed that was all free. The object was to obtain a variety that combined the robustness of the upland with the freedom of seed and the greater length of staple of the sea island, and Mr. Clark then crossed or hybridised the free-seeded uplands, which he called "Klondyke," with the sea island. How far the experiment was a success can be gauged by the illustrations.

No. 4 gives you an example of uplands cotton, whilst No. 5 gives a drawing of the new hybrid between "Klondyke" and sea island. You will notice a great improvement on Klondyke—greater length of staple with free seed. As this hybrid has but very recently been produced its commercial value is not known, but in all probability it is of great value. In No. 6 I give an illustration of Queensland uplands cotton, which again, as in the sea island variety, shows that there is ample room for improvement by either the process of selection or hybridisation. I do not think any attempt has been made in Queensland to improve the quality of cotton in any direction, but I am convinced that it will be only by the application of the two principles advocated, either singly or together, that we can hope to reintroduce the cotton industry. I may mention incidentally that the society I have the honour to represent at this Conference has decided to attempt this important work; that they will be successful in producing a variety which will give a good return to the acre as well as an improved quality of lint is warranted by the success obtained in other countries, and when we look round and

remember how nearly everything now grown has been improved, how the apple of our days is descended from the crab, how the cabbage of 30 lb. weight is the result of "selection" during centuries from plants that weighed not more than a few ounces, how wheat has been improved, how beet sugar has trebled its percentage of sugar, surely we may expect the same improvement can be made in cotton, and before many years I hope to see Queensland cotton quoted on the European market—not as a variety of uplands or sea island, but as a distinct variety that has been evolved by the skill and cleverness of our farmers, and if it should happen that the Queensland Acclimatisation Society should lead the way, there is still plenty of room for others to follow.



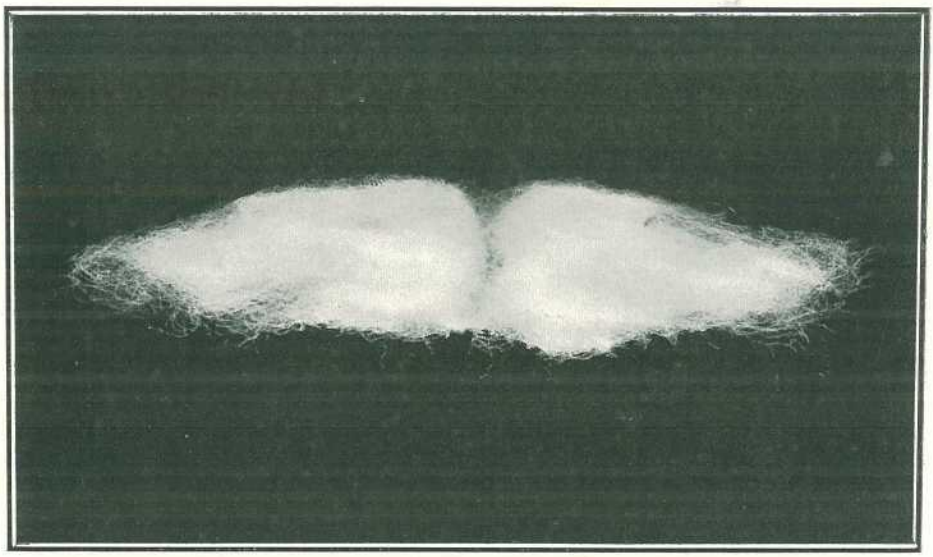




In concluding my remarks, I would like to say that I think if any revival takes place in the cotton industry, it will not take the form of a profitable speculation for the capitalist, but will probably take a place amongst the mixed farming of the man who tills his own land, and who can command sufficient labour for picking from his own family and the families of the few hands he may employ.

I hope that I have made my paper sufficiently plain to those who take an interest in cotton, and if any amongst you should decide to take the improvement of cotton in hand, I shall be sufficiently rewarded.

No. 7 depicts a variety which at first was classed by two Queensland cotton experts as sea island, but closer examination shows that it is more like Mr. Clark's hybrid "Klondyke," some seeds of which found their way to Queensland some years ago. This cotton was forwarded to us by Mr. W. Schafer, in the Burnett district.—Ed. "Q.A.J."



GINSENG.

Some years ago we published several articles on the cultivation and value of Ginseng, one of which we reprint in this issue. The "New Zealand Farmer," for October, 1916, writes, under the caption "Worth £5,000 an Acre," as follows:—

"A crop that is declared to be worth so colossal a return as £5,000 an acre will surely attract attention in countries looking around for new industries. Even if one has to use a little salt to discount, there is still left a handsome result. This is said to be the return from a product called ginseng, used for medicinal purposes. The Americans got hold of the idea to raise the plant in recent years, and as a result roots of it for seed purposes sold as high as 25s. to 35s. each. China seems to be the great market for it, where there is wanted annually up to £5,000,000 worth. Mr. H. V. Edwards, of Bega, N.S.W., has just issued a booklet dealing with the product, in which he points out that very little work is required in raising. While he does not give the return so high as £5,000 an acre, he says he has seen £80 worth produced on a plot 16 by 32 ft. An American authority says it can be raised on any but wet ground. The land must be well drained. Shade is an important condition it would appear. Attention to the crop during its growth is no more

arduous than that required for vegetables. The Chinese claim that as a medicine ginseng stands high as a restorer of fatigue, to invigorate the feeble old, and to brace up the weak. Some readers may be inclined to treat this matter as a joke, but Mr. Edwards is a reputable citizen. Here in these countries we mostly import all our drug plants. It is the result of our following up callings which require a lot of land. There are really few husbandmen amongst us, as they know them in the old-world countries. But if we are to become economically progressive, and independent of outsiders, there must be a revolution in our methods. Departments of Agriculture would take a wise step if they introduced an expert in the culture of plants of this sort for obvious reasons."

In 1906, the Department of Agriculture of this State (Queensland) secured some ginseng seed from the Tokyo Plant, Seed, and Implement Company, Japan, which was sent to the Kamerunga State Nursery, but failed to germinate. This was possibly owing to the climatic conditions of the North of Queensland, as we are informed that the plant is indigenous to and is only cultivated in countries subject to severe winter conditions such as occur in Korea, Japan, and New York State.

GINSENG CULTURE.

Seven thousand pounds per acre for a crop seems an incredible return, yet it is quite within the bounds of possibility. There is a root called " Ginseng," which is highly esteemed for its medicinal properties by the Chinese, who give enormous prices for it. The " Encyclopœdia Britannica" says it is the root of a species of *Panax* (*P. Ginseng*). The demand for it is so great that many other roots are substituted for it, notably *Panax quinquefolium*, distinguished as American Ginseng, imported from the United States. The ginseng prepared in Corea is the most esteemed variety. Lockhart says that all the ginseng collected in China is imperial property, and is sold to those who have the privilege of dealing in it at its weight in gold.

Ginseng of good quality generally occurs in hard, rather brittle, translucent pieces, about the size of the little finger, and varying in length from 2 to 4 in. In price it varies from 6 or 12 dollars to the enormous sum of 300 or 400 dollars an ounce—that is to say, from 24s. or 48s. to £60 or £80 per ounce. [Presumably the prepared article.—Ed. *Q.A.J.*]

Now, we ask how it comes about that a root which is as easy to grow as yams or cassava or ginger is not grown universally in tropical or semi-tropical countries? In Manchuria it grows wild, so it does in Corea, and it is also cultivated in those countries.

Here is what a farmer of New Mexico (U.S.A.) writes about the plant and its cultivation to the " Florida Agriculturist":—The increasing scarcity of ginseng, together with the high prices paid for it, drew my attention to its cultivation for the market. There is no question but that the plant can be as easily grown as any other cultivated plant, provided it is furnished with the right kind of soil and with shade. It was my plan to follow Nature as near as possible, and consequently I began planting the roots and seeds in the rich fertile soil of the forests

where there was plenty of natural shade. But, with the experience I now have, I think garden culture with artificial shade or lattice shade is the best. Yet one can grow it successfully in the forest. Lattice shade is more manageable and economical of space. In the forests the plants are checked in their growth by the trees absorbing the moisture, while under the lattice work they have a more thrifty appearance. Open field or garden soil, suitable for growing garden vegetables, is preferable. Old worn-out land can be made profitable by planting it in ginseng if made rich by the use of fertiliser.

I consider ginseng the most profitable crop grown, as but little land is required, and, if properly cared for, will yield a greater profit than many large farms. It requires no great amount of money invested in lands, no expense in building large barns to store your grain, and no expense for stock or help. In fact, it is one of the best occupations one can get into. If our farmers would investigate such a valuable industry as ginseng and grow more of it, in a few years they will find themselves prospering. The demand far exceeds the supply, and it will be many years before the supply of cultivated ginseng will change the price of the root. There is ready sale for it at all times, and it is a sure crop, standing drought better than any other plant.

What ginseng wants most is soil rich in vegetable matter, moisture, and shade. It is of such a nature that it propagates itself by means of its seed only. When seed are planted they produce roots; when roots are planted they produce seed. The bud at the top of the root makes the next year's plant and seed crop. The root sends up each year a new stem, leaving at the top leaves, flowers, and berries. The berries are the seed. Ginseng increases very fast. Plants two years old produce seed. At the first seed crop each plant produces about ten seed, the second about twenty, and the third about forty, and so on, doubling itself every year. Ginseng should be seven or eight years old before digging, as the root continues to grow all the time, and the larger the roots the more valuable they are. Plant a bed every year, and in a few years you can have a bed to dig for market each year. Well-dried ginseng root is worth now from 4·25 dollars to 5·75 dollars (18s. to £1 15s.) per lb., and the cultivated root is worth still more, and is more even in size, of a nicer shape, and better in every way than the wild root. My lowest estimate on 1 acre planted in ginseng, and allowed to grow for five years, at the price it is sold at to-day, is 35,000 dollars (£7,000) for roots alone, and the seed crop on 1 acre for five years would be great. You can always find a market for your seed. There are but few ginseng farms in the United States at the present time, but in my opinion in the next ten years there will be a great number.

[The only wonder to our mind is that there are not already hundreds of ginseng farms in the United States. Five ½ acres should satisfy any reasonable man's desires.—Ed. *Q.A.J.*]

MARKET GARDENING.

TRAINING TOMATOES TO ONE STEM.

As soon as the young tomatoes are planted out, drive in stakes alongside them, to stand 5 ft. above the surface. As the plants grow, pinch off *all* side shoots as they appear, allowing only the *leading* shoot to grow. As the plants increase in height, tie them closely to the stakes, but in such a manner that the ties cannot cut into the stems (raffia fibre is the best).

After a good few bunches have formed along the stem, pinch off the tops of the plants, say, after they are 4 or 5 ft. in height. The plants will then make efforts to send out more side shoots, but keep on removing them as long as any appear. Plants may be allowed to grow with two stems, which is a good plan, but not so easy to manage as the single stem. The object of removing the lateral shoots is to secure larger fruit, and heavier and earlier crops. The side shoots absorb nourishment needed by the fruit, and are of no use to the plant. Wherever tomatoes are grown on a large scale, the single stem plan is adopted, especially in America, where over 8 tons of tomatoes are produced on one acre.

A WAY TO UTILISE OLD NEWSPAPERS.

The "Scientific American" states that an accumulation of old newspapers may be converted into an excellent fuel for use in stove, fireplace, or furnace. The papers should be piled into a tub or other water-holding receptacle until it is about one-third full, and the tub then filled to the brim with water. Left thus for two or three days, the papers will become thoroughly soaked. If at first they show an inclination to float, a heavy stone laid on top will weigh them down until the water completely covers them. When thoroughly soaked with water, the papers are taken from the water and squeezed into balls about the size of one's two fists, and thrown on to the ground in the sun to dry. The papers have become so soft and pulpy that a perfectly compact ball is easily formed. It will dry, if left in the sun long enough, until it is almost as hard as wood. These balls, if made in the summer, will constitute excellent fuel for winter use, and will burn in the fireplace with a glow like carbon briquettes. Moreover, they will burn with comparatively little ash, and they are clean to handle.

Pastoral.

THE PRICKLY-PEAR FEEDING STATION, WALLUMBILLA.

SECOND PROGRESS REPORT.

The work of this Station has proceeded upon lines indicated in a First Progress Report, dated 20th June.

The utility of prickly-pear in the maintenance of cattle will be here briefly reported on, together with such facts becoming evident during experimentation as are deemed worthy of notice.

The Comparative Merits of Scrub and Forest Pear.

A series of comparative analyses of scrub and forest pear, made through the period, May to August, shows no essential difference in composition. In either "variety," entering upon the period in question after sufficient rains, seasonal variation has been inconsequential, except that with the spring season a slight increase in percentage of protein is apparent. Comparison of palatability shows no superiority for scrub pear, and absence of any temporary augmentation of appetite on change from one variety to the other is evidence of no distinction in flavour. The apparent preference of browsing animals for the scrub "variety" will probably be found due to a comparative innocuity of prickle, upon which question it is being endeavoured to obtain demonstrable evidence. The non-occurrence of fruiting season has rendered the investigation of higher palatability of the popular "male" or "cow" pear impossible of approach or co-relation of abnormality in fruiting with properties rendering it more highly acceptable to the animal. It is significant, however, that the scrub pear utilised for comparison of palatability with the forest "variety" showed evidence of having been much eaten down by grazing cattle during the recent drought, and the cuttings were made very largely from plants selected by animals having access to the area.

The whole question of the existence of a pear of superior nutritive value or palatability is one of great importance in the ultimate evaluation of the grazing value of pear, and should be subject to inquiry as far as means permit.

On Maintenance Feeding and the Use of Supplementary Feeds.

The main issues of experimental work in the maintenance of mature animals are the following:—

1. Prickly-pear does not suffice for sustenance, though it would appear that a ration solely so constituted might preserve life for a considerable period, the duration depending on initial condition.

2. Prickly-pear with medium amount of non-nitrogenous roughage is much more efficient, and would suffice to preserve cattle for long periods though with ultimate considerable depreciation.

3. Prickly-pear, supplemented by nitrogenous concentrates or leguminous hay in comparatively small quantity, conserves body-weight and excellent condition, and in the amounts consumed permit of actual though small gains. The incidence of the experimental period at the time of year of lowest diurnal temperatures warrants the conclusion that during milder seasons the observed gains would be somewhat augmented.

4. The satisfactory result recorded in 3 can be achieved at a cost per head of little more than 2d. per day.

5. The amount of pear eaten per day is primarily dependent on the individual appetite for pear.

6. When pear is the sole diet, the amount consumed is much below that which the animal is willing to take when supplementary foods are judiciously employed.

7. In minimum amounts nitrogenous supplemtary feeds are conducive to higher pear consumption than non-nitrogenous.

8. Satisfaction of appetite by employment of more than a minimum quantity of supplementary feeds leads to diminished pear consumption.

The Treatment of Pear for Hand-fed Stock.

Indubitably the method to be adopted for rendering pear acceptable to farm cattle should involve the minimum of time and labour. Experience gained by allowing experimental animals access to pear on forest has demonstrated that selection is made of certain terminal cladodes almost devoid of prickle or invested with prickles of pronounced downy character, both of which are limited in quantity. It became evident, both from inspection and rapid decline of body-weight below normal, that grazing was impeded.

The passage through a form of slicer—as has been the practice on the Station since the inception of feeding—provides an alternative to the removal of prickles from standing pear by singeing either by gasolene torches or other means. It is the opinion of the writer that harvesting, hauling, and slicing will prove as little tedious and as rapid as any method of singeing that is likely to be devised. It should be possible for one man to provide by this means and to distribute pear for fifty to sixty head per day at the maximum average rate of consumption ascertained, while improvement in the means of feeding the slicer in operation should enable a somewhat greater quantity to be dealt with. Pear in this form has been readily eaten, and the prickles, detached or softened by exudation from the cut surfaces, exert no injury on the tongue or palate. No animal in five months during which chopped pear has been daily administered has given any evidence of discomfort from this cause.

Whether veterinary inspection at this or a later stage is desirable is left to the discretion of the Advisory Board. Scouring, resultant on pear consumption, has not been pronounced or excessive except on occasions in animals receiving pear alone or in individuals obtaining, with minimum amounts of supplementary fodders, upwards of 90 pounds of pear per diem.

The Improvement of Palatability of Pear.

The utility of pear in rations is proportional to the amount consumed. With the view to increasing daily consumption, some attention has been paid to possible improvement of palatability and to inquiry into the influence of method and frequency of feeding on appetite. Such means as have been adopted—notably, salting of ration, incorporation of oilcake, and more frequent administration of smaller quantity—have failed to augment the amounts partaken of. Experimentation with a limited number of animals and cooked pear is in progress.

The Projected Course of Experimentation.

It was purposed at the conclusion of the maintenance trials to investigate the function of pear in rations designed for fattening. These involved the employment, respectively, of concentrates up to 7 lb. per head per day and of leguminous hay up to 8 lb., and were calculated, in the additional quantities above the maintenance allowance and with a sustained pear consumption, to produce up to 2 lb. liveweight increase per day. The operation of increased supplementary feeds, as noticed in paragraph 8 (above), has made it evident, however, that the rate of fattening increase designed would be much reduced, and that a limit is set to the productive value of pear rations.

The writer prefers to allow any further pronouncement upon this phase of the subject to remain in abeyance, except to point out its significance to the whole question of productive pear-feeding. A more accurate study of the influence of quantity of adjunct feeds upon pear appetite is warranted, with a view to ascertaining the maximum nutriment that can be administered in pear-concentrate or pear-hay combinations, while preserving a considerable proportion of pear. Meanwhile, a determination of maintenance requirement on rations, consisting solely of pear and nitrogenous supplementary foods, has been instituted partly for the purpose of investigating the effect of pear and concentrates fed without usual roughage feeds, which were utilised in small amount in the first maintenance work and to adjust the maintenance allowance to the requirements of a period more in agreement with the mean annual daily temperature.

On this basis it will be possible with close approximation to evaluate the productive capacity of any pear ration subsequently elaborated.

While scientifically sound, this method of attack possesses an advantage of being less expensive in its application than the feeding of rations containing considerable amounts of concentrated feeds over a comparatively lengthy period.

In view of the almost universally held belief that access to water is inimical, it has been resolved to direct inquiry to this point during late spring and early summer.

Any detrimental effect should be made manifest by comparison of the efficiency of an allotted maintenance ration in watered and unwatered animals. The writer professes the belief that the somewhat limited water supply of the medium pear-eater on succulent pear may at all times not be below the physiological minimum for store or fattening cattle, though water supply may become a crucial question to cows in milk.

Attention is also being paid to the analytical examination of edible shrubs, and for this purpose specimens are at present being collected.

Accordingly, the work of the Station is proceeding on the following lines:—

(1) Determination of spring and summer maintenance requirement.

(2) Investigation of the comparative progress of watered and unwatered animals on pear diet.

(3) Determination of pear rations of maximum nutritive value and pear content.

(4) Attention to the question of variation in prickle as a determining factor in edibility to browsing animals.

(5) The analyses and evaluation of edible shrubs.

Cultural Operations.

Subsequent to the date of the First Progress Report there have been harvested one-third of a ton of field peas and wheat and barley, sufficient at an estimate for 5½ tons of hay and 6 tons of silage. The stacked hay has been efficiently thatched for storage till next year, and the ensilage stock raised to 30 tons. Complete filling of the silo was hindered by a breakdown in the engine operating the cutter. Full stock of silage can be secured from an ensuing cut of wheat, of which 5 acres were drilled in late July.

Two acres are at present occupied by field peas.

An oat crop of small area failed to come on, and will be found unsuitable for utilisation as feed. It is proposed to immediately sow the ground available with cowpea.

" FRANK SMITH.

The Prickly-pear Feeding Station,
Wallumbilla, 22nd September, 1916.

The Orchard.

WOOL YOLK FOR CODLIN MOTH.

Some little time ago there appeared a paragraph pointing out how an apple grower had for seven years secured complete immunity from the codlin moth. His plan was to scoop away the earth from the roots of the trees at the fall of the year and fill in the depression with sheep droppings. The result was that his trees were not afterwards affected by the codlin moth, besides which the crop of fruit was unusually heavy. What was the reason that the codlin moth had made itself scarce? The man himself advanced the theory that in the manure there would be a percentage of wool yolk, and that this soaking into the trees became objectionable to the larvæ of the pest. Not a few scouted the idea as absurd, but there now comes some support to the theory by another orchardist, who says that he always ran his sheep in the orchard, as by rubbing themselves against the trunks of the apple trees they embalmed the bark with a certain amount of yolk, and since he has been doing this he has not seen any riddled fruit from the ravages of the moth. It ought to be a very easy matter for the Department of Agriculture to investigate this matter. Hitherto the uses of the yolk have been passed by in Australia, but not so in other countries. We seem to sell the greasy wool as if we were glad to get rid of a by-product, the value of which used to specially appeal to the Germans. Catch the Hun buying scoured wool. He gladly paid the freight on the grease.—"New Zealand Farmer."

THE BANANA BEETLE AT COOROY.

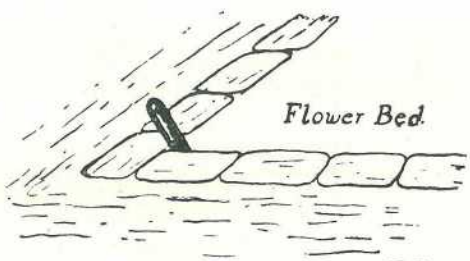
A meeting attended by about fifty banana growers was held last month at Cooroy, to discuss the banana beetle which has been discovered in that district.

The facts showed that last year, when large consignments of plants were landed in Cooroy, there was one of 4,000 plants from Redland Bay, and it was these that were affected. Mr. Mitchell (Government inspector) had visited the district, and had traced one lot from the original 4,000, and the beetle had been found, and he had immediately declared the district affected, and advised immediate action to get the menace eradicated. There are now some 500 or more acres of land under bananas, and the growers are fully alive to the responsibility of drastic action. It was decided, on the motion of Mr. Hugh Walker, who is one of the largest growers, to immediately correspond with the department, and endeavour to obtain the services of an inspector to make a minute inspection of every plantation in the district, and also to ask that Mr. Tryon (Government Entomologist) visit the district and address the growers on the habits of the beetle and the means of eradication. It was also decided to form a fruitgrowers' union, so that united efforts could be taken. At present only two plantations are known to have the beetle, and it is expected to have the pest fully eradicated in a short time.

Horticulture.

A USEFUL HINT TO GARDENERS.

In gardens where the beds are laid out in square diamonds, and triangles, it is troublesome to water them with a long hose, as in turned corners of the pathways, dragging the hose along, as it is sure to cut off corners instead of following along the path. The result is that the gardener has to make frequent stops and go back to prevent the hose from sliding over and destroying, perhaps, valuable plants, by lifting it back to the path. We early discovered this, and as a preventive, drove in iron rods at the angles of the bed, thus keeping the hose off the plants. We were not so fortunate as a flower gardener in South Africa, who struck the same idea and was awarded a one-guinea prize in the monthly competition instituted by the proprietors of "South African Gardening and Home Life," Johannesburg. This gentleman's plan is here depicted, and he remarks that to obviate the trouble, he bought a few ordinary broomsticks—one being needed for every four corners of flower-bed to be protected.



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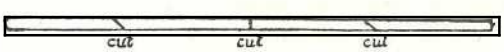


Each stick is sawn into four pieces, and a piece is then hammered into the ground right at the corner of the bed to be protected, leaving some 3 to 4 in. of stick above the ground. It is advisable to knock the wood in so that it slopes outwards towards the path, as sketch No. 1, so as to prevent the hose "riding" over the peg if it is dragged against it. It is also as well to make two of the saw cuts, when sawing the stick into four, in a *diagonal* direction, as per sketch 2, as this then leaves each of the four pegs with one end pointed, which makes it all the easier to hammer into the ground. Since adding these corner ornaments, it has been possible to pull a fairly lengthy hose round the paths, without the bother of going back and lifting each length piece by piece, and also

without any damage to the flower beds. The writer is aware that the best authorities recommend *not* dragging the hose along gravel paths, but he is certain that those authorities do not live in a little dorpje which enjoys about half an hour of water a day in the summer time, so that the watering of a garden of any size becomes more of a cycle race than a leisurely saunter round.

For the better preservation of the pegs, they should have a coat of paint before putting into the ground, and green is a very suitable colour.

Incidentally, the snake-like winding of the hose as it progresses along paths and winds round pegs, helps considerably to retain a kitten and a baby in good temper, and assist to keep those charming "garden ornaments" in their right place, off the flower beds.

THE DIVINING ROD.

Mr. W. A. Deane, district surveyor at Grafton, New South Wales, in an article published in the "Surveyor," gives some interesting particulars of his experience with the use of the divining-rod in locating subterranean water.

"It is not generally known," he writes, "that the depth of a stream can be approximately ascertained. I do not say that it can always be accurately determined without fail, because I have not seen it proved yet a sufficient number of times, but I have proved that it can be found by the following method:—Having located the stream and found its general direction, stand on the edge and walk at right angles to it, holding the rod; it will fall at one particular place, and the distance from that place back to the edge of the stream is the depth at which the water will be found. It is the radius of a circle, of which the observer above the edge of the stream, on the earth's surface, is the centre. It can easily be ascertained if the rod was falling on account of another stream by walking further on and going back towards the located stream; if it fell for the depth, it will not fall when going back till the stream is reached. Further mystery. Mr. F. J. White, of Saumarez, Armidale, told me of this some years ago, and I have tested it from bridges over rivers, where the heights could be actually measured, also by the depths of wells sunk down to underground streams. Though I can locate an underground stream, I have not yet come across any means of telling the volume of water in the stream. The subject is an important one, especially in such a country as this, where so much of the water is underground, and I think it should be widely known that there are two ways of holding the rod. I have come across people who said they had tried, and the rod would not work for them; and I found they had been holding the rod with their hands apart, and they were surprised when they found that, on joining their hands, the rod worked for them."

[Mr. Deane mentions that the instrument for finding water may be either a forked stick from any green tree supple enough to bend without breaking, or a loop of wire—either black, galvanised, or copper.]

Viticulture.

WINE-GROWERS' CO-OPERATIVE WINE-CELLAR.—No. 3.

By G. A. GATTINO, Charleville.

Some explanations concerning co-operative cellars—

(*a*) The share of each member in the formation capital.

(*b*) The maintenance of the Cellar.

(*c*) The distribution of profits.

Regarding the share of each member in the formation capital, the following method could be adopted:—

That each member bring to the Cellar all wine vessels and cellar implements that he owns, in good working order, and these will have to be itemised and valued in a special inventory book.

Should this material require immediate repairs, same will be made at the expense of the proprietor, deducting the amount from the value of the produce supplied in one or two years' instalments in proportion to the amount expended.

For new machines which may be required and vessels to contain the wine of members not possessing any, the Cellar will buy them and deduct the cost from the produce of all the members in proportion to their deliveries.

By doing so the constitution of the Cellar will become easily formed, because the one who brings vessels and implements will be compensated by the interest that the Cellar will pay him on the value of them, and the one who has none (which is often the case of the small proprietors) can also become a member of the Cellar, because the latter will buy what is required and make a small charge on all the members.

Should winding-up become necessary, the proceeds of plant purchased by the Cellar will be divided amongst all members.

Regarding the building of the Cellar, this will have to be properly built, with economy and in accordance with the requirements of modern enology.

By this method it is not easy to have straight away sufficient means for this purpose; therefore, in the first few years, it could be arranged to rent premises conveniently situated.

The rent would be contributed to by all the members in proportion to the quantity of produce delivered by each.

Meanwhile by the annual instalments retained by the Cellar, a fund would accumulate for building purposes, never forgetting that this

building must be of plain design and properly adapted for a Cellar for that particular district.

Speaking of the maintenance of the Cellar, a question arises as to the quantity of grapes that each member should bring to the Cellar. In some Cellars members would be called upon to consign all the grapes they produce; in others a minimum limit would be fixed; in both cases the grapes of bad quality would be rejected as the Director may decide.

For all expenses required in the maintenance of the Cellar, the same rule will be applied of proportionate share, calculated on the *quantity* of produce brought to the Cellar by each individual member.

Above all difficulties, however, the most important is undoubtedly the one referring to the distribution of profits.

As I before stated, the profits have to be absolutely distributed on the basis of *value* of the material delivered, because it is only natural that the possessor of inferior quality grapes cannot pretend that they should be valuated on the same basis as for good, sound grapes.

It is therefore necessary that a graduated scale be established between different grapes.

This can be done by reckoning the different elements that influence the value of the special produce.

The system of the degree of density can be adopted, or, more rational still, the glucometric degree.

These coefficients, varying by season and locality, could conveniently be modified and ascertained, adapting same to the different varieties of plants.

On the same fixed basis establishing the proportionate right of each member to the distribution of net profits, the advances that could be paid or the warrants to issue to each member can also be calculated, limited, however, to the rules and regulations of the co-operative.

In conclusion, this matter absolutely will represent the pure and true co-operative principle amongst growers, preventing any chance of any shareholder gaining fictitious supremacy above others or deriving a profit without supplying the material means to make same.

It would therefore prevent a capitalist speculator becoming a member without being a grower and supplier, and the distribution of the profits would be equitable and the vote would be also proportionate to the delivery of supplies.

In Europe there are many of these co-operative Cellars very successful; their number is increasing every year. The Governments are encouraging these institutions by way of subsidies.

If the Government of this country would assist the establishing of such cellars by formation subsidy it is certain that a large and permanent new industry would be established, increasing the area of land under grape cultivation, and also benefit the State generally and the public and temperance in particular.

Tropical Industries.

COTTON MEMS. WORTH NOTING.

On 15th September a Texas farmer sold a bale of cotton at 15 cents. (7½d.) per lb. The bale weighed 677 lb., and brought 101.55 dollars (£20 6s. 5½d.). The seed from the cotton in the bale weighed 1,202 lb., and was sold at 45 dollars (£9) per ton, making a total of 128.60 dollars (£25 15s.) received for the one bale of short-staple Uplands cotton, similar to the Uplands cotton variety being supplied to Queensland farmers by the Department of Agriculture and Stock. Again, in Texas, in the same month, a negro tenant farmer gathered 100 bales of cotton from 175 acres of land. A bale of cotton is a bale of 500 lb. of ginned cotton. The current season's output of American cotton is estimated by the United States Department of Agriculture at about 11,800,000 bales. The Continental and Commercial National Bank of Chicago estimates the yield at 10,600,000 bales, or 1,200,000 bales less than the estimate of the Department of Agriculture. Latest telegraphic advices from London towards the end of October quoted 10½d. per lb. (21 cents) for Uplands cotton. The extent to which the ravages of the boll weevil in the United States have damaged the cotton crop is shown as follows in "The Cotton and Cotton Oil News," Texas, of 18th September:—

"The Census Bureau of Entomology published an amazing report on the spread of the boll weevil. During 1915, 86,800 additional square miles of cotton area were infested, against an average yearly invasion of only 17,048 square miles. At present, of the total cotton belt area of 609,000 square miles, only 200,000 are free of infestation."

This terrible pest does not exist in Queensland, and strict regulations regarding imported cotton seed from America safeguard us from its introduction.

We advise Queensland farmers to largely grow cotton now, and during and after the war. Everything points to high prices.

CASSAVA AS A COMPETITOR OF MAIZE AND POTATOES IN THE PRODUCTION OF STARCH AND ALLIED PRODUCTS.

New industries are very slowly entered upon in this State, and that for several reasons. At the head of the older industries stands the cultivation of sugar-cane, and the manufacture of sugar, to which crop some 160,000 acres are devoted on the coast lands from the Southern border to Port Douglas, a stretch of over 900 miles. From this area, about 225,000 tons of sugar are annually produced on some 4,000 plantations. Sugarmills number fifty-two, and the capital invested in sugar machinery

amounts to nearly £3,000,000. Exclusive of hands employed in the fields planting, cultivating, cutting, carting, irrigating, &c., numbering about 5,000, some 5,000 hands are employed in the works, and many thousands more derive a good living indirectly from the industry, amongst whom are to be reckoned carters, wharf labourers, seamen, shipowners, mechanical engineers, storekeepers, and many others. The check given to the sugar industry this year has had a disastrous effect upon all engaged in it. The mills, except in a few instances, closed down, and thousands of acres of cane ready for the mill were left uncut, whilst cane already cut lay rotting in the fields. The money value of the sugar which should have been produced weekly from 72,500 tons passing through the rollers is set down at £144,000. The causes which led to this disaster we cannot discuss. What we are concerned about is, to point out how cane lands could be utilised by growing some other crop which, while not requiring so much labour as the cultivation and manufacture of sugar, would keep the land under a crop suitable to the tropical and sub-tropical climates. Such a crop appears to be cassava, which has been proved to be a formidable competitor of maize in the production of starch and allied products.

Maize starch has its own characteristics which distinguish it from other starches. In the plant cassava we have a raw material which yields a starch of the highest purity, possessing all the characteristics of the maize product, the cost of production being one-fifth that of maize. Of the cassava there are two varieties—the sweet and the bitter.

In the tropical regions of South America and in the West Indies cassava forms a valuable article of diet under the name of manioc or manihot, in the shape of cassava flour and the well-known tapioca of commerce. The plant is a semi-wooden shrub, and attains a height of from 5 to 6 ft., and under favourable conditions of soil and climate, even as much as 8 ft. The leaves have somewhat the appearance of papaw leaves. The value of the plant lies in its large tubers, which attain a weight on an average of 8 or 10 lb., with a length of 18 in. to 2 ft. These tubers are brown, or dark yellow, and contain a quantity of poisonous juice. Fortunately, the poison is very volatile—consisting of hydrochloric (prussic) acid. In the bitter variety the poison is distributed throughout the root, while, in the sweet cassava, the poisonous principle is chiefly in the rind. The bitter cassava can be distinguished from the sweet by the leaves. In the former the leaves have seven divisions; in the latter, only five. The root also of the sweet variety is smaller and reddish in colour, and does not contain so much farina as the bitter, hence the latter is almost exclusively cultivated in countries where cassava flour is a principal article of native diet.

The average percentage of starch is from 25 to 26 with fresh roots, and the product obtained in Florida, U.S.A., from several pounds of roots had all the characteristics of the best maize starch, and 4 per cent. of sugar was recovered from the liquor.

In the Annual Report of the Department of Agriculture, Mauritius, for 1915, it is stated that amongst the manioc (cassava) variety tests, the White Top, bitter, yielded 4,770 lb. of starch per arpent (⅝ of an acre).

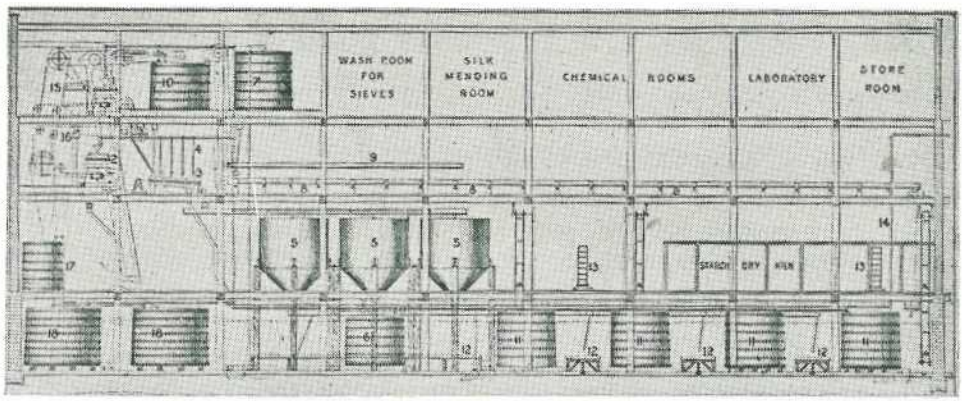
Compared with maize and potatoes, upon which practically the whole world depends for its supply of starch, the average yield of starch is as follows:—Maize, 53; potatoes, 18; cassava, 25 per cent. An acre of ground yields an average of 40 bushels of maize, which, in turn, yield 1,200 lb. of starch, whilst the same ground will yield 10 tons of cassava yielding 6,720 lb. of glucose and 5,000 lb. of starch, and it is possible to reach a much greater amount. In Jamaica, 20 tons per acre are easily produced, and judging by what we have seen of the returns of cassava in Queensland, our rich scrub lands, such as most of our sugar lands, should yield as much as the Jamaican sugar lands. (See Plate 35.)

PLATE 35.—FIELD OF CASSAVA AT FARNBRO, CHILDERS.

It is quite evident that cassava is the cheapest known source of starch.

The only complete cassava starch factory in the world is situated at Lake Mary, Florida, where cassava, grown on a basis of 8 or 10 tons per acre, costs ¼d. per lb. in the unmanufactured state, or £2 6s. 8d. per ton. It may here be mentioned that arrowroot bulbs, some years ago, were grown by the writer at Oxley Creek, near Brisbane, and sold at £2 10s. per ton to Messrs. Grimes, who had an arrowroot mill on the Brisbane River, and this price paid the grower handsomely. A cassava starch plant was devised by Professor Arnold, Ph. D., Toronto (Canada) University, in, we believe, 1902, by means of which the whole 25 per cent. of dry starch can be obtained, and this plant can be worked 25 per cent.

cheaper than the potato starch plant, the process being automatic and continuous. The plant will work up 100 tons of roots per day of ten hours. The entire process only occupies three days, when the starch is ready for market, while maize, under the most favourable circumstances, requires from twelve to fourteen days. The machinery is very simple and not at all costly. (See diagram.)

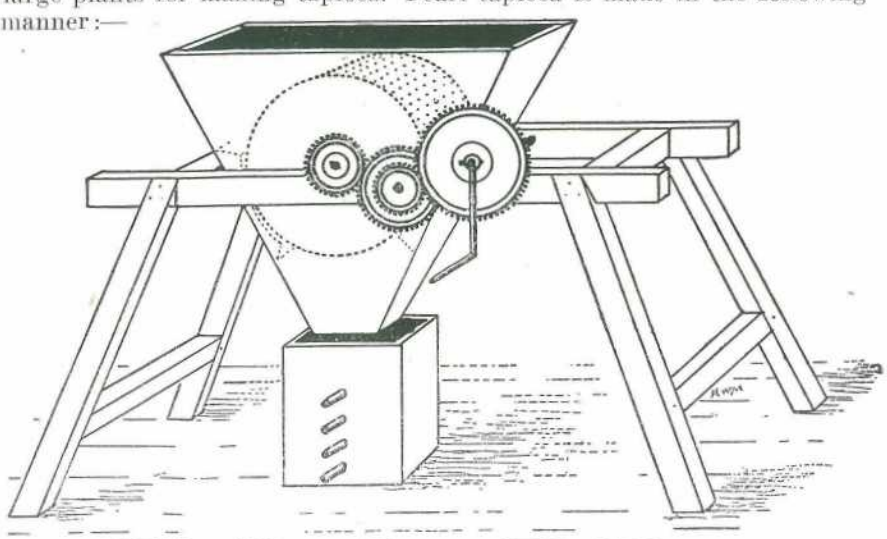


LONGITUDINAL SECTIONAL ELEVATION OF STARCH PLANT.

Explanatory Key.

1. Degerminator.
2. First Grinder.
3. Shakers.
4. Sprinklers over Shakers.
5. Cones.
6. Well, after Cones.
7. Regulator Tanks to 8.
8. Starch Tables.
9. Starch Conveyors.
10. Break Tanks.
11. Washing Tanks.
12. Boxing Tables.
13. Cars for the Drying Kilns and Packing Rooms.
14. Pumps, &c., to convey Starch to Glucose House.
15. Corn Screen.
16. Magnetic Separator.
17. Hot Water Tank to Supply Steep Tanks.
18. Steep Tanks.

The cassava farina constitutes the tapioca of commerce when heated on hot plates, which causes the grains to swell, many of them bursting, and the whole agglomerating into irregular masses or lumps. The finest are sold as tapioca, the intermediate sample being used as starch. There are large plants for making tapioca. Pearl tapioca is made in the following manner:—



The dried masses of starch are placed in a hand mill, where they are reduced to the size of No. 4 shot. From the roof of the factory hangs a coarse cloth, like a veranda blind, spread out by a wooden cross-piece, so that it looks like a canvas boat. The cloth is filled with the shot-like starch, and it is then swung backwards and forwards by two men. Under this treatment the grains are ground into perfectly round little balls, which require to be once more warmed for half an hour by gentle heat in a pan, when the process is complete.

CULTIVATION.

The planting and cultivation of the cassava plant are as simple as for arrowroot. It should, for preference, be grown near the coast, where atmospheric moisture is found even in the absence of rain, which is only required during the first two months after planting. After that, the plant will thrive without any further showers.

As a matter of fact, the plant will thrive under the most diverse conditions of climate (frost excepted), on dry plains, on rocky hill-sides, as well as on humid plains and hills, wherever the soil is friable or gravelly.

We have seen very large tubers grown near Barcaldine, 358 miles inland from Rockhampton, in Central Western Queensland.

THE MANUFACTURE

of the starch is similar to the process adopted for the manufacture of arrowroot in Queensland (peeling excepted). The tubers are washed and peeled to get rid of the poisonous principle. They then pass through a grating machine, continuous streams of water being poured on the mass to separate the starch from the fibre. When the starch has settled in the vats, the water is drained off through a series of taps. More water is added and the starch is well stirrred, and again allowed to settle. This process is repeated until the starch is perfectly white. After this, it is cut out in lumps, thoroughly dried on airy shelves, and then placed on heated tin plates.

BY-PRODUCTS.

The fibrous and glutinous matter left in the filter presses is dried and sold as cattle fodder. Glucose is also made from the pulp. The starch in the boxes is made into tapioca.

Botany.

NOTES BY THE GOVERNMENT BOTANIST.—No. 3.

THE SWORD BEAN (*CANAVALIA GLADIATA*) AND THE JACK BEAN (*CANAVALIA ENSIFORMIS*).

Information is continually being sought for in regard to these two plants, which have been cultivated in Queensland for some time, the Sword Bean more commonly than the Jack Bean. The following information is compiled from various sources, mainly from an article by C. V. Piper in Circular No. 110 of the Bureau of Plant Industry of the United States Department of Agriculture:—

SWORD BEAN (*Canavalia gladiata*).

All varieties known to me are climbers. The leaves are composed of three large leaflets. Flowers varying in colour, rather large. Pod 10-14 seeded, the valves becoming hard and somewhat woody when ripe. Seeds red or white with a large brown hilum almost the length of the seed. In India the variety with white seeds and white flowers is most esteemed.

The Sword Bean is found cultivated through much of Asia and Africa, and has been introduced into America and Australia, but only grown in these latter places in a limited degree. In Queensland during the past few years it has been sold by the seedsmen under the name of "Bengal Butter Bean." It is commonly cultivated as a vegetable in Japan, India, Burma, Java, and the Mauritius. The young pods are prepared after the manner of French Beans, and are said to be well flavoured and wholesome; when older, the pods are very tough and stringy. P. Boname, writing on the bean as grown in Mauritius, highly recommends the green pods as a vegetable. The seeds seem to be used as food to only a limited extent. In Queensland, reports are somewhat conflicting, some persons speaking most highly of it, others complaining of severe ill-effects after eating it.

As a forage plant its value is not very high, the vines being of a rambling habit and the foliage rather bitter. As a cover crop it has proved satisfactory in Porto Rico, and cattle are said to graze there on the plant to a limited extent.

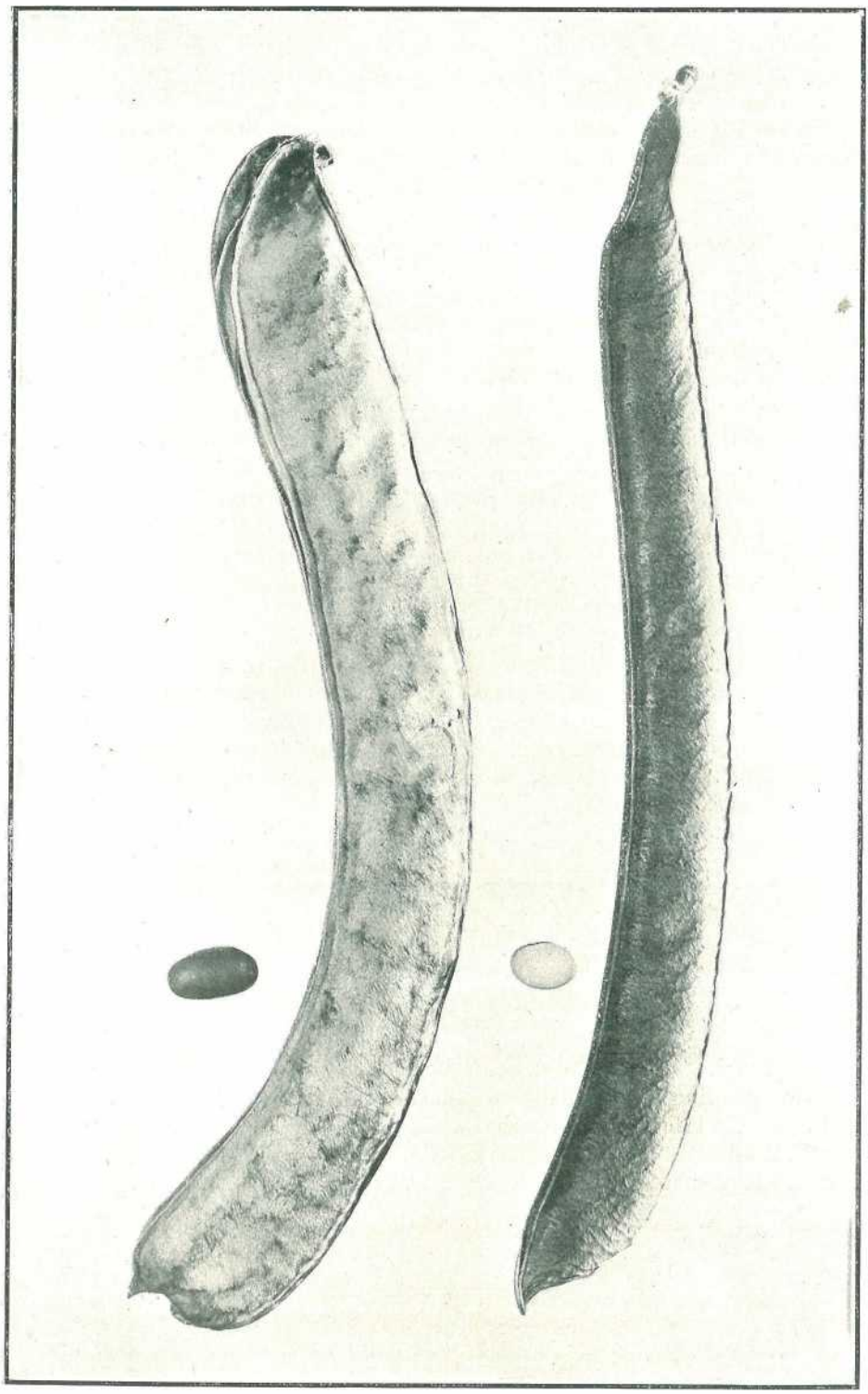


PLATE 36.—SWORD BEAN. JACK BEAN.

JACK BEAN (*Canavalia ensiformis*).

The Jack Bean is a bushy annual plant attaining a height of 4 ft. The rather thickish leaves have a decidedly bitter taste. The flowers are usually purple. The first blossoms are born near the base of the stem, so that many of the pods hang low. When mature, the pods are hard and firm, 9-14 in. long, each containing 10-14 seeds, which are pure white. The plant is said to withstand much drought and to be remarkably free from insect and fungus pests. The Jack Bean is a native of West Indies and the adjacent mainland. In Jamaica it is called the Horse Bean or Overlook Bean; in Antigua it is known as the Babricon Bean; and in the United States as the Pearson Bean, and also the Wonder Bean. Some years ago several experiment stations connected with the United States Department of Agriculture carried out tests with this bean, the yield varying from 30-40 bushels to the acre. Attempts were made to utilise the beans as feed for both beef and dairy cattle, but they were found to be both unpalatable and indigestible. More recent experiments carried out at Hawaii showed that the reason for this was a too limited experience of its use. As with most new feeds, it is important to use at the beginning only a small proportion in the accustomed ration, and then increase the proportion gradually. Several dairies have fed green Jack Beans and sorghum in equal proportions to dairy cows with excellent results. In an article on the Jack Bean in the "Agricultural Gazette of New South Wales" for May of last year, Mr. E. Cheel states that he tried some young pods, varying in length from 4-9 in., cut up into slices and cooked in the same way as French beans. The smaller pods were tender and palatable, but the inner lining of the larger pods proved to be tough and horny. Mr. Cheel found the seeds of the larger pods, when fully developed, useful in the same way as Lima beans or broad beans.

ANONYMOUS COMMUNICATIONS.

We cannot reply to anonymous communications. A letter has reached us from a resident of Deeford, Dawson Valley line, on the subject of vine growing in that district, signed "An Interested Farmer." We will give the information required when we know whom to address. The same applies to "Interested," Fig-tree Pocket, Cairns, who asks that a certain issue of the Journal may be sent to him.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FOR MONTH OF SEPTEMBER, 1916.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Bluebelle ...	Jersey	22 June, 1916	905	4·7	50·14	
Nina ...	Shorthorn... ...	24 June ,,	1,110	3·6	46·84	
Netherhall Queen Kate	Ayrshire	15 June ,,	1,101	3·6	46·46	
Lilia ...	,, ...	4 Sept. ,,	1,039	3·6	43·85	
Lowla II. ...	Shorth'rn-Ayrshire	6 July ,,	979	3·8	43·61	
Lady Melba	Holstein	28 Oct., 1915	983	3·7	42·61	
Sweet Meadows	Jersey	16 Aug., 1916	686	5·2	42·13	
Thornton Fairetta	,, ...	26 May ,,	713	5·0	42·06	
Auntie's Lass	Ayrshire	4 April ,,	814	4·3	41·18	
Rosine ...	,, ...	5 July ,,	876	3·8	39·01	
Miss Bell ...	Jersey	1 Aug. ,,	597	5·4	38·10	
Iron Plate ...	,, ...	20 Jan. ,,	596	5·4	38·04	
Princess Kate	Ayrshire	21 June ,,	826	3·9	37·80	
Hedge's Dutchmaid	Holstein	22 Aug. ,,	980	3·3	37·77	
Pauline ...	Shorthorn... ...	16 Aug. ,,	913	3·5	37·39	
Mistress Bee	Jersey	21 Jan. ,,	570	5·2	35·02	
Lady's Maid	Shorthorn... ...	26 Jan. ,,	665	4·2	32·82	
Belinda ...	Ayrshire	27 Feb., ,,	717	3·8	31·94	
Cocoatina ...	Jersey	17 Mar. ,,	573	4·7	31·74	
Lady Loch II.	Ayrshire	17 Mar. ,,	728	3·7	31·55	
Skylark ...	,, ...	21 Mar. ,,	728	3·6	30·70	
Twylish's Maid	Jersey	22 Oct., 1915	508	5·1	30·60	
Netherton Belle	Ayrshire	23 April, 1916	560	4·5	29·68	
Lady Margaret	,, ...	14 Oct., 1915	550	4·5	29·15	
Miss Mischief	,, ...	15 June, 1916	584	4·2	28·83	
Charity ...	Jersey	28 May ,,	511	4·6	27·69	
Leonie ...	Ayrshire	16 Aug. ,,	653	3·6	27·53	
Lady Spec...	,, ...	6 Jan. ,,	608	3·7	26·35	
Jeannie ...	,, ...	1 Nov , 1915	473	4·5	25·06	
Red Lark ...	,, ...	24 June 1916	508	4·1	24·47	
Constancy ...	,, ...	24 Nov., 1915	547	3·8	24·26	
LadyMitchell	Holstein	3 June, 1916	570	3·6	24·05	
Violette's Peer's Girl	Jersey	8 Dec., 1915	337	6·0	23·94	
Windyhill Davidina	Ayrshire	16 July, 1916	558	3·6	23·53	
Jess of Greystanes	,, ...	18 Oct. 1915	484	3·9	22·14	
Mischief ...	,, ...	27 Sept. ,,	489	3·8	21·98	
Lerida II. ...	,, ...	12 June, 1916	460	3·8	20·49	
Lady Lark...	,, ...	24 June ,,	465	3·7	20·15	

Grazed on Soudan grass during first half of month, received a ration of sorghum ensilage, in addition to natural pasture, during second half.

GOATS' MILK CHEESE.

The demand for goats since the war has been greatly on the increase, and this year in particular, owing to many people being obliged to give up keeping a cow on account of having no man to look after it, goats are wanted to provide a substitute. Now, it often happens where several goats are kept that they are all in full milk at about the same time. This is not good management, but it is not easy to prevent it. Under such conditions there is generally more milk supplied than can be consumed in its natural state, and the goat-owner bethinks him of making it into butter or cheese. Goats' milk, however, seldom makes good butter; it is as white as lard, and generally as soft and greasy; but for cheesemaking this milk is well adapted, and on the Continent—especially in France—goats' milk cheese is in great demand, and forms a commercial industry. The most famous of these—of the hard variety—is Roquefort, though it is said to usually contain a certain proportion of cows' milk on account of the scarcity of the other milk.

There is a very popular belief that Gruyère is composed more or less of goats' milk. The origin of this is difficult to understand, as this milk has never entered into the composition of Gruyère cheese. It may, perhaps, be on account of a breed of goat in France that is known as the Gruyère goat. Most of the cheeses sold in France that are made from goats' milk are of the "soft" variety, and quite small. The best known of these are the Mont d'Or, Levroux, and St. Marcelin.

The following is an American recipe for making cheese of this character, which is said to be of very good quality:—

"Heat the fresh milk to about 90 degrees, and add one teaspoonful of extract of rennet to each quart of milk, stirring it well for three to five minutes; the rennet, however, should first be diluted by twenty times its equal of cold water. Set the milk aside and leave until thoroughly coagulated. Let it stand for twelve hours, when it should be cut into small cubes with curd knives, or sliced at right angles with an ordinary knife, and stirred with the hand for ten or fifteen minutes, after which it should be strained through a cheese-cloth and the curd packed in perforated tin moulds placed on straw matting. The perforated cups used in small fruit presses are very good for the purpose if lined with cheese-cloth. The moulds should be turned every half-hour for several hours until all free whey has drained off and the cheese is firm; slight pressure will be helpful. When firm, the cheese is removed from the cloth and sprinkled freely with salt over the upper surface. After twelve hours turn the cheese and salt the other surface and edges. These cheeses should then be ripened for about three weeks in a cool cellar (temperature about 60 degrees), when they become mellow in texture, with a flavour resembling Schweitzer. Four quarts of milk will make two cheeses 3½ in. in diameter and about 2 in. thick, weighing about 10 oz. each."

It may be of interest to mention that the milk from the goats exhibited at the Royal Show at Manchester last week was made into cheese, being the first attempt of the kind at any show in England.

This is an educational feature of a very useful kind, and one that attracted a good number of goatkeepers, of which there are many in that neighbourhood, for a question that the writer is repeatedly being asked is: "How can I make cheese with my surplus goats' milk?"—"Live Stock Journal."

PROFITABLE CARE OF DAIRY COWS.

A New Zealand journal writes: "This is how a Canterbury dairyman, who keeps 38 cows on 32 acres, feeds them. The cows are feeding, on the whole, seven hours a day in the stalls. The rest of the time they are on the pasture, each cow rugged on cold days. This dairyman never buys any feed; he grows it all on his own small farm. The daily bill of fare is: hay for breakfast, ensilage for dinner, hay and mangels for tea. That's all; but every cow is given all she will eat up clean, and consequently the leisure of the cow is occupied in resting and making milk. She never has to hustle for her tucker. Need we repeat that this is the method of a man who never had any practical experience of the work until he set to work on his present farm. Before that time he was a commercial traveller, and earlier still was an apprentice to an engineering business. Now he makes rather more net profit than two commercial travellers."

THE PREPARATION OF HOME-MADE RENNET.

By A. TODD, Manager, British Dairy Institute, Reading; and ELFRIDA. C. V. CORNISH, M.Sc., Assistant for Chemical Research, Dairy Research Institute, Reading.

(From the "Journal of the Board of Agriculture," London, August, 1916.)

The present price of rennet has led to the carrying out of certain experiments, an account of which will be given in the September issue of this Journal. Rennet, prepared by the method described, has been used in the preparation of cheeses with results which appear to be satisfactory.

Rennet is prepared from the fourth stomach, or vell, of the calf, and has usually been extracted from the vells after they have been dried. At the present time, however, it does not appear to be possible to obtain a supply of dried vells which contain enough rennet to make an extract of sufficient strength for cheesemaking. The cheesemaker is, therefore, advised to make use of fresh vells, or of vells which he himself has recently dried.

It is usual to state that the stomachs must be taken from calves of not more than about ten days old, which have, therefore, been only milk-fed. If such vells are available in sufficient number, the stomach contents should be shaken out, not squeezed, the vells slit up and put whole into brine. If, on the other hand, it is necessary to keep the stomach for any

length of time before use, the contents should be shaken out, one end should be tied and the vell filled with salt. The other end should then be tied and the skins should be hung up in a current of air in a cool, dark place until required.

If it is impossible to obtain stomachs of calves of the age which has been stated, an extract may be obtained from the stomachs of calves up to two or three months' old, or perhaps even older. Whether the extract is, as a rule, of the same potency as that obtained from younger vells is not yet known; all that can be said is that such rennet has been prepared and was satisfactory. It is mentioned here as a possible way out, in case of difficulty being encountered in securing stomachs of calves of the right age. Whether this extract owes its coagulating properties to pepsin (the ferment of the adult stomach), or to rennet, appears to be immaterial, since it was shown in this country some years ago that quite good cheeses could be made by using pepsin instead of rennet, and, since the war started, this work has been confirmed in America. If vells of this character are used, they should be slit open, the contents removed, and the inner surface washed with water. They should then be placed in the brine.

Preparation of Brine for Steeping.—The following method of preparing the brine solution is recommended:—To 1 gallon of water, which had been previously boiled and cooled, add 2 lb. of salt and 1 oz. of saltpetre. Boil this solution for half an hour, and allow it to cool before using. This is sufficient for ten vells. If the vells are fresh, they may be put straight into the brine; if, on the other hand, they have been salted, the two ends must be cut off and the salt shaken out before putting them into the brine. An enamel pail, with a lid, has proved very suitable for this purpose. The steep should then be kept in a cool, dark place, and should be well stirred twice daily for a week with a clean, Scotch hand, pressing the vells against the side of the pail.

At the end of a week boric acid should be added to the steep in the proportion of 2 oz. to each gallon of brine. If sliminess should develop before seven days, the boric acid may be added at an earlier date. After the addition of boric acid, rennet tests should be made every two or three days until the extract is of sufficient strength to be of practical use. Two points must be borne in mind—(1) that, at its best, home-made rennet is not likely to be of more than half the strength of the commercial article; and (2) that the vells appear to vary considerably in their rennet-producing properties. It is, therefore, advisable to add a considerable number of vells to a larger quantity of brine; for example, 10 vells to a gallon as recommended, as thus the better vells balance the weaker, rather than to add 2 or 3 vells to a quart of brine. When possible, it is well to have more than one batch of vells steeping at the same time.

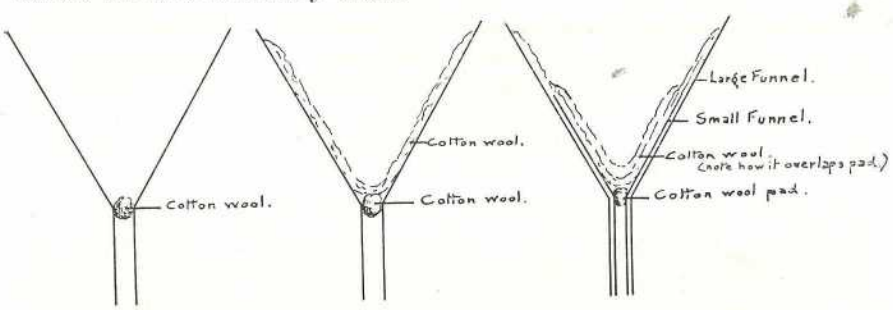
As a rule it should be found that an extract of sufficient strength is obtained at the end of ten days or a fortnight after the first immersion of the vells in brine. If this is not so, they may be left for another fourteen days, making a month in all, when, if the extract proves still too weak for use, it should be discarded.

If the extract from the first steep proves to be sufficiently strong, say about half the strength of commercial rennet, then the vells may be immersed in a second quantity of brine, ten vells and 1 oz. of boric acid to half a gallon, when quite a usable, though somewhat weaker, extract may be obtained.

Rennet Test.—The simplest means of testing the strength of rennet is the rennet test used by cheesemakers: 1 dr., or 3½ cc., of the extract is placed in a cup; 4 oz. of fresh milk at a temperature of 85 deg. F. is

measured. A few pieces of cut straw are placed in a cup to indicate the exact moment that coagulation takes place. The milk is poured on to the rennet in a cup at a given time and stirred with a thermometer for 20 seconds, and occasionally till it has coagulated, thus keeping the straws rotating. When the coagulating point is reached the straws will suddenly stop and give a backward movement. During this period, care must be taken to keep the temperature of the milk at as near 85° F. as possible. This can be done by placing the cup in a basin of water at a temperature of 86° F.

Fresh milk added to the ordinary commercial rennet will coagulate in about 33 seconds, but when added to home-made rennet at least double the time is usually taken.



Filtration of the Extract.—When the vells are ready to be removed from the brine, the whole should be poured on to two layers of cheese-cloth fixed over an enamel pail. When most of the liquid has run through, the corners of the cloth are brought together and tied round with a piece of string. The bundle is then suspended over a clean enamel pail, and allowed to drip into it for five or six hours. At the end of this time the bundle is well squeezed by hand, and if considered advisable the vells are placed in a second quantity of brine.

A cotton-wool filter is then prepared by taking a clean funnel, preferably not less than 6 in. in diameter at the top, and placing a piece of absorbent cotton-wool well over the hole in the bottom of the funnel. A long strip should then be placed round the inside of the funnel, with the lower edges coming well down and over the edges of the piece first put in.

The whole must then be thoroughly well damped with water which has been previously boiled, and the cotton-wool pressed firmly against the side of the funnel, thus pressing out most of the water. The filter is then ready for use, and the extract should be poured on to the funnel. It may be necessary to pass it through two or three fresh filters before it becomes sufficiently clear. At first the liquid comes through rapidly, but gradually the filtration becomes very slow. It may, however, be hastened considerably by placing a small funnel inside the large one.

In this case the cotton-wool pad is placed inside the smaller funnel, and the strip reaches down from the larger funnel inside the smaller, lapping over the pad at the bottom. There should be no wool between the two funnels. The filtered liquid may be collected in a scalded enamel vessel, from which it may be transferred after the final filtration to well-scalded and stoppered stone jars or glass bottles through a clean funnel, or by means of a clean enamel or porcelain cup. Prepared in this way the final extract should keep good for at least six weeks if stored in a cool, dark place. It should have no smell other than the meaty odour natural to the vell, and it should not become markedly cloudy or show gas bubbles on its surface.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, SEPTEMBER, 1916.

Ten thousand five hundred and forty-five eggs were laid during the month, an average of 144 per pen. The weather has been ideal for egg production, and the birds have responded liberally. Miss Hinze and J. Zahl divide the monthly prize with 160 eggs each. Another pen laid an equal number, but, owing to the weight not being up to standard, is, under the rules, ineligible for a prize. Several other pens are close up to the leaders. During the last few days broodies have been numerous, several Leghorns being included amongst them. The following are the individual records:—

Competitors.	Breed.	Sept.	Total.
*T. Fanning	White Leghorns	149	752
*J. Zahl	Do.	160	747
*Mrs. J. H. Jobling, N.S.W.	Black Orpingtons	155	721
*Miss M. Hinze	White Leghorns	160	714
A. Howe	Do.	152	712
*A. T. Coomber	Do.	157	705
G. H. Turner	Do.	151	686
*J. M. Manson	Do.	158	686
Dr. E. C. Jennings	Do.	144	669
W. Meneely	Do.	148	664
*Dixie Egg Plant	Do.	135	659
J. R. Wilson	Do.	155	649
Geo. Tomlinson	Do.	149	646
J. M. Manson	Black Orpingtons	156	638
T. B. Hawkins	White Leghorns	141	637
*J. F. Dalrymple, N.S.W.	Rhode Island Reds	154	630
*A. E. Walters	White Leghorns	148	627
*E. A. Smith	Do.	149	627
W. Lyell	Do.	147	619
Geo. Prince	Do.	150	617
*E. F. Dennis	Do.	145	616
S. B. Tutin	Do.	144	613
Mrs. Munro	Do.	154	608
Mrs. W. D. Bradburne, N.S.W.	Do.	151	607
A. W. Bailey	Do.	145	602
T. Taylor	Do.	146	596
H. W. Broad	Do.	146	596
T. E. Jarman, N.S.W.	Do.	139	593
Kelvin Poultry Farm	Do.	154	593
H. Jobling, N.S.W.	Black Orpingtons	138	587
Cowan Bros., N.S.W.	Do.	135	587
R. Burns	S. L. Wyandottes	148	584
*C. Knoblauch	White Leghorns	144	580
*W. L. Forrest, N.S.W.	Do.	145	576
A. F. Camkin, N.S.W.	Do.	134	575
C. P. Buchanan	Do.	140	570
*J. H. Gill, Victoria	Do.	134	570
*E. West	Do.	148	569
*Kelvin Poultry Farm	Do.	140	567
F. Clayton, N.S.W.	Do.	141	565
Mrs. C. Davis	Do.	139	564
*W. H. Knowles, junr.	Do.	152	563
A. H. Padman, S.A.	Do.	146	562
P. Brodie	Do.	141	558
Mars Poultry Farm	Do.	142	552

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Sept.	Total.
King and Watson, N.S.W.	White Leghorns ...	143	541
E. F. Dennis	Black Orpingtons ...	160	541
E. Pocock	White Leghorns ...	155	540
W. Purvis, S.A.	Do.	157	540
J. Gosley	Do.	128	535
*J. H. Madrers, N.S.W.	Rhode Island Reds ...	139	535
*J. Anderson, Victoria	Red Sussex	112	534
J. Anderson, Victoria	White Leghorns ...	145	528
*J. W. Macrae	Black Orpingtons ...	151	526
W. Hirst, N.S.W.	White Leghorns ...	139	522
R. Burns	Black Orpingtons ...	142	522
T. Fanning	Do.	134	519
F. Clayton, N.S.W.	Rhode Island Reds ...	146	509
W. Becker...	White Leghorns ..	149	506
Cowan Bros., N.S.W.	Do. ...	147	503
J. G. Richter	Do.	137	496
Mars Poultry Farm	Black Orpingtons ...	151	481
W. H. Forsyth, N.S.W.	Do.	116	479
G. W. Holland	White Leghorns ...	143	462
L. K. Pettit, N.S.W.	Do.	136	436
Harveston Poultry Farm	Do.	142	432
F. W. Leney	Do.	141	418
H. Hammill, N.S.W.	Do.	143	400
W. Lindus, N.S.W.	Do.	130	391
A. T. Coomber	Sicilian Buttercups ...	134	387
Moritz Bros., S.A.	White Leghorns ...	146	386
F. W Leney	Rhode Island Reds ...	138	361
E. F. Dennis	White Wyandottes ...	132	342
Totals	...	10,545	41,330

* Indicates that the pen is engaged in single hen test.

RESULTS OF SINGLE HEN TEST.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
T. Fanning	130	135	134	133	117	103	752
J. Zahl	117	124	135	117	127	127	747
Mrs. Jobling	137	147	94	125	97	121	721
Miss Hinze	125	106	141	109	120	113	714
A. T. Coomber	126	133	122	98	106	120	705
J. M. Manson	100	140	106	108	130	102	686
Dixie Egg Plant	149	134	132	123	...	121	659
J. F. Dalrymple	108	90	127	73	116	116	630
A. E. Walters	114	133	97	87	119	77	627
E. A. Smith	131	108	99	124	80	85	627
E. F. Dennis	93	129	78	118	108	90	616
C. Knoblauch	101	100	86	83	104	106	580
W. L. Forrest	106	107	52	118	108	85	576
J. H. Gill	71	100	80	128	98	93	570
E. West	127	112	76	82	77	95	569
Kelvin Poultry Farm	92	81	100	75	123	96	567
W. H. Knowles, junr.	99	84	99	76	103	102	563
J. H. Madrers	71	113	106	98	84	63	535
J. Anderson	107	82	117	35	119	74	534
J. W. Macrae	58	126	109	79	70	84	526

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, OCTOBER, 1916.

Ten thousand six hundred and seventy-four eggs were laid during the month, an average of over 146 per pen. The weather has been very favourable for egg production. Mr. J. M. Manson's White Leghorns win the monthly prize with 167 eggs, closely followed by Cowan Bros. (166) and J. R. Wilson (165), all with White Leghorns. The following are the individual records :—

Competitors.	Breed.	Oct.	Total.
*T. Fanning	White Leghorns ...	157	909
*J. Zahl	Do.	155	902
*Miss Hinze	Do.	158	872
*A. T. Coomber	Do.	159	864
A. Howe, N.S.W.	Do.	152	864
*J. M. Manson	Do.	167	853
*Mrs. J. H. Jobling, Plattsburg, N.S.W.	Black Orpingtons ..	127	848
G. H. Turner	White Leghorns ...	159	845
W. Meneely	Do.	159	823
Dr. E. C. Jennings	Do.	148	817
J. R. Wilson	Do.	165	814
Geo. Tomlinson	Do.	162	808
*Dixie Egg Plant	Do.	132	791
J. M. Manson	Black Orpingtons ..	151	789
*A. E. Walters	White Leghorns ...	160	787
*E. A. Smith	Do.	155	782
*E. F. Dennis	Do.	163	779
T. B. Hawkins	Do.	141	778
Mrs Munro	Do.	158	766
*J. F. Dalrymple, N.S.W.	Rhode Island Reds ...	136	766
W. Lyell	White Leghorns ...	145	764
Geo. Prince	Do.	141	758
Mrs. W. D. Bradburne, N.S.W. ..	Do. ...	150	757
A. W. Bailey	Do.	150	752
T. Taylor	Do.	151	747
Kelvin Poultry Farm	Do.	152	745
T. E. Jarman, N.S.W.	Do.	148	741
H. W. Broad	Do.	145	741
S. B. Tutin	Do.	121	734
R. Burns	S.L. Wyandottes ...	143	727
Cowan Bros., N.S.W.	Black Orpingtons ...	140	727
*J. H. Gill, Victoria	White Leghorns ...	154	724
H. Jobling, N.S.W.	Black Orpingtons ..	137	724
*C. Knoblauch	White Leghorns ...	144	724
*E. West	Do.	154	723
*W. H. Knowles, junr.	Do.	154	717
*W. L. Forrest, N.S.W.	Do.	138	714
A. F. Camkin, N.S.W.	Do.	139	714
*Kelvin Poultry Farm	Do.	144	711
P. Brodie	Do.	150	708
F. Clayton, N.S.W.	Do.	142	707
W. Purvis, S.A.	Do.	164	704
C. P. Buchanan	Do.	133	703
Mrs. C. Davis	Do.	138	702
Mars Poultry Farm	Do.	149	701
A. H. Padman, S.A.	Do.	135	697
E. F. Dennis	Black Orpingtons ...	151	692

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Oct.	Total.
E. Pocock	White Leghorns ...	152	692
King and Watson, N.S.W.	Do.	149	690
J. Anderson, Victoria	Do.	153	681
T. Fanning	Black Orpingtons ...	154	673
Cowan Bros., N.S.W.	White Leghorns ...	166	669
W. Hirst, N.S.W.	Do.	147	669
W. Becker	Do.	159	665
*J. H. Madrers, N.S.W.	Rhode Island Reds ...	128	663
*J. W. Macrae	Black Orpingtons ...	134	660
R. Burns	Do.	134	656
*J. Anderson, Victoria	Red Sussex	121	655
J. Gosley	White Leghorns ...	114	649
F. Clayton, N.S.W.	Rhode Island Reds ...	137	646
J. G. Richter	White Leghorns ...	149	645
Mars Poultry Farm	Black Orpingtons ...	146	627
C. W. Holland	White Leghorns ...	159	621
W. H. Forsyth, N.S.W.	Black Orpingtons ...	122	601
Harveston Poultry Farm	White Leghorns ...	143	575
L. K. Pettit, N.S.W.	Do.	131	567
F. W. Leney	Do. ...	147	565
H. Hammill, N.S.W.	Do.	151	551
Moritz Bros., S.A.	Do.	159	545
W. Lindus, N.S.W.	Do.	149	540
A. T. Coomber	Sicilian Buttercups ...	135	522
F. W. Leney	Rhode Island Reds ...	135	496
E. F. Dennis	White Wyandottes ...	124	466
Totals	...	10,674	52,004

* Indicates that the pen is taking part in single hen competition.

RESULT OF SINGLE HEN TESTS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
T. Fanning	157	161	161	162	141	127	909
J. Zahl	140	151	164	143	152	152	902
Miss Hinze	148	133	170	135	148	138	872
A. T. Coomber	152	159	151	124	130	148	864
J. M. Manson	128	167	133	135	159	131	853
Mrs. J. Jobling	162	172	117	141	115	141	848
Dixie Egg Plant	172	160	162	150	...	147	791
A. E. Walters	142	160	125	111	143	106	787
E. A. Smith	158	136	126	151	102	109	782
E. F. Dennis	118	155	106	147	137	116	779
J. F. Dalrymple	124	115	151	102	142	132	766
J. H. Gill	95	125	109	153	126	116	724
C. Knoblauch	119	127	111	108	129	130	724
E. West	154	138	103	109	99	120	723
W. H. Knowles, junr....	121	111	123	102	133	127	717
W. L. Forrest	133	134	52	146	136	113	714
Kelvin Poultry Farm	113	109	124	97	151	117	711
J. H. Madrers	87	132	135	120	105	84	663
J. W. Macrae	80	149	129	107	93	102	660
J. Anderson	127	101	143	57	136	91	655

General Notes.

INCIDENCE OF THE NEW SCHEME OF TAXATION.

The new taxation proposals of the Commonwealth Government provide for an increase of 25 per cent. in the rate of the war income tax imposed last year. To set out for public information what the effect of this will be on individuals, the subjoined table has, at our request, been prepared for us ("Brisbane Courier").

Assuming a man had an income of £300 from personal exertion, and his ordinary deductions were £50, that would leave an income of £250. Presuming the exemption will be £100, he would then have a taxable income of £150. Under the old rate, the income tax payable would be £2 4s. 6d.; if 25 per cent. be added to the tax he would pay £2 15s. 7d. (the new rate).

In the case of incomes from property, the old and the new rates would be, respectively, £2 7s. 10d. and £3 9s. 9d., as shown in the property column of figures.

Statement showing the amount of Federal income tax payable under the old and proposed new rates after allowance of all usual deductions as well as the statutory exemption, which it is intended to reduce:—

Taxable Income.	Personal Exertion.		Property.	
	Old Rate.	New Rate.	Old Rate.	New Rate.
£	Tax. £ s. d.	Tax. £ s. d.	Tax. £ s. d.	Tax. £ s. d.
150	2 4 6	2 15 7	2 7 10	3 9 9
200	3 2 6	3 18 1	3 8 5	4 5 6
250	4 2 0	5 2 6	4 11 3	5 14 10
300	5 3 1	6 8 10	5 16 5	7 5 6
350	6 5 9	7 17 2	7 3 11	8 19 11
400	7 10 0	9 7 6	8 13 8	10 17 1
450	8 15 9	10 19 8	10 5 8	12 17 1
500	10 3 1	12 13 10	12 0 1	15 0 1
550	11 12 0	14 10 0	13 17 8	17 7 1
600	13 2 6	16 8 1	16 8 9	20 10 11
650	14 14 6	18 8 1	19 4 0	24 0 0
700	16 8 1	20 10 1	22 3 2	27 13 11
750	18 3 3	22 14 0	25 6 3	31 12 10
800	20 0 0	25 0 0	28 13 2	35 16 5
850	21 18 3	27 7 9	32 3 10	40 4 9
900	23 18 1	29 17 7	35 18 2	44 17 8
950	25 19 6	32 9 4	39 16 2	49 15 2
1000	28 2 6	35 3 1	43 17 9	54 17 2
2000	87 10 0	109 7 6	157 15 7	197 4 6
3000	178 2 6	222 13 1	323 13 7	404 12 0
4000	300 0 0	375 0 0	529 14 5	662 3 0
5000	453 2 6	566 8 0	760 18 1	951 2 7
6000	637 10 0	796 17 6	1,005 11 1	1,256 18 10

A CHEAP AND EFFECTIVE HAND BORING PLANT.

Contributed by Messrs. J. H. Bestmann and W. E. Bevan, Water Finders under the Lands Department.

The main desire of every man on the land is to obtain a permanent supply of water. Water being essential to either the farmer or grazier, he naturally, when choosing an area, endeavours to obtain one with a permanent creek or spring thereon. This unfortunately cannot always be obtained, hence there are many areas of good agricultural and grazing areas which are termed "dry."

To overcome this state of affairs the services of reputable water diviners are often obtained, and when a site has been located, either a bore or a well is sunk to tap the sub-artesian flows which, in practically every case, exist upon these areas.

To facilitate the finding of these sites the Queensland Government has appointed two water finders, whose duty it is to locate water with the aid of the rod and automatic water finder.

A site having been decided on, it is necessary to either sink a well or, in cases where the streams are too deep, to sink a bore. The latter is usually the preferable alternative.

Now, in many cases the farmer is either unable to wait for a boring plant to come along or is unable to pay for a bore being put down. In such circumstances the hand boring plant here shown will be found most effective, and can be constructed by a handy man. The idea was obtained from a selector in the Yamala district, Mr. Frank Ponton, who, being of an inventive turn of mind, constructed a similar plant for his own use, and finding it very successful, he was pleased to give the writers the idea for publication, so that it may aid some of his fellow-settlers on the land.

With a 3-inch sinker bar and jars Mr. Ponton sunk one hole for 5-inch casing 156 ft. through rock and clay, and upon another site he, with two others, sunk a hole 326 ft., 100 ft. of rock and clay and 226 ft. layers of hard slate shale and blue rock. In both bores Mr. Ponton averaged 12 ft. 6 in. per day, the biggest day being 18 ft. 10 in.

These results, we think, are sufficient to show the effectiveness of the plant. We have endeavoured to show the construction plainly upon the plan and specification, which it is hoped will be found to explain itself. If it is not quite understood, however, we shall be pleased to give any further information.

SPECIFICATION FOR A SPRING POLE HAND BORING PLANT.

The plant as shown is built of rough bush timbers. The shearlegs consist of four saplings, each 26 ft. long, 6 in. diameter at foot, and tapering to not less than 4 in. at head. The head is secured with a 1-in. bolt passing through the four legs. It is as well to either bind or put a small bolt through each head at right angles to the main bolt to prevent splitting.

Suspended on this main bolt, and hanging between the central and outside legs, is a wrought-iron "D" to carry two 6-in. pulleys. These pulleys take the sand pump line and the drill cable. The foot of each leg should rest on a solid foundation and be prevented from spreading by four saplings laid round the outside of same and pinned together with wooden pins. The two front legs should be 14 ft. apart and the two back ones 4 ft. apart and a space of 14 ft. between the front and back pair.

A set of "rungs" to form a ladder are now to be secured to the outside of the back legs. As shown on plan, set four uprights 2 ft. 6 in. in ground to form a frame to receive two windlasses, one for the sand line and the other for the drill cable. The top rails are to be mortised and tenoned and bolted with ½-in. bolts to these uprights and to the back shearlegs. An effective brake when lowering sand pump or drill can be made by using a sapling over the back rail and under the windlass. It is also necessary to drill holes in the side rails for the insertion of a bolt to be used as a stop against the windlass handles.

The spring pole is to be 30 ft. long, of ironbark or spotted gum, to be 4 in. diameter at smallest end, to be shaped and let well into a tree at heel and 8 ft. from ground. This heel in turn is kept in place by a bolt passing through the tree and heel.

Eight feet from the tree, at a height of 10 ft. from the ground, the spring pole is supported on a cross-tree. The cross-tree is constructed of 6-in. saplings bolted together, as shown on plan, and the toes let into a log which has been flattened on two sides. The cross-tree is kept in place by the weight of the pole and a chain round the tree and the cross-tree, to prevent it from sliding forward. A sapling against the foot of tree and leaning against the cross-tree just under the chain will prevent the cross-tree from slipping back, but owing to the angle of the pole this may not be found necessary, as the tendency is to slip out at the top. As the drill descends and the weight increases, the cross-trees can now be moved further out to stiffen the spring of the pole.

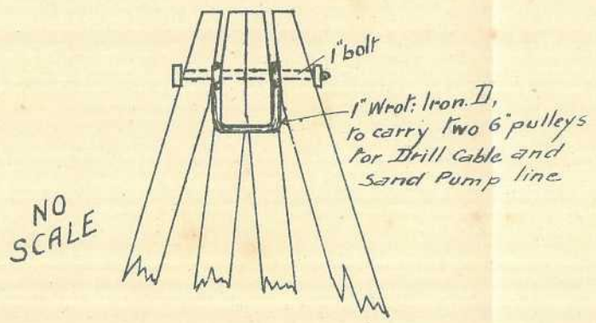
At the extreme end of pole, and level with the heel of shearlegs, secure a short rope and cross bar at a convenient height to the person about to work the pole. Directly under the point where the heads of the legs meet secure a ¾ ring and bolt; from this ring suspend a chain and clamp as shown. The drill cable is secured to the clamps, and when drilling the drill can be lowered by taking the weight on the windlass and dropping the drill another link, as shown on plan, and only when you have reached the end of the chain is it necessary to take a fresh hold of the rope in the clamp.

Together with the above construction the following gear is required:—

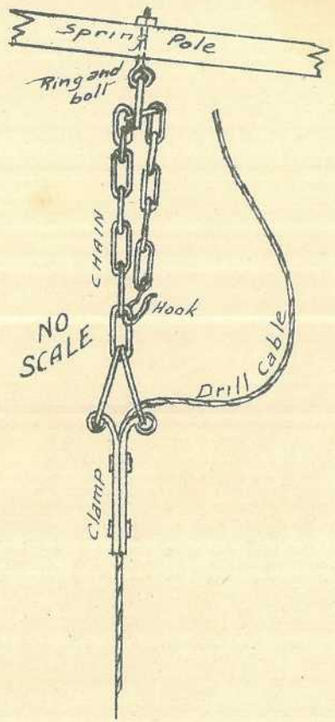
Set of 3-in. jars, one 3-in. sinker, bar, 6-in. drill (under cutting), 6-in. star drill, 6-in. drill chisel point, 6-in. earth socket, 6-in. reamer bit, 5-in. sand pump, 300 ft. drilling cable, 300 ft. sand pump line, together with all necessary spanners, pipe tongs, casing clamps, &c. A small blacksmith's portable forge and tools for doing up drills.

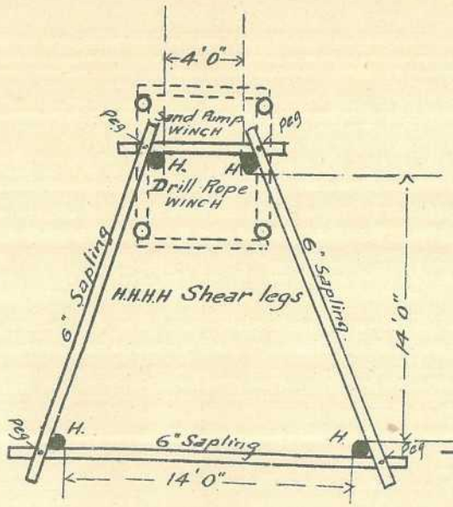
SPRING POLE PLANT
FOR
HAND BORING

Scale 8 feet to an Inch

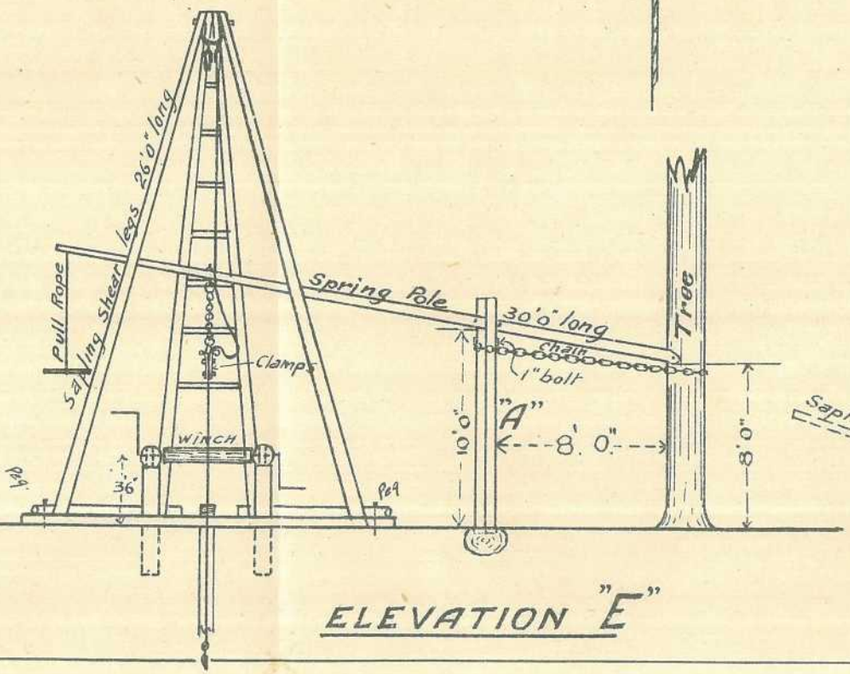


Plan showing construction at head of legs.

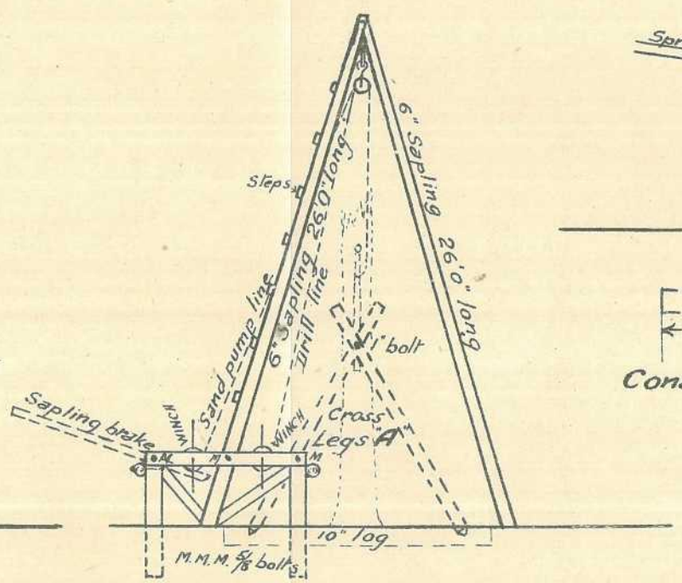




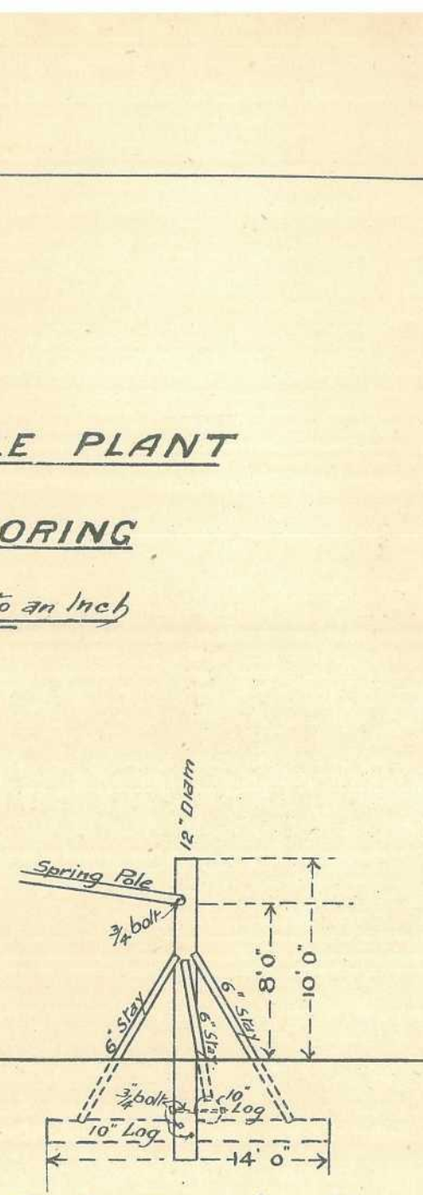
PLAN



ELEVATION "E"



ELEVATION "B."



Construction in lieu of tree

W.E.B.

SIMPLE STILLS FOR ESSENTIAL OILS.

Some weeks ago we were asked by a correspondent to furnish a description of a cheap form of still for extracting essential oil from various herbs and leaves. At the time we were unable to do so, but we have just received a copy of the "Agricultural News," of Barbados, West Indies, which describes and illustrates what seems to us to be the kind of still our correspondent wished to procure. The description is as follows:—

"With increasing attention to the production of the essential oil of Bay leaf and other essential oils, there arises a demand for a convenient type of still. In the 'West Indian Bulletin,' vol. IX., p. 276, suggestions were made for simple stills, two forms being described. Both types have been in experimental use for a number of years. As the result of this experience, it is found that the simple still of the first type there described is quite satisfactory in operation, but it has the defect that it soon corrodes and has to be entirely renewed.

"It occurs to the writer to suggest that if the still is constructed in segments, the corroded parts may be readily renewed at little expense and with little loss of time. Furthermore, should it be required to increase the capacity of the still, this may be done by adding segments.

"A still of the kind suggested is shown in the accompanying illustration. It consists of segments formed by riveting sheet-iron to rings of angle-iron, thus forming hollow drums which can be bolted together one on top of the other until a still of the required capacity is constructed. The bolts connecting the segments can be disconnected at any time for the replacing of a segment, while the joints between the rings can be made tight in the usual manner with asbestos or other packing.

" The sides of the drums may be made of sheet-iron of ⅛-in. thickness.

"The bottom of the still should be made of thicker material, and may be of ¼- or ⅜- in. iron sheet. In mounting the still over the fireplace, the ring with the bolts should be embedded in the mason work so as to protect it from the direct action of the fire. This will reduce the difficulty of removing the bolts when it becomes necessary to renew the bottom plate.

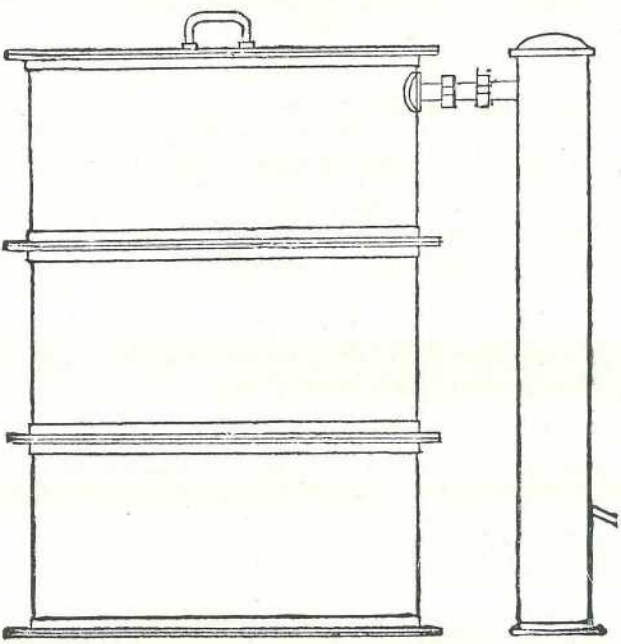
"The top of the still should also be made of ¼-in. to ⅜-in. iron sheet; it should be held in place by bolts and nuts (not shown in the drawing); these should be placed sufficiently close together to make a good joint, which may also be fitted with asbestos packing. A coating of blacklead on the cover will prevent this from sticking to the asbestos, and in this way the joint may be broken and renewed without difficulty.

" If the top bolts are permanently fixed in the angle-iron ring they will always be in place, and cannot be lost; the nuts may be winged so as to enable them to be screwed down by hand without the use of a spanner.

"Connection with the condenser may be made through the side of the upper segment and near the top. This is preferable to making the connection through the cover, for in this way the joint has not to be broken when the cover is removed.

"In the drawing the still is shown connected to an 'Ideal' condenser. As this is made of copper, it is suggested that the connection between the still and condenser should be made by means of a short length of flanged pipe made of vulcanite, so as to obviate galvanic action, which would be induced by the contact of iron and copper, and would lead to the corrosion of the still.

" The still is operated in the manner described in the ' West Indian Bulletin' above referred to. A perforated grating is fixed in the bottom segment at a convenient distance from the bottom; a sufficient quantity of water is placed at the bottom of the still, and the leaves or other material placed above the grating. For convenience in handling and removing, the leaves may be contained loosely in cages or baskets of iron wire; these baskets can be lifted out by means of the same hoist which is used to remove the cover, and this can be done without waiting for the still to cool.



"The hoist referred to may consist of a simple wooden tripod standing over the still, and provided with a pulley and hoisting rope.

"If the discharge orifice of the condenser can be placed at a height of some 3 ft. or so above the level of the water in the still, it is possible to arrange that the distilled water separating from the oil in the Florentine flask, commonly used as the collecting vessel, may be conducted by a pipe directly back to the still, thus maintaining a constant water-level in the still and obviating the risk of burning from lack of water; at the same time, it automatically leads to the recovery of any essential oil that may inadvertently escape in the waste water. To effect this, the condenser should be placed relatively much higher than is shown in the accompanying drawing. This may readily be done by lengthening the pipe connecting the still with the condenser. "F.W."

Apropos of the above, the following note on the extraction of oil from Eucalyptus leaves was lately published in the "Daily Mail," Brisbane:—

"A novel and truly Australian 'trade,' suitable for women, is the extraction of eucalyptus from the leaves of the gum-tree. Miss Roberts, of the Technical College, recently appealed to women to grow things and to make things, so that we would keep money in the country. 'Every woman in Australia must become a producer,' she said, 'and so lessen the amount of money sent out of the country.' Miss Roberts stated that a woman could earn £2 a week by extracting eucalyptus oil from the leaves.

"There are many examples throughout the State of sisters going in for farming, especially in the Moss Vale, Monaro, and Yass districts. As the work of eucalyptus-getting is clean and healthy, and not strenuous, there are great possibilities in it for women, and it would be very suitable for sisters. At present the majority of those who go in for this novel work use the most primitive tools imaginable. One outfit in the Cootamundra district a few years ago consisted of little beyond a few oil drums and kerosene tins.

"As very good oil is extracted from the suckers and from the younger leaves of saplings, there would be no occasion for a woman to climb the trees to get the leaves, though if she preferred the more mature leaves a bushwoman would be quite capable of that, if necessary. The blue gum is one of the best for the purpose.

"The leaves are cut and brought to a watercourse, where they are boiled. A large-sized copper or one of those galvanised iron tanks so common in country districts is most suitable. It must have a closely-fitting lid, as the steam which rises from the 'brew' is charged with the oil. This steam is led out of the copper by means of a pipe, which is bent down so as to run along the creek bed for a while. The cold waters on the pipe condense the steam within, and it falls into a vessel placed ready. The oil rises to the top and the water stays at the bottom of the drum or tin. Here we have the pure extract of eucalyptus. But the eucalyptus of commerce has various mixtures added to it. The oil as it is found in the tin brings about 6d. per lb. Two men working in a good area, with very primitive tools, are known to make from 12s. to 18s. a day without difficulty. This occupation would be just the thing for a woman whose health required her to live out of doors."

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR OCTOBER, 1916.

Article.		OCTOBER. Prices.
Bacon	lb.	9d. to 11d.
Barley	bush.	...
Bran	ton	£5
Broom Millet	,,	£18 to £25
Butter	cwt.	139s. 4d.
Chaff, Mixed	ton	£3
Chaff, Oaten	,,	£4 15s. to £5 10s.
Chaff, Lucerne	,,	£3 to £5 5s.
Chaff, Wheaten	,,	£3 15s. to £4 10s.
Cheese	lb.	9½d. to 10d.
Flour	ton	£12 5s.
Hams	lb.	1s. 3d. to 1s. 4d.
Hay, Oaten	ton	..
Hay, Lucerne	,,	£2 to £2 15s.
Honey	lb.	5d. to 6d.
Maize	bush.	3s. 6d. to 3s. 7½d.
Oats	,,	3s. 6d. to 4s.
Onions	ton	£6 to £7 10s.
Peanuts	lb.	3d. to 4d.
Pollard	ton	£5 15s.
Potatoes	,,	£9 to £11 10s.
Potatoes (Sweet)	cwt.	2s. 6d. to 4s.
Pumpkins (Cattle)	ton	£1 5s to £1 10s.
Eggs	doz.	8d. to 10d.
Fowls	pair	5s. 6d. to 7s.
Ducks, English	,,	4s. 9d. to 5s. 6d.
Ducks, Muscovy	,,	6s. 6d. to 7s. 6d.
Geese	,,	6s. to 8s. 6d.
Turkeys (Hens)	,,	10s. to 13s.
Turkeys (Gobblers)	,,	16s. to 25s.
Wheat	bush.	5s. to 5s. 3d.

VEGETABLES—TURBOT STREET MARKETS.

Cabbages, per dozen	6d. to 2s. 6d.
Beans, per sugar bag	9d. to 2s.
Beetroot, per dozen bunches	9d. to 1s.
Carrots, per dozen bunches	4d. to 9d.
Cauliflowers, per dozen	1s. to 5s.
Chocos, per quarter-case	1s. 6d. to 2s.
Celery, per bundle	1s. 3d. to 1s. 9d.
Cucumbers, per dozen	...
Custard Marrows, per dozen	1s. to 2s.
Vegetable Marrows, per dozen	1s. to 2s.
Lettuce, per dozen	4d. to 9d.
Parsnips, per dozen bunches	...
Peas, per sugar bag	1s. to 3s. 3d.
Sweet Potatoes, per sugar bag	1s. 3d. to 2s.
Table Pumpkins, per dozen	1s. 8d. to 3s.
Tomatoes, per quarter-case	5s. 6d. to 10s. 6d.
Turnips, per dozen bunches	4d. to 6d.
Rhubarb, per dozen bundles	6d. to 1s.

SOUTHERN FRUIT MARKETS.

Article.	SEPTEMBER. Prices.
Bananas (Queensland), per case	11s. to 14s.
Bananas (Fiji), per case	14s. 6d. to 15s. 6d.
Bananas (G.M.), per case	16s. to 18s.
Custard Apples, per tray	4s. to 6s.
Mandarins, per case	9s. to 15s.
Mangoes, per case	...
Oranges (Navel), per case	12s. to 18s.
Oranges (other), per case	6s. to 9s.
Passion Fruit, per half-case	4s. 6d. to 5s.
Lemons (Local), per bushel case	6s. to 10s.
Papaw Apples, per bushel-case	7s. to 9s.
Persimmons, per half-case	...
Pineapples (Queens), per double-case	8s. to 9s.
Pineapples (Ripleys), per double-case	6s. to 7s.
Pineapples (Common), per double-case	6s. to 7s.
Tomatoes, per quarter-case	7s. to 8s.
Strawberries (Queensland), per tray	2s. to 3s. 6d.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	OCTOBER. Prices.
Apples, per case	10s. to 12s.
Apples, Cooking, per case	7s. 6d. to 8s. 6d.
Bananas (Cavendish), per dozen	1¾d. to 5½d.
Bananas (Sugar), per dozen	1¾d. to 3½d.
Cape Gooseberries, per case	3s. to 5s. 6d.
Citrons, per cwt.	10s.
Cocoanuts, per sack	12s. to 15s.
Cumquats, per quarter-case	3s. 6d. to 4s. 9d.
Custard Apples, per quarter-case	4s. to 6s.
Granadillas, per quarter-case	...
Lemons (Lisbon), per case	7s. to 10s.
Limes, per quarter-case	...
Mandarins, per half-case	10s. to 16s.
Mangoes, per case	...
Oranges, (Navel), per case	12s. to 16s.
Oranges (other), per case	6s. to 9s.
Oranges (Seville), per cwt.	10s. to 12s.
Papaw Apples, per quarter-case	1s. 3d. to 2s.
Passion Fruit, per quarter-case	6s. to 10s.
Peaches, per quarter-case	...
Pears, per half-bushel case	7s. to 11s.
Peanuts, per pound	3d. to 4d.
Persimmons, per quarter-case	...
Plums, per case	...
Pineapples (Ripleys), per dozen	1s. 6d. to 2s. 9d.
Pineapples (Rough), per dozen	6d. to 1s.
Pineapples (Smooth), per dozen	1s. 6d. to 3s.
Quinces, per case	...
Rockmelons, per dozen	...
Rosellas, per sugar-bag	...
Strawberries, per dozen boxes	2s. to 5s.
Tomatoes, per quarter-case	5s. 6d. to 10s. 6d.
Piemelons, per cwt.	7s. to 8s.
Watermelons, per dozen	...

TOP PRICES, ENOGGERA YARDS, SEPTEMBER, 1916.

Animal.	SEPTEMBER. Prices.
Bullocks	£18 10s. to £22
Bullocks (Single)	...
Cows	£11 12s. 6d. to £13 15s.
Merino Wethers	35s.
Crossbred Wethers	40s. 3d.
Merino Ewes	26s. 6d.
Crossbred Ewes	30s. 9d.
Lambs	31s. 9d.
Pigs (Porkers)	...
Pigs (Slips)	...

LONDON QUOTATIONS.

London, 7th October.

Danish butter has recovered to 210s. per cwt., though little business is being done.

The market for frozen rabbits is steady, and prices are unchanged.

Hemp, December-February shipment, is quoted at £49 10s. per ton.

Rubber: Fine, hard Para, 3s. 2½d. per lb.; plantation, first latex crepe, 2s. 4⅞d.; smoked sheet, 2s. 4⅜d.

Copra, South Sea, September-October shipment, £32 5s. per ton.

Raw linseed oil, spot pipes, £39 5s. per ton.

The Liverpool quotation for middling American cotton, October-November shipment, is 9·79d. per lb.

The jute market is firm. September-October shipment from Calcutta is quoted at £34 per ton.

Hemp is firm. October-December shipment, £50.

Rubber, fine, hard Para, 3s. 3d. per lb.; plantation, first latex crepe, 2s. 5⅜d.; smoked sheet, 2s. 4⅞d.

Copra, South Sea, October-December shipment, £33 10s. per ton.

Raw linseed oil, spot pipes, £39 10s. per ton.

The Liverpool quotation for middling American cotton, October-November shipment, is from 10d. to 9.11d. per lb.

SEA ISLAND COTTON MARKET.

In reference to the sales of West Indian Sea Island cotton in Liverpool, Messrs. Wolstenholme and Holland state in their report, dated 24th July, 1916, as follows:—

"A fair business has been done in West Indian Sea Island since our last report, most of the sales having been delivered on the forward contract. About 200 bales have been sold, chiefly Antigua 13d. to 16¾d., Virgin Islands 15½d., St. Eustatius 13d. to 16½d., together with a few superior St. Kitts at 20d. Prices generally are firm."

HEMP MARKET.

Messrs. Landauer and Co., London, in their last fortnightly market report, state that Mexican sisal continues to be without interest as far as the European markets are concerned. Mauritius hemp (Furcrea)—spot values, £46 to £47 per ton for prime and £44 to £45 for medium quality. British East African sisal—sales have been made at £50 to £53 per ton, according to quality. Tow, £31 to £37 10s. per ton.

ASTRONOMICAL DATA FOR QUEENSLAND.

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

TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON FOR THE THIRD FOUR MONTHS OF 1916.

Date.	September.		October.		November.		December.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·3	5·33	5·29	5·47	4·59	6·5	4·46	6·28
2	6·2	5·33	5·28	5·48	4·58	6·6	4·46	6·29
3	6·1	5·34	5·27	5·48	4·57	6·7	4·46	6·29
4	6·0	5·34	5·26	5·49	4·56	6·8	4·46	6·30
5	5·59	5·35	5·25	5·49	4·55	6·8	4·46	6·31
6	5·58	5·36	5·24	5·50	4·55	6·9	4·46	6·31
7	5·57	5·36	5·23	5·50	4·54	6·10	4·46	6·32
8	5·56	5·37	5·22	5·51	4·54	6·10	4·46	6·33
9	5·55	5·37	5·20	5·51	4·53	6·11	4·47	6·34
10	5·54	5·38	5·19	5·52	4·52	6·11	4·47	6·34
11	5·53	5·38	5·18	5·52	4·52	6·12	4·47	6·35
12	5·52	5·39	5·17	5·53	4·51	6·12	4·47	6·36
13	5·51	5·39	5·16	5·53	4 51	6·13	4·47	6·36
14	5·50	5·40	5·15	5·54	4·50	6·13	4·48	6·37
15	5·48	5·40	5·14	5·54	4·50	6·14	4·48	6·38
16	5·47	5·41	5·13	5·55	4·50	6·15	4·48	6·38
17	5·46	5·41	5·12	5·56	4·49	6·16	4·49	6·39
18	5·45	5·41	5·11	5·56	4·49	6·17	4·49	6·40
19	5·43	5·42	5·10	5·57	4·48	6·18	4·49	6·40
20	5·42	5·42	5·9	5·57	4·48	6·19	4·50	6·41
21	5·41	5·43	5·8	5·58	4·47	6·20	4·50	6·41
22	5·40	5·43	5·7	5·58	4·47	6·21	4·51	6·42
23	5·38	5·44	5·6	5·59	4·47	6·22	4·51	6·42
24	5·37	5·44	5·5	5·59	4·47	6·23	4·52	6·43
25	5·36	5·44	5·5	6·0	4·47	6·23	4·52	6·43
26	5·35	5·45	5·4	6·1	4·46	6·24	4·53	6·44
27	5·34	5·45	5·3	6·1	4·46	6·25	4·53	6·44
28	5·33	5·46	5·2	6·2	4·46	6·25	4·54	6·45
29	5·32	5·46	5·1	6·3	4·46	6·26	4·55	6·45
30	5·30	5·47	5·0	6·3	4·46	6·27	4·55	6.46
31	...	...	5·0	6·4	...	...	4·56	6·46

The Phases of the Moon commence at the times stated below in Queensland, New South Wales, Victoria, and Tasmania.

			H.	M.	
5	Sept.	☾ First Quarter	2	26	p.m.
12	„	○ Full Moon	6	31	a.m.
19	„	☽ Last Quarter	3	35	p.m.
27	„	● New Moon	5	34	„

The moon will be nearest the earth on the 9th at 11·24 p.m., and farthest from the earth on the 21st at 7·36 p.m.

4	Oct.	☾ First Quarter	9	0	p.m.
11	„	○ Full Moon	5	1	„
19	„	☽ Last Quarter	11	8	a.m.
27	„	● New Moon	6	37	„

The moon will be nearest the earth on the 7th at 8·30 a.m., and on the 19th, at 3·12 p.m., at its farthest distance.

3	Nov.	☾ First Quarter	3	50	a.m.
10	„	○ Full Moon	6	18	„
18	„	☽ Last Quarter	8	0	„
25	„	● New Moon	6	50	p.m.

The moon will be nearest the earth on the 1st at 4·48 a.m., and on the 28th at 5·42 a.m.; it will be farthest from the earth on the 16th at noon.

2	Dec.	☾ First Quarter	11	55	a.m.
9	„	○ Full Moon	10	44	p.m.
18	„	☽ Last Quarter	4	6	a.m.
25	„	● New Moon	6	31	„
31	„	☾ First Quarter	10	7	p.m.

The moon will be farthest from the earth on the 14th at 6·48 a.m., and nearest on the 26th at 10·30 a.m.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during September, October, November, and December may be roughly arrived at by adding 16 minutes to those given above for Brisbane.

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

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

A fair approximation to the times of sunrise and sunset at Rockhampton can be obtained for November by adding 16 minutes to the Brisbane time for sunrise but only 4 minutes to the Brisbane time for sunset.

These figures will not do for other months; for example, in June 1 minute should be added for sunrise and 19 minutes for sunset.

Clocks at Rockhampton should give the same time as at Brisbane; the standard time being the same throughout Queensland, New South Wales, and Victoria. The same standard time was used in Tasmania till the introduction of the daylight saving principle.

The following table gives the times of sunrise and sunset at Rockhampton for November:—

ROCKHAMPTON, 1916.

Date.	Rises.	Sets.	Date.	Rises.	Sets.
1 November	5·14	6·9	16 November	5·5	6·20
2 ,, ..	5·13	6·10	17 ,, ..	5·5	6·21
3 ,, ..	5·12	6·11	18 ,, ..	5·5	6·22
4 ,, ..	5·11	6·12	19 ,, ..	5·5	6·22
5 ,, ..	5·11	6·13	20 ,, ..	5·5	6·23
6 ,, ..	5·10	6·13	21 ,, ..	5·5	6·23
7 ,, ..	5·9	6·14	22 ,, ..	5·4	6·24
8 ,, ..	5·9	6·14	23 ,, ..	5·4	6·25
9 ,, ..	5·8	6·15	24 ,, ..	5·4	6·25
10 ,, ..	5·8	6·15	25 ,, ..	5·4	6·26
11 ,, ..	5·7	6·16	26 ,, ..	5·4	6·26
12 ,, ..	5·7	6·17	27 ,, ..	5·4	6·27
13 ,, ..	5·6	6·18	28 ,, ..	5·4	6·28
14 ,, ..	5·6	6·19	29 ,, ..	5·4	6.29
15 ,, ..	5·6	6·20	30 ,, ..	5·4	6·30

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF SEPTEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING SEPTEMBER, 1916 AND 1915, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Sept.	No. of Years' Records.	Sept., 1916.	Sept., 1915.
North Coast.	In.		In.	In.
Atherton	0·54	15	1·70	Nil
Cairns	1·65	34	4·50	Nil
Cardwell	1·44	44	2·36	0·10
Cooktown	0·56	40	0·47	0·04
Herberton	0·46	29	1·42	0·04
Ingham	1·09	24	0·75	0·24
Innisfail	3·58	35	6·49	Nil
Mossman	1·38	4	3·36	Nil
Townsville	0·81	45	0·03	0·06
Central Coast.				
Ayr	1·79	29	0·15	0·48
Bowen	0·87	45	0·84	0·01
Charters Towers ...	0·85	34	0·03	0·50
Mackay	1·59	45	0·44	0·20
Proserpine	2·15	13	3·32	0·01
St. Lawrence ...	1·38	45	0·27	1·71
South Coast.				
Biggenden	1·66	17	2·25	2·65
Bundaberg	1·81	33	4·23	0·28
Brisbane	2·04	65	2·81	1·57
Childers	1·98	21	3·24	3·28
Crohamhurst ...	2·34	23	5·18	4·93
Esk	2·26	29	2·85	2·36
Gayndah	1·58	45	1·46	1·04
Gympie	2·10	46	4·03	3·18
Glasshouse M'tains	1·71	8	3·13	2·76
Kilkivan	1·75	37	1·69	0·79
Maryborough ...	1·94	45	3·81	2·94

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Sept.	No. of Years' Records.	Sept., 1916.	Sept., 1915.
South Coast—continued:	In.		In.	In.
Nambour	2·28	20	5·06	3·17
Nanango	1·83	34	2·98	2·43
Rockhampton ...	1·35	29	0·92	2·33
Woodford	2·12	29	3·77	2·71
Darling Downs.				
Dalby	1·78	46	0·86	1·55
Emu Vale	1·79	20	2·34	0·67
Jimbour	1·62	28	0·50	1·20
Miles	1·41	31	0·45	0·93
Stanthorpe ...	2·47	43	1·80	1·81
Toowoomba ...	2·19	44	3·63	0·83
Warwick	1·88	29	1·32	0·61
Maranoa.				
Roma	1·54	42	0·77	0·67
State Farms, &c.				
Bungeworgorai ...	0·77	4	0·77	0·91
Gatton College ...	1·54	17	1·84	1·12
Gindie	0·85	17	0·06	1·07
Hermitage ...	1·45	10	1·54	0·73
Kairi	1·21	4	1·76	Nil
Kamerunga ...	1·31	27	4·44	Nil
Sugar Experiment Station, Mackay	1·49	19	...	0·53
Warren	0·24	4	0·53	0·08

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for September this year and for the same period of 1915, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
Divisional Officer.

Farm and Garden Notes for December.

Too much care can scarcely be bestowed upon potatoes dug up this month to protect them from the sun. They should be dug or ploughed out as soon as the skin is firm, as they are liable to rot in the ground owing to the great heat.

FIELD.—The wheat harvest will be now nearing completion, and to all appearance, while the results are not likely to contribute a record, owing to the dry spell in the early stages of the crop, still the subsequent seasonable rains effected a wonderful change in the young crops, which throve amazingly, and in October gave promise of a bountiful crop pretty well all over the wheat districts. Up to the middle of October there were scarcely any signs of rust. The estimates of the probable yield have varied so considerably that it will be well to wait until the entire harvest is over before speculating on the result. This State is a long way from becoming a wheat-exporting country. The principal factor operating against a still greater extension of the wheatgrowing industry is that many farmers who formerly grew wheat and barley have turned their attention to dairying, which offers larger and quicker returns.

Given favourable weather, maize, panicum, imphee, kafir corn, and the various millets may be sown.

KITCHEN GARDEN.—Gather cucumbers, melons, vegetable marrows, and French beans as soon as they are fit for use. Even if they are not required, still they should be gathered, otherwise the plants will leave off bearing. Seeds of all these may be sown for a succession. Sow cabbage and cauliflower seed. Great difficulty will be experienced in getting these to grow at this season, and the plants will consequently be more valuable in proportion. Tomatoes should be in full bearing, and the plants should be securely trained on trellises or stakes. Take up onions, and spread them out thinly on the barn floor until the tops wither sufficiently to pull off easily. They should then be graded into sizes, and sent to market or stored in a cool place. Where there is an unlimited supply of water, and where shade can be provided, lettuce and other salad plants may still be sown. All vacant ground should be well manured and dug two spits deep. Manure and dig as the crops come off, and the land will be ready for use after the first shower.

FLOWER GARDEN.—Keep the surface of the land well stirred. Do not always stir to the same depth, otherwise you are liable to form a "hard pan," or caked surface, beneath the loose soil. Alternate light with deep hoeings. A few annuals may still be planted, such as balsams, calendulas, cosmos, coreopsis, marigold, nasturtium, portulaca, zinnia,

and cockscomb. Plant out whatever amaranthus may be ready. These may still be sown in boxes. Clear away all annuals which have done flowering. Bulbs should have all the dead leaves cut away, but the green leaves should not be touched. Stake chrysanthemums, and, as the flower buds develop, give them weak liquid manure. Coleus may now be planted and propagated from cuttings. Dahlias are in various stages, but the greater part will have been planted by this time. Give them liquid manure, and never let them dry up. Lift narcissus about the end of the year, but do not store them. Plant them out at once in their new positions. Top-dress all lawns.

Orchard Notes for December.

THE SOUTHERN COAST DISTRICTS.

December is somewhat an off month for pines, though bananas should be improving both in quality and quantity. The purely tropical summer ripening fruits are not yet ready, and, consequently, there is only a limited supply of fruit in this part of Queensland during the month.

Early ripening varieties of grapes will mature, and care should be taken to market them in good order. The first fruit to ripen should be put up in small packages, as, if marketed in this manner, it will fetch a better price, but as it becomes more plentiful it can be packed in larger cases.

Pay particular attention during the month to all peaches, apples, pears, Japanese plums, or other fruits that are liable to be attacked by fruit fly, and see that no fly-infested fruits are allowed to lie about under the trees, and thus breed out a great crop of flies that will be ready to destroy the grape and mango crops as they mature.

If the month is dry see that the orchard is kept well worked so as to retain moisture in the soil, and, in any case, even should there be a good rainfall, it is necessary to cultivate in order to keep down weed growth, as if weeds are not kept in check now there is little chance of their being kept in hand once the January and February rains set in.

The planting out of pineapples, bananas, and most kinds of tropical fruits can be carried out during the month, especially if there is any rainy weather; but, if the weather is dry, it is better to defer the planting out of tropical fruits till January or February.

The cyaniding of citrus trees can be continued when necessary, and where Maori or orange mite is showing it should be checked at once, as Maori fruit is of no use for the Southern markets, and is unsuitable for export to the old country,

THE TROPICAL COAST DISTRICTS.

Clean up all orchards and pineapple and banana plantations as long as you have the chance of fine weather, so as to have your land in good order when the wet season commences, as once the rain sets in there is little chance of fighting weeds. Watch bananas carefully for fly, and market the fruit in good order. Handle the crop of pines carefully; don't let the fruit get too ripe, as an over-ripe Northern pine is tasteless. The fruit should be cut as soon as it is fully grown, as even when quite green the rough-leaf varieties have usually developed sufficient sugar to suit most persons' taste. Pack carefully to prevent bruising, and they will carry South in good order.

Only send high-class mangoes South—bad-flavoured sorts, and stringy, carroty, or turpentine flavoured varieties are not worth shipping. High-class fruit will pay to handle carefully, but there is no demand for rubbish, and I am sorry to say that fully 90 per cent. of the mangoes grown in the State must be classed under the latter heading.

Tropical fruits of all kinds can be set out during suitable weather. Fruit pests of all sorts must be systematically fought.

THE SOUTHERN AND CENTRAL TABLELANDS.

December is a busy month for the growers in the Stanthorpe district. Early apples, plums, peaches, nectarines, &c., will ripen during the month, and must be marketed as soon as ripe, as they do not keep long once they are gathered. Handle carefully, and grade better; there is far too much early rubbish slumped on to the local markets, which tends to spoil the demand as well as the price. Watch the orchards very carefully for Codling moth and fruit fly, and take every possible precaution to keep these pests in check should they make their appearance, as the future cleanliness of the orchard depends very largely on the care that is taken now to keep these pests in check.

If the month is dry, keep the orchard and vineyard well cultivated. Watch the vines carefully so as to detect the first signs of Oidium or Anthracnose, and systematically fight these pests, remembering always that in their case prevention is better than cure, and that only prompt action is of the slightest value.

On the Darling Downs every care must be taken to keep the fruit-fly in check, and on no account must infested fruit be allowed to lie about under the trees, as this is far and away the best method of propagating the pest wholesale.

In the Central District the grape crop will ripen during the month. Handle the fruit carefully. Cut it when dry, and where it has to be sent long distances to market pack in 6-lb. baskets rather than in larger cases. Where dry keep the orchard and vineyard well cultivated, and where the citrus and other fruit trees require it give them an irrigation. Don't irrigate grapes once the seeds have been formed, as it tends to deteriorate the quality, and to make the fruit tender and consequently to carry badly.