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# QUEENSLAND AGRICULTURAL JOURNAL

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## Event and Comment.

### The Current Issue.

"The Sweet Potato," with illustrations in colour, is strongly featured in this issue. An abridged report of the Fruitgrowers' Conference, at which concrete proposals for better organisation of the industry were considered, covers many matters of interest to agriculturists generally. The whole farming industry will naturally be interested in the aim of the orchardists towards working out their economical salvation on tested co-operative lines and the development of that aim will be watched very closely by all concerned. The second instalment of a special contribution on irrigation in Queensland dealing with the Burdekin and other sugar district projects, is opportune in view of awakened public interest in closer settlement. A paper on some faults in the manufacture of cheese will be useful to those engaged in one of our rapidly expanding industries. In a continuation of a summary of experiments by the Bureau of Sugar Experiment Stations some valuable tables of soil and other chemical analysis are presented. The full text of the Governor's Speech, containing an important agricultural programme for the current Parliamentary session, will be read with interest. The regular features include some valuable entomological notes from the Northern sugar areas, and contain generally much useful information. This number is well and profusely illustrated.

### Agriculture and the University.

The Senate of the Queensland University has under consideration definite proposals for an agricultural education scheme. Widespread public interest has been aroused by various authoritative references to the possibilities of a co-ordinated scheme of agricultural education, leading right from the primary schools up to, and including the University. The transfer of the Gatton Agricultural College from the Department of Agriculture to the Department of Public Instruction would seem to indicate that this institution, instead of remaining a detached fragment as heretofore, in the general scheme of State education, is now to take its place in one co-ordinated scheme of agricultural education.

## The Fruit Industry and Its Difficulties.

At the recent conference of fruitgrowers arranged by the Council of Agriculture a decisive stage was reached on the march towards effective organisation. Though some time was wasted over non-essentials, the conference got down to hard business in the proposals that were ultimately adopted. The Committee of Direction, in its efforts to give effect to the definite proposals agreed to by the conference will, however, find the track ahead anything but easy going. The enormous difficulties facing the fruitgrowers have become evident by the operation of the Federal fruit pools, and those difficulties will continue until the selling end of the industry is completely organised. The problem of marketing must be tackled energetically, and, judging by the tone of the conference, the ability displayed by the delegates and their constructive criticism of the proposals, the problem is seen by those concerned in its right perspective. On the main point at issue—the securing of Parliamentary authority for the Committee of Direction—the conference was practically unanimous, and there is every reason to believe that through this committee the growers will exercise a power to control effectively the marketing of their products. The use of this power will not necessarily mean the substitution of existing methods and channels of distribution, but will make, rather, for more efficient handling and marketing in the interests of all connected with the industry, including those directing existing agencies. At present growers have to bear all seasonal risks, pay full prices for fertilisers, plant, and other material necessary for production, engage in a never-ending fight against pests, and, from a marketing point of view, they are handicapped by the perishable nature of their produce. On top of all these disabilities is an archaic marketing system. The simple desires of the growers may be reduced to the placing of the industry on a sound foundation and the securing of net returns in reasonable ratio to the cost of production.

## The Conference Scheme in Brief.

By a system of well-organised marketing it is aimed to reduce the risks of recurring gluts that benefit neither the man in the field nor the man in the market, and to stabilise prices so that heavy crops will not necessarily mean low returns. Changes, if any, in existing methods will be brought about gradually. Control of the industry will be vested in a Committee of Direction, representing all sections of the industry in all parts of the State. The committee will connect closely with the growers through sectional groups. In pineapples, bananas, and citri, the sectional groups will correspond to the advisory council's elected by the several sections; but in respect to Stanthorpe deciduous fruits, the District Council of Agriculture, with representatives of other deciduous fruit-producing areas, like Roma and Pinkenba, where grapes are extensively grown, will assume the necessary responsibility. With this arrangement in force, the policy of the Committee of Direction will be reviewed from time to time and its members kept in touch with the requirements of each section represented on that body. The success, or otherwise, of the scheme will depend upon the growers themselves. In its nature it is evolutionary and it will certainly be some time before its benefits will be felt. A practical working basis must first be established and then should follow an extension of operations on common-sense business lines.

## The Meat Industry—Scheme for Uplift.

As a result of representations made by a number of local producers' associations, whose members are interested in grazing, a Graziers' Subcommittee has been constituted by the Council of Agriculture for the purpose of evolving a scheme for improving the conditions affecting the beef cattle industry. At its first meeting the subcommittee realised that if anything of a practical nature were to be achieved it would be necessary to obtain the support of all organisations interested. At the June meeting of the Council of Agriculture it was, therefore, decided that a joint committee representative of the Council, State Meat Advisory Board, Cattle Owners' Association, and the Roma Conference be appointed for the purpose of unifying the activities of the various organisations with a view to definitely alleviating the lamentable conditions at present surrounding one of the most important industries of the State. At a subsequent meeting of the joint committee nineteen more cattle owners from all parts of the State, who had attended to hear the discussion, were appointed. An outcome of the proceedings was the appointment of a strong and representative subcommittee carrying instructions to formulate a scheme embodying the principle of compulsory co-operation connected with the sales of Queensland cattle, providing for the retention of entire control by the cattle owner, and the charging of the necessary administrative fund to the proceeds of sales. The decisions of the graziers were conveyed by deputation to the Minister for Agriculture and Stock (Hon. W. N. Gillies), who advised the deputation to work under the auspices of the Council of Agriculture. The Minister promised to refer the proposals to the Council and consult the Crown Solicitor as to their legal aspect.

# A SUMMARY OF SOME EXPERIMENTS CARRIED OUT BY THE BUREAU OF SUGAR EXPERIMENT STATIONS.—VIII.

*The Director of Sugar Experiment Stations, Mr. H. T. Easterby, commenced this series in the May (1922) Journal, and in his opening article discussed deep cultivation experiments and tabulated comparative crop result from subsoiled and non-subsoiled fields. The second instalment, an account of results of irrigation experiments and the action of irrigation and manures upon the density and purity of sugar juices, appeared in the June (1922) issue. In the August number Mr. Easterby's notes covered experiments in fertilisation, and were followed in the succeeding issue by an account of distance experiments and resultant crops. In the October (1922) number the summary was continued with notes on the introduction and testing of cane varieties. In the February Journal experiments to determine if cane sets cut from arrowed canes have a prejudicial effect on the germination and subsequent yield were discussed. In his introduction to the Summary of Experiments above mentioned, the Director stated that a summary of the chemical work accomplished by the Bureau, to be prepared by Mr. George R. Patten, formerly Chief Chemist to the Bureau, would also be presented. Mr. Patten has now completed this summary, which entailed a great deal of elaborate work and occupied much time. The results will appear from time to time in the Journal until complete, when the whole summary will then be published in bulletin form.—Ed.*

## SOIL AND OTHER CHEMICAL ANALYSES—*continued.*

Summarised by GEORGE R. PATTEN, Analyst, Agricultural Laboratory, Brisbane, formerly Chief Chemist, Bureau of Sugar Experiment Stations.

The following summary includes the average analyses of Hatton (Mackay) and Alton Downs (Rockhampton) soils. Typical examples of good, bad, and wallum soils, average agricultural analyses of composite samples of soils from different districts, also showing solvent action of various acids in a 1 per cent. solution on composite soils, and water absorption and retentive power of soils. Further tables are included comprising the nitrogen and ash analyses of sugar-cane.

AVERAGE ANALYSES OF HATTON (MACKAY) AND ALTON DOWNS (ROCKHAMPTON) SOILS.

| | TOTAL ELEMENTS IN SOIL. | | | | AVAILABLE ELEMENTS IN SOIL. | | |
|---|---|---|---|---|---|---|---|
| | Lime. | Potash. | Phosphoric Acid. | Nitrogen. | Lime. | Potash. | Phosporic Acid. |
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| Hatton (Mackay) .. .. | 0·615 | 0·235 | 0·203 | 0·154 | 0·1112 | 0·0046 | 0·0024 |
| Alton Downs (Rockhampton) | 1·520 | 0·325 | 0·166 | 0·150 | 0·4616 | 0·0072 | 0·0038 |

| | TOTAL POUNDS PER ACRE. | | | | AVAILABLE POUNDS PER ACRE. | | |
|---|---|---|---|---|---|---|---|
| | Lime. | Potash. | Phosphoric Acid. | Nitrogen. | Lime. | Potash. | Phosphoric Acid. |
| Hatton (Mackay) .. .. | 22,487 | 6,600 | 6,525 | 3,800 | 3,170 | 192 | 57·5 |
| Alton Downs, (Rockhampton) | 38,000 | 8,125 | 4,650 | 3,750 | 11,540 | 180 | 95 |

The Hatton soils compare favourably with those of other sugar districts. In regard to total elements they are for the most part well up to standard, though the available potash is rather low. This, however, is a matter which may improve on cultivation, as the total amount is quite up to standard, and apparently only requires being made available.

TYPICAL EXAMPLES OF GOOD AND BAD SOILS FOR SUGAR OR ANY OTHER KINDS OF AGRICULTURAL CROPS.

| Soil. | TOTAL ELEMENTS IN SOIL. | | | | AVAILABLE ELEMENTS IN SOIL. | | |
|---|---|---|---|---|---|---|---|
| | Lime. | Potash. | Phosphoric Acid. | Nitrogen. | Lime. | Potash. | Phosphoric Acid. |
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| Good .. .. | ·916 | ·344 | ·188 | ·103 | ·1650 | ·0344 | ·0078 |
| Bad .. .. | ·210 | ·250 | ·160 | ·173 | ·0087 | ·0049 | ·0003 |
| Wallum .. .. | ·063 | ·061 | ·072 | ·042 | ·0097 | ·0036 | ·0012 |

ELEMENTS PER ACRE TO THE DEPTH OF ONE FOOT.

| | TOTAL POUNDS PER ACRE. | | | | AVAILABLE POUNDS PER ACRE. | | |
|---|---|---|---|---|---|---|---|
| | Lime. | Potash. | Phosphoric Acid. | Nitrogen. | Lime. | Potash. | Phosphoric Acid. |
| Good .. .. | 27,480 | 10,320 | 5,640 | 3,090 | 4,950 | 1,032 | 234 |
| Bad .. .. | 6,200 | 7,500 | 4,800 | 5,190 | 261 | 147 | 9 |
| Wallum .. .. | 1,575 | 1,525 | 1,800 | 1,050 | 243 | 90 | 30 |

These examples are given—first, on account of their general value, showing the wide differences in the chemical composition of "good" and "bad" soils; and secondly, because of special examples, which accentuate the great difference described and also showing the essential need of soil analyses.

The two tables next set out represent the average agricultural analyses of composite samples of soil from the sugar districts between Bundaberg and Mossman, also the relative solvent action of various acids upon such composite samples. For lands upon which sugar-cane is grown, Maxwell's aspartic acid method was considered the most useful, and the one which approximates most closely in showing the amount of the necessary elements available for cane crops.

AVERAGE AGRICULTURAL ANALYSES OF COMPOSITE SAMPLES OF SOIL.

| Locality. | Moisture. | Volatile Matter. | Insoluble Residue. | Chlorine. | Phosphoric Acid. | Ferric Oxide. | Alumina. | Lime. | Magnesia. | Potash. | Soda. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent |
| Mossman, Hambledon, Mulgrave (alluvial) | 1·717 | 6·029 | 74·653 | ·003 | ·136 | 4·122 | 8·940 | ·271 | ·435 | ·481 | ·180 |
| Innisfail, Mourilyan, Halifax, Ripple Creek, and Ingham (alluvial) | 2·808 | 7·696 | 71·644 | ·003 | ·164 | 5·414 | 10·941 | ·324 | ·472 | ·240 | ·152 |
| Innisfail and Mulgrave (bastard red soils) | 3·444 | 13·182 | 50·953 | ·004 | ·264 | 13·009 | 18·592 | ·159 | ·256 | ·248 | ·157 |
| Mackay and Proserpine (alluvial) | 2·349 | 6·760 | 79·013 | ·004 | ·174 | 3·969 | 5·932 | ·753 | ·520 | ·200 | ·207 |
| Burdekin (alluvial) .. | 2·334 | 6·139 | 80·439 | ·004 | ·187 | 3·414 | 5·166 | ·958 | ·734 | ·348 | ·144 |
| Isis Level Land Soils (volcanic) | 2·558 | 11·255 | 53·943 | ·003 | ·247 | 14·336 | 16·726 | ·344 | ·277 | 186 | ·092 |
| Woongarra, Bundaberg (volcanic) | 3·733 | 13·985 | 43·641 | ·004 | ·407 | 15·267 | 21·613 | ·604 | ·329 | ·139 | ·130 |
| Bingera (red soils) .. | 1·965 | 8·436 | 69·210 | ·009 | ·201 | 6·548 | 12·842 | ·365 | ·177 | ·187 | ·114 |

TABLE SHOWING THE SOLVENT ACTION OF VARIOUS ACIDS UPON COMPOSITE SAMPLE OF SOILS USING 1 PER CENT. SOLUTIONS OF EACH ACID.

| Locality. | Name of Solvent. 1 %. | ANALYSIS CALCULATED TO THE % OF THE SOIL. | | | | | |
|---|---|---|---|---|---|---|---|
| | | Silica. | Ferric Oxide and Alumina. | Phosphoric Acid. | Lime. | Potash. | Soda. |
| | | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| Mossman, Mulgrave, and Hambledon—*Alluvial* | Aspartic acid .. | ·0092 | ·0093 | ·0013 | ·0880 | ·0121 | ·0104 |
| | Acetic acid .. | ·0049 | ·0055 | ·0013 | ·0821 | ·0085 | ·0092 |
| | Citric acid .. | ·0274 | ·1558 | ·0037 | ·0843 | ·0142 | ·0122 |
| | Hydrochloric acid | ·1066 | ·3572 | ·0045 | ·1216 | ·0187 | ·0090 |
| Innisfail, Mourilyan Halifax, Ripple Creek, and Ingham —*Alluvial* | Aspartic acid .. | ·0810 | ·0111 | ·0014 | ·0830 | ·0104 | ·0119 |
| | Acetic acid .. | ·0080 | ·0054 | ·0020 | ·0705 | ·0067 | ·0019 |
| | Citric acid .. | ·1016 | ·2060 | ·0035 | ·0798 | ·0136 | ·0151 |
| | Hydrochloric acid | ·1742 | ·5898 | ·0042 | ·1450 | ·0163 | ·0117 |
| Innisfail and Mulgrave —*Bastard Red Soils* | Aspartic acid .. | ·0076 | ·0297 | ·0010 | ·0608 | ·0132 | ·0098 |
| | Acetic acid .. | ·0038 | ·0177 | ·0021 | ·0581 | ·0090 | ·0113 |
| | Citric acid .. | ·0233 | ·2614 | ·0017 | ·0555 | ·0157 | ·0135 |
| | Hydrochloric acid | ·0866 | ·5865 | ·0025 | ·0736 | ·0162 | ·0093 |
| Mackay and Proserpine —Soils, *Alluvial* | Aspartic acid .. | ·0134 | ·0078 | ·0017 | ·1280 | ·0051 | ·0060 |
| | Acetic acid .. | ·0116 | ·0016 | ·0014 | ·1103 | ·0073 | ·0094 |
| | Citric acid .. | ·0746 | ·2365 | ·0071 | ·1480 | ·0080 | ·0129 |
| | Hydrochloric acid | ·2079 | ·6578 | ·0075 | ·3240 | ·0154 | ·0160 |
| Burdekin — Soils, *Alluvial* | Aspartic acid .. | ·0235 | ·0044 | ·0174 | ·1783 | ·0084 | ·0142 |
| | Acetic acid .. | ·0140 | ·0020 | ·0107 | ·1508 | ·0057 | ·0103 |
| | Citric acid .. | ·0723 | ·1711 | ·0367 | ·2215 | ·0101 | ·0171 |
| | Hydrochloric acid | ·2042 | ·4943 | ·0490 | ·5230 | ·0218 | ·0168 |
| Isis Level Land—Soils, *Volcanic* | Aspartic acid .. | ·0254 | ·0091 | ·0017 | ·1593 | ·0097 | ·0077 |
| | Acetic acid .. | ·0186 | ·0030 | ·0015 | ·1411 | ·0110 | ·0050 |
| | Citric acid .. | ·0532 | ·2114 | ·0027 | ·1640 | ·0173 | ·0124 |
| | Hydrochloric acid | ·1036 | ·4300 | ·0042 | ·2713 | ·0259 | ·0262 |
| Woongarra, Bundaberg —Soils, *Volcanic* | Aspartic acid .. | ·0681 | ·0057 | ·0018 | ·2755 | ·0083 | ·0074 |
| | Acetic acid .. | ·0465 | ·0005 | ·0017 | ·2545 | ·0079 | ·0065 |
| | Citric acid .. | ·0993 | ·2825 | ·0051 | ·2915 | ·0132 | ·0107 |
| | Hydrochloric acid | ·1932 | ·6267 | ·0106 | ·5174 | ·0282 | ·0329 |
| Bingera—Soils, *Red* .. | Aspartic acid .. | ·0324 | ·0097 | ·0017 | ·1680 | ·0048 | ·0082 |
| | Acetic acid .. | ·0263 | ·0012 | ·0018 | ·1653 | ·0047 | ·0086 |
| | Citric acid .. | ·0576 | ·1887 | ·0036 | ·1755 | ·0084 | ·0101 |
| | Hydrochloric acid | ·0943 | ·4118 | ·0062 | ·2233 | ·0208 | ·0269 |

The following table, which is a highly interesting one, shows the average per centage of organic matter, water absorbed, and water retained of the various sugar districts of Queensland. It must be borne in mind, however, that being artificial tests in a laboratory the percentages of water retained and absorbed are valuable in a comparative sense only :—

TABLE SHOWING THE AVERAGE PERCENTAGE OF COMBINED WATER AND ORGANIC MATTER, WATER ABSORBED, AND WATER RETAINED OF VARIOUS SUGAR DISTRICTS OF QUEENSLAND.

| District. | Sub-district. | Combined Water and Organic Matter. | Water Absorbed. | Water Retained. |
|---|---|---|---|---|
| | | Per cent. | Per cent. | Per cent. |
| Cairns .. .. | Mossman .. .. .. .. | 6·52 | 39·62 | 2·03 |
| | Kamerunga .. .. .. | 3·55 | 34·10 | 1·15 |
| | Hambledon .. .. .. | 5·33 | 36·19 | 1·63 |
| | Mulgrave (red soils) .. .. | 7·15 | 39·69 | 2·84 |
| | Mulgrave (alluvial soils) .. | 5·72 | 40·90 | 2·40 |
| | Innisfail (red soils) .. .. | 15·98 | 46·01 | 5·17 |
| | Innisfail (alluvial soils) .. .. | 11·89 | 49·18 | 5·77 |
| | Mourilyan .. .. .. | 11·93 | 45·02 | 4·51 |
| | Halifax .. .. .. .. | 5·64 | 41·47 | 2·91 |
| | Ingham .. .. .. .. | 4·88 | 39·17 | 2·09 |
| | Ripple Creek .. .. .. | 5·82 | 42·18 | 2·82 |
| | Burdekin .. .. .. .. | 6·48 | 43·65 | 3·39 |
| Mackay .. | Proserpine .. .. .. | 8·22 | 43·93 | 4·70 |
| | Homebush .. .. .. | 4·08 | 34·63 | 1·63 |
| | Mackay (river banks) .. .. | 5·92 | 39·23 | 2·83 |
| | North Eton .. .. .. | 4·55 | 37·41 | 2·03 |
| | Plane Creek (forest) .. .. | 10·77 | 43·55 | 6·14 |
| | Plane Creek (scrub and low flats) | 7·02 | 40·84 | 3·44 |
| | North of River and Farleigh .. | 9·63 | 43·25 | 5·74 |
| | Sunnyside .. .. .. | 6·34 | 42·33 | 3·70 |
| Bundaberg .. | Isis (level lands) .. .. | 11·34 | 43·80 | 3·41 |
| | Isis (hill sides) .. .. .. | 12·73 | 46·58 | 3·44 |
| | Woongarra .. .. .. | 13·97 | 51·45 | 4·46 |
| | Bingera .. .. .. .. | 8·39 | 38·63 | 2·41 |
| | Watawa .. .. .. .. | 12·03 | 43·44 | 4·64 |
| | Gin Gin (forests) .. .. | 8·71 | 41·08 | 3·63 |
| | Gin Gin (river flats) .. .. | 7·33 | 41·74 | 3·38 |
| | Birthamba .. .. .. | 7·85 | 34·52 | 1·69 |
| | Sharon, Oakwood, Kalbar, and Bonna | 5·86 | 36·36 | 2·44 |
| | Fairymead .. .. .. | 9·10 | 47·14 | 4·48 |
| | Avondale .. .. .. | 5·67 | 42·58 | 3·51 |
| | Miara .. .. .. .. | 15·65 | 73·95 | 6·89 |
| | Invicta .. .. .. .. | 8·09 | 39·94 | 3·21 |
| | Gooburrum .. .. .. | 3·95 | 30·49 | 1·06 |
| | Pialba .. .. .. .. | 8·12 | 33·47 | 2·72 |
| | Nerang .. .. .. .. | 8·89 | 54·00 | 4·46 |
| | Mount Bauple (red) .. .. | 8·04 | 40·31 | 2·49 |
| | Mount Bauple (grey) .. .. | 6·96 | 35·76 | 2·35 |
| | Beenleigh .. .. .. | 8·08 | 41·81 | 4·54 |
| | Nambour .. .. .. | 10·60 | 43·82 | 4·28 |
| | Goodwood .. .. .. | 11·84 | 43·81 | 3·20 |

NITROGEN AND ASH ANALYSES (53 DETERMINATIONS) IN DIFFERENT VARIETIES OF SUGAR CANE, INCLUDING TOPS.

| Variety of Cane. | Locality. | Type of Soil. | PER CENT. IN DRY MATTER OF CANE (INCLUDING TOP) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mineral Constituents of the Ash. | | | | | | | | | |
| | | | Nitrogen. | Crude Ash. | Silica, $SiO_2$. | Ferric Oxide, $Fe_2O_3$. | Manganese Oxide, MnO. | Lime, CaO. | Magnesia, MgO. | Potash, $K_2O$. | Soda, $Na_2O$. | Sulphuric Anhydride, $SO_3$. | Chlorine, Cl. | Phosphoric Acid, $P_2O_5$. |
| | | | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| Demarara 1135.. | Pialba .. .. .. | Grey scrub soil | ·707 | 4·27 | ·69 | ·05 | trace | ·08 | ·15 | 1·83 | ·05 | ·48 | ·38 | ·14 |
| Do. .. | Cordalba .. .. .. | Red volcanic soil | ·472 | 3·01 | ·54 | ·04 | ·01 | ·19 | ·09 | 1·29 | ·20 | ·63 | ·10 | ·13 |
| Do. .. | Childers .. .. .. | do. .. .. | ·354 | 1·95 | ·61 | ·03 | ·01 | ·14 | ·18 | ·42 | ·08 | ·30 | ·14 | ·11 |
| Do. .. | Goodwood .. .. | do. .. .. | ·509 | 2·93 | ·64 | ·06 | ·01 | ·15 | ·16 | ·88 | ·08 | ·26 | ·15 | ·17 |
| Do. .. | East Bundaberg .. | Alluvial soil .. | ·598 | 4·46 | 1·24 | ·05 | ·01 | ·13 | ·17 | 1·57 | ·12 | ·34 | ·22 | ·25 |
| Do. .. | Bonna, near Bundaberg.. | do. .. .. | ·435 | 3·45 | ·92 | ·05 | trace | ·12 | ·13 | 1·27 | ·05 | ·23 | ·22 | ·32 |
| Do. .. | Woongarra, near Bundaberg | Red volcanic soil | ·371 | 3·26 | 1·03 | ·07 | do. | ·14 | ·12 | ·99 | ·10 | ·35 | ·35 | ·21 |
| Do. .. | Bingera .. .. .. | do. .. .. | ·504 | 3·54 | 1·06 | ·04 | do. | ·16 | ·16 | 1·17 | ·07 | ·34 | ·21 | ·19 |
| Do. .. | Bingera .. .. .. | Alluvial soil .. | ·470 | 4·57 | ·67 | ·04 | ·01 | ·16 | ·12 | 1·84 | ·08 | ·10 | ·43 | ·19 |
| Do. .. | Oakwood, near Bundaberg | Red volcanic soil | ·649 | 4·46 | 1·24 | ·09 | trace | ·15 | ·13 | 1·37 | ·16 | ·45 | ·38 | ·30 |
| Do. .. | Mossman .. .. .. | Alluvial .. | ·349 | 1·91 | ·64 | ·03 | ·01 | ·10 | ·20 | ·47 | ·07 | ·14 | ·07 | ·13 |
| Badila, New Guinea 15 | Woongarra, near Bundaberg | Red volcanic soil | ·405 | 3·30 | 1·52 | ·09 | trace | ·18 | ·11 | ·80 | ·09 | ·19 | ·14 | ·21 |
| Do. .. | Bonna, near Bundaberg.. | Alluvial soil .. | ·447 | 4·23 | 2·03 | ·04 | ·01 | ·13 | ·15 | 1·05 | ·14 | ·21 | ·22 | ·40 |
| Do. .. | Proserpine .. .. | do. .. .. | ·370 | 3·12 | 1·79 | ·08 | trace | ·19 | ·16 | ·58 | ·09 | ·09 | ·11 | ·16 |
| Do. .. | Burdekin .. .. .. | do. .. .. | ·298 | 3·91 | 1·65 | ·03 | do. | ·19 | ·16 | 1·09 | ·12 | ·16 | ·21 | ·24 |
| Do. .. | Ingham .. .. .. | do. .. .. | ·535 | 3·11 | 1·45 | ·04 | ·01 | ·12 | ·11 | ·95 | ·14 | ·07 | ·13 | ·20 |
| Do. .. | Innisfail .. .. .. | Red volcanic .. | ·416 | 1·69 | ·53 | ·04 | ·01 | ·16 | ·12 | ·39 | ·10 | ·12 | ·09 | ·10 |
| Do. .. | Nelson, near Cairns .. | do. .. .. | ·389 | 2·60 | ·82 | ·06 | ·01 | ·12 | ·10 | ·81 | ·11 | ·06 | ·10 | ·30 |
| Do. .. | Mossman .. .. .. | Alluvial .. | ·481 | 3·31 | 1·13 | ·03 | trace | ·15 | ·17 | 1·01 | ·08 | ·17 | ·16 | ·30 |

NITROGEN AND ASH ANALYSES (53 DETERMINATIONS) IN DIFFERENT VARIETIES OF SUGAR CANE, INCLUDING TOPS—*continued.*

| Variety of Cane. | Locality. | Type of Soil. | PER CENT. IN DRY MATTER OF CANE (INCLUDING TOP). | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mineral Constituents of the Ash. | | | | | | | | | |
| | | | Nitrogen. | Crude Ash. | Silica, $SiO_2$. | Ferric Oxide, $Fe_2O_3$. | Manganese Oxide, MnO. | Lime, CaO. | Magnesia, MgO. | Potash, $K_2O$. | Soda, $Na_2O$. | Sulphuric Anhydride, $SO_3$. | Chlorine, Cl. | Phosphoric Acid, $P_2O_5$. |
| | | | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| Rappoe .. .. | Childers .. .. .. | Red volcanic soil | ·320 | 2·54 | ·80 | ·04 | trace | ·21 | ·11 | ·69 | ·09 | ·21 | ·12 | ·12 |
| Do. .. | East Bundaberg .. | Alluvial soil .. | ·544 | 4·12 | 1·39 | ·07 | ·01 | ·13 | ·13 | 1·36 | ·11 | ·33 | ·18 | ·17 |
| Do. .. | Oakwood, near Bundaberg | Red volcanic soil | ·514 | 3·27 | 1·26 | ·08 | trace | ·26 | ·16 | ·67 | ·09 | ·17 | ·19 | ·27 |
| Do. .. | Bingera .. .. .. | Alluvial soil .. | ·325 | 3·78 | 1·12 | ·03 | do. | ·15 | ·10 | 1·26 | ·08 | ·11 | ·15 | ·21 |
| Do. .. | Bingera .. .. .. | Red volcanic soil | ·563 | 3·84 | 1·19 | ·04 | do. | ·25 | ·18 | 1·09 | ·09 | ·31 | ·23 | ·18 |
| Do. .. | Bonna, near Bundaberg.. | Alluvial soil .. | ·326 | 2·94 | 1·06 | ·01 | do. | ·15 | ·11 | ·75 | ·10 | ·11 | ·12 | ·22 |
| New Guinea 24B | Bonna, near Bundaberg.. | Alluvial soil .. | ·415 | 4·31 | 2·04 | ·07 | trace | ·11 | ·12 | 1·17 | ·12 | ·22 | ·26 | ·33 |
| Do. .. | Proserpine .. .. | do. .. .. | ·243 | 2·82 | 1·07 | ·04 | ·01 | ·09 | ·07 | 1·02 | ·09 | ·07 | ·12 | ·16 |
| Do. .. | Burkedin .. .. .. | do. .. .. | ·521 | 4·79 | 1·65 | ·04 | ·02 | ·17 | ·16 | 1·46 | ·12 | ·21 | ·19 | ·25 |
| Do. .. | Ingham .. .. .. | do. .. .. | ·319 | 2·91 | 1·00 | ·05 | ·01 | ·09 | ·09 | ·86 | ·08 | ·07 | ·11 | ·13 |
| Do. .. | Nelson, near Cairns .. | Red volcanic .. | ·412 | 2·11 | ·53 | ·04 | ·02 | ·07 | ·13 | ·67 | ·03 | ·06 | ·15 | ·11 |
| New Guniea 24A | Proserpine .. .. | Alluvial .. | ·279 | 2·50 | 1·12 | ·05 | trace | ·20 | ·15 | ·51 | ·13 | ·11 | ·10 | ·20 |
| Do. .. | Burdekin .. .. .. | do. .. .. | ·363 | 3·61 | 1·28 | ·05 | ·02 | ·18 | ·13 | 1·07 | ·08 | ·09 | ·13 | ·22 |
| Do. .. | Ingham .. .. .. | do. .. .. | ·232 | 3·17 | 1·20 | ·06 | ·01 | ·10 | ·10 | ·98 | ·10 | ·10 | ·16 | ·15 |
| Do. .. | Innisfail .. .. .. | Red volcanic .. | ·515 | 2·87 | ·68 | ·05 | ·03 | ·26 | ·19 | ·61 | ·13 | ·31 | ·15 | ·13 |
| Mauritius | Proserpine .. .. | Alluvial .. | ·364 | 5·43 | 2·52 | ·10 | ·01 | ·15 | ·25 | 1·28 | ·11 | ·20 | ·28 | ·30 |
| Malagache | | | | | | | | | | | | | | |
| Do. .. | Burdekin .. .. .. | do. .. .. | ·357 | 4·04 | 1·31 | ·05 | trace | ·16 | ·12 | 1·34 | ·12 | ·18 | ·18 | ·24 |
| Do. .. | Ingham .. .. .. | do. .. .. | ·200 | 2·33 | ·86 | ·05 | do. | ·08 | ·09 | ·71 | ·09 | ·05 | ·06 | ·17 |
| Do. .. | Innisfail .. .. .. | Red volcanic .. | ·466 | 2·27 | ·77 | ·08 | ·03 | ·15 | ·12 | ·56 | ·06 | ·21 | ·15 | ·09 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mauritius 1900 Seedling | Cordalba .. .. .. | Red volcanic soil | ·396 | 2·44 | ·44 | ·05 | ·01 | ·14 | ·15 | ·63 | ·08 | ·24 | ·10 | ·14 |
| Do. .. | Childers .. .. .. | do. .. .. | ·472 | 2·30 | ·74 | ·03 | ·01 | ·15 | ·12 | ·69 | ·02 | ·28 | ·09 | ·14 |
| Do. .. | Goodwood .. .. | do. .. .. | ·294 | 2·75 | 1·07 | ·06 | ·01 | ·14 | ·14 | ·66 | ·12 | ·23 | ·13 | ·12 |
| Do. .. | Woongarra, near Bundaberg | do. .. .. | ·379 | 4·33 | ·98 | ·06 | trace | ·24 | ·15 | 1·57 | ·06 | ·40 | ·39 | ·23 |
| Striped Singapore | Pialba .. .. .. | Grey scrub soil | ·877 | 4·26 | ·73 | ·06 | ·01 | ·11 | ·17 | 1·83 | ·05 | ·33 | ·35 | ·19 |
| Do. .. | Bonna, near Bundaberg .. | Alluvial soil .. | ·410 | 3·38 | 1·33 | ·01 | trace | ·13 | ·15 | ·81 | ·13 | ·12 | ·16 | ·26 |
| Do. .. | Bingera .. .. .. | do. .. .. | ·451 | 4·55 | 1·03 | ·03 | do. | ·15 | ·08 | 1·64 | ·08 | ·19 | ·19 | ·24 |
| New Guinea 40 .. | Goodwood .. .. | Red volcanic soil | ·518 | 4·05 | 1·18 | ·05 | ·01 | ·17 | ·18 | 1·28 | ·09 | ·23 | ·23 | ·17 |
| Do. .. | Innisfail .. .. .. | do. .. .. | ·436 | 3·02 | ·79 | ·03 | ·03 | ·21 | ·09 | ·83 | ·11 | ·23 | ·22 | ·09 |
| Goru, New Guinea 24 | Nelson, near Cairns .. | Red volcanic .. | ·431 | 2·95 | ·73 | ·10 | ·01 | ·10 | ·16 | ·94 | ·25 | ·13 | ·20 | ·17 |
| Do. .. | Mossman .. .. .. | Alluvial .. | ·473 | 3·10 | ·54 | ·05 | ·01 | ·10 | ·15 | 1·08 | ·10 | ·14 | ·15 | ·22 |
| Green Seedling, Barbadoes 156 | Pialba .. .. .. | Grey scrub soil | ·750 | 3·78 | ·61 | ·05 | ·01 | ·14 | ·17 | 1·57 | ·17 | ·33 | ·37 | ·16 |
| Do. .. | Bingera .. .. .. | Red volcanic soil | ·612 | 3·94 | 1·36 | ·06 | trace | ·26 | ·22 | 1·09 | ·08 | ·35 | ·22 | ·12 |
| Mavoe or Batoe | Pialba .. .. .. | Grey scru soil | ·740 | 4·24 | ·75 | ·05 | ·01 | ·10 | ·15 | 1·78 | ·04 | ·43 | ·26 | ·15 |
| Black Innis .. | Woongarra, near Bundaberg | Red volcanic soil | ·390 | 4·51 | 1·38 | ·07 | trace | ·23 | ·13 | 1·57 | ·07 | ·36 | ·41 | ·24 |

## Analyses made to Determine Amounts of Plant Foods Removed from the Soil by Sugar-cane.

### Plot No. 1—Cane Planted in April, 1913, and Cut October, 1914.

| Laboratory No. | Variety of Cane. | Estimated Tons per Acre. | Ash. | | Lime. | | Potash | | Phosphoric Acid. | | Nitrogen | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Per cent. | Lb. per Acre. | Per cent. | Lb. per Acre. | Per cent. | Lb. per Acre. | Per cent. | Lb. per Acre. | Per cent. | Lb. per Acre. |
| 1269 | Hambledon, Q. 426 .. .. C.C. | 40 | ·480 | *430* | ·054 | *48* | ·057 | *51* | ·063 | *56* | ·067 | *60* |
| 1271 | Do. do. .. .. T. and L. | 10 | 1·545 | *346* | ·117 | *26* | ·384 | *86* | ·096 | *21* | ·202 | *45* |
| .. | Do. do. .. .. T.C.P. | .. | .. | *776* | .. | *74* | .. | *137* | .. | *77* | .. | *105* |
| 1255 | Badila .. .. .. .. C.C. | 45 | ·486 | *490* | ·052 | *52* | ·061 | *61* | ·037 | *37* | ·065 | *66* |
| 1274 | Do. .. .. .. .. T. and L. | 95 | 1·818 | *387* | ·108 | *23* | ·495 | *105* | ·105 | *22* | ·204 | *43* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *877* | .. | *75* | .. | *166* | .. | *59* | .. | *109* |
| 1277 | Goru .. .. .. .. C.C. | 35 | ·294 | *230* | ·044 | *34* | ·072 | *56* | ·019 | *15* | ·052 | *41* |
| 1273 | Do. .. .. .. .. T. and L. | 4·4 | 1·608 | *158* | ·117 | *11* | ·351 | *35* | ·084 | *8* | ·198 | *19* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *388* | .. | *45* | .. | *91* | .. | *23* | .. | *60* |
| 1252 | Cheribon .. .. .. C.C. | 50 | ·270 | *302* | ·033 | *37* | ·056 | *63* | ·021 | *23* | ·021 | *23* |
| 1258 | Do. .. .. .. .. T. and L. | 10·2 | 1·650 | *377* | ·134 | *31* | ·445 | *102* | ·076 | *17* | ·131 | *30* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *679* | .. | *68* | .. | *165* | .. | *40* | .. | *53* |
| 1256 | Malabar .. .. .. C.C. | 30 | ·350 | *235* | ·033 | *22* | ·083 | *56* | ·024 | *16* | ·029 | *19* |
| 1270 | Do. .. .. .. .. T. and L. | 6·1 | 1·685 | *230* | ·134 | *18* | ·327 | *45* | ·056 | *8* | ·161 | *22* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *465* | .. | *40* | .. | *101* | .. | *24* | .. | *41* |
| 1268 | Otamite .. .. .. C.C. | 50 | ·390 | *437* | ·036 | *40* | ·090 | *101* | ·036 | *40* | ·042 | *47* |
| 1250 | Do. .. .. .. .. T. and L. | 7·7 | 1·572 | *271* | ·097 | *17* | ·390 | *67* | ·050 | *9* | ·140 | *24* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *708* | .. | *57* | .. | *168* | .. | *49* | .. | *71* |

### Plot No. 1—Cane Planted in August, 1913, and Cut December, 1914.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1265 | Hambledon, Q. 426 .. .. C.C. | 48 | ·377 | *405* | 043 | *46* | ·058 | *62* | ·055 | *59* | ·055 | *59* |
| 1248 | Do. do. .. .. T. and L. | 11·5 | 1·512 | *389* | ·132 | *34* | ·405 | *104* | ·120 | *31* | ·244 | *63* |
| .. | Do. do. .. .. T.C.P. | .. | .. | *794* | .. | *80* | .. | *166* | .. | *90* | .. | *122* |
| 1257 | Badila .. .. .. .. C.C. | 40 | ·351 | *314* | ·039 | *35* | ·054 | *48* | ·042 | *38* | ·046 | *41* |
| 1236 | Do. .. .. .. .. T. and L. | 8·5 | 1·630 | *310* | ·103 | *20* | ·521 | *99* | ·118 | *22* | ·212 | *40* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *624* | .. | *55* | .. | *147* | .. | *60* | .. | *81* |
| 1254 | Goru .. .. .. .. C.C. | 35 | ·434 | *340* | ·041 | *32* | ·035 | *27* | ·025 | *20* | ·040 | *31* |
| 1237 | Do. .. .. .. .. T. and L. | 5·8 | 1·550 | *201* | ·132 | *17* | ·467 | *61* | ·082 | *10* | ·190 | *25* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *541* | .. | *49* | .. | *88* | .. | *30* | .. | *56* |
| 1235 | Cheribon .. .. .. C.C. | 55 | ·352 | *434* | ·024 | *30* | ·092 | *113* | ·030 | *37* | ·037 | *46* |
| 1245 | Do. .. .. .. .. T. and L. | 12·2 | 1·260 | *344* | ·096 | *26* | ·366 | *100* | ·066 | *18* | ·156 | *43* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *778* | .. | *56* | .. | *213* | .. | *55* | .. | *89* |
| 1241 | Malabar .. .. .. C.C. | 35 | ·589 | *462* | ·054 | *42* | ·180 | *140* | ·109 | *85* | ·028 | *22* |
| 1262 | Do. .. .. .. .. T. and L. | 7·3 | 1·118 | *160* | ·096 | *14* | ·305 | *44* | ·060 | *9* | ·131 | *19* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *622* | .. | *56* | .. | *184* | .. | *94* | .. | *41* |
| 1249 | Otamite .. .. .. C.C. | 55 | ·441 | *543* | 036 | *44* | ·132 | *162* | ·030 | *37* | ·042 | *52* |
| 1260 | Do. .. .. .. .. T. and L. | 9·5 | 1·236 | *263* | ·095 | *20* | ·380 | *81* | ·060 | *13* | ·140 | *30* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *806* | .. | *64* | .. | *243* | .. | *50* | .. | *82* |

PLOT NO. 2—CANE PLANTED IN APRIL, 1913, AND CUT OCTOBER, 1914.

| Laboratory No. | Variety of Cane. | Estimated Tons per Acre. | Ash. | | Lime. | | Potash. | | Phosphoric Acid. | | Nitrogen. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Per cent. | Lb. per Acre. | Per cent. | Lb. per Acre. | Per cent. | Lb. per Acre. | Per cent. | Lb. per Acre. | Per cent. | Lb. per Acre. |
| 1264 | Hambledon, Q. 426 .. .. C.C. | 40 | ·447 | *400* | ·045 | *40* | ·081 | *73* | ·048 | *43* | ·130 | *116* |
| 1275 | Do. do. .. .. T. and L. | 11·2 | 1·503 | *377* | ·077 | *19* | ·431 | *108* | ·071 | *18* | ·161 | *40* |
| .. | Do. do. .. .. T.C.P. | .. | .. | *777* | .. | *59* | .. | *181* | .. | *61* | .. | *156* |
| 1276 | Badila .. .. .. .. C.C. | 45 | ·264 | *266* | ·033 | *33* | ·049 | *49* | ·027 | *27* | ·064 | *64* |
| 1234 | Do. .. .. .. .. T. and L. | 10 | 1·495 | *335* | ·130 | *29* | ·404 | *90* | ·077 | *17* | ·192 | *43* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *601* | .. | *62* | .. | *139* | .. | *44* | .. | *107* |
| 1279 | Goru .. .. .. .. C.C. | 35 | ·480 | *376* | ·060 | *47* | ·060 | *47* | ·021 | *16* | ·067 | *52* |
| 1272 | Do. .. .. .. .. T. and L. | 4·6 | 1·713 | *176* | ·117 | *12* | ·396 | *41* | ·090 | *9* | ·219 | *23* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *552* | .. | *59* | .. | *88* | .. | *25* | .. | *75* |
| 1266 | Cheribon .. .. .. C.C. | 50 | ·354 | *396* | ·034 | *38* | ·097 | *109* | ·023 | *26* | ·036 | *40* |
| 1261 | Do. .. .. .. .. T. and L. | 10·7 | 1·758 | *421* | ·111 | *27* | ·561 | *134* | ·063 | *15* | ·173 | *41* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *817* | .. | *65* | .. | *243* | .. | *41* | .. | *81* |
| 1280 | Malabar .. .. .. C.C. | 30 | ·610 | *410* | ·055 | *37* | ·152 | *102* | ·039 | *26* | ·060 | *40* |
| 1281 | Do. .. .. .. .. T. and L. | 6·4 | 2·197 | *315* | ·177 | *25* | ·533 | *76* | ·067 | *10* | ·173 | *25* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *725* | .. | *62* | .. | *178* | .. | *36* | .. | *65* |
| 1278 | Otamite .. .. .. C.C. | 50 | ·357 | *400* | ·036 | *40* | ·090 | *101* | ·024 | *27* | ·059 | *66* |
| 1259 | Do. .. .. .. .. T. and L. | 9·6 | 1·362 | *285* | ·093 | *19* | ·504 | *105* | ·078 | *16* | ·185 | *39* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *685* | .. | *59* | .. | *206* | .. | *43* | .. | *105* |

PLOT NO. 2—CANE PLANTED IN AUGUST, 1913, AND CUT DECEMBER, 1914.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1239 | Hambledon, Q. 426 .. .. C.C. | 48 | ·367 | *395* | ·069 | *74* | ·055 | *59* | ·061 | *66* | ·049 | *53* |
| 1246 | Do. do. .. .. T. and L. | 10·7 | 1·626 | *390* | ·102 | *24* | ·432 | *104* | ·072 | *17* | ·181 | *43* |
| .. | Do. do. .. .. T.C.P | .. | .. | *785* | .. | *98* | .. | *163* | .. | *83* | .. | *96* |
| 1243 | Badila .. .. .. .. C.C. | 40 | ·400 | *358* | ·034 | *30* | ·060 | *54* | ·040 | *36* | ·040 | *36* |
| 1263 | Do. .. .. .. .. T. and L. | 7·9 | 1·341 | *237* | ·078 | *14* | ·428 | *76* | ·064 | *11* | ·155 | *27* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *595* | .. | *44* | .. | *130* | .. | *47* | .. | *63* |
| 1242 | Goru .. .. .. .. C.C. | 35 | ·244 | *191* | ·031 | *24* | ·044 | *34* | ·019 | *15* | ·035 | *27* |
| 1247 | Do. .. .. .. .. T. and L. | 73 | 1·456 | *238* | ·104 | *17* | ·389 | *64* | ·098 | *16* | ·200 | *33* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *429* | .. | *41* | .. | *98* | .. | *31* | .. | *60* |
| 1240 | Cheribon .. .. .. C.C. | 55 | ·529 | *652* | ·051 | *63* | ·080 | *99* | ·029 | *36* | ·199 | *245* |
| 1244 | Do. .. .. .. .. T. and L. | 10·8 | 1·698 | *411* | ·146 | *35* | ·376 | *91* | ·058 | *14* | ·151 | *36* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *1,063* | .. | *98* | .. | *190* | .. | *50* | .. | *281* |
| 1253 | Malabar .. .. .. C.C. | 35 | ·690 | *541* | ·048 | *38* | ·183 | *143* | ·123 | *96* | ·059 | *46* |
| 1251 | Do. .. .. .. .. T. and L. | 6·0 | 1·089 | *146* | ·096 | *13* | ·271 | *36* | ·041 | *5* | ·126 | *17* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *687* | .. | *51* | .. | *179* | .. | *101* | .. | *63* |
| 1267 | Otamite .. .. .. C.C. | 55 | ·359 | *442* | ·033 | *41* | ·101 | *124* | ·030 | *37* | ·085 | *105* |
| 1238 | Do. .. .. .. .. T. and L. | 12·0 | 1·624 | *436* | ·154 | *41* | ·420 | *113* | ·068 | *18* | ·177 | *48* |
| .. | Do. .. .. .. .. T.C.P. | .. | .. | *878* | .. | *82* | .. | *237* | .. | *55* | .. | *153* |

C.C., Crushable Cane. T. and L., Tops and Leaves. T.C.P. Total Cane Plant.

This shows the pounds of lime, potash, phosphoric acid, and nitrogen removed in crops of cane of the weight grown. It is noteworthy that more potash is removed than nitrogen, lime, or phosphoric acid in these cane crops. This table requires special study in relation to the application of fertilisers.

# THE QUEENSLAND CHEESE INDUSTRY.

*Points of a Paper read before the Queensland Dairy Factory Managers Conference on "Some Faults in Our Cheese Industry from the Dairy Farms to the Market," by Mr. R. M. K. Snell, Cheese Instructor, Department of Agriculture and Stock.*

It would be impossible to enunciate all the faults connected with the subject in one short paper, but the following are some of the principal defects the lecturer had observed in carrying out his duties as Instructor in Cheesemaking.

## AT THE DAIRY FARM.

### Situation of Premises.

Apart from the construction of dairy premises, a subject beyond the range of this paper, the situations of a big majority of our dairy premises are wrong. They should be so situated as to admit of good drainage, and bails should front the north so as to allow of as much sunlight as possible to enter them. One of the greatest faults, however, in the situation of dairy premises is that cattle are allowed to traverse the whole surroundings, rendering it impossible to select a clean, dustless spot upon which to erect a suitable milk-storage room. Dairymen would be well advised to give this latter fault serious consideration and rearrange the fences of their dairy premises so as to admit of one side being kept free from traffic. Generally, in the cheese districts of Queensland, the storage of milk should be provided for on the eastern side of the yards and bails.

### Cleanliness in Milking.

Lack of cleanliness in milking is the cause of many serious defects in our cheese. Much improvement would be effected in its quality if dairymen would thoroughly cleanse their hands and each cow's teats before milking, thereby preventing undue contamination of the milk by harmful bacteria. Where milking machines do not receive thorough attention daily, much damage is caused to milk and consequently the cheese made therefrom.

### Straining of Milk.

Considerable deterioration of milk is often caused by the use of unsuitable strainers. Strainers that cannot be easily dissembled for cleansing should not be used, and cloth strainers should, on no account, be used.

### Aeration.

Milk should always be aerated immediately after milking, especially so when dairy cows are being fed with strong flavoured foods. Aeration should be carried out in as pure and dustless an atmosphere as possible. Unfortunately, many of our dairymen perform this duty in the milking sheds, or adjacent thereto, with the result that the milk becomes seriously contaminated with harmful bacteria such as *Coli Communis*, yeasts, liquifiers, and others that are always present in considerable numbers in the air surrounding milking yards and bails. As is generally known, these bacteria are the cause of some of the most serious defects in the quality of cheese.

### Storage of Milk over Night.

As it is the practice only to make one delivery of milk daily at cheese factories the storage of the night's milk is an important matter. On no account should milk be stored overnight in the milking shed or adjacent thereto, as the same defect will result as instanced in the foregoing paragraph.

### Colostrum Milk.

The milk from freshly calved cows, known as colostrum milk, should on no account be used for cheesemaking, as it is the cause of serious defects in the body and keeping quality of cheese. Unfortunately, some dairymen use this milk after a cow has been only a couple of days in lactation, whereas it should not be used until fully seven days have elapsed after commencement of lactation.

Preservative chemicals, watering, and partial skimming of milk have an ill effect on the quality of cheese.

### Care of Utensils.

Dairy utensils must be kept thoroughly clean. Much of the trouble experienced with milk for cheesemaking is due to neglect of this duty. Immediately after use utensils should be washed with warm (not hot) water, to which has been added some washing soda or other good cleansing agent. They should them be treated with steam or boiling water, and left to drain in a clean place. Before again using it is advisable to rinse with clean cold water.

### Delivery of Milk to Factory.

In concluding the dairy farm section of this paper, it is desired to point out that milk in transit from farm to factory should be protected by a suitable covering from dust and the heat of the morning sun.

## CHEESE MANUFACTURE.

Given good milk, our cheesemakers are generally capable of producing a high-grade cheese, but for the benefit of young and inexperienced makers, who in the future may use the advice contained herein, some hints are briefly set out for their guidance.

### Testing for Acidity at Setting.

After the milk has been received into the cheese vats the first duty of a cheese-maker is to ascertain, by means of an acidimeter, the percentage of lactic acid therein. Armed with this knowledge the maker will be greatly assisted throughout the whole of the subsequent operations, and thereby avoid many serious mistakes which may otherwise occur.

### Use of Starter.

A good lactic starter should always be used, but the quantity must be in keeping with the acidity of the milk at the commencement of operations. Starters of clean pleasant aroma and clean acid flavour only must be used.

### Use of Rennet.

Cheesemakers must be very sure of the quality of rennet used, and must avoid that which shows any sign of putrefaction. The quantity of rennet to be used is a consideration. Too little will cause a weak body in cheese and too much will tend to an opposite effect.

### Cooking the Curd.

Unless the acid is developing quickly the cooking of the curd should proceed slowly. If the heat is raised too quickly on a soft curd, the result will be a bad cook and an injury will be done to the quality of the cheese.

### Drawing the Whey.

This is one of the most important functions in the manufacture of cheese and when not done properly is the cause of serious defects. The curd at this stage should be well shrunken and shotty, but not too firm. The acidity should be such that the hot-iron test will show threads of $\frac{1}{8}$ to $\frac{1}{4}$ inch in length. It is advisable to always draw the whey when the hot iron shows this test, but if the curds are still soft and holding much moisture, it can be remedied by the addition of water the same temperature as the whey, after the whey has been drawn and before the curds have time to mat. Sufficient water must be used to just cover the curd, and if the first lot becomes too mixed with whey it can be drawn off and more added; this process should be repeated until the curds are nicely firm, when the final drawing can be made and the curds allowed to mat, to be cheddared in the usual way.

### Care of Whey and Tanks.

Some of the worst faults in the flavour of cheese are caused by neglect of the whey and the whey tanks. To mention one, that of fruity flavour: Each export season much of our cheese has been graded second owing to this flavour, and it is considered that the neglect of the whey tanks, and the cleansing of milk cans after whey has been taken back to the dairy, is the most prolific cause of this defect. As soon as possible after drawing, the whey should be heated to at least 180 degrees, and after the tanks are emptied each day, they should be scrubbed with hot water and soda and then thoroughly steamed with the cover closed.

**Pasteurised Cheese.**

Pasteurisation of milk for cheesemaking is becoming fairly general in Queensland, and the system is expanding. I feel certain that in the near future it will be adopted by the majority of our factories. This section of the paper would not be complete unless it was pointed out that one of the worst faults found in this class of cheese during our export season is over-body. Owing to this fault, much of our cheese, which may be graded superfine here, realises no better price in London than some other makes grading second before leaving our State. I do not advocate a too soft or mushy body in pasteurised cheese, but cheesemakers should aim at a nice meaty body.

CONSTRUCTION OF THE FACTORY.

Under this section only the cheese-room is considered. Many of these are wrongly constructed and others, which are otherwise well built on good lines, are faulty in lighting. A cheese-room, to be good, must always be fitted with glass windows and outside shutters. They can then be opened up to the cool pure air of the evening, and, when the hot air of the room has been expelled, the windows can be closed and kept so, at the same time permitting the necessary work therein to be carried out in the light admitted through the windows. During the summer season harm is caused to our cheese by having the shutters of cheese-rooms open whilst work is being done, thereby allowing hot dry air to enter the room.

TRANSIT.

Railway trucks used for the carriage of cheese are unsuitable and cheese becomes overheated in transit to market. I understand, however, the railway authorities have this matter under consideration in relation to their future policy.

IN THE MARKETS.

For export cheese the usual cold storge is provided, which, in efficiency, is quite satisfactory; but warehouses are not all provided with efficient storage wherein to hold cheese waiting local selling.

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## "BUNCHY TOP" IN BANANAS—INTERSTATE INVESTIGATIONS.

Valuable joint inquiry has already been made by the New South Wales and Queensland Agricultural Departments respecting the occurrence of "bunchy top" in the banana plantations of the Northern Rivers of the Southern State and the Southern areas of Queensland. Some months ago, however, there was some hitch in the arrangement owing to suggestions by the New South Wales Department, one of which had respect to the incidence or extent of the cost of the work; the other bore on the matter of making periodical inspections in the Tweed district by officers other than the two entomologists—Dr. Darnell Smith (New South Wales) and Mr. Henry Tryon (Queensland)—already associated in the work. Queensland had suggested that the entire responsibility for carrying out the investigations should be in the hands of these particular officers.

The Minister for Agriculture and Stock (Hon. W. N. Gillies) said recently that when the New South Wales Director and Under Secretary for Agriculture (Mr. G. Valder) was in Brisbane he had a brief interview with him, and was assured by the visitor that so far as the Southern department was concerned there had not been any hitch in the carrying out of the arrangement for a joint inquiry by Mr. Tryon and Dr. Darnell Smith. Subsequent to that he (Mr. Gillies) suggested that the Under Secretary (Mr. E. G. E. Scriven) should meet the New South Wales Minister (Mr. F. A. Chaffey) and Mr. Valder at the Tweed and discuss the matter further, but the message making that proposal evidently had not been delivered to the Southern authorities until they had commenced their journey south.

To clear the air and pave the way for an acceptable arrangement, Mr. Scriven sent a telegram to Mr. Valder as follows:—"Following your conversation with my Minister (Mr. Gillies), when you said that New South Wales desired to make arrangements to meet this department, I now propose that the two departments should share the expense of the joint inquiry from 1st January last, and that the two entomologists in question should have entire responsibility for carrying out investigation and be free to make their own arrangements. Also that a full report should be presented by them by the end of this year, that is if the investigations are not concluded before then. At the end of the year a revision of the arrangement may be made if necessary."

## SUGAR: FIELD REPORTS.

The Director of the Bureau of Sugar Experiment Stations has received the following report, under date 20th July, 1923, from the Southern Field Assistant, Mr. J. C. Murray:—

### Yerra.

The cane here is making a fair showing. Farmers have their holdings in good order, and cane is suffering little from noxious weeds or insect parasites. There is a great need for better roads here.

Cane farmers on this area are advised to go in strongly for green manures, and where possible local experiment with a well known standard fertiliser. It is simple and inexpensive to conduct a manurial experiment, and by doing so the farmer will know exactly where he stands when he wants to purchase fertiliser. A chemical analysis is very helpful in this respect, but it is not as conclusive as local experiment.

Cane varieties making a good showing are Striped Singapore, Rappoe, Q.813, Shahjahanpur No. 10, M.1900, N.G.24, and Demerara 1135. These canes are healthy and free from disease. Farmers are recommended to keep M.1900 and Q.813 on the higher loams, and D.1135 and Shahjahanpur No. 10 on the more low-lying areas.

It is probable that material which is the by-product of meatworks should give good fertilising results on soil of this class. Known results with meatworks manures on soils fairly typical of Yerra bear this out. Farmers are advised to be careful in plant selection. Discard any unsatisfactory looking sticks when planting, and destroy any varieties that have proved to be useless commercially.

### Mount Bauple.

While the cane here will not cut a heavy crop, farmers are going to have a better harvest than anticipated. There is at present abundant moisture in the soil, the cane is healthy, and any varieties that may remain uncut till the middle of the season should make good growth. Farms in the Bauple districts are well cultivated and kept. Another satisfactory feature for the farmer is the fact that the young plant crop is a success, with a minimum of misses. One farmer has adopted the process of double planting—that is, planting two plants together in the drills, instead of one. The results showed a very small percentage of blank spaces in the field.

Cane varieties making a fair showing at Bauple are D.1135, M.1900, H.Q.285, N.G.22, M.89, Q.822, and E.K.1, also Meerah. With the possible exception of N.G. 22 and M.89, the farmers are very satisfied with the other varieties. H.Q.285 is a variety that will ultimately do well here on a larger scale than at present. This cane, under fair conditions, is a quick grower, and shows, as a rule, a good sugar content as early as July. Unlike many of the other varieties H.Q.285 shows no inclination to bleed if cut early.

In supplying misses to a field care should be taken, if possible, to obtain top plants of a known quick striking variety such as Q.813. This is important, otherwise the supplied plants, in the case of an annual crop, will not be fit to cut when the season comes, and the supplying might as well have been left undone.

Owing to the average chemical fertiliser being dependent for results on fair amount of moisture at the period of application, it is possible that, over a period of years the farmer may get more satisfactory results from dressings of lime, green manures, such as cowpea and green maize, or applications, when planting, of bone meal.

### Nambour and Maroochy Districts.

Land improvement and settlement is making rapid progress in these districts. Farmers are extending their existing areas, new settlers are coming in, the company is improving its cane haulage facilities, and the new growing canes are determined to equalise the ups and downs of the sugar market by better farming, and consequently higher tonnages per acre. With this end in view, both on Petrie's Creek and the Maroochy River, the drainage systems are being extended and greater use of lime is being made. New settlers on these ti-tree flat lands are advised not to plant a stick of cane until they have a drain through their farms at least 4 ft. deep. The bottom of the drain at the outlet should be on a level with dead low water, with a watertight gate.

Farmers are cultivating more intensively than hitherto. Green manure crops are more frequently seen than in previous years. A far greater interest is being taken in cane varieties and recognition of disease. Some of the growers are very efficient in this latter respect. An active interest is being taken in the recognition and control of insect parasites.

Numbers of farmers are coming into these areas from the Northern Rivers of New South Wales. They are advised not to bring cane plants from these localities, as there is a danger of transmitting disease.

Cane varieties are in a fairly healthy condition with one exception. This is B.208, a cane introduced by the Colonial Sugar Refining Company to Queensland a number of years ago. It is very susceptible to disease, and is in a very bad condition on the Maroochy River. If this variety were not so susceptible, it would be one of the best canes in Queensland from a commercial point of view.

Canes making a good showing in these districts are Q.813, Gingila, Q.970, N.G.15, D.1135, E.K.1, H.Q.285, M.1900, Rappoe, N.G.40, Striped Singapore, and N.G.16. Of these it is probable that E.K.1, Q.813, and Gingila look the best. The latter cane is making a particularly good showing. There is not a great quantity of it growing, but present results would justify the farmers in extending its acreage. A visit was made to Buderim Mountain in the course of the week spent in the Nambour district. The soil is red volcanic, not unlike Childers, and should grow good crops of M.1900 Seedling. One farmer has in about four acres of this variety, and it is very satisfactory. A deterrent to canegrowing is the lack of loading facilities at the railhead. It would be well worth the farmers' time to seriously consider canegrowing around Buderim Mountain. Just at present the worst roads in Queensland are keeping the district from progressing.

### Eumundi and Cooroy.

No new development in canegrowing was noticeable. Distance from rail and the condition of the roads is holding the farmers back. Cane could, however, especially at Eumundi, be profitably grown if the farmers could reach the mill at a reasonable expense.

Cane varieties looking well at Cooroy are H.Q.285, M.189, M.89, and D.1135. At Eumundi H.Q.285 and D.1135 are making an excellent showing.

### Bundaberg.

There is a considerable acreage of good land between the city and the Elliott River which might yet be developed for canegrowing. Farmers who have started planting along the Maryborough road are getting on well, the soil being a red forest loam of fair depth and excellent texture. Some growers are using ground limestone and Millaquin mill refuse on their soil with good results.

Canes planted and looking well include M.1900, Q.813, Black Innis, and D.1135. The whole of this country could be irrigated at no very great expense from the Elliott River.

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## THE FUTURE OF THE SUGAR INDUSTRY.

### COMMODITY ACQUIRED—PRICE FIXED—PROCLAMATION ISSUED.

Following the acceptance, under protest, of the Commonwealth Government's sugar policy, and the appointment of a Sugar Board, it became necessary for the Queensland Government to cause a proclamation to be issued under the Sugar Acquisition Act fixing the price payable to the owners of raw sugar at £27 per ton of 94 per cent. net titre for sugar manufactured to the highest practicable standard of dryness, delivered f.o.b. A proclamation fixing this rate, and setting out certain other terms and conditions, has been issued.

The schedule includes the following provisions:—The raw sugar shall be manufactured to the highest practicable standard of dryness. Stocks of raw sugar shall, until delivered, be protected from the weather and air currents to prevent absorption of moisture or other damage. Rules are laid down for the delivery of the raw sugar, and for each millowner from time to time, as fixed by the Treasurer, to give particulars of the quantity of raw sugar manufactured at his mill, and available for delivery. The Treasurer will, from time to time, by notice to deliver, inform each millowner of the quantity of raw sugar which such millowner is required to deliver, and the

place and time at which delivery must be made. A clause is also inserted which provides that the Treasurer or his duly authorised representative may direct any millowner to deliver, at the cost of such millowner, the quantity of raw sugar mentioned in the order, at any mill or refinery or to any person named by him.

It is further provided that if any raw sugar tendered for delivery shall, at the time of tender, contain a greater percentage of water than one-third of the difference between the polarisation of the raw sugar and 100, the Treasurer may either—(i.) Reject the sugar (in which case neither he nor the Government of Queensland shall be under any legal liability whatsoever in respect of such sugar) and such sugar shall revert to or become the property of the millowner; or (ii.) accept delivery of such sugar and deduct from the purchase price of the sugar an amount equal to the amount of probable loss which will result to the Treasurer from the presence of excess water therein after an average time has been allowed for the period between delivery and refining of the sugar.

The certificate by the manager of the refinery at which the raw sugar is refined, setting out the polarisation and net titre of the raw sugar, water percentage, and amount of any probable loss to the Treasurer shall be in evidence on these matters, but the millowner concerned may, within three months after receiving the certificate, appeal against it to an arbitrator to be appointed by the State Chief Justice. The award of the arbitrator shall be regarded as conclusive evidence of the matters stated therein.

In the clause dealing with the payment of the purchase money for the raw sugar delivered and accepted it is provided:—(i.) Whenever delivery of any sugar has been accepted, the Treasurer will, if the millowner so desires, pay to the millowner by whom the sugar was delivered a sum on account not exceeding in any case £21 for each ton of raw sugar delivered; (ii.) after the polarisation, net titre, water contents, and quality of the sugar have been ascertained at the refinery, the Treasurer will pay to the millowner by whom the sugar was delivered the difference (if any) between the amount already paid to the millowner on account of the sugar and the total purchase price therefor, calculated at the rate of £27 per ton of 94 net titre sugar after deducting the amount of probable loss (if any) which will result from the presence of excess water.

Authorised check chemists may enter sugar-mills or the stores of millowners to make analyses and inspections of the sugar.

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## THE SUGAR SEASON, 1923.

The Director of Sugar Experiment Stations (Mr. H. T. Easterby) has returned to Brisbane after an extended visit to the sugar districts of Bundaberg, Mackay, Cairns, Gordonvale, Babinda, Innisfail, and Lower Burdekin. Following are notes on the tour:—At Bundaberg it was found that the crops had greatly improved since March, due to the favourable falls of rain. In place of the half crop then anticipated, it is now considered that at least a two-thirds crop will be harvested. Some crops of cane are looking particularly well, but a good deal of the cane is still backward compared with what it should be at the time of the year. The cane in the Childers district was reported to be not so far forward as at Bundaberg owing to a smaller rainfall this season.

Conditions at Mackay had been exceptionally severe up to the beginning of June and the cane crops, particularly around the old lands of Pleystowe, Palms, and Racecourse had made poor growth. Grubs were found to be doing more damage than usual in parts of the district. At the Palms Mill only 11 in. of rain had been recorded since the beginning of the year. A large amount of cane for next year had been planted and fortunately, at the commencement of June, good rains fell which were of the greatest service to the young cane and could improve to some extent the standing cane. Before the rains it was estimated that only about a half crop would be cut, and about 32,000 tons of sugar would be manufactured. This, due to the recent rain, was raised to 36,000 tons of sugar for the Mackay district, and may probably be more. Should the remainder of the year be favourable, there should be a crop for next year as the young cane had struck well and was looking particularly vigorous and healthy.

At Cairns the cane generally had made splendid progress, and crops were expected to be well up to the average. Grubs were, however, prevalent in places, more particularly on the Colonial Sugar Refinery Company's plantation at Green Hills where there is still a great amount of old cane stools, trash, and other rubbish which should be cleared away and destroyed, as at present it appears to

be an admirable place for breeding grubs. Experiments at the present time are being carried on with para-dichlorobenzene on Green Hills by the Bureau's Entomologist, Mr. E. Jarvis. There is a marked difference between the treated and check plots. Plots at Meringa show a still greater difference, the green appearance of the cane treated with the chemical being in strong contrast with the yellow appearance of that to which the para-dichlor. had not been applied. It is proposed to carry out further experimentation with this substance.

A disease in cane which was termed "Leaf Scald" was prevalent in parts of the Mulgrave area, particularly in two fields at Aloomba and Mount Sophia. The disease affects the leaf of the cane, in many cases depriving it of chlorophyll so that the leaves are either quite white or only have a few green stripes. The sticks become dwindled and oval. As a rule more disease is found in cane during dry seasons. The utmost care should be taken in planting sound healthy sets and every possible supervision should be exercised. This disease is visible in Badila and H.Q. 426. The Mulgrave Mill are carefully watching the fields in question and are proposing to conduct a survey of the whole district. This disease has been seen for many years past, but up to the present has done little or no damage. It is possible it may disappear if proper precautions are taken to prevent the planting out of sets from diseased fields.

Additions are being made to the Cairns wharves of a most substantial character. A new sugar store is also being erected, so that this important port will be able to store 13,000 tons of sugar. Mechanical loaders are being installed.

Fine crops of cane were seen at Babinda and it is anticipated that the commercial cane sugar content will be above the average this season. A large crop is anticipated and the mill has already commenced crushing. The area continues to be free from serious ravages of pests and diseases. The falling of scrub on new lands destined for canegrowing is taking place, and matters generally appear to be on a fairly successful footing. The rainfall from the beginning of the year till end of June was 88 in.

At Innisfail large crops are expected this season. The cane areas about Goondi and South Johnstone are exceedingly good, and scarcely any damage from grubs was seen. There is also not much disease visible. The Mourilyan Mill are making considerable additions to their plant, including a new carrier using a tipping hopper for truck unloading. A new building is being erected over the crushing plant fitted with an electric gantry. A new 5½-ft. shredder, new 5½-ft. crushing mill, two extra effet pots with 5,000 square feet of heating surface have also been installed. Extensions have been made to the sugar room doubling its capacity. It is intended to put on further improvements next year.

An immense number of tractors are now at work in the Innisfail district on ploughing operations. A large amount of cane has been and is to be planted for next year.

The Lower Burdekin district was next visited. Conditions here had been very trying, it being one of the driest years ever experienced. At Home Hill the new irrigation scheme was now working solidly, and 126 farmers were being supplied with water. Only three wells are now wanted to complete the present scheme. Where early irrigation had been used the cane crops were looking well, but some areas had not received water in time, and the cane was in consequence very backward and in some cases dying. Due to the recent rains there is a very large area already and now being planted for the next year in the Inkerman and Ayr districts, and the land generally has been excellently prepared and is in a fine state of tilth. Good stands of young cane were in evidence everywhere. The variety known as Q.813 was found to be doing well in the Lower Burdekin, one farmer reporting 60 per tons per acre last year with a c.c.s. of 15½ per cent. Tractors are obtaining a great hold in this district also, and many of them are proving a big success in pumping water for irrigation.

Highly successful field days were held at the Bundaberg, Mackay, and South Johnstone Sugar Experiment Stations. There were large attendances of growers in each case, and the proceedings were most interesting and instructive to canegrowers.

## SUMMARY.

From Townsville northwards the crops are good to excellent, and the largest portion of this year's crop will be harvested there this year. The tonnages in the Lower Burdekin and Mackay districts will be on the low side, while the yield at Bundaberg should be moderate providing no severe frosts occur. With the exception of Moreton, which has a fine crop this season, the remaining Southern districts will only harvest fair crops. An estimate of the season's output will be published in a few days.

# AGRICULTURE IN QUEENSLAND.

## PROPOSED LEGISLATION LISTED IN THE GOVERNOR'S SPEECH.

The Speech of His Excellency the Governor (the Right Hon. Sir Matthew Nathan, P.C. (Ire.), G.C.M.G.) at the opening of the First Session of the Twenty-third Queensland Parliament contained the following references to the agricultural position in this State:—

### A White North.

"Since the dissolution of the last Parliament I have again visited the North and West of Queensland, and once more satisfied myself that in these parts of the State a white population can live and flourish. At the same time, I realise that they suffer from certain inconveniences and want of amenities not experienced in cooler climates and in more settled parts. The inconveniences due to climate are largely surmountable by improvement in housing and other conditions. But this means, at any rate for the man on the land, higher cost of living in most of Queensland than is entailed in Southern countries for the same standard of comfort, and therefore requires every man's industry to be more remunerative. The cure for lack of amenities is no doubt closer settlement, which brings with it improved roads and other communications, and more agreeable social conditions. With closer settlement, more closely binding communities together, and the industry of individual producers sufficiently rewarded to ensure health and comfort, I have no doubt of the great future of the North and West of Queensland.

### The Outlook.

"The Parliament which has just been elected is faced with the task of dealing with many problems of great moment to the people of the State.

"A number of important industries have suffered severely from drought conditions, and, owing to the unremunerative prices which are ruling for certain products in the world's markets, others are labouring under disabilities.

"Nothwithstanding these difficulties, the outlook for Queensland is by no means discouraging. Queensland's ability to make rapid recovery from seasonal adversity; the expectation of improved market conditions for the products of our industries; the celerity with which new areas of land are being prepared for settlement; and the prospects of the cotton industry: all indicate for the future a condition of profitable industrial and commercial activity for the State.

### Resumption of Pastoral Holdings.

"With a view to accelerating closer settlement in the grazing areas of Western Queensland, it is the intention of my advisers to provide for the resumption of some of the pastoral holdings, and their subdivision into grazing farms.

### Fodder Conservation.

"The losses suffered by owners of live stock during the recent dry season acutely demonstrates the necessity for a more extensive system of fodder conservation, and the provision of more adequate water supply facilities for settlers in the dry areas. My advisers hope, after consultation with the Council of Agriculture, to submit measures dealing with both of these subjects.

### The Sugar Industry.

"The sugar industry has been faced with a very critical position, owing to the tardiness of the Commonwealth Government in declaring its intentions toward the industry on the expiration of the sugar agreement. The proposal eventually put forward by the Commonwealth, although wholly inadequate to stabilise the industry and ensure fair prices to the producers, has had to be accepted, as the only alternative would result in an increased control by the refining interests, uncertainty as to prices and conditions, and difficulty in financing the present crop.

### Soldier Settlements.

"One of the undoubted difficulties with which the soldier settlers have to contend is the over-capitalisation of their holdings. In most cases, the improvements on the holdings were effected when costs were unusually high, and as a consequence the improved blocks to-day do not, in many instances, represent a value commensurate with the indebtedness attached to them. It is the intention of my advisers to order a revaluation of the holdings with a view to reducing, where it is necessary, the capital liability of the settlers.

**British Empire Exhibition.**

"The British Empire Exhibition will be held in England next year. Queensland is participating in this venture in co-operation with the Commonwealth and the other States. My advisers are doing everything possible to ensure that this State's products will be creditably represented at the exhibition."

Among other proposals listed in the Speech and of concern to rural interests are—

A Bill to deal with the Burnett and Callide Valley lands, which will shortly be opened for selection;

A Bill to provide a Scheme of Development for the Palmerston area in the vicinity of Innisfail;

An Amendment of the Main Roads Act to enable the Main Roads Board to undertake the construction of developmental roads in areas about to be settled;

A Forestry Bill;

A Scheme to provide better water supply facilities in agricultural districts;

A Bill to provide encouragement for oil prospecting, and to protect the public from the operations of "wild-cat" companies;

A Bill to make better provision for co-operative companies;

A Bill to provide for the adequate control of the cotton industry;

A Bill to provide a more liberal scheme of financial assistance to settlers;

A Bill to provide for the conservation of fodder.

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## POULTRY IN THE NORTH.

The Poultry Inspector, Mr. J. Beard, reports on his Northern tour:—I found the poultry industry in the North still on the increase, and what is the most noticeable the ordinary barn or back yard mongrels are to a great extent giving way to the pure bred birds. The ordinary back yard fanciers, who keep fowls for their own domestic use, are beginning to realise that it is more profitable in every way to run a dozen pedigreed birds, which cost less to feed and show fully double or even greater returns, than two dozen nondescripts in the same time.

While in the Tableland I visited the Atherton and Mareeba Shows and noted the marked improvement in the high quality of the birds exhibited. In almost every class were birds that would be a credit to any show in Southern Queensland.

The poultry at Cairns was a striking feature of the local show. Many new birds came before my notice all of a very high standard. The Tablelanders quite held their own here in any classes in which they competed.

In addition to small holders there are about a dozen fairly large plants established in or near Cairns, and all appear to be working on right lines. Along the way to Innisfail several large plants are established, noticeably at Babinda, Mirriwinni, and Moolala.

Several fair sized plants are worked in and around Innisfail, where the stock during the last two years has been greatly improved by importations from the South, and by using the shedding system of housing during the frequent wet days.

Other towns visited in the far North were Kairi, Yungaburra, Malanda, and Millaa Millaa, on the Beatrice River. The poultry in the four towns are just about holding their own, in spite of the disadvantages of prolonged wet seasons which is detrimental to egg production and favourable to diseases.

At Townsville fanciers are taking a great interest in the industry. New importations are landing by every boat from the South. A number of utility plants are established and are being conducted on satisfactory lines.

Charters Towers is still holding its own in the fancy. Although since my last visit several fanciers have left the field for Southern States, others are filling their places.

Ayr, for the size of the town, possesses many poultrymen. There are upwards of a dozen utility plants all stocked with the right stamp of birds. The locality, consisting of sandy loam country, is ideal for poultry.

Bowen and Proserpine Shows were next visited. Fanciers in these localities are few, and not much encouragement for fostering the industry exists owing to the distances from their market, Townsville, and lack of efficient marketing organising there. I saw eggs marked 4s. per dozen, yet the storekeepers at the same time were only offering 2s. 6d. per dozen, and with maize at 9s., wheat at 10s., and mill offals in proportion, suppliers are worthy of fairer treatment than the margin of retailers' profit indicate.

## TO POULTRY KEEPERS.

Notwithstanding repeated warnings by the Queensland Society for the Prevention of Cruelty and public reproaches in the Press, crates of poultry continue to be consigned to market under conditions involving cruelty.

Thoughtful persons, for their own protection and in order to secure the best returns for their consignments, will do well to follow the following recommendations when consigning their poultry to market:—

1. Be sure that your crate is not overcrowded. Use decent crates, lime washed for preference, and have them returned. (Why kill your birds prematurely?)
2. Be sure that there is ample ventilation. (A plain framework crate with wire netting sides and wire netting top is the best. The public buys best what it sees best.)
3. Be sure that all birds have plenty head-room. Fowl and duck crates should be at least 18 in. high, geese and turkey crates at least 30 in. high, pigeon crates at least 9 in. high. All birds in one crate should be as nearly equal in size as possible. (There will be fewer casualties, and they will look better to buyers who are inclined to judge the lot by the small ones. Prime young ducklings trample each other unless divided into small lots.)
4. Be sure that there are no gaps between the flooring boards of the crate where birds may get their feet crushed or their legs broken. (Damaged goods are bad sellers.)
5. Be sure you cover the bottom of the crate with straw. (It keeps the birds clean and adds to their appearance, and condition sells the birds.)
6. Be sure that water is available in the crate. (A loose tin is worse than useless. Fix syrup tins at opposite corners of the crate and see that they are filled with clean water before trucking. Your agent can also fill them easily on arrival.)
7. Be sure that your birds are well fed with grain before despatching. (A drooping, thirsty, or starving bird is a bad seller.)
8. Be sure that while waiting for consignment your birds are not left exposed to rain, wind, or sun. (You can't depend on the porter.)
9. Be sure you send a post card to the person to whom you are consigning birds, so that he knows when to expect them.
10. Be sure that you do not carry or consign any birds tied together by the legs. (We'll give you no second chance.)
11. Be sure that you do not get prosecuted for cruelty by neglecting to follow the foregoing advice. (We have inspectors at the markets every day, and any cases of bagging, cramping, overcrowding, rough handling, or other cruelty to poultry are thoroughly investigated. Court cases are costly in time, money, and reputations.)

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## FORTHCOMING SHOWS.

Sandgate: 3rd and 4th August.
Brisbane Royal National: 6th to 11th August.
Belmont: 18th August.
Coorparoo: 25th August.
Gympie: 29th and 30th August.
Wynnum: 31st August and 1st September.
Imbil: 5th and 6th September.
Zillmere: 8th September.
Laidley: 13th and 14th September.
Stephens: 15th September.
Beenleigh: 20th and 21st September.
Ingham: 21st and 22nd September.
Rocklea: 22nd September.
Dakabin: 22nd September.
Toombul: 28th and 29th September.
Kenilworth: 4th October.
Esk Bushman's Carnival: 17th and 18th October.
Nerang: 19th October
Ascot: 24th October.
Malanda: 24th and 25th October.
Pomona: 21st and 22nd November.
Millaa Millaa: 23rd and 24th November.

## THE ORANGE TREE BUG.

*The Minister for Agriculture and Stock (Hon. W. N. Gillies) has received the following report from the Government Entomologist, Mr. Henry Tryon, on the Orange Tree Bug reported as especially prevalent in the Blackall Range district:—*

One of the points that had to be cleared up related to the question—Whence came the individual insects that appeared in spring (September), they being apparently absent during the winter months? This was especially raised by Mr. H. Morris, of Flaxton, probably the most patient observer of the insect in the Blackall Range area.

Now in my January investigations I was fortunate in discovering a peculiar phase in the life-history of the Orange Tree Bug that had been previously overlooked by those concerned. This phase was entered upon on a casting of the skin, when the insect was about five days old. In this it measures 7 mm. long (about 3½ lines) is perfectly flat, almost as thin as paper, and is coloured so very like to the green of the underleaf surface as to be practically invisible; and, moreover, unlike, in this respect to the insect of the first stage growth, clings to the foliage with some tenacity on being disturbed. In the occurrence of this appeared to reside the probable explanation the virtual absence of the insect during the winter months.

Accordingly, when I deputed Mr. A. A. Girault, Assistant Entomologist, to resume the inquiry at the point to which it had been conducted, he was instructed "To concentrate his attention on the method in which the insect overwinters, and when, and where this takes place, with a view to the discovery of a possible efficacious seasonal method of dealing with it; my discovery of a special—previously overlooked—phase in its life-history being suggestive in this regard.

Mr. Girault, on his return from his visit to the Blackall on 6th July, has reported that my tentative conclusion actually accords with fact.

That these (the Orange Bugs) are present in this second larval (or nymphal) stage of growth during the winter period, and that although the greatest difficulty attends the discovery when they occur, of even an individual or two, still they may be caused to fall to the ground in numbers on the trees being beaten (jarred) and so reveal their presence. Moreover, he has noted the remarkable fact that every insect that has been thus laid low, and fell how it will, makes invariably but slowly for the trunk of the tree from whence it has been precipitated, and on reaching this commences to climb up it and so repairs to its old quarters.

It thus happens that the bug, when once established in an orangery breeds continuously therein, and that accordingly, the winter months, after the crop is off, give the opportunity for dealing with it, and so preventing a spring brood of adults appearing on the scene. Also that unvisited orangeries are threatened by a visit of the pest from one in which already the insect is established, and that therefore its subjugaction is a matter of common concern.

How best to destroy it then, and under the circumstances mentioned, is still a matter for experiment, a feature in the work that this office will not overlook. At present banging the trees, in order to dislodge the young insects, so that they may fall on to bare earth to be collected say by poultry at hand, will involve in most cases throwing down the crop, at least in part; but there are other measures, one consisting possibly in the use of smoke for example, that may be found to accomplish the desired result.

It is proposed that the Assistant Entomologist's interesting report will be published and made generally available in the near future.

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## QUEENSLAND TREES.

By C. T. WHITE, F.L.S., Government Botanist, and W. D. FRANCIS, Assistant Botanist.

No. 23.

### THE CORDUROY TAMARIND.

This tree, which is known botanically as *Nephelium Lautererianum*, is a very ornamental species, as it forms a dense head of very pretty fern-like foliage. Like several other species of the natural order Sapindaceæ, when the bark is removed the surface of the sapwood is seen to be strongly wrinkled lenghtwise. From this peculiarity is derived the name "Corduroy" on account of the resemblance of the wrinkled surface of the sapwood to corduroy cloth. The timber is brown in colour, prettily grained and fairly heavy. Under the recommendation of the Forestry Department it is being used as a substitute for maple. The seeds are enveloped in a yellow pulp of a sharply acid flavour similar to that of the Native Tamarind. The trees are found in the rain forests of the North Coast Line, from Beerwah to Maryborough, on Fraser Island, and in the Eungella Range, westward of Mackay. They attain a height of about 80 ft., and a barrel diameter of 1 ft. 8 in.

*Photo by the Authors.*]

PLATE 13.—CORDUROY TAMARIND (*Nephelium Lautererianum*).
A Tree in the Ranges eastward of Traveston, North Coast Line.

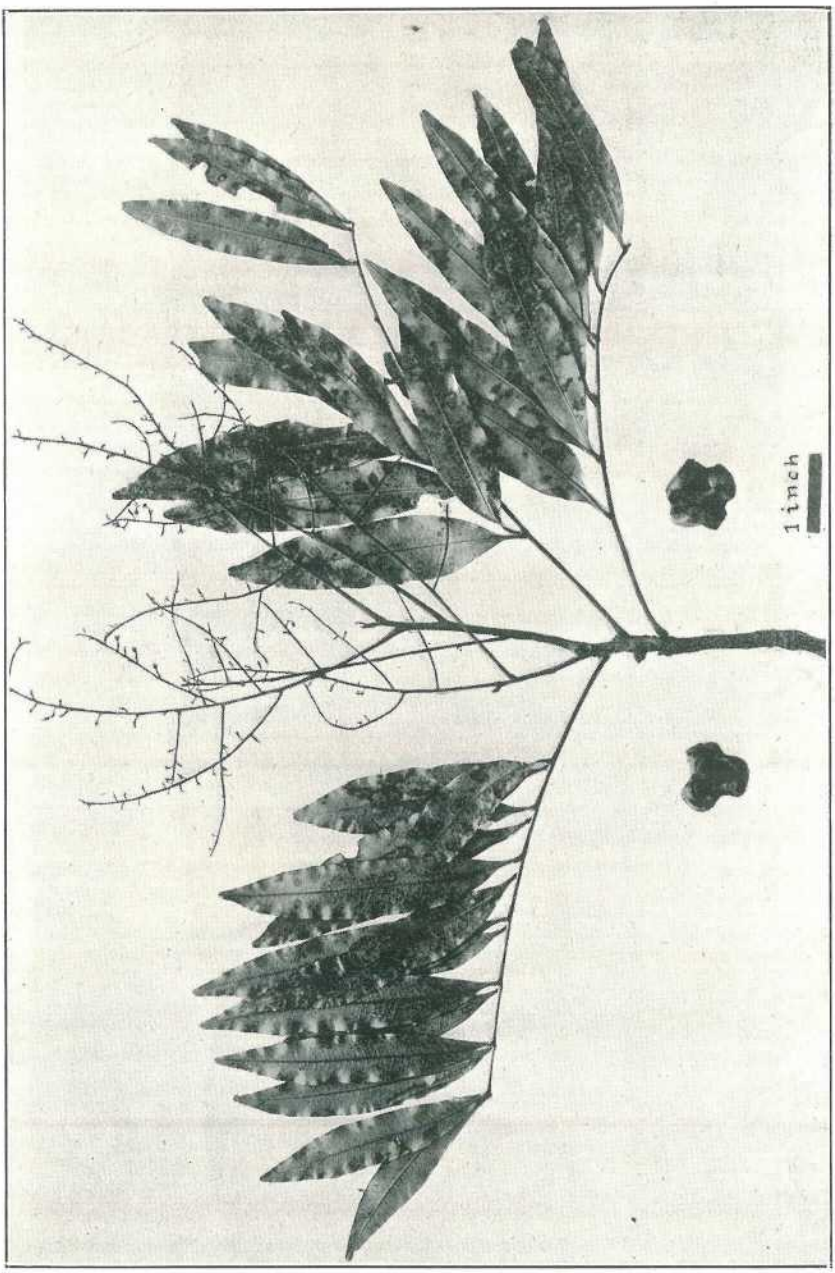


*Photo. by Dept. Agriculture and Stock.*]

PLATE 14.—CORDUROY TAMARIND.
Showing Twig with two Dried Fruit Separate.

# A THIN-SHELLED VARIETY OF THE QUEENSLAND NUT
## *(MACADAMIA TERNIFOLIA).*

BY C. T. WHITE, Government Botanist.

It is unquestionably granted on all sides that one of the finest flavoured nuts in cultivation is the Queensland Nut or Bush Nut (*Macadamia ternifolia*). It is a nut particularly suitable for high class confectionery, but a great objection to its use on a very large commercial scale has been the very hard thick shell (putamen) in which the kernel is enclosed.

The nut has attracted some attention outside Australia, thus E. André, the well-known French horticulturist, writing the the "Revue Horticole,"* says—"The ripe fruit, however, is more particularly interesting. Usually one of the ovules is abortive, and the surviving one fills the whole of the interior of the shell with its white, firm, close-grained albumen, forming a kernel which is as crisp as that of the hazel nut, but has a higher aroma and a finer flavour. We have gathered and eaten these nuts in the month of December. *Macadamia ternifolia* is a tree which should be cultivated, both from an ornamental and economic point of view. Even if it yielded no fruit; it would make a fine appearance in gardens in the South of France, where the specimens already planted have passed uninjured through winters as severe as that of 1890-91, but how greatly enhanced would be the interest and importance attaching to these species if we could look forward to the discovery of some feasible mode of inducing the trees to yield a regular supply of their pleasantly flavoured nuts."

E. Popenoe, writing on the "Tropical and Subtropical Fruits of California,"† says—"The drought-resisting qualities of this tree make it of value for semi-arid regions, while its ornamental appearance commends it for culture in every garden. While very few trees are yet in bearing in the State, several thousand young plants have been disseminated by the nurserymen within the last few years, and the tree promises to become popular, not only for the home garden or orchard, but commercially as well."

The tree is a native of Southern Queensland and Northern New South Wales, being quite plentiful in many of the coastal scrubs (rain-forests). It is found in heavy rain-forest country such as the Northern Rivers (N.S.W.), Tallebudgera (Q.), &c., and drier scrubs such as Mount Bopple (Q.), &c. It is to be noted that the tree is spoken of in America as one being particularly drought-resistant; and it is interesting to note that in its natural habitat the species finds its greatest development on the one hand in heavy rain-forest country such as that on the Tweed River with an average rainfall of 70 in., and on the other hand in drier "scrubs" (rain-forests) to the north and west of Gympie with an annual rainfall of approximately 45 in. These instances go to show that the tree can be grown under a variety of conditions.

Mr. J. B. Waldron, of Upper Eungella, Tweed River, New South Wales, has for some years past given a good deal of attention to the Queensland Nut, and has among a large collection of varieties or forms growing on his place a particularly thin-shelled one which should have considerable possibilities as a commercial nut. The shell measures in parts only 1 mm. (½ line) in thickness, and in addition to being thin, usually cracks along one side of the sature so that a penknife can be inserted and the shell opened and the kernel extracted with great ease. The Department has secured from Mr. Waldron a number of seeds of his thin-shelled variety, and it is intended to raise a number of plants to see if the variety will come true to seed, and to keep on improving it by selection so that eventually a race of large thin-shelled nuts may be produced. It is further intended to try other methods of propagation in an attempt to perpetuate the variety in case seedlings should not come true.

The photographic illustrations show: (*a*) The leaves and fruit of the thin-shelled nut, and (2) Two trees of the variety growing on Mr. Waldron's farm.

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* Translation from Maiden's Forest Flora of N.S.W., Vol. 1, page 218.

†Journal of the Royal Horticultural Society, England, Vol. XXXIX., p. 336.

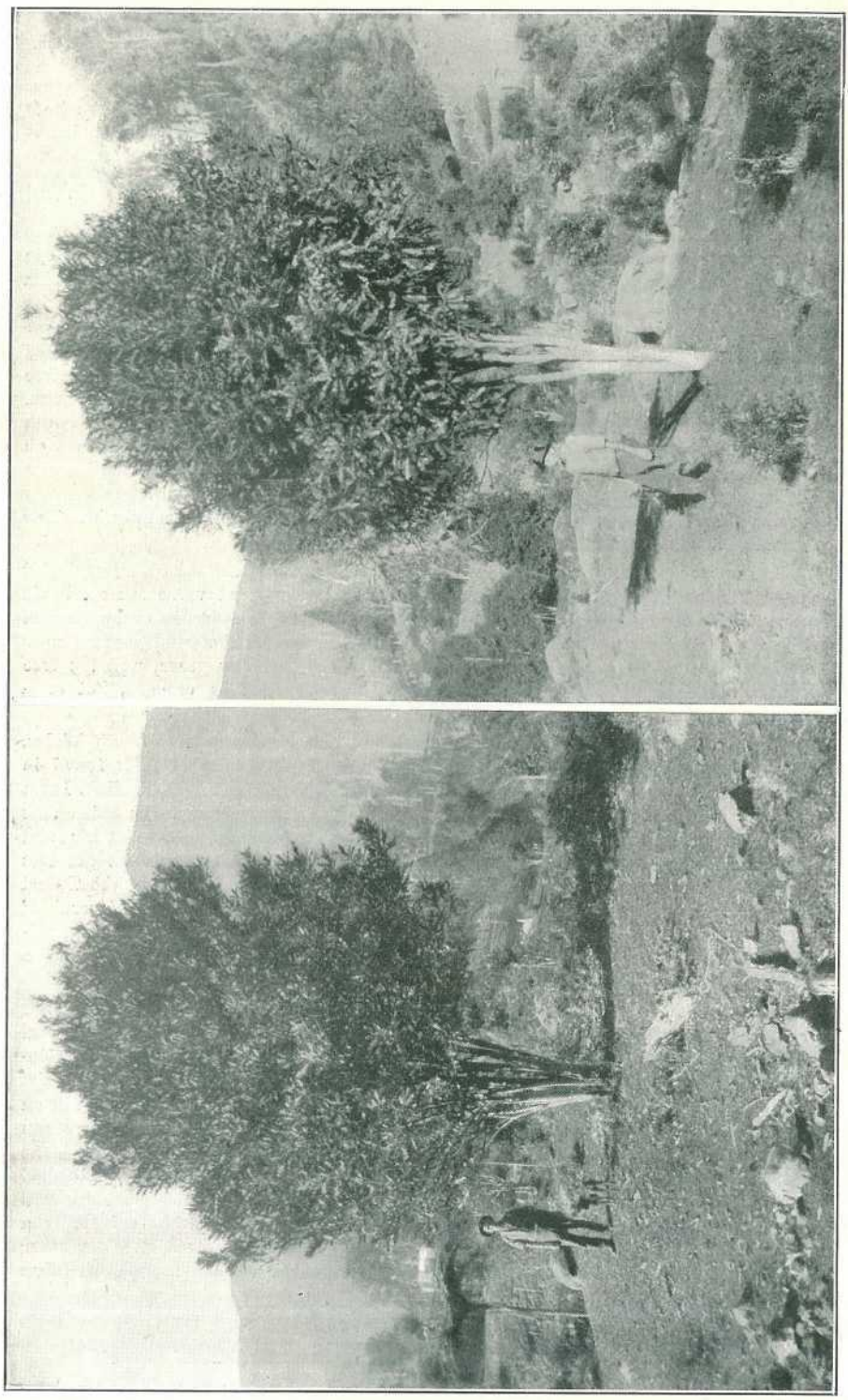

PLATE 15.—QUEENSLAND NUTS (MACADAMIA) TREES, UPPER EUNGELLA, TWEED RIVER, N.S. WALES.
Left: Parent tree, thin-shelled variety. Right Seedling from parent tree, 12 years old.

PLATE 16.—QUEENSLAND NUT (*Macadamia ternifolia*), THIN-SHELLED VARIETY.
The line at base represents 1 inch.

# MARKETING QUEENSLAND FRUIT.

COUNCIL OF AGRICULTURE CONFERENCE—ORCHARDISTS ADOPT REORGANISATION SCHEME—PROVISIONAL COMMITTEE OF DIRECTION APPOINTED.

**No Industry calls more insistently for better Marketing of Products than the Fruitgrowing Industry.**

**The future of the Industry depends on efficient and effective reorganisation.**—*Hon. W. N. Gillies.*

An important Fruitgrowers' Conference, attended by over 100 delegates from local producers' associations in the fruitgrowing regions of the State, assembled in Brisbane on 19th July. The business of the gathering was to consider concrete proposals for the reorganisation of the fruitgrowing industry, as recommended by a special committee of the Council of Agriculture. The Chairman of the Fruit Standing Committee (Mr. W. Ranger, B.Sc., Stanthorpe) presided, and with him on the platform were the Director of Fruit Culture (Mr. A. H. Benson, M.R.A.C.), the State Trade Commissioner (Mr. W. H. Austin), the Director of the Queensland Producers' Association (Mr. L. R. Macgregor), and members of the Council of Agriculture.

The proceedings were opened by the Minister for Agriculture and Stock (Hon. W. N. Gillies) who, in the course of a vigorous address, said that the conference was one of the most important gatherings of fruitgrowers in the history of the State. He hoped that the delegates would concentrate their attention on the real essentials for which the conference had been called. The questions to be considered were so important that they might be regarded as of national concern. No industry called for better marketing of crops than did the fruitgrowing industry. The only chance for the industry to make advancement lay in reorganisation. That was the reason the Council of Agriculture had been brought into being. This conference was the result of the work of that council, and he asked them to recognise the amount of work that the fruit committee of the council had performed in connection with the present scheme. He hoped they would give very careful consideration to the proposals. They could modify them if they thought it necessary, but before they dispersed let them do something that would prove of benefit to the industry. They should not allow anonymous correspondents to draw "red herrings" across their track unless they had something better to put before the fruitgrowers. The Press of Queensland on a previous occasion had been able to sink political differences in the battle for fair treatment of the sugar industry. He hoped the Press would do the same thing for the fruit industry, and if it did it would be doing something of great service to the fruitgrowers. (Loud applause.)

The Director of the Queensland Producers' Association (Mr. L. R. Macgregor), in the course of a lucid exposition, outlined the proposals recommended by the special committee. He also spoke strongly of the difficulties against which fruitgrowers had to contend, and pointed out their duty to place their product on the market in an attractive condition.

## THE PROPOSALS.

The concrete proposals submitted to the conference for consideration were:—

1. That an Act of Parliament be asked for covering the reorganisation of the fruit marketing.

2. That an endeavour be made to use local organisations and corporations already in existence and existing agencies of distribution as far as practicable.

3. That provision be made by such Act for legal constitution of local fruitgrowers' marketing associations operating at present without due incorporation, either on a non-capital non-profit basis or on a basis of capital as may be desired.

4. That local organisations be allowed to trade in fertilisers, fruit cases, and other growers' requisites by consent of the central organisation, but the activities of the central organisation shall be confined to the marketing of fruit.

5. That each local organisation be a member of the central organisation to control marketing in Brisbane, Sydney, Melbourne, Adelaide, and elsewhere.

6. That the Central Growers' Organisation be controlled by a Committee of Direction elected annually by members of the local organisations, and one member nominated by the Council of Agriculture. The Committee of Direction shall not exceed ten in number, and shall be comprised as follows:—Banana growers, 2; pineapples, 2; citrus, 2; deciduous, 2; small fruits, 1; and a nominee from the Council of Agriculture. The Committee of Direction shall control matters of general policy, but may devolve certain powers upon an executive of three, to be elected from among their own number.

7. (*a*) That the growers' representatives on the Committee of Direction shall be elected by growers on a sectional basis; and (*b*) that the members of the Committee of Direction shall retire annually, but shall be eligible for re-election.

8. The central organisation shall be a non-profit, non-capital organisation.

9. That the proposed Act shall vest in the Committee of Direction control of the marketing of all Queensland fruit as from a date to be fixed. Fruit to be allowed at the outset to filter through to existing channels as at present, control gradually to be exercised as bringing to fruition of a policy of extension of markets justifies this, or as an approaching glut season renders this urgently desirable.

10. That it is desirable to allow the Committee of Direction to formulate and carry out its policy, but as indicative of what could be accomplished under the method of control recommended, suggestions are set out in clauses following, and that power should be provided in the Act for the committee to carry out the suggestions set out hereunder:—

(i.) A vigorous policy to be pursued to attain the objective of ensuring that all fruit transmitted to market will pass through either community packing sheds, or, alternatively, a form of inspection in cases in which the application of the packing shed principle is impracticable or undesirable.

(ii.) Arrangements governing loaders to be extended to the fullest degree under control of central organisation, and all fruit to be consigned in bulk where possible.

(iii.) Provision for institution of packing sheds on requisition of the growers concerned, and this under conditions to be arranged by the Committee of Direction.

(iv.) Fruit to be marketed under the grower's or community brand, and at the outset growers to be invited to nominate those agents by whom they desire their fruit to be handled, and, in order that as little disturbance as possible may result, an endeavour to be made by the Committee of Direction to the effect that fruit which has been marketed by growers for years through one agent shall still go through that agent.

(v.) Agreements embodying guarantees to be entered into by Committee of Direction with the agents. The committee to maintain constructive and to seek to eliminate destructive and inimical competition, and to limit the number of agents, if desirable.

(vi.) The Committee of Direction should appoint a receiving representative in each market who would be placed in a position to compare the results, and gradually endeavour to bring about stabilisation.

(vii.) Agency or other representation should be established in the large towns in Queensland, such as Gympie, Maryborough, Rockhampton, Bundaberg, Mackay, Cairns, Mount Morgan, Toowoomba, Roma, and Goondiwindi, as well as in such places outside the State, as Newcastle, if necessary.

(viii.) Consideration should be given to the running of a special fruit train on country railways, either by affording existing distributors a limited time in which to build up such a trade subject to the Committee of Direction stepping in if it be not sufficiently quickly developed, or, alternatively, a straight-out arrangement under which such fruit trains would from the inception be accompanied by a representative of the Committee of Direction to deal with the sale of fruit at places other than those mentioned in the preceding clause.

(ix.) Consideration should be given to instituting negotiations with the Commissioner for Railways with a view to railway station-masters acting as agents on a small commission basis.

(x.) Consideration should be given to the fixation of two prices, wholesale to the retailer, and a retail price to the private buyers, encouragement to be given to country fruiterers and storekeepers who sell fruit and who should be recognised as being a good asset to the industry.

(xi.) All distribution should be effected as far as possible through trade channels, either established or to be established.

(xii.) Encouragement should be given to the establishment of co-operative retail shops by bodies of a growers' society, but not under the Committee of Direction, in which connection the following observations are offered:—

(*a*) Buying in open market gives first-hand knowledge of wholesale trade and leads to effective control.

(*b*) Purchasing on a large scale would stabilise market, as the shops would be run in growers' interests, fair prices would always be paid, and extra efforts to sell retail would be made in times of over supply (*e.g.*, fruit carts).

(*c*) By selling honestly the public would be encouraged to continue and extend their buying.

(*d*) The primary object being to give a reasonable return to the grower, the consumer would be encouraged by being charged reasonable prices.

(*e*) Inferior fruit (*i.e.*, below reasonable standard) would not be sold.

(*f*) Buying for the shops could be combined with buying for country establishments. The bigger the connection secured the more could the market be dominated until it might be possible to assume entire control.

(*g*) This method of attack could be developed gradually and systematically. The wholesale trade demands extended credit, and an accurate summing up of buyers' stability. The vested wholesale interests are firmly entrenched, and would jealously guard themselves. Retailers generally have interests other than fruit, and are not closely banded together. Fresh territory could be explored and, if thought advisable, competition need not be entered into where a district was adequately served. Fruit products (pure fruit drinks, fruit sweetmeats, canned and dried fruits, &c.), could be handled as well as fresh fruits.

(*h*) No heavy finance is required. Money is turned over quickly, and each establishment would be self-supporting probably from the start.

(*i*) There is no possibility of serious loss. The risk is spread very widely, and the exact position of each establishment known weekly. A big number of shops would not be opened simultaneously. The ground captured at each advance would be consolidated before a fresh offensive was undertaken.

(*j*) Ample precedent is available in the big success of the multiple shop establishments in England (*e.g.*, Lipton's grocery), Maypole Dairy Company (butter, margarine, and tea), Hunter's (tea, sugar, and condensed milk), Public Benefit Company (boots and shoes), Mansfield (boots and shoes), Home and Colonial (tea, sugar, and condensed milk).

(*k*) If establishments were opened at such centres as Toowoomba, Ipswich, Rockhampton, and Mackay, the representatives there could probably also act as "receiving agents," thus minimising the expenses.

(xiii.) Marketing both in the sphere of the local and central organisations should be conducted on a non-profit basis, growers securing full benefit of freight concessions, and any other savings. Expenses, including advertising, to develop markets, if, and when desirable, should be met by deductions from account sales, either on a case or bunch basis, or on a basis of percentage of values or such other method as may be determined by the Committee of Direction.

(xiv.) Request should be made for Government guarantee to enable financing of proposals herein.

*Note.*—Financing under the scheme set out herein does not involve trading risk. Trading by Committee of Direction is not advocated. *Del credere* would be carried out by existing distributors whom it is not proposed to eliminate. The finance therefore embraces only inital establishment until funds are available. The temporary overdraft at the bank would not exceed £——, and for this only would Government guarantee be sought.

(xv.) Steps should be taken to obtain legislation for the standardisation of fruit agents' accountancy and bookkeeping methods, which would show, among other items, the buyers' names and addresses.

*Note.*—If by reason of any of the foregoing clauses difficulties should arise with existing fruitgrowers' organisations having a similar or allied object, every effort shall be made to have these difficulties amicably adjusted.

11. Provision should be made for the scheme to be operative for a term of three years, and to continue thereafter unless on requisition of 500 growers a ballot be demanded, and a majority of registered growers demand discontinuance.''

**Support for the Scheme. Solidarity an Essential Feature.**

The chairman read a minute which the Director of Fruit Culture had forwarded to the Minister, in which he stated that he was thoroughly in accord with the scheme. He urged that the scheme must be carried out by all growers, as their solidarity was an essential feature.

The banana growers of the Tweed and Richmond River districts forwarded a message congratulating the Queensland fruitgrowers on their attempt to deal with marketing problems, and stating that they had carried a motion advocating if the scheme were adopted, that the banana growers of New South Wales should be brought in line with such scheme.

A number of questions relating to the proposals were asked of Mr. Macgregor by the delegates, and satisfactorily answered.

**Proposals Considered.**

The meeting dealt with several of the special committee's proposals, the adoption of which was moved by Mr. Macgregor.

On proposal 1, Mr. A. A. Baker moved an amendment setting out that an Act of Parliament should be passed ''embracing a system of co-operative marketing of fruit and vegetables.''

Mr. Macgregor pointed out that the conference was one of fruitgrowers alone, and he suggested that the additional words should be added to the proposal, setting out that the Governor in Council might extend the provisions of the Act to vegetables. Mr. Baker accepted the suggestion, and withdrew his amendment. Subsequently effect was given to Mr. Macgregor's suggestion.

Another delegate submitted an amendment providing for a plebiscite of the growers in respect to No. 1 proposal, but it was defeated by an overwhelming majority.

The clause was carried without amendment.

Proposals 2, 3, and 4 were agreed to practically without discussion.

Proposals 5, 6, and 7 were considered together. The conference, by a big majority, decided that the method of the election of the Committee of Direction should not be by direct ballot on the part of he growers, but through the sectional groups of fruitgrowers.

An attempt in respect to proposal 6, to reduce the number of the members of the committee to 9, and to give the banana growers three representatives, pineapple growers two, citrus growers one, deciduous growers one, and growers of other fruits one, was defeated. It was resolved, however, to alter ''small'' fruits to ''other'' fruits.

On the motion of Mr. Macgregor it was resolved that the first committee should be provisional, and should hold office for six months after the passing of the Act.

A diversity of opinion existed concerning the method of the appointment of this provisional committee. After considerable discussion, Mr. Macgregor moved that the conference should assemble at 9 o'clock on the following morning, when those interested in the different sections of the industry should select four members from each of the principal groups, and from these the Council of Agriculture should make a selection as provided for in proposal 6.

The motion was carried by a substantial majority.

## SECOND DAY'S SESSION.

### The Pooling Question.

The conference was continued on Friday, when clause 9 of the proposals, which proposes to vest in the Committee of Direction the control of marketing of all Queensland fruit, came up Mr. Andrews (Samford) moved as an amendment "That the committee have no power to form pools."

Mr. Gower seconded the amendment.

Mr. Edwards (Cooroy) said he believed that pools were frequently necessary.

Mr. Macgregor suggested that the position might be met by inserting a provision that growers' fruit shall secure its own price and not be pooled with inferior products, except in case of a condition of emergency threatening the whole industry.

### Grades and Prices.

Mr. Andrews: My association contends that there are preferential grades, and in pooling all grades bring the same price. This removes the incentive to produce first-class fruit. It encourages a levelling down process that is injurious to the industry.

Mr. Macgregor: That principle is wrong. Grading protects the industry. Lemons can be bought by cable quotations from Italy on the grade system with absolute safety. We want to bring about a similar position with the fruits of Queensland. To adopt any other policy would be fatal. Certain definite grades and brands should be established and encouraged. Differentiation between grades would be highly inimical to the whole industry.

Mr. Skaner (Eumundi) supported the amendment. He said that several attempts had been made to "ring in" this clause. It gave power to form pools, and that was opposed to the growers' interests.

Mr. Baker (Thulimbah) said he considered the clause was vital to all they had discussed. If it were dropped their efforts for organised marketing would have been useless.

Mr. Nicklin (Palmwoods): Unless something is done to ensure a market for winter pines we will be in a serious position. It is highly necessary to have a unified marketing organisation.

A Delegate: When I consign my fruit I never know where it is going to. My experience is that it always finds its way into a pool, private or otherwise. It may be consigned to a certain person, but there is no guarantee that it is not going to some agent who is trying to create a corner. In view of this it seems idle to me to deny the association the opportunity of conserving the growers' interests.

### Constitution of the S.Q.F.S.—Alteration Proposed.

Mr. Ross (Summit) said he believed pineapple growers were "on a good wicket." There had been a lot in the Press about rotting crops. The Trade Commissioner should have grappled with that. Could it not have been arranged that the State canneries should deal with abnormal situations, such as the one complained of? Pineapples were selling at 6d. a dozen on the field. The consumer was paying 9d. each for them. Somebody was doing pretty well out of it.

Mr. Andrews contended that if new markets were opened up there would be no gluts.

The amendment was defeated by a large majority, and clause 9 was passed as drafted.

Clause 10, subclause (i.), "packing," was agreed to. Subclause (ii.), "loaders," and (iii.), "local packing," were agreed to. It was then decided that subclauses (iv.) to (xv.) should be agreed to, with unimportant modifications, as drafted, except in clause (v.), which was amended by consent to provide that agreements could be entered into with canners as well as agents where guarantees were concerned.

Desultory debates on various irrelevant matters occupied a lot of time, until the chairman applied the closure.

Mr. Macgregor moved that it should be a recommendation to the shareholders of the S.Q.F.S. to alter its constitution, eliminating individual shareholders, and providing that shareholders should be local associations, and that this should be set

out in the Act and that the society should agree to the power being set up in the proposed Act to enable the transposition to be effectively carried out. He pointed out that this would be an essential to the effective carrying out of the proposed co-operative retailing scheme. The motion was seconded and carried.

### Co-operation with the Government.

It was decided that the association should co-operate with the Government in the proposed legislation, and that there should be an annual conference of growers.

The subjects discussed and passed at the first session were then recommitted for final consideration in their amended form.

The clauses of the scheme were agreed to without amendment, and the proposal passed all stages.

### Committee of Direction Elected.

Elections for the Provincial Committee of Direction resulted as follows:—

Banana section: W. B. Cathcart (Landsborough), C. Christie (Currumbin).

Pineapple: H. Vinicombe (Glasshouse), J. J. Thomas (Montville).

Citrus: T. H. Brown (Montville), L. G. Swain (Flaxton).

Deciduous: J. S. Mehan (Stanthorpe), D. Ferunda (Stanthorpe).

Other fruits: H. Archibald (Stanthorpe).

The newly elected members returned thanks, and the conference concluded.

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## REPORTED OCCURRENCE OF BOLL WEEVIL IN THE NORTHERN TERRITORY.

The Minister for Agriculture (Hon. W. N. Gillies) mentioned recently that in view of the statement to the effect that the boll weevil (*Anthonomus grandis*) had been reported in the Brisbane Press of Tuesday, 24th July, as being present in the cotton fields of the Northern Territory, and that alleged report is erroneous and misleading, an inquiry into its origin connects this with a recent report by the Government Entomologist (Mr. Henry Tryon), from which it appears certain that the designation accorded the insect should have been boll worm (*Platyedra gossypiella*) and not the one assigned to it. This distinction is very material since one insect is a genuine weevil attacking the flower-buds of the cotton with great perniciousness, and the other a small moth attacking in its caterpillar phase of life the seed-capsules or bolls of this plant, and that may be locally very pernicious or not—as the experience of cotton-growers in India indicates. They differ again with respect to their geographical range of distribution, the boll worm named being almost cosmopolitan in its occurrence within the limits of cotton growth as a field crop, and already known to have existed in Australia; the boll weevil, on its part, being limited to the New World.

Mr. Tryon's report sets forth that on the 26th June there was found a living Platyedra caterpillar, and characteristically damaged seed—the work of the same insect, in a consignment that had just been sent from the Northern Territory to Brisbane to be ginned, and that it was an evidently very rare occurrence in this consignment; also that this cotton, on his advice, had been exported. Further, that on the 19th July a very small package of what was described as "some diseased specimens of cotton bolls" had been forwarded in a sealed tin box by the Commonwealth Superintendent of Agriculture (Mr. C. E. T. Allen) and that amongst the insects that constituted the "disease" were two moths of the boll worm named, and the two empty cocoons from which they had emerged. Mr. Tryon further added that in view of the probability of the occurrence of this pest in cotton on its arrival at any ginnery, he had urged some time since the installation of a Simon's heat generator appliance at the various ginneries for treating seed as it issued from the gins, so as to destroy any insects present, and that he now recommended the isolation of the Northern Territory with respect to cotton so far as the remainder of Australia was concerned.

What the significance of this discovery may be to the Northern Territory as a cotton-producing State cannot be confidently anticipated; but of our obligation to confine it there, or better, if practicable, to secure its extermination, one cannot but entertain a positive opinion; and no doubt, after full inquiry as to the facts of the insect's occurrence there, steps will be taken to do this and do it speedily.

# IRRIGATION IN QUEENSLAND—II.

BY H. E. A. EKLUND, late Hydraulic Engineer, Queensland Water Supply Department.

**Subjoined is continuation of a comprehensive survey of irrigation possibilities in Queensland. Mr. Eklund was formerly in the State Service as an Hydraulic Engineer and as Executive Engineer in charge of the Inkerman Irrigation Works in North Queensland, and is now engaged on an important water supply project in South Australia. The widespread interest now centred upon land settlement in Queensland, and the general practical development of the forward Government policy in relation to agricultural extension and the enrichment of rural life in this State, makes the publication of Mr. Eklund's observations particularly timely. The review will be continued through succeeding issues of the Journal.—Ed.**

## IRRIGATION ON THE LOWER BURDEKIN.

"The earth is here so kind, that just tickle her with a hoe and she laughs with a harvest."

The system of irrigation here employed is based on the fact that adequate supplies of water can be obtained at shallow depths. The geological formation of the area is that known as a "delta," and the water occurs in a coarse drift usually met with at from 10 to 40 ft. below the surface. The easiest and quickest way of obtaining this water is by employment of the spear-tube or gang-well system, for many years practised in certain localities in America. The actual spear point is the Abyssinian spear modified, and consists of an octagonal cast-steel cone screwed into

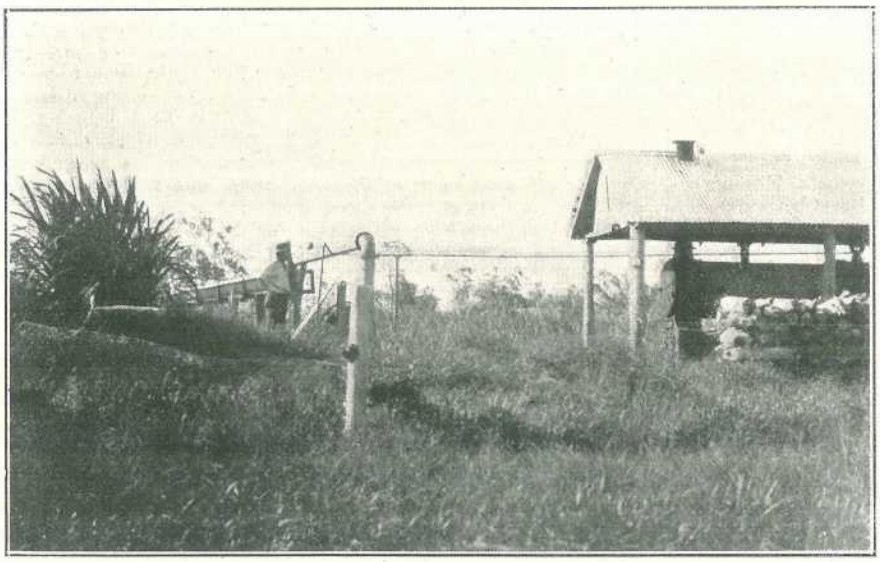

PLATE 17.—AN EIGHT-INCH PUMPING PLANT ON AN OPEN WELL, 56FT. DEEP, LOWER BURDEKIN.

the pipe to be driven. This pipe (usually 2 in.) for the first 2 or 3 ft. from the cone is drilled with $\frac{3}{8}$-in. or $\frac{7}{16}$-in. holes, closely placed and covered with fine copper or brass gauze (200 mesh) soldered to the pipe. Copper or brass wire is then sometimes wound round the gauze and a further cover of perforated zinc or brass sheet secured to this, so making a very efficient screen. The cone at the bottom being larger at the shoulder than the pipe gives a clearance as shown in fig. 1, so saving the covering from being torn off the tube in driving, and the coupling above acts as a protection when the pipe is being withdrawn. In cases where very fine sand is met with even the screen on a spear or well-point becomes choked, and one method of overcoming this trouble is described by Myron L. Fuller, an American authority, in W. S. Papers 225.

Assuming that a 2-in. spear is to be inserted into the troublesome strata, the hole is commenced of a diameter sufficiently large to permit a 4-in. tube to reach the fine water-bearing sand. A supply of pebbles is then dropped down the well and the well-point worked into this. In many cases this method has been found efficacious in dealing with troublesome quicksands. The driving is done by means of shear legs and a hardwood "monkey" after a $2\frac{1}{2}$-in. or 3-in. hole has been bored with an ordinary earth auger as deep as practicable. Any number of these tubes may be driven, and after it has been ascertained that they are in the water-bearing stratum they are coupled up to a common suction main connected with a centrifugal pump. In cases

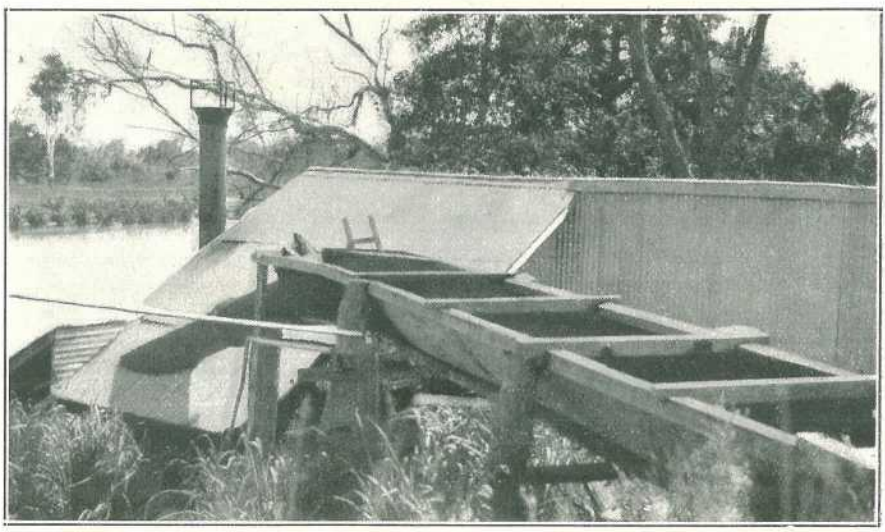

PLATE 18.—A PUMPING PLANT DRAWING FROM OPEN WATER, LOWER BURDEKIN.

where the water has to be lifted more than 16 ft. to the surface, the tubes are driven in the bottom of trenches and the pump put in a pit sufficiently deep to render the lift practicable. As it is necessary to get the least suction lift possible, a low-lying portion of the land is usually chosen for the spear battery. This necessitates lifting the water to a flume sufficiently high to deliver the water by gravitation at the point from which it is distributed to the irrigation channels. It will often appear, in view of the extra lift and long flume thus necessitated, that the sinking of a well at the right spot would have been cheaper in the long run. There are two reasons why this is not generally done: Firstly, water may be unobtainable just where required for distribution; and secondly, sinking wells in the loose drift requires expert labour and special appliances not always obtainable. Some attempts at well-sinking proved so troublesome that further endeavours in this direction have been completely abandoned by the farmers. In one or two cases where wells reached water, trouble was also experienced with the sand rising inside the lining of the well as soon as pumping commenced.

A drawback to the spear battery is the greater power needed for a certain amount of water obtained. Another very annoying experience is to find that the

suction is leaky, and owing to the great number of joints it is often difficult to find the leak. Where the connections are laid in trenches it is often a long job to put a spear plant in order, and all things considered a well, even if great in first cost as compared with the spears, would certainly be more efficient and satisfactory. The writer succeeded in obtaining a good supply—750 to 1,000 gallons per minute, or 2 to 3.6 cusecs—from each of four new wells sunk on the southern side of the Burdekin put down in order to test the supply for a proposed irrigation scheme. Only 9 ft. of water was obtained in each, but for permanency and safety not less than 15 ft. is desirable.

The method of applying water to the crop in the Burdekin district, where sugar-cane is the principal product, is almost invariably the furrow system, the water being applied between the rows of the cane. It is to be regretted that the only measure of water used is that obtained by noting the time of pumping, and this but roughly. There do not appear to be any precautions taken to ensure constancy of speed, and it is very doubtful if any of the pumps employed have ever been properly rated; the makers' rating being generally accepted without any attempt at corrections to suit the exact "head" or height of lift.

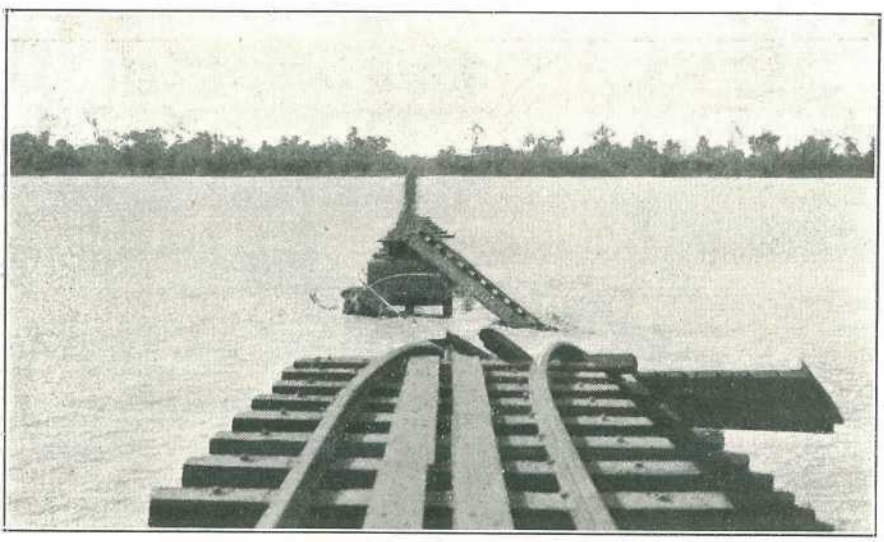

PLATE 19.—DAMAGE DONE TO RAILWAY BRIDGE OVER THE BURDEKIN RIVER BY FLOOD, 1916 (SOUTHERN END).

A reference to Table I. will show that the Lower Burdekin district is by far the most important as far as irrigation is concerned, and area for area the greatest sugar-producing district in Queensland. The sugar industry has for many years been one of the principal agricultural industries in the State, and a reference to Tables II. and III. will show how it compares with its only rivals. While in some years the area under wheat or maize may have exceeded that cropped for cane, the value of the sugar crop easily gives pride of place to sugar-cane. An examination of these statistics indicates the importance of the industry as compared with other forms of agriculture, and some credit for progress made is recorded by Major Boyd as being due to the late Hon. J. V. Chataway.

The lead given by sugar-growers on the Lower Burdekin does not appear to have been readily followed in other districts, though some steps had been taken to inaugurate irrigation at Bundaberg. The scheme here first considered embraced some of the Woongarra lands, with the Elliott River as the proposed source, but the first firm in the Bundaberg district to initiate a practical scheme was Messrs. Gibson and Howe.

## BINGERA PLANTATION.

"Production and not acreage is the measure of profit, and moisture at the right time and at the right temperature all the time is the measure of production."

The Bingera Plantation is situated on the Burnett River, near Bundaberg. A small plant was first installed about 1888, sufficient to supply water to about 100 acres, and the results were sufficiently satisfactory to warrant the outlay for a proper installation capable of supplying water to the whole plantation. An order for a plant to lift 11,000,000 gallons of water in twenty-four hours was placed with Walkers Limited, of Maryborough, and as this was probably the first plant of its kind in Queensland a detailed description may be of interest.

The plant is located about 100 yards from the Burnett River, whence the supply is drawn. The river is subject to floods, and to safeguard the plant it has been placed well above the highest known water mark. Two horizontal cross compound condensing pumping engines with 16-in diameter high-pressure and 32-in. low-pressure cylinders and 48-in. stroke are connected by gearing to two sets of three throw

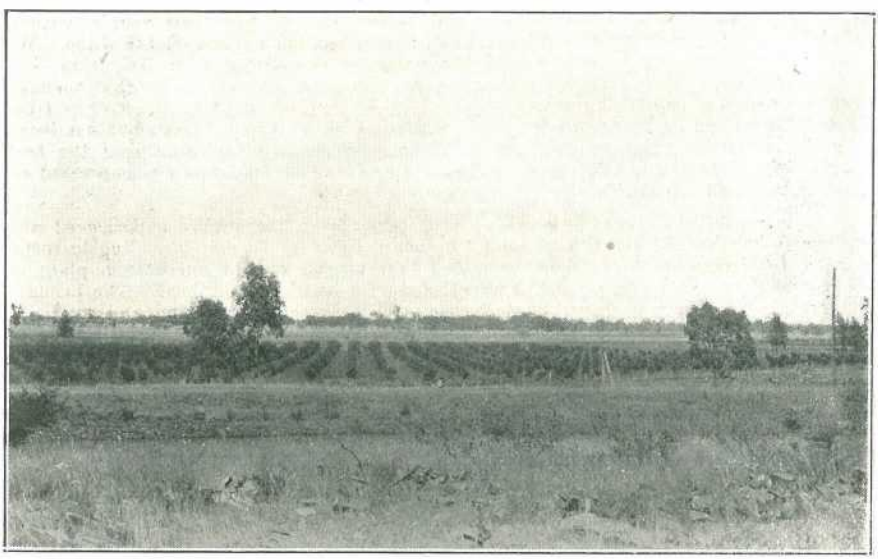

PLATE 20.—CITRUS ORCHARD, 12 MONTHS OLD.

pumps 32 in. diameter. The steam is supplied at a pressure of 150 lb. per square inch by two Lancashire boilers, 7 ft. 6 in. diameter by 26 ft. long. The pumps are placed in a shaft, 87 ft. deep by 17 ft. in diameter, and draw the supply from the river through a tunnel. The mains are 30 in. diameter (steel pipes), and the total lift is 252 ft. The storage capacity provided by means of dams is about 8,000,000 gallons (or 29 acre ft.). With this storage capacity the pumps may work continuously, but actual irrigation is only carried out during the hours of daylight. The reservoirs being placed at the highest points on the estate enables subsequent distribution to be done by gravity, and about two miles of 15-in. mains convey water to Hill End Estate, where irrigation is also practised.

Including pumping machinery, piping, channels, and grading, about £40,000 have been spent on this venture. Considerable trouble has been taken to get the land properly graded, without which no irrigation project can hope for success. When it is remembered that some years no use is made of the plant, it will be better recognised that irrigation can be made to pay. If it is assumed that only 1,000 acres were under cane, and a drought should occur, the saving in having the plant may easily represent the difference between, say, 50,000 tons and no crop.

A point to be noted is that intelligent irrigation does not lower the density or sugar contents of the cane. For the Bingera Plantation each application of water equals 2 in. to 3 in. per acre, or, say, 46,000 to 69,000 gallons per acre, and Mr. A. Gibson, writing in 1903, states: "Regarding the sugar content of irrigated cane, I have not the least hesitation in saying that for quantity of juice and quality our irrigated canes of last year were better than anything we passed through our hands. Before me I have our chemist's report of an analysis of an eleven months' old cane of 29th July, 1902, showing Brix. 19.49, cane sugar 17.66, fruit sugar 0.71; and another of 28th August, ratoon crop, Brix. 20.09, cane sugar 18.90, fruit sugar 0.09. These figures speak for themselves. The canes were not picked samples. Regarding the tonnage of irrigated lands, this requires careful reply. Enthusiasts put Bingera crop down last year considerably over the mark, but all the same it was a great testimony to what can be done in a season such as 1902 was, when our rainfall for the crop was 8½ in. only. With or without irrigation, you are aware that certain conditions more or less govern the crop results, such as, for instance, quality of the soil, thorough and proper tillage before planting, healthy plants, length of growing season, fertilisers applied, &c. With irrigation, besides the above, the cane requires good water and plenty of it, properly applied during the growing season. Last year's crop did not have by any means a fair trial. We had irrigation only for four growing months, and our land was by no means properly laid out for irrigation. Again, the crop was almost ruined before the water was applied.

"This year's crop is equal to, if not better, so far, than last year's, with a rainfall of 9½ in., not including May, 1903, and irrigation only from 6th June. We have not yet thoroughly determined the value of fertilisers with irrigation, but putting our experience alongside Hawaiian experience it appears to us that tonnage results become a practical certainty. My idea is that for a certainty a crop from 30 to 50 tons can be reaped under the conditions I have named. Last, but not least, a good economical and reliable plant is the first requisite to obtaining the best results from irrigation. For large systems this cannot be too strongly impressed on intending irrigationists."

It is regrettable that the warning thus given by a thoroughly experienced and eminently successful irrigationist cannot be heard by every farmer intending to instal a plan for irrigation. It might be added that no one should purchase a plant or decide what system to adopt until competent advice had been obtained. The primary factors almost certainly vary in every case, such as lay of land, kind and condition of soil and subsoil, crops to be grown, and water supply available. In utilisation of the water again, some cases require uniform flooding, while others would give a better result if a furrow system, or a sprinkling service, were used. In one case brought under the writer's notice, £1,400 had been spent where £800 would have given as good, if not a better, result, and many cases are known where savings of from £100 upward could have been effected by obtaining advice costing but a small portion of the saving effected thereby.

Irrigation has also been practised at "The Cedars," a sub-estate of Bingera, provided with an independent supply, the lift here being only 90 ft.

To the farmer who labours under the common delusion that "if a little water is good more water is better," it will be an eye-opener to learn that in this example of successful irrigation each application of water consists of but from 2 to 3 in. per acre at the time. The number of waterings per season must, of course, depend on the times and amounts of the rainfall.

## IRRIGATION AT FAIRYMEAD.

"The best way to find out how to do a thing—Go and do it."

During the protracted drought occurring at the commencement of this century, the necessity for irrigation was sorely felt at Fairymead. All the more so as at this time the cane on an adjoining plantation bore evidence of the effect of water properly applied. Messrs. Young Brothers recognised that if they desired to safeguard against further losses of a similar nature irrigation must be established.

A trial spear driven into the ground rewarded the attempt by a display of water rising almost to the surface. Having made this gratifying discovery, Mr. Young paid a visit to Burdekin, and on his return to Fairymead immediately inaugurated irrigation on similar lines. Had no water been available practically no cane could have been supplied to the mill during the crushing of 1903, but with irrigation the crop obtained ranged from 30 to 60 tons per acre.

About July, 1903, no less than eleven separate plants had been installed on this plantation, and, though (as at Bingera) years may occur when irrigation is not

necessary, the outlay is more than compensated for by the sure returns of a crop every year.

On some of the smaller holdings irrigation has also been attempted, but the pumps are not started unless the dryness of the season appears to endanger the crop. The Elliott River scheme, already mentioned, was the first attempt at a large scheme for a group of settlers, and an outline of its history is given below.

## ELLIOTT RIVER SCHEME.

An Order in Council issued 24th April, 1903, authorised the Woongarra Irrigation Board to draw 60,000,000 gallons of water per week from the Elliott River during the period from 1st September to 1st May following. This board was formed in connection with the Woongarra lands. The area under consideration comprised 3,000 acres. The quantity to be pumped, expressed as acre feet, is 223, very nearly; and if the distribution of this amount were possible without loss, each acre would have received 0.82 in. per week during the irrigating season. As seepage and

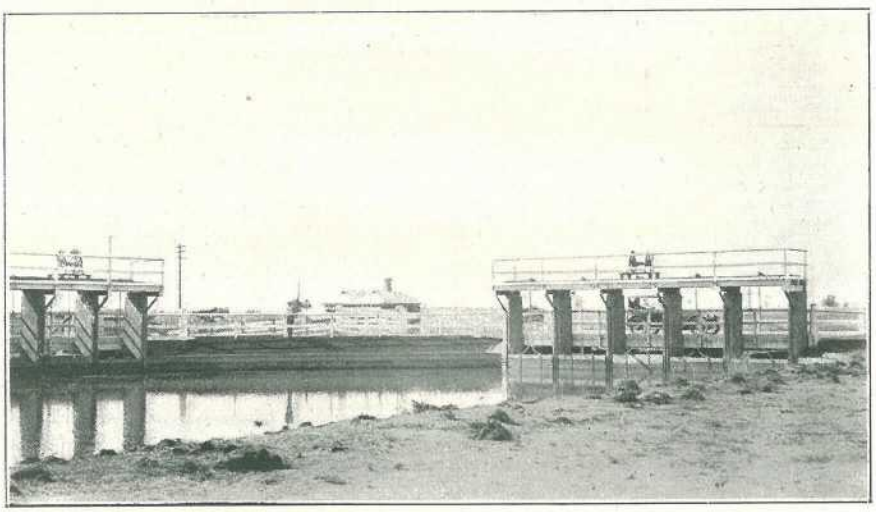

PLATE 21.—REGULATORS ON MAIN CANAL, YANCO.

evaporation losses would probably have accounted for fully half this amount, and the remaining quantity is quite inadequate to be depended upon, Dr. Maxwell, amongst others, reported adversely upon the proposal. Persistent efforts on the part of those concerned led, however, to the undertaking of a fuller investigation, which also included an estimate for the provision of storage works in the river of a sufficient capacity. From these storage works the water was to be pumped to a high-level reservoir, the suggested site for which was in a declivity between two spurs of the "Hummock," at a distance of over eight miles from the pumping station. From this high-level reservoir distribution by gravity, either through pipes or channels, had to be effected.

The first cost of the scheme was estimated at about £170,000 without maintenance or working expenses. With these, added to interest and redemption charges, the annual cost for water only was calculated to be £5 15s. per acre. This charge being clearly too great compared with the then ruling price for cane the scheme was abandoned.

Underground supplies were also investigated, but though the engineer making the investigation stated that he recognised that a fairly large catchment area (144 square miles) with only a small run-off should have produced a fair underground supply, he had not been lucky enough to find it.

## IRRIGATION AT BOWEN.

"In the home of prosperity the value of water is known."

The Lower Burdekin and the Burnett districts have been, and are, the only localities where irrigation has been practised generally on a fairly large scale. Irrigation at Bowen is carried out from wells for growing citrus fruits and vegetables, principally tomatoes, and the area under irrigation at Bowen is steadily increasing. The supply from the wells is good and the water soft and suited to the purpose.

Though the source of supply at Bowen, as on the Burdekin, is obtained in a delta formation, tube wells are not used because the depth to water below surface is greater than on the Burdekin delta. Difficulties met with in sinking wells near the Burdekin do not appear at Bowen, the formation under the surface at the latter place being firmer. Water appears, however, to be just as abundant at both places, though the area over which it can be obtained with ease on the Don River is not as great as on the Burdekin.

Where fruit is grown by irrigation, as at Bowen, the necessity for care and cleanliness in the orchard is of paramount importance. It is of little use for odd

PLATE 22.—PEACH ORCHARD, FOUR YEARS OLD, YANCO.

farmers to strive for good results and clean fruit unless those more lax, or perhaps unaware of the danger incurred in not taking every precaution, are compelled to observe the necessary care. Some instances were noted at Bowen, where drastic powers freely exercised would not have been out of place. It is confidently hoped by those concerned that legislative measures will be taken in this respect, and provision for their enforcement made. Citrus fruits of a very fine quality can be grown in this district and possibly this industry, if carefully supervised, would prove more lucrative than any other.

As an instance of what could probably be regularly done if an export market were established, the following data obtained from the Yanco Experimental Farm may be of interest:—Seven cases of oranges and fifteen of lemons sent from Yanco in July, 1913, cleared net 14s. 3d. per case of oranges and 12s. 3d. per case of lemons. On 31st August, one month later, another lot sent only cleared 8s. 4d. per case of oranges and 2s. 3d. per case of lemons, due to the late shipment. Fruit grown in northern parts of Queensland could always be sent early enough to catch the early market.

It must not be forgotten that irrigated fruit (that is, citrus) does not carry or keep as well as the normally grown citrus. There is no doubt that some means can be found of overcoming this difficulty and as our product increases the question

may be of sufficient importance to be taken up in earnest. A firm of Tasmanian fruitgrowers appear to have overcome the difficulty attending shipping of citrus fruits. By means of thoroughly air drying the fruit, skin moisture is got rid of, and as skin moisture is generally considered the cause of the trouble citrus growers would do well to fully investigate the process.

At present, however, the Bowen district is better known by its production of tomatoes, which often find their way to very distant markets.

Very few irrigators in this district have as yet tried the benefit of grading. The experienced irrigator will find this statement difficult to believe, but as a rule grading is considered superflous. It may, however, be accepted as an axiom that where grading has not been done, irrigation, though perhaps successful at first, is certainly not efficient. There are admittedly some fields where the natural slope is such that no adjustment is necessary, and if the head ditch is properly placed conditions are perfect for efficient irrigation. But such cases are very scarce, and where nature has not attended to the grading the would-be successful irrigator *must*.

Some are afraid that taking the soil from the higher places and dumping it in the hollows will expose subsoil to such an extent that the crop will be patchy. There is but little danger of this if the grading is intelligently carried out, because subsequent ploughing and harrowing so counteracts any danger in this respect as to practically eliminate it. As a result of grading the irrigation can be carried out with ease and one man can do all the work necessary when irrigating an average crop. Without grading irrigation becomes a drudge of shovel work to be done and undone every time an application of water is necessary.

Apart from the labour necessary, there is a very real danger present where grading is not carefully attended to. Every farmer who has tried to irrigate an ungraded or badly graded plot of land knows that the hollows will fill with water in spite of him. Watch the result. Is not the crop in such hollows generally poorer than if it had been grown on the "bare" patch of subsoil exposed by grading?

This constant filling up of the lower portions of a field with water ultimately tends to water-log the ground. To cure water-logged ground may be a much more expensive job than to provide a water supply for dry ground. It is in this respect that the irrigator should be wise and beware.

*(The next instalment will cover Irrigation in the West.)*

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## A NEW AMERICAN RECORD.

A new American record for butter production has been established. With a yearly semi-official record of 1,218.59 lb. butter fat, equivalent to 1,523.2 lb. of butter from 31,610.6 lb. of milk testing 3.85 per cent. May Walker Ollie Homestead, a seven-year-old Friesian, is now the champion butter-producing cow over all breeds and ages. As a result of this performance, which was completed on 18th December, she exceeds the former American record made over seven years ago by Duchess Skylark Ormsby.

A study of May Walker Ollie Homestead's 365-day production record shows that she is a consistent and even producer. In no one calendar month did she produce less than 80 lb. butter fat or 2,000 lb. milk, nor did she go over 3,000 lb. milk in any one month. She carried a calf for almost six months of her test period.

The supervision of her test was very thorough. In 23 test periods, of which 18 were retests, 18 different supervisers of the Minnesota College of Agriculture were in charge.

Her constitution and strength stood her in good stead, for she finished her test weighing 1,765 lb.—the same weight at which she entered her tests period a year ago.

In addition to being the possessor of the American record for butter production, May Walker Ollie Homestead has two other 365-day records which are highly creditable for her age. As a four-year-old she produced 1,096.6 lb. of butter with 22,535.8 lb. of milk in one year on semi-official test while carrying a calf for eight months. Previously, as a senior three-year-old, she produced in 304 days 583.83 lb. butter with 11,622.9 lb. of milk, carrying a calf 192 days.

## TOOWOOMBA EGG-LAYING COMPETITION.

Following are the results of the egg-laying competition which is being held under the auspices of the N.U.P.B.A. (Toowoomba Branch) at Charlsmith Farm, South street, Toowoomba:—

WHITE LEGHORNS.

| No. | Name. | B/M Total. | B/M Score. |
|---|---|---|---|
| 53 | C. A. Keen | 87 | 12 |
| 13 | D. Dippel | 84 | 10 |
| 15 | R. C. Cole | 83 | 13 |
| 2 | Jas. Hutton | 82 | 12 |
| 56 | Enroh Pens | 81 | 12 |
| 1 | Jas. Hutton | 80 | 10 |
| 48 | S. Mansbridge | 80 | 11 |
| 37 | Parisian P. Yards | 78 | 11 |
| 54 | C. A. Keen | 77 | 11 |
| 14 | D. Dippel | 76 | 9 |
| 16 | R. C. Cole | 76 | 10 |
| 10 | H. Hindes | 75 | 8 |
| 7 | G. Stilton | 74 | 11 |
| 5 | H. Grant | 71 | 11 |
| 26 | R. W. Shaw | 71 | 11 |
| 50 | A. R. Petty | 71 | 12 |
| 44 | P. J. Fallon | 70 | 9 |
| 8 | G. Stilton | 68 | 10 |
| 9 | H. Hindes | 66 | 8 |
| 12 | S. Chapman | 65 | 10 |
| 22 | J. W. Short | 65 | 11 |
| 29 | W. Cummings | 65 | 11 |
| 36 | H. G. Shaw | 65 | 12 |
| 11 | S. Chapman | 64 | 10 |
| 3 | J. N. Jones | 63 | 11 |
| 6 | H. Grant | 63 | 8 |
| 51 | Alf. Walker | 63 | 1 |
| 4 | J. H. Jones | 62 | 1 |
| 21 | J. W. Short | 61 | 6 |
| 24 | Jas. Goggins | 60 | 7 |
| 17 | Geo. Lawrenson | 57 | 8 |
| 18 | Geo. Lawrenson | 57 | 9 |
| 47 | N. Mansbridge | 55 | 9 |
| 26 | W. S. Adams | 54 | 11 |
| 30 | W. Cummings | 54 | 0 |
| 33 | Mrs. F. Bliss | 54 | 8 |
| 28 | E. Wiles | 53 | 11 |
| 57 | J. W. Newton | 51 | 5 |
| 19 | R. W. Shaw | 50 | 10 |
| 49 | A. R. Petty | 49 | 10 |
| 27 | E. Wiles | 46 | 9 |
| 46 | R. C. J. Turner | 45 | 11 |
| 35 | N. G. Manning | 40 | 11 |
| 38 | Parisian P. Yards | 40 | 10 |
| 52 | Alf. Walker | 40 | 3 |
| 25 | W. S. Adams | 39 | 3 |
| 34 | Mrs. F. Bliss | 38 | 11 |
| 45 | R. C. J. Turner | 37 | 9 |
| 55 | Enroh Pens | 30 | 12 |
| 58 | J. W. Newton | 30 | 5 |
| 59 | C. E. Rogers | 24 | 11 |
| 39 | Vic. Brand | 22 | 10 |
| 43 | P. J. Fallon | 20 | 0 |
| 31 | Jas. Taylor | 19 | 9 |
| 41 | Stan. McBean | 17 | 2 |
| 23 | Jas. Goggins | 13 | 0 |
| 40 | Vic. Brand | 10 | 7 |
| 42 | Stan. McBean | 10 | 6 |
| 60 | C. E. Rogers | 7 | 7 |
| 32 | Jas. Taylor | 5 | 0 |

BLACK ORPINGTONS.

| No. | Name. | B/M Total. | B/M Score. |
|---|---|---|---|
| 88 | Marville P. Yards | 94 | 15 |
| 111 | T. J. Carr | 94 | 13 |
| 121 | Jas. Hutton | 93 | 12 |
| 112 | T. J. Carr | 91 | 12 |
| 127 | E. Walters | 90 | 13 |
| 97 | R. Burns | 89 | 14 |
| 86 | T. J. Moloney | 86 | 14 |
| 95 | S. H. K. Champion | 86 | 10 |
| 131 | H. B. Stephens | 85 | 13 |
| 122 | Jas. Hutton | 84 | 12 |
| 103 | E. F. Dennis | 82 | 12 |
| 116 | Cliff. Lavers | 82 | 13 |
| 90 | W. Wilson | 81 | 11 |
| 107 | R. Holmes | 79 | 12 |
| 117 | Mrs. L. Maund | 79 | 12 |
| 132 | H. B. Stephens | 78 | 10 |
| 83 | Wombo P. Yards | 77 | 12 |
| 109 | D. Dippel | 75 | 14 |
| 94 | N. Mansbridge | 74 | 13 |
| 128 | E. Walters | 74 | 11 |
| 115 | Cliff. Lavers | 73 | 11 |
| 84 | Wombo P. Yards | 70 | 10 |
| 110 | O. Dippel | 70 | 13 |
| 114 | Ken. McFarlane | 70 | 12 |
| 89 | W. Wilson | 66 | 10 |
| 101 | R. W. Shaw | 64 | 12 |
| 113 | Ken. McFarlane | 64 | 9 |
| 87 | Marville P. Yards | 63 | 11 |
| 104 | E. F. Dennis | 63 | 12 |
| 105 | R. R. Rivett | 63 | 12 |
| 124 | G. E. Rogers | 59 | 11 |
| 102 | R. W. Shaw | 55 | 10 |
| 123 | G. E. Rogers | 54 | 11 |
| 96 | T. C. Ollier | 50 | 11 |
| 120 | Parisian P. Yards | 46 | 12 |
| 92 | S. H. K. Champion | 45 | 9 |
| 106 | R. R. Rivett | 41 | 9 |
| 91 | S. H. K. Champion | 40 | 11 |
| 130 | G. Radford | 39 | 9 |
| 85 | T. J. Moloney | 39 | 0 |
| 19 | Parisian P. Yards | 38 | 9 |
| 99 | Mrs. G. H. Kettle | 37 | 8 |
| 29 | G. Radford | 36 | 10 |
| 93 | N. Mansbridge | 33 | 4 |
| 98 | R. Burns | 33 | 10 |
| 108 | R. Holmes | 30 | 15 |
| 100 | Mrs. G. H. Kettle | 23 | 1 |
| 126 | C. E. Dennis | 16 | 13 |
| 118 | Mrs. L. Maund | 8 | 5 |

## TOOWOOMBA EGG-LAYING COMPETITION—*continued.*

OTHER BREEDS.

| No. | Name. | Total. | B/M Score. | No. | Name. | Total. | B/M Score. |
|---|---|---|---|---|---|---|---|
| 76 | W. Becker (C.L.) .. | 80 | 12 | 81 | C. G. Warrian (P.R.) | 53 | 9 |
| 73 | H. Dibbs (C.L.) .. | 76 | 10 | 79 | A. W. LePla (R.I.R.) | 49 | 8 |
| 68 | R. W. Shaw (B.L.) .. | 72 | 10 | 77 | W. Paulsen (P.R.) .. | 31 | 16 |
| 64 | T. J. Carr (S.W.) .. | 69 | 8 | 61 | Mrs. L. Maund (C.W.) | 23 | 9 |
| 82 | C. G. Warrian (P.R.) | 66 | 11 | 62 | Mrs. L. Maund (C.W.) | 21 | 0 |
| 63 | T. J. Carr (S.W.) .. | 65 | 9 | 69 | Parisian P.Y. (B.L.) | 21 | 7 |
| 67 | R. W. Shaw (B.L.) .. | 65 | 10 | 65 | J. W. Short (B.L.) .. | 21 | 9 |
| 71 | J. W. Allatt (Campine) | 64 | 10 | 70 | Parisian P.Y. (B.L.) | 17 | 5 |
| 75 | W. Becker (C.L.) .. | 64 | 11 | 80 | A. W. LePla (R.I.R.) | 13 | 11 |
| 74 | H. Dibbs (C.L.) .. | 61 | 15 | 72 | J. W. Allatt (Camp.) | 9 | 4 |
| 66 | J. W. Short (B.L.) .. | 53 | 10 | 78 | W. Paulsen (P.R.) .. | 6 | 0 |

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JUNE, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JUNE, 1923 AND 1922, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | June. | No. of Years' Records. | June, 1923. | June, 1922. |
| *North Coast.* | In. | | In. | In. |
| Atherton ... ... | 1·58 | 22 | 0·65 | 1·31 |
| Cairns ... ... | 2·86 | 41 | 1·36 | 2·71 |
| Cardwell ... ... | 2·06 | 51 | 2·04 | 1·50 |
| Cooktown ... ... | 2·03 | 47 | 0·38 | 1·48 |
| Herberton ... ... | 1·01 | 36 | 0·96 | 0·94 |
| Ingham ... ... | 2 42 | 31 | 2·14 | 1·75 |
| Innisfail ... ... | 7·10 | 42 | 2·15 | 9·37 |
| Mossman ... ... | 2·32 | 15 | 2·53 | 1·58 |
| Townsville ... ... | 1·25 | 52 | 2·43 | 0·19 |
| *Central Coast.* | | | | |
| Ayr ... ... ... | 1·28 | 36 | 3 93 | 0·73 |
| Bowen ... ... | 1·58 | 52 | 2·36 | 0·50 |
| Charters Towers ... | 1·30 | 41 | 1·77 | 0·30 |
| Mackay ... ... | 2·68 | 52 | 5·27 | 1·34 |
| Proserpine ... ... | 3·64 | 20 | 3·33 | 1·26 |
| St. Lawrence ... | 2·44 | 52 | 3·61 | 1·46 |
| *South Coast.* | | | | |
| Biggenden ... ... | 1·86 | 24 | 4·90 | 2·38 |
| Bundaberg ... ... | 2 69 | 40 | 4·10 | 1·57 |
| Brisbane ... ... | 2·64 | 72 | 2·66 | 1·83 |
| Childers ... ... | 2 20 | 28 | 4·27 | 2·33 |
| Crohamhurst ... | 4·16 | 30 | 2·89 | 1·81 |
| Esk ... ... ... | 2·03 | 36 | 2·53 | 1·24 |
| Gayndah ... ... | 1·87 | 52 | 3·39 | 1·36 |
| Gympie ... ... | 2·52 | 53 | 3.60 | 3·13 |
| Glasshouse Mts. ... | 3·94 | 15 | 2·70 | 1·66 |
| Kilkivan ... ... | 2·05 | 44 | 3·54 | 1·28 |
| Maryborough ... | 2·85 | 52 | 4·39 | 2·80 |

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | June. | No. of Years' Records. | June, 1923. | June, 1922 |
| *South Coast*—continued: | In. | | In. | In. |
| Nambour ... ... | 3·36 | 27 | 3 12 | 2·02 |
| Nanango ... ... | 2 04 | 41 | 2·31 | 1·47 |
| Rockhampton ... | 2·34 | 52 | 3·91 | 1·82 |
| Woodford ... ... | 2 66 | 36 | 2·44 | 2·23 |
| *Darling Downs.* | | | | |
| Dalby ... ... | 1·70 | 53 | 2·21 | 2 55 |
| Emu Vale ... ... | 1·44 | 27 | 1·84 | 1 55 |
| Jimbour ... ... | 1·73 | 35 | 2·23 | 2 45 |
| Miles ... ... | 1·92 | 38 | 2·79 | 2·04 |
| Stanthorpe ... | 1·88 | 50 | 2·95 | 1 49 |
| Toowoomba ... | 2·35 | 51 | 2·83 | 1 64 |
| Warwick ... ... | 1·80 | 58 | 2·02 | 2 08 |
| *Maranoa.* | | | | |
| Roma ... ... | 1 72 | 49 | 2·78 | 3 27 |
| *State Farms, &c.* | | | | |
| Bungeworgorai ... | 1·78 | 9 | 2·74 | 2·58 |
| Gatton College ... | 1.72 | 24 | 2·37 | 1 03 |
| Gindie ... ... | 1·53 | 24 | 3·62 | 1·10 |
| Hermitage ... | 1·97 | 17 | 1·98 | 2 10 |
| Kairi ... ... | 1·32 | 9 | ... | 1 84 |
| Sugar Experiment Station, Mackay | 2·32 | 26 | 5·25 | 0·91 |
| Warren ... ... | 1·86 | 9 | 2·68 | 1·54 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for June this year, and for the same period of 1922, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
State Meteorologist.

# General Notes.

### New Agricultural Measures.

New legislation relating to rural interests and initiated by the Minister for Agriculture and Stock (Hon. W. N. Gillies) include an amendment of the Dingo and Marsupial Destruction Act, a Diseases in Poultry Bill, a Pest Destroyers Bill to regulate the sale of insecticides, fungicides, vermin and weed destroyers. As the session advances other beneficial agricultural legislation will be introduced.

### A Jersey Test.

The Secretary of the Jersey Cattle Society of Queensland advises that Carlyle Lady Lynn, the property of Mr. J. Williams, Woodbine, Kingaroy, has completed the 273 days' test, with a yield of 6,511 lb. milk, and 375.61 lb. fat, equal to 441.91 lb. commercial butter in the period. Carlyle Lady Lynn is by Master of Lynn (imp.), (717), and her dam was Lady of Carlyle (751, vol. 6). She was seven years of age at the beginning of her test.

### Marketing of Ratoon Cotton.

Replying to a question in Parliament on the subject of the disposal of ratoon cotton, the Minister for Agriculture and Stock (Hon. W. N. Gillies) stated that the Agent-General, who is quite alive to the position, and after making discreet inquiries amongst English spinners, had cabled that ratoon cotton is not wanted. Inquiries already made indicated that the average market price for such cotton would only ensure the Queensland grower from 2d. to 2¼d. per lb. in the seed. Our experts advise that our only hope of permanently establishing an industry that will stand on its own feet is to produce a high standard of annual cotton.

### Recent Illawarra Figures.

The Secretary of the Illawarra Milking Shorthorn Society of Australia advises that Garnet of Fairfield and Duchess of Fairfield are the two latest heifers to complete the 273 days' test for the advanced register of the Illawarra Milking Shorthorn Herd Book of Australia. Both heifers are the property of Mr. F. E. Birt, Fairfield, Sexton. Garnet of Fairfield (710), by Dandy of Blacklands (36), ex Lettie of Fairfield, yielded 9,015½ lb. milk and 393.61 lb. fat, equal to 463.08 lb. commercial butter. She was two years and five months old at the beginning of her test. Duchess of Fairfield (708), by Dandy of Blacklands (36), ex Queenie of Fairfield (885), yielded 9,523 lb. milk and 370.65 lb. fat, equal to 430.06 lb. commercial butter. She was two years and eight months old at the beginning of her test.

### Crown Lands Selection.

In the period of six months ended on 30th June last, 561 persons in Queensland took up 2,216,207 acres of Crown land. A return issued by the Lands Department last week shows that the rental in respect of these selections totals £11,530. In the corresponding period of 1922, the number of selectors was 582, the area was 1,380,716, and the rental £10,821.

Last month 82 persons took up 473,846 acres of Crown land, at a total rental of £1,849. In June of last year 96 selectors took up 169,577 acres, for which the rental is shown at £861.

### Atherton Pig Pool.

Upon the recommendation of the Council of Agriculture, the Governor in Council, by Order in Council, has declared that pigs grown in the Petty Sessions Districts of Atherton, Herberton, and Chillagoe, to be a Commodity under the Primary Products Pools Act. A Board, consisting of the following members has also been appointed, and which Board will administer the affairs of the Atherton Tableland Pig Board up to the 30th June, 1924:—

ROBT. CAMPBELL, of Peeramon,
MICHAEL LYNCH, of Peeramon,
GEO. R. DAVIDSON, of Peeramon,
CLARENCE H. JURD, of Millaa Millaa, and
CHAS. W. ROSEBLADE, of Yungaburra.

### Potash for Potatoes.

Potato experiments in Northamptonshire in 1922 showed that muriate of potash and sulphate of magnesia gave the heaviest yield per acre—viz., 13 tons 13 cwt. The plot without potash gave the lowest yield 7 tons, and a natural manure like kainit, which contained about 14 per cent. of potash, gave lower yields than other forms of potash. In 1921 a plot receiving magnesia with potash also gave the highest yield. All the plots received a dressing of 2 cwt. sulphate of ammonia, and 6 cwt. superphosphate. The potash dressings were arranged to supply the same amount of potash as 2 cwt. sulphate of potash per acre.—"Australasian."

### Beerburrum Dehydrated Products.

Bottles of bananas and pineapples treated by the Beerburrum Co-operative Company's dehydration process are at present displayed in the Queen street window of the Sanitarium of Health Company's premises. The exhibits are an excellent example of the efficiency of the dehydration process. The fruit appears to have retained its original colour and conveys the impression that, as an edible, it would be equal to fruit in its natural state. The Empire Exhibition Commission have authorised the expenditure of £20 to purchase dehydrated tropical fruits of this kind to display in London. Samples of dehydrated pineapples and bananas were shown at a recent conference of the Australasian Fruit Growers in Melbourne, and were much admired.

### Pest Destroyers Bill.

In submitting this measure to Parliament, Mr. Gillies said the fruit section of the Council of Agriculture for some considerable time had been asking that legislation of this character should be placed on the statute-book. At the conference of Ministers at Perth last year, resolutions on the question were passed, and various conferences of agricultural chemists have dealt with the matter. Similar legislation is on the statute-books of Victoria, South Australia, and all the States of America in connection with sheep dip, sprays, and various pear poisons and other mixtures sold, and it is necessary that the farmers should be protected. Tests will be made, the sellers must be registered, and generally the farmers will be protected against paying high prices for stuff that is of no value.

### Atherton Tableland Maize Board.

Notice has been given that it is the intention of the Governor in Council, upon the recommendation of the Council of Agriculture, to declare that maize produced from seed sown after the 1st July, 1923, in the Petty Sessions Districts of Atherton, Herberton, and Chillagoe, is and shall, for a period of ten years as from the 1st July, 1923, be a commodity under "*The Primary Products Pools Act of* 1922;" and also to constitute a Board in relation to such commodity.

Any petition for a poll to decide whether the above Order shall be made must be signed by at least fifty maize-growers of one acre or more in the above Petty Sessions Districts and must reach the Minister before the 24th August, 1923.

Nominations will be received by the Under Secretary, Department of Agriculture and Stock, up to the 24th August, for election for one year as Growers' Representatives on the Atherton Tableland Maize Board. Each nomination is to be signed by at least ten maize-growers who grew, during 1923, one or more acres of maize.

### Friesian Herd Tests.

The Secretary of the Friesian Cattle Club of Australia (Mr. R. S. Maynard) advises that the following cows have completed their 273 days' tests for the Herd Book:—Belle of Friesland 2nd, by Colantha Pontiac, 569, N.Z.H.B., ex Belle of Friesland, 646, N.Z.H.B., at the age of six years and three months, yielded 14,229¾ lb. milk, and 509.29 lb. fat, equal to 599.40 lb. commercial butter. Colantha Wild Rose, by Colantha Pontiac, 569, N.Z.H.B., ex Friesland Wild Rose, 638, N.Z.H.B., yielded 14,181¼ lb. milk, and 498.12 lb. fat, equal to 586.03 lb. commercial butter. She was seven years of age at the beginning of her test. Anna of Brundee, by King of Brundee (181), ex Annette 2nd of Brundee, nine years of age at the beginning of her test, yielded 12,116 lb. milk, and 444.03 lb. fat, equal to 522.40 lb. commercial butter in that period. These three cows are the property of Mr. G. Newman, St. Athan, Wyreema. Another Friesian heifer, which has just completed her test, with very creditable results, is Psyche 2nd of St. Gwithian, the property of Mr. S. H. Hosking, St. Gwithian, Toogoolawah. At the age of two years four months she yielded 12,285¾ lb. milk, and 454.45 lb. fat, equal to 534.65 lb. commercial butter in 273 days. She is by Jewel's Maxwell of Brundee ex Psyche (app. vol. 1).

### Turkeys in the Cotton Field.

A writer in "The Reliable Poultry Journal" (March), discussing the practical side of turkey breeding and rearing, says that turkeys do a great service to farmers in the United States by cleaning up insect pests. Turkey raisers in the South, especially, have found that the presence of a flock of turkeys in their cotton fields means a big reduction in the damage caused by the boll weevil.

### Cost of Cotton Seed for the Coming Sowing.

Replying to a question in Parliament, the Minister for Agriculture and Stock (Hon. W. N. Gillies) made it clear that the charge for seed for the coming planting will be ½d. per lb. From 10 to 15 lb. will plant an acre. The average area under cotton per cotton-grower last year was 7 acres. The total cost per farmer will therefore not exceed a few shillings. The proceeds of sales are paid into the Cotton Fund, and will either be paid to the growers or used to make good any loss arising out of the guarantee.

### Dairy Shorthorn Points.

An English studmaster recently demonstrated to a party of students the essential points of a good dairy Shorthorn cow. As a primary point he laid considerable stress on the value of free and graceful carriage. If the action were not good, one of two things was the cause—either the animal had been overfed or had a hereditary weakness. The points of the head were the usual—longish head, wide muzzle, and bright eye—but a few black spots on the muzzle did not necessarily bar an animal from a distinguished career. Then the shoulders must be narrow. This point combined with width across the hookbones gave the characteristic wedge-shape of the dairy cow. A well-defined escutcheon always pointed to a good cow, yet many good cows were found with a poor escutcheon. Common sense would suggest that in the dairy cow the udder was the most important part. The shape of this must be as half mooned as possible, coming well down behind and stretching far forward under the belly, and not divided. The teats must be set on evenly at the four corners and the skin must be fine, silky, and very elastic to the touch. The milk veins must be thick and tortous. The question of milk pedigree was then discussed, and the opinion was expressed that if there were four or five good dairy bulls on the top of the pedigree there was no need to lay any emphasis on a long pedigree stretching back to remote ancestry, however good. From the milk point of view the value of the dairy bull was to be based on his milk ancestry, and in actual appearance he must be as masculine a type as the beef bull. Feminine appearance belonged to the cow and not to the bull.

### N.U.P.B.A. Activities—Meat Meals as Poultry Food.

At the last monthly meeting of the National Utility Poultry Breeders' Association a paper, by Mr. W. H. Paine, on the value of meat meals as poultry food was read by the secretary, Mr. Kidd. A lively discussion followed on the use of dried blood as a protein food. Mr. Paine, basing his opinion on the analyses and experiments carried out by southern chemists, claimed that dried blood, if not injurious, is absolutely valueless to poultry. Mr. M. H. Campbell took the opposite view, and stated that he had used this ingredient in his mashes for many years with very satisfactory results, provided that the blood had been prepared and dried by the modern method of heating in a vacuum, which prevents the destruction of the vitamins, as was the case with the old-fashioned retort method. The latter had the effect of carbonising the blood, which rendered it indigestible and of about the same feeding value as ashes. Several other practical farmers supported Mr. Campbell's views, and it was decided to request the Council of Agriculture to settle the question at one of the feeding tests to be held at the Gatton College shortly. It was suggested that individual breeders should hold tests in their yards and report results, and also that a special sub-committee be appointed to work out a suitable ration. It was further suggested that proprietary meat-meal manufacturing firms be written to for an expression of opinion on this question.

### Opossum Season Closed.

The Minister for Agriculture (Hon. W. N. Gillies), replying to a question in the House, stated definitely that the open season for opossums will not be extended.

### African Maize Purchase.

Public attention has lately been given to the importation and local purchase of African maize, and to make clear the extent of the operation of the State Produce Agency in overseas grain the Minister for Public Works (Hon. W. Forgan Smith), replying to a question in Parliament, stated that the State Produce Agency's buying of African maize amounted to 100 tons at 5s. 11d. in store, Brisbane, and the purpose of the purchase was to ensure supplies for country customers (mostly poultry farmers) at prices that would enable the Agency to compete with Queensland produce merchants, who had, according to report, purchased African maize up to 5,000 tons.

### Queensland Cotton on the Liverpool Market.

The British Australian Cotton Association has received a cable message from its Liverpool office that 130 bales of A grade Queensland cotton, shipped by the "Runic," has been sold on the Liverpool market for 15¼d. per lb., which is about 2¾d. above the price of middling American cotton. The association also states that it shipped 841 bales of cotton from Rockhampton in May by the steamer "Woodarra," which was recently on fire; apparently this has been confused in the report with wool. Cotton with a grade of similar variety has recently brought 2¾d. above middling American. The Liverpool cotton is fully insured.

### Cotton Seed Receipts.

The British Australian Cotton Association advises that the receipt of seed cotton at the various ginneries to 17th July was as follows:—

| Ginnery. | Net weight. lb. | Amount. £ s. d. |
|---|---|---|
| Rockhampton .. .. .. | 3,193,964 | 69,835 13 0 |
| Wowan .. .. .. .. | 1,757,941 | 40,275 8 8 |
| Whinstanes .. .. .. | 3,771,920 | 85,706 14 7 |
| Gayndah .. .. .. | 711,816 | 16,311 9 8 |
| Dalby .. .. .. .. | 402,161 | 9,215 12 1 |
| Totals .. .. .. | 9,837,802 | £221,344 18 0 |

### The Queensland Sugar Crop, 1923.

Queensland is expected to produce in the 1923 sugar season about 240,000 tons of raw sugar. This estimate has been made by the Director of Sugar Experiment Stations (Mr. H. T. Easterby) from figures recently supplied.

He said recently that this with the New South Wales (cane) and the Victorian (beet sugar) production would make some 258,000 tons of sugar for Australia. In addition to this, there was the present carry over of about 55,000 tons of sugar, so that there would be, at the end of the 1923 season, another carry over, but of a smaller amount. The production in Queensland last year was, in round numbers, 288,000 tons of sugar.

Due to the extremely dry weather experienced during the early part of the year, this season's production would show a decrease of some 48,000 tons of sugar. It would, however, be much larger than the crops of 1918, 1919, and 1920. The record crop was that of 1917, when 307,000 tons of raw sugar were produced. In 1921 the yield was 283,198 tons of sugar, so that the expansion of the sugar industry in the past two years, during the currency of the late sugar agreement, had been most marked. The present crop, of course, also was planted while the agreement was in force.

**Codlin Moth Control.**

At the last monthly meeting of the Fruitgrowers' District Council, Mr. Henry Tryon (Government Entomologist) addressed the delegates on the codlin moth pest. He traced the life history of the codlin moth, and advocated spraying in the early spring, just as the petals were falling.

One of the delegates raised the question of the pemble injury to bees by the arsenate of lead spray used to kill the codlin moth, and stressed the point that bees were one of the fruitgrowers' best friends.

Mr. Tryon said that he was conscious of that, but pointed out that if spraying were carried out at the time he advocated—that is, when the petals were falling—no injury would be done to the bees.

Mr. Ward (Chief Instructor in Fruit Culture) also spoke on the question of dealing with the codlin moth, and said that if three sprayings were effectively carried out he would guarantee that loss by the codlin moth could be reduced to 1 per cent. He only wished they could deal as effectively with the fruit fly as they could with the codlin moth.—"Courier."

**Staff Changes and Appointments.**

Inspector Charles Edward Ford, of the Pioneer Shire Council, Mackay, has been appointed an officer under "*The Animals and Birds Act of* 1921."

Mr. A. J. Caswell and Edwin Franklin, of Wangalpong, have been appointed officers under "*The Animals and Birds Act of* 1921."

Police Constable H. J. A. Bovard, of Miles, has been appointed an Inspector of Slaughter-houses.

L. W. Ball, Temporary Agricultural Field Assistant in connection with the establishment of the Cotton Experiment Plot, Upper Burnett District, has been appointed as an Agricultural Field Assistant, Department of Agriculture and Stock, as from the 1st July, 1923.

The Officers in Charge of Police at Surat and Injune, together with Police Constable R. J. Hamilton, of Miles, and Police Constable J. Mahon, of Injune, have been appointed acting Inspectors under "*The Diseases in Stock Act of* 1915."

The Police Magistrate, Bowen, has been appointed Government Representative of the Bowen Dingo Board.

The resignation of S. K. Crowther, Inspector of Dairies, Kingaroy, has been accepted as from the 6th August, 1923.

**Dairying in the Central Burnett.**

Dairying was given the first uplift by the formation of the Gayndah Co-operative Company in 1910. This company has made marked progress. In 1911 there were 76 suppliers; the present total is 350. In 1922 (with a seven months' drought) 502,140 lb. cream was supplied to the factory, and to such an extent has the supply increased that additional plant has become necessary. This has entailed an expenditure of £7,000, including an 800-gallon Batch pasteuriser, 20-ton refrigerating compresser, 6,000-gallon cold water tank, and 50 h.p. boiler, with extensions to the ice plant, cream room, and manufacturing room. The Maryborough Co-operative Company has butter factories at Biggenden and Mundubbera, which are up to date in every way. These three concerns turn out an average of over 60 tons of butter weekly. In 1915 the Gayndah Company opened cheese factories at Byrnestown and Binjour Plateau, and the Maryborough Company a cheese factory at Branch Creek, each of which turns out, on an average, about 1 ton of cheese per week. Cheese factories, owned by farmers in the localities on the co-operative principle, have been established at Dundarrah and Emu Creek. These also have a weekly output very little under the other factories. Ready markets are found for the product in various parts of the State and in England. The Gayndah factory has a big business connection with Central Queensland. The industry has grown so rapidly that even with these demands of the cheese factories there has been no diminution of cream to the butter factories. Burnett people assert that their district is destined to be the premier dairying part of Queensland, for they have the country and a good average rainfall. Dairymen have made it their aim to procure good stock, and they declare that the yield per cow will compare with that of any part of Australia.

### Advisory Board for Government Stallions.

Messrs. E. Baynes, J. Tait, A. H. Cory, M.R.C.V.S., H. C. Quodling, and the Under Secretary for Agriculture (Mr. E. G. E. Scriven) have been appointed members of a Board for making arrangements for the service of the stallions recently purchased by the Queensland Government, the conditions on which mares will be received for service, and other matters in relation thereto.

### Prickly-Pear as Fodder—New Machine Tested—A Correction.

In the course of a brief reference to a machine for treating prickly-pear for the purpose of making it more palatable as stock food, patented by Mr. L. W. Page, of Warra, and appearing under the above heading in the July Journal, it was stated that the machine was capable of "treating 3 or 4 tons daily." The error is evident. Obviously the statement should have read "3 or 4 tons *per hour*," and we are taking the earliest opportunity of correcting a palpable mistake.

### Pigs, Bacon, and Fixed Prices.

Replying to a question in Parliament as to whether, in view of the present high cost of feeding pigs, he would direct the Commissioner of Prices (Mr. Ferry) to cancel all notifications fixing the prices of hams and bacon, the Premier and Treasurer (Hon. E. G. Theodore) said: Decontrol is unnecessary, as any increase in the price paid by the factories for pigs is allowed in the wholesale price. Fixation does not, therefore, affect the price of pigs. Further, the limiting of profits on the retail prices of such commodities encourages consumption, and to such extent stabilises prices paid to the producer. In the course of the current week the decontrol of prices as desired by the honourable member had also been urged on the Commissioner by the proprietary companies, and strongly opposed by a co-operative representative.

## CERTIFICATES OF SOUNDNESS.

Certificates of Soundness were issued for Stallions listed as under in the course of the period July 1–26 :—

| Name of Stallion. | Class. | Period for which Certificate issued. | Owner's Name. | Owner's Address. |
|---|---|---|---|---|
| Black Mac .. | Pony .. | Life .. | P. Lyne .. | Laidley |
| The Sheik .. | Pony .. | 12 months | G. E. Jackson .. | Eagle street, Brisbane |
| Delor Rex .. | Trotter .. | 12 months | W. G. Arnold .. | Crombie street, Milton, Brisbane |
| Prince George | Draught .. | 12 months | W. Preefert .. | Summer Hill, Laidley |

PLATE 23.—QUEENSLAND BANANAS IN TRANSIT TO MARKET.

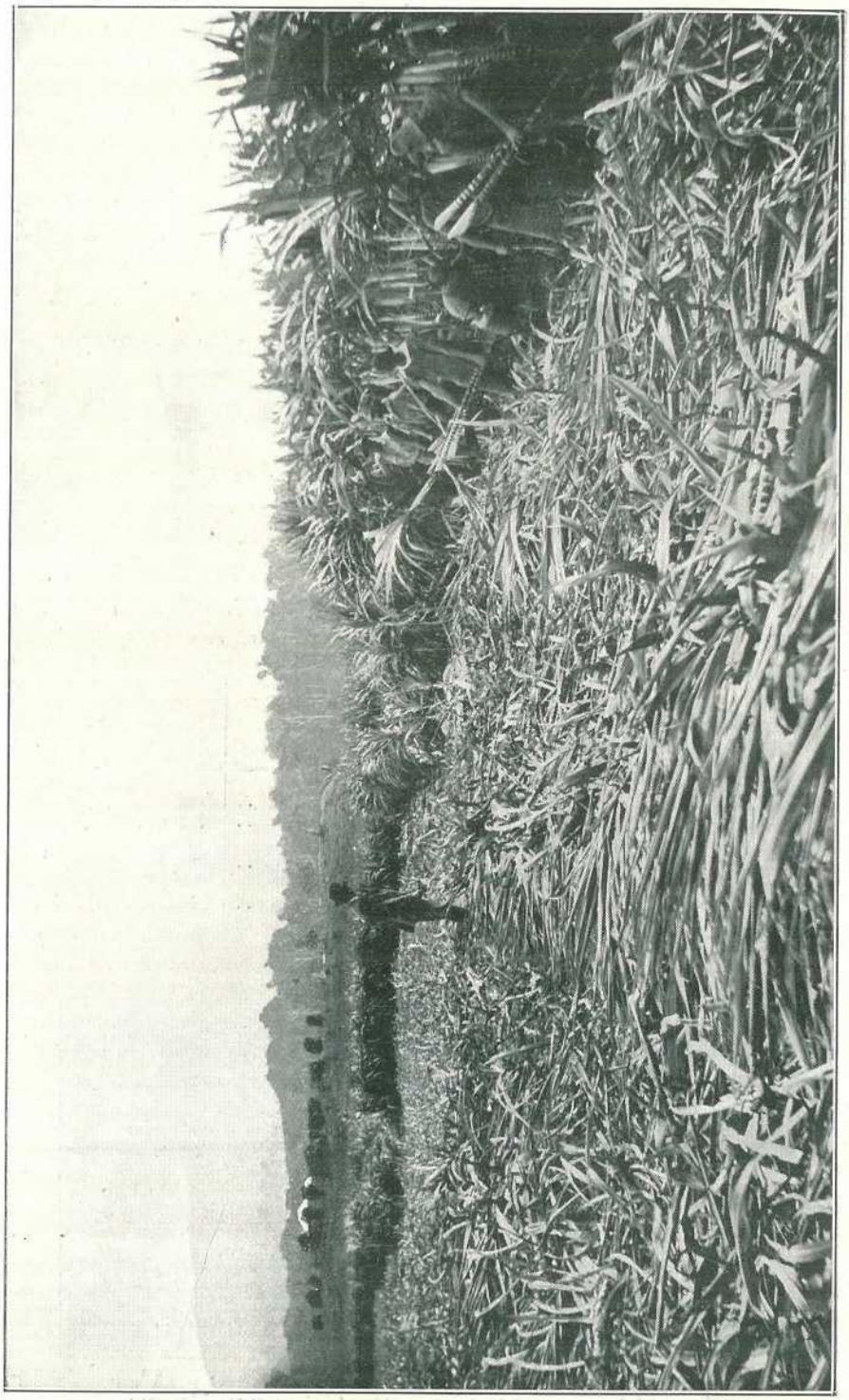


PLATE 24.—CANE CUTTING, BABINDA.

PLATE 25.—A GOOD CANE CROP, LOWER BURDEKIN.

PLATE 26.—FIFTY TONS OF SUGAR-CANE PER ACRE, LOWER BURDEKIN.
*See* "Irrigation in Queensland."

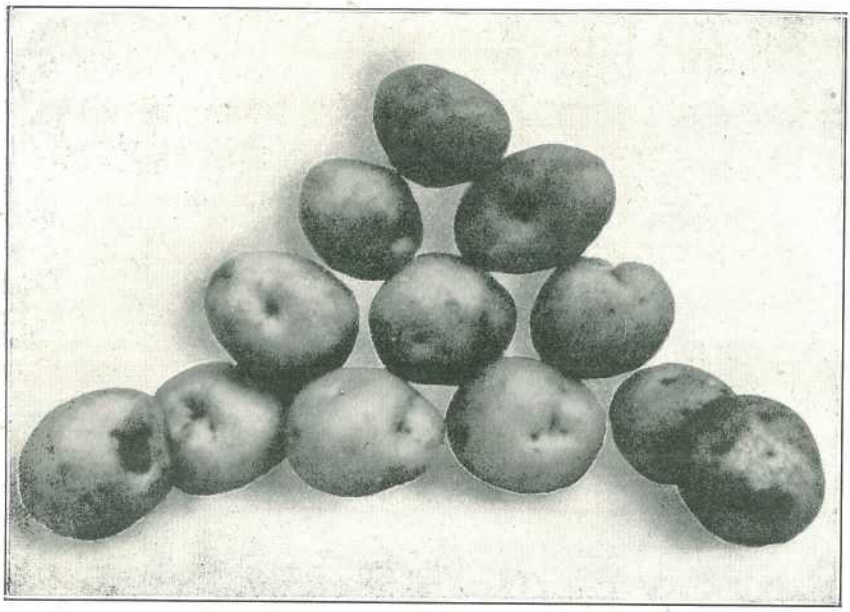


PLATE 27.—"SATISFACTION" POTATOES.
Produced under very dry weather conditions. From Mr. George Harvey's Farm, South Kolan.

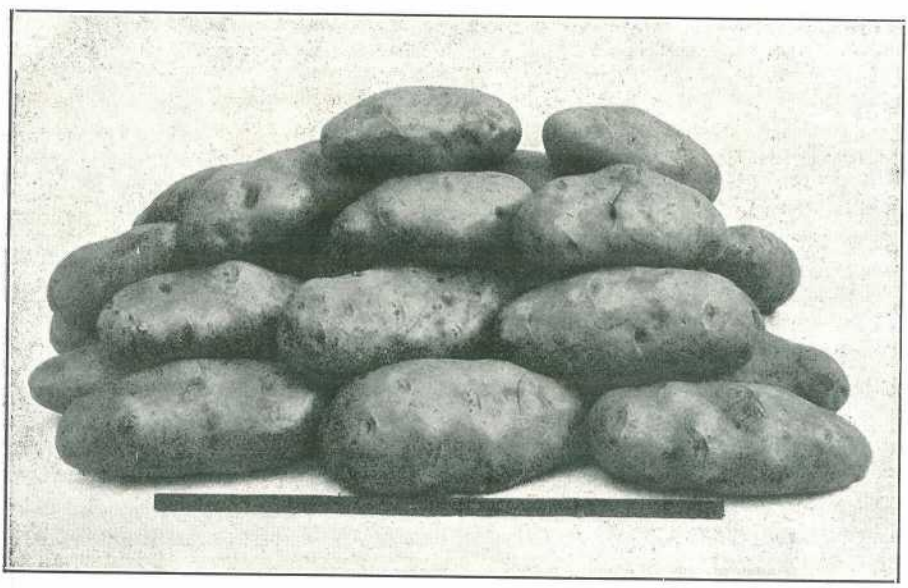
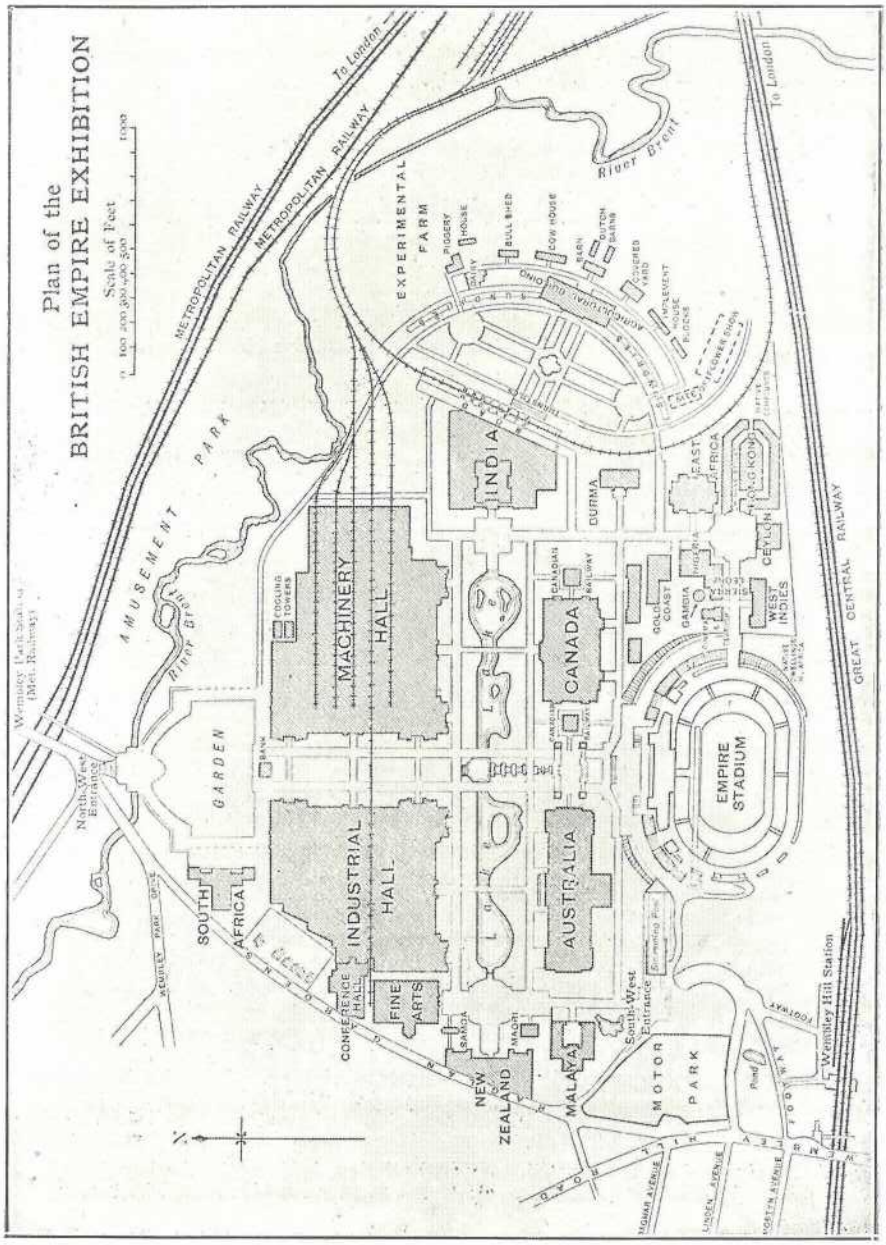


PLATE 28.—A FINE DISPLAY OF "DELAWARES."
Produced from Seed supplied by the Council of Agriculture and from which phenomenal returns have been recorded.


Plan of the
BRITISH EMPIRE EXHIBITION
Scale of Feet
0 100 200 300 400 500 1000
To London
METROPOLITAN RAILWAY
AMUSEMENT PARK
River Brent
EXPERIMENTAL FARM
PIGGERY
DAIRY
BULL SHED
COW HOUSE
BARN
OUTDOOR DAIRIES
COVERED YARD
IMPLEMENT HOUSE
BLOCKS
GLASSHOUSES
INDIA
BURMA
EAST AFRICA
HONG KONG
CEYLON
WEST INDIES
GOLD COAST
GAMBIA
NIGERIA
CANADA
CANADIAN RAILWAY
MACHINERY HALL
COOLING TOWERS
GARDEN
BANK
INDUSTRIAL HALL
FINE ARTS
CONFERENCE HALL
SOUTH AFRICA
AUSTRALIA
NEW ZEALAND
SAMOA
MALAYA
EMPIRE STADIUM
GREAT CENTRAL RAILWAY
North-West Entrance
South-West Entrance
MOTOR PARK
Wembley Hill Station
FOOTWAY
ROAD
MORAR AVENUE
LINDEN AVENUE
NORTH AVENUE

# Answers to Correspondents.

## Unemployed Workers' Insurance.

C.M. (Grandchester)—

The Act came into force on 1st March of this year. Deduct threepence from employee's wages each week and add the same amount as your own contribution. Unemployment cards and stamps (for covering the combined weekly contribution) may be obtained from the local Clerk of Petty Sessions. Farmers are not under an Arbitration Court award, consequently no minimum wage has been fixed.

## Hide Tanning.

J.R.C. (Goranba)—

All vessels used in connection with tanning operations should be of wooden or other non-metallic substances.

Hides may be tanned either freshly flayed or in a salted condition, but stored hides should be kept from heating.

To dehair hides, take 6 to 8 lb. of freshly burnt lime in a half barrel and gradually slake; when slaked add up to 2 gallons of water. Shake the hide to remove all salt, trim thoroughly, and, if of large size, split down the back to facilitate handling. Soak hide flesh side out in clean water, suspending the hide on sticks for two or three hours, stirring frequently. After soaking, lay them on a beam, hair side up, scrape and scrub well; reverse and remove all flesh and fat. Scrape well with the back of a butcher's knife; resoak. Green hides require twelve to fourteen hours, and salted hides twenty-four to forty-eight; scrape again with a butcher's knife. A "beam" consists of a piece of timber about 2 feet wide and 8 feet long, planed and placed in a sloping position from waist high to about 12 inches above the ground.

Place lime water prepared as above in the barrel previously used for soaking the hide and nearly fill with water. Immerse the hides in this till the hair will rub off easily with the palm of the hand. Keep the solution frequently stirred and covered.

Place the hide on the beam and scrape off all hair; if sufficiently soaked a cheesy or curdy layer will rub off with the hair. Scrape flesh side as well to remove as much lime as possible.

Soak the hide in a barrel of water to which has been added 9 oz. of 22 per cent. tannery lactic acid or half a gallon of vinegar. Soak for twenty-four hours; wash with clean water and soak over night.

The tanning solution should be prepared fifteen or twenty days before the actual operation. Take 30 to 40 lb. finely ground wattle or mangrove bark to 20 gallons of hot water, cover and stir frequently. Strain liquor into the barrel and add water to nearly fill it; add 2 quarts vinegar. Soak hides in this solution, stirring and moving them frequently.

Prepare a second lot of tanning solution in the same manner, and when the hides have coloured nicely remove 5 gallons of the old tan and substitute 5 gallons of the new tan and add another 2 quarts of vinegar. Repeat this operation every five days, omitting the vinegar. After thirty-five days add 30 to 40 lb. fine ground bark moistened with hot water, stirring well in order to cover the hides with bark.

After six weeks' soaking with continual stirring, half empty the barrel and fill up with finely ground bark. After two months the hide should be thoroughly tanned.

Rinse and rub out all the tan water with a stiff brush and "slicker"; the latter is a piece of brass 6 inches by 4 inches let into a piece of wood along one edge, and is used in a similar manner to that of a scraper. When the hide is damp, but not wet, coat well with neatsfoot or cod oil. Hang up and let dry slowly. When dry, damp again and apply a mixture of tallow and neatsfoot, in equal parts; boil and apply warm. Dry the hides and sprinkle with sawdust to remove any oiliness.

**Scale Ailment in Fowls.**

The poultry instructor (Mr. J. Beard) advises the following treatment for a scale ailment in fowls caused by a minute parasite which burrows under and about the scales of a bird's legs:—

Wash the legs thoroughly and allow them to dry. Mix 1 lb. of lard, ½ lb. of sulphur, and ¼ lb. of boracic acid. Warm it over a slow fire, and, when cooling, add a little kerosene, and stir well. One good rubbing of this mixture into the legs should be quite sufficient for most cases. This mixture can be made in less quantity proportionately. All the perches should be thoroughly washed with boiling water, and, when dry, painted with kerosene or wood-preserving oil.

**Kapok.**

W.A.J.H. (Grantham)—

Information, compiled by the Government Botanist (Mr. C. T. White, F.L.S.), was published in this Journal for September, 1921.

Bulletin No. 26, "The Kapok Industry," by Murad M. Saleeby, issued by the Bureau of Agriculture, Government of the Phillipine Islands, Manila, contains the fuller information you seek, but space limitations precludes its reprinting in the Journal. Natural conditions for its propagation are, however, not entirely favourable in your district, and no doubt you would find cotton-growing a better commercial proposition. If, however, you still require seeds or cuttings for experimental purposes, write to the Curator, Botanic Gardens, Rockhampton.

**Greasy Heel.**

The Chief Inspector of Stock (Major A. H. Cory), replying to a correspondent, advises that it would appear from the information given about a horse, that the swelling in the fetlock joints is due to the greasy heels. In such cases it is necessary to treat the animal internally as well as externally. A purgative drench consisting of 5 drachms Barbadoes aloes, dissolved in one pint hot water, should be given. This drench must be allowed to cool before being administered. When this has operated, the following powder should be given daily in food: Powdered sulphur, ½ oz.; saltpetre, 2 drachms; black antimony, 5 grains. The affected heels should be dressed twice daily with sulphate of zinc and acetate of lead, equal parts. Those drugs, if rubbed well together, will form a paste, which should be applied to the affected part. Upon no account should water be applied to the greasy heels, as this retards the curative action of the drugs mentioned.

**Tobacco in the Stanthorpe District.**

"TOBACCO" (Stanthorpe)—

It is suggested that you obtain small quantities, say ¼ oz. each, of "Blue Pryor," "Broadleaf Gooch," "White Burleigh," and "White Orinoco" tobacco seed for trial. Frost will, of course, have to be guarded against. Select a well-drained, weed-free area carrying light friable soil with subsoil underlying at a depth of from 12 to 18 inches—a clay having a proportion of sand incorporated with it. Stanthorpe soil, generally, requires fertilising. Use, say, a complete manure containing 4 to 5 per cent. water or citrate soluble phosphoric acid, 5 per cent. nitrogen, and 8 to 10 per cent. potash as sulphate. Texture, aroma, and burning qualities of the leaf are influenced by the character of the manure used. Rank, coarse, organic manures and also manures containing chlorides should be avoided. Fertilisers should be freely used, and quantities of 6 to 10 per cent. per acre have proved profitable in some tobacco-growing areas. A new edition of the departmental pamphlet on tobacco-growing is now in the printer's hands, and will be available shortly for distribution.

# THE SWEET POTATO *(Ipomœa Batatas).*

BY G. B. BROOKS, Instructor in Agriculture.

IN tropical and sub-tropical areas, probably no other crop is so universally cultivated as the sweet potato. In many countries, such as Mexico, Central and South America, the sweet potato is the principal article of diet, while in the United States of America, South Africa, India, China, Japan, South Sea Islands, New Zealand, and Australia, it is more or less extensively grown.

In Queensland, although not raised on a large scale as a market crop, practically every farmer has his sweet potato patch.

## ORIGIN.

While authorities differ as to the exact country of origin, it is generally agreed that it is either American or Asiatic. De Candolle, in "The Origin of Cultivated Plants," gives the opinion that it is a native of China, it being mentioned in the oldest work on medicine—that of the Emperor Shen-Ming.

Captain Cook, in his first voyage round the world in 1760, discovered the sweet potato growing in Tahiti, and in the following year found that it was largely raised in New Zealand.

The present-day vernacular in the different countries is of interest, as the names given suggest a place of common origin. The old Chinese potato was known as "chu," the introduced as "au-chu." In India we have "Mita-Alu," "Shine-Alu" being the white form, and "Shakarand-Alu" the red variety. In Tahiti it is called "Kumara," in the South Sea Islands "Umara," in Central America "Cumar." In Japan it is known as "Kara-Zimo," in Peru as "Skirrets," and in South Africa "Veeazee." In the United States and Australia the only name applied is sweet potato.

## VARIETIES.

Probably in no other crop grown is there so much confusion in regard to names of varieties as in the case of sweet potato. Farmers who may have quite a number of sorts under cultivation, very rarely know them by name. Many growers invariably call all white varieties "Maltese," and all red ones "Rosella." While collecting specimens for classification purposes, I invariably found that different names were given to a similar variety in the different districts.

The importance of the crop certainly warrants that some order should be introduced into the existing chaos. The writer some two years ago undertook the task of unravelling the tangle, not only to make the nomenclature of the varieties uniform, but to ascertain those most suitable for stock feeding, culinary use, and starch production, together with their behaviour under different types of soils and climatic conditions.

My duties as Instructor in Agriculture facilitated the collecting of specimens, which were obtained from the agricultural areas visited, also from adjacent islands and the Southern States, together with a number of American varieties.

## PROPAGATION.

In order to facilitate the work of classification, it was essential that the varieties should be under close observation during the various stages of growth. A portion of land adjacent to my residence was utilized for propagation purposes. This permitted the compilation of data at periods that did not interfere with my duties as Instructor.

To ensure purity of type, the propagation of each variety was carried out from a single tuber. As the vines became available, cuttings were planted out under field conditions on the farm of Mr. A. E. Fisher, Gracemere, so that the necessary information could be obtained in regard to habits of growth, yield, &c. The varieties under observation numbered fifty. Several duplicates had previously been discarded.

Owing to the dry conditions prevailing at this time—no useful rain falling until the middle of January—the season was of thus too short duration to permit the full development of the crop, more particularly late maturing sorts. Reliable data as to early and late maturing habits, yields, &c., were therefore not obtainable. Arrangements were made, however, to again grow all varieties, together with several additions in the propagation bed, and also to carry out comparative tests in a number of districts where there was a considerable variation in soils and climatic conditions.

The field classification plot was on this occasion located on the farm of Mr. S. G. Hoare, Alton Downs, the soil being a very heavy close-textured basalt.

As already mentioned, the original propagation plot consisted of one tuber of each variety. In laying down the plot for the following season's operations, approximately, one half-hundredweight of selected tubers of each sort was used. These produced a fine crop of vines, over 30,000 cuttings being distributed during the season.

## CLASSIFICATION.

A good deal of consideration was given to compiling a classification key which would enable growers to easily identify varieties from the formula set out. It was intended that the description should only embrace such well-defined characteristics as shape of leaf, colour of skin and flesh of tuber; but when put into practice it was found that the characters mentioned were not sufficient to separate certain varieties, consequently additional factors had to be included, making the key of a more elaborate nature.

It will be seen that the method of classification adopted is that usually applied in regard to plant nomenclature. The characters chosen are, with one or two exceptions, easy of observation, commencing with the leaf-size, shape, &c., and following on with the stem, colour of tuber, flesh, habit of growth, early, culinary qualities, feeding value, yield, &c.

Several experimentalists in America have attempted to classify the varieties into groups, according to the shape of the leaves alone. This method, however, I found to be quite impracticable, as some sorts invariably show certain variation in type.

The key evolved by Dr. H. A. B. Groth, of the University of Pennsylvania, embraces some thirty-six characteristics. The order in which those are detailed have to some extent been followed in this instance; but, being limited exclusively to characters necessary to classification, and as the chief objective in taking up this work was the improvement of the crop, a much more comprehensive key had to be elaborated, the inclusion of factors such as culinary qualities, maturing habit, yield, starch contents, feeding value, &c., being absolutely essential.

## DISTINGUISHING CHARACTERISTICS.

Several authorities consider that the shape of the leaf alone is sufficient to distinguish all varieties, dividing them into three groups, viz.:—cut, round and lobed, or shouldered. It is certainly not difficult to tell a cut from a round-leaf variety, but, unfortunately, there is a considerable variation in the round and shouldered class, according to climatic conditions and period of growth. The size of the leaf in a well-grown plant is probably less variable than the shape. The colour of the leaf is a valuable aid in separating some of the varieties, more particularly during the early stages of growth. There are several shades of green represented—light, olive, and dark. In a number of sorts the young leaves are of a distinct purple; others have a purple tip, while some are light-green, with purple edge.

A number of crossbred seedlings have been raised. Of the first crop the seeds produced were, with one exception, dark-brown or black in colour. The exception was black and white, in about equal proportions. From this was raised a seedling, the tubers of which, on being planted, gave respectively leaves all green, variegated green and white, and pure white.

A very prominent characteristic in some varieties is the purple star on the upper portion of the leaf, where the veins spring from the petiole or leaf stalk.

The colouration of the midrib and other large veins is an easy manner of distinguishing between varieties. In some, the veins are green, while in others it varies from a faint pink to a deep purple.

*Pubescence.*—In regard to the presence or absence of hairs, I have found that this characteristic is somewhat variable. Many varieties during the early stages of growth, more particularly when it is rapid, have both leaves and stem covered with fine hairs, which disappear later on. In some, the stems are covered with stiff hairs throughout the whole period of growth.

*Stem.*—The length and also the thickness of stem is a very definite character, the variation between respective varieties, even under different climatic conditions, being fairly constant. The colour of the stem is also a distinguishing feature, the shades represented varying from a uniform green, green with purple marks around the base of the leaf stalk, deep purple, and purplish-green.

There are also thin, or fine-stemmed, and thick heavy-stemmed varieties.

*Tubers.*—There are several characteristics connected with this part of the plant that are of much importance in the scheme of classification, such as colour of outside or skin of tuber, colour of flesh, distinctness of wood bundles in starch, dryness or texture of flesh when cooked, taste or flavour, size, shape, and more particularly the manner in which the tubers are attached to the plant—whether bunch or spreading, early or late maturing, yield, starch content, and feeding qualities.

*Outside Colour.*—In several varieties the outside colour varies according to the period of growth, and to a certain extent upon the type of soil in which they are grown. For instance, in the early stages of growth some are a distinct pink; others are of a pinkish tinge, but on reaching maturity the colour will be a deep yellow. Unfortunately, a number of sorts are described by growers as being white, while as a matter of fact they are either cream or yellow.

*Colour of Flesh.*—The colour of the flesh is a fairly constant characteristic, and much more reliable for distinguishing types than the colour of the outside skin. There are quite a variety of shades to be met with, ranging from a greyish or slatey white to white, pale yellow, golden-yellow, orange, pink, orange mottled with pink and with purple.

*Wood or Fibre Bundles.*—The presence of wood bundles, their colour, and the manner in which they are grouped, are distinctive features, and play an important part in classification. In several varieties those fibre bundles are not visible.

*Culinary Qualities.*—Owing to the difference of opinion as to the characteristics that should be embodied in a good table variety, I found some difficulty in fixing a standard of excellence. To numerous enquiries made as to what type was most desirable, the answer invariably given was, "a white, dry, mealy sort." This statement was not quite in accordance with fact, however, for when supplied with a white mealy potato and a rather soft, yellow, good flavoured one, the latter was preferred. An American authority, writing on this subject, says that "in the South the wet sugary varieties are preferred. Some sorts boil soft, but when baked are most delicious."

The type of soil, together with climatic conditions, has an important bearing in regard to edible quality. Some of the slow-growing medium-sized varieties can be harvested for table use at a very early stage of growth; others that grow rapidly to a large size are generally soft and watery, improving, however, later in the season, when the vines are checked in growth, either through cold or dry conditions. Which of the varieties are most suitable for cooking early in the season can be ascertained by cutting a tuber and discarding those in which the latex or milky exudation rapidly turns a dark colour.

*Habit of Growth of Tubers—Bunch or Spreading.*—This is a very distinctive characteristic, and is an easy means of separating varieties that are otherwise similar in type. In some sorts the tubers are bunched together close to the stem, while in others they are attached by underground runners which vary in length from a few inches to over a foot. The bunch type have invariably long tubers, which in some instances

project through the surface of the soil to the extent of several inches—an undesirable feature, as they are thus more liable to the attack of the sweet potato weevil or borer. In those of a spreading habit the tubers are mostly oblong or round.

*Early and Late Maturing Habit.*—This character is rather indefinite, owing to the fact that the crop does not mature or ripen in a well-defined manner such as the English potato, maize, or wheat, the period of growth usually extending to the advent of low temperature or frost. Analyses made of several varieties at two periods of growth—early July and late in August—when cut down by frost, were of considerable interest, in that it showed in some instances a decrease in starch in the late-harvested tubers which had grown in the interval to about double the size they were when first tested. For example, Mammoth Cattle gave in the first test 18·91 starch, and later 12·40.

The type of vine has often a considerable influence both in regard to growth and yield. Cuttings from a strong, robust variety like Ruby will establish themselves much more readily under adverse conditions than those from a soft, thin-stemmed sort, such as Small-stem Jersey, which, if exposed to a hot sun immediately after planting out, will burn off close to the soil.

*Cropping Qualities.*—Comparative tests carried out in several districts have demonstrated that there is considerable variation in the cropping qualities of the respective varieties. There was only one place where all varieties were grown together—viz., on the stud plot at Alton Downs. In order that a strict comparison should be made, the weights given are from the crop harvested there. The soil was of a heavy, black-basaltic nature, a type not generally recognised at being suitable for sweet potato culture. The conditions were extremely dry for several weeks after planting out the cuttings, and on two occasions the crop was reported as being practically a failure, but rain came just in time to keep the plants alive. Most of the growth was made during the early winter months. Individual varieties gave much heavier yields in districts where the season was more favourable.

Now that the work of classification is well in hand, comparative tests will be carried out in districts where a considerable variation will be met with, both in regard to climate and soil, so that the best varieties for local conditions can be ascertained.

*Starch Content and Feeding Value.*—As the composition of the tuber is of the greatest importance, all available varieties growing on the stud plot were submitted to the agricultural chemist (Mr. J. C. Brünnich) for analysis. The tubers were all obtained from one centre—viz., the stud plot at Alton Downs. The results, which appear in the accompanying table, are most interesting, varieties analysed showing a wide variation in both starch and protein content. The variety showing the highest starch content is Vitamine, with 24·27, the average of all varieties tested being 17·79. Had the season been more favourable, this would undoubtedly have been higher. Very little rain fell at Alton Downs until

late in the summer; consequently the period of growth was very short—much too short, in fact, for the late-maturing sorts.

## PROPAGATION OF NEW VARIETIES.

The propagation of the sweet potato crop has been carried out probably for centuries, principally by cuttings taken from the vine or stem; and, as little or no attention has been given to selection as a means of improvement, it is a rather remarkable fact that the varieties grown have retained to such an extent their vitality and comparative freedom from disease.

That a certain amount of deterioration has taken place in various districts is evident from the numerous requests that have come to hand for vine cuttings, with the explanation that their plants have run out. The vines, although growing profusely, do not produce tubers.

In addition to the collecting and classification of existing varieties, which have been grown from specially selected tubers, the work of raising new varieties from seed was also taken in hand.

The seed was secured from those growing in the propagating bed. Approximately six crops of vine cuttings were removed during the summer, and it was in the subsequent growth that was allowed to stand over the winter that blooms appeared. It was found that although several sorts flowered very freely, no seed was produced. It was thought that in all probability the flowers might not be fertile to their own pollen, so recourse was made to cross-fertilization. This proved to be effective, as practically all the flowers so treated produced fertile seed.

The flower borne on a 3 to 4-inch footstalk was bell-shaped, of a pinkish colour outside and a purplish blue inside. The stamens are a little longer than the style, and produce a fairly plentiful supply of pollen. East flower produces one to three seeds, which are enclosed in a round, brown-coloured capsule, which is very brittle and in size about that of a small garden pea. The seeds vary in colour from a light brown to a dead black. It was noted that in one instance the seeds obtained from a cross between Mammoth Cattle and Giant Gindie were black and white, about equally divided in cross-section.

The precaution was taken to sprout all seeds before putting them in the soil, germination invariably taking about three weeks. The seedlings are rather delicate during the early stages of growth. The leaves are of the characteristic sweet potato shape, both cut and round, shouldered being also represented.

From the black and white seeds a plant resulted having green, white and green, and white leaves. The small tubers, on being planted, produced vines with all-green leaves, with green and white leaves, and with pure ivory-white leaves, with the stem a delicate pink.

So far, the only variety that has shown a tendency to sport is Ruby. In Ruby the leaf is round and smooth that of the variation long and shouldered, with rough crinkled surface, somewhat similar in type to the English potato.

## TABLE OF ANALYSES OF VARIETIES.

| Variety. | Water. | Starch. | Other Carbohydrates. | Fibre. | Proteins. | Fat. | Ash. | Dry Starch. | Tons per Acre Stud Plot. |
|---|---|---|---|---|---|---|---|---|---|
| Aromatic .. .. | 79·10 | 10·10 | 7·10 | 0·69 | 1·61 | 0·15 | 1·25 | 48·17 | 6·19 |
| Abundance .. .. | 70·60 | 15·56 | 9·15 | 0·66 | 2·75 | 0·22 | 1·05 | 53·52 | 5·50 |
| Acme .. .. | 64·00 | 22·72 | 9·11 | 0·87 | 2·05 | 0·26 | 0·99 | 63·20 | 4·60 |
| Alton Downs Red .. | 75·40 | 13·30 | .. | 0·76 | 1·50 | 0·17 | 0·88 | .. | 5·80 |
| Boyne River .. | 69·00 | 19·43 | 7·32 | 0·85 | 2·06 | 0·29 | 1·05 | 62·68 | 16·16 |
| Brooks's Gem .. | 56·00 | 21·74 | 7·95 | 0·78 | 2·34 | 0·21 | 0·98 | 63·95 | 28·00 |
| Bon Accord .. .. | 70·40 | 19·33 | 6·44 | 0·67 | 2·09 | 0·14 | 0·93 | 65·30 | 27·12 |
| Big Bunge .. .. | 68·90 | 19·64 | 6·80 | 0·86 | 2·46 | 0·24 | 1·10 | 53·16 | 24·20 |
| Capricorn .. .. | 68·30 | 17·89 | 11·24 | 0·95 | 0·50 | 0·33 | 0·79 | 56·44 | 14·13 |
| Cook's Favourite .. | 64·70 | 20·83 | 9·90 | 0·84 | 2·49 | 0·22 | 1·02 | 59·06 | 17·12 |
| College Eclipse .. | 75·60 | 14·82 | 6·00 | 0·78 | 1·50 | 0·28 | 1·02 | 60·72 | 30·90 |
| Captain Page .. | 66·30 | 19·30 | 10·5 | 0·84 | 1·75 | 0·27 | 1·01 | 57·38 | 10·15 |
| Director .. .. | 53·40 | 23·00 | 10·44 | 0·88 | 1·14 | 0·32 | 0·82 | 52·87 | 30·40 |
| Don River .. .. | 75·80 | 15·25 | .. | 0·68 | 1·70 | 0·16 | 0·91 | .. | 27·12 |
| Emerald .. .. | 77·40 | 13·28 | 6·10 | 0·75 | 1·50 | 0·19 | 0·78 | 58·74 | 19·13 |
| Farmers' Special .. | 63·40 | 24·10 | 7·84 | 0·89 | 2·56 | 0·27 | 0·94 | 65·82 | 17·50 |
| Golden Casket .. | 64·50 | 23·00 | 7·84 | 0·89 | 2·49 | 0·19 | 1·99 | 64·83 | 11·12 |
| Golden Nugget .. | 78·60 | 12·21 | 5·42 | 0·67 | 1·83 | 0·14 | 1·13 | 57·06 | 15·90 |
| Homehill .. .. | 75·20 | 13·75 | 7·76 | 0·66 | 1·52 | 0·15 | 0·96 | 55·45 | 29·50 |
| Hermitage .. .. | 70·70 | 17·92 | 7·66 | 0·77 | 1·78 | 0·21 | 0·96 | 61·96 | 14·40 |
| Impd. Long Bunch | 71·90 | 17·96 | 6·44 | 0·86 | 1·63 | 0·22 | 0·99 | 64·26 | 24·20 |
| Kairi .. .. | 71·20 | 17·19 | 9·07 | 0·86 | 1·59 | 0·15 | 0·92 | 59·57 | 11·14 |
| Mammoth Cattle .. | 68·90 | 18·91 | 8·34 | 0·79 | 1·75 | 0·28 | 1·03 | 60·80 | 35·11 |
| Matchless .. .. | 69·40 | 17·94 | 9·00 | 0·82 | 1·61 | 0·20 | 1·03 | 58·62 | 28·17 |
| Prospector .. .. | 73·90 | 15·69 | 6·50 | 0·75 | 2·06 | 0·17 | 0·93 | 60·10 | 28·00 |
| Pink Rambler .. | 72·80 | 18·96 | 4·61 | 0·62 | 1·94 | 0·14 | 0·93 | 69·70 | 12·00 |
| Ruby .. .. | 65·80 | 20·00 | 10·76 | 0·91 | 1·41 | 0·36 | 0·76 | 58·58 | 26·90 |
| Russell Island .. | 75·30 | 14·76 | 6·20 | 0·90 | 1·75 | 0·18 | 0·91 | 59·76 | 32·70 |
| Record .. .. | 68·80 | 20·90 | 6·86 | 0·77 | 1·62 | 0·16 | 0·89 | 67·00 | 18·11 |
| Rumsey's Yellow .. | 76·10 | 12·85 | 7·41 | 0·92 | 1·44 | 0·32 | 0·96 | 53·77 | 10·15 |
| Royal Purple .. | 73·20 | 15·88 | 7·13 | 0·79 | 1·78 | 0·24 | 0·98 | 59·24 | 21·12 |
| Snow Queen .. | 71·90 | 17·39 | 6·84 | 0·78 | 1·96 | 0·23 | 0·90 | 61·88 | 17·50 |
| Star of Warren .. | 66·20 | 19·70 | 10·32 | 0·72 | 1·94 | 0·22 | 0·90 | 58·30 | 10·60 |
| Springfield Prolific .. | 73·10 | 16·46 | 6·58 | 0·74 | 2·17 | 0·17 | 0·78 | 61·18 | 21·40 |
| Star of Queensland | 69·10 | 18·70 | 8·10 | 0·88 | 2·03 | 0·20 | 0·99 | 60·52 | 4·60 |
| Sokkar .. .. | 78·90 | 11·37 | 5·76 | 0·63 | 1·98 | 0·13 | 0·93 | 55·33 | 5·50 |
| Superfine .. .. | 67·10 | 22·00 | 6·44 | 0·88 | 2·19 | 0·30 | 1·09 | 66·92 | 15·10 |
| Vitamine .. .. | 62·90 | 24·27 | 9·41 | 0·97 | 1·20 | 0·33 | 0·92 | 65·43 | 15·90 |
| White Australia .. | 77·30 | 14·00 | 5·53 | 0·69 | 1·44 | 0·19 | 0·85 | 61·76 | 25·00 |
| White Kumura .. | 78·50 | 11·72 | 6·56 | 0·76 | 1·44 | 0·15 | 0·87 | 54·50 | 25·18 |
| Yellow Fitzroy .. | 72·00 | 17·23 | 6·23 | 0·81 | 2·44 | 0·18 | 1·11 | 61·53 | 17·50 |
| Averages .. | 70·80 | 17·79 | 7·56 | 0·81 | 1·85 | 0·22 | 0·97 | 60·84 | 20·86 |
| Maxima .. | 79·10 | 24·27 | 11·24 | 0·97 | 2·76 | 0·36 | 1·25 | 69·70 | 35·11 |
| Minima .. | 62·90 | 10·10 | 4·61 | 0·62 | 0·50 | 0·13 | 0·78 | 48·17 | 4·00 |

| | |
|---|---|
| Average Yield per Acre for 5 Highest Yielding Varieties .. .. .. | 31·07 |
| Average Yield per Acre for 10 Highest Yielding Varieties .. .. .. | 29·47 |
| Average Yield per Acre for 20 Highest Yielding Varieties .. .. .. | 22·25 |
| Average Yield per Acre for 44 Highest Yielding Varieties .. .. .. | 20·86 |

## CLASSIFICATION KEY FOR SWEET POTATO VARIETIES.

A. Shape of Leaf—
1. Cut.
2. Round. 2A Frilled.
3. Long. 3A Shouldered.
4. Broad. 4A Shouldered.
5. Mixed.

B. Size of Leaf—
1. Small—Less than 4 in. across.
2. Large—More than 4 in. across.

C. Length of Stem—
1. Short—Less than 6 feet.
2. Medium—6 to 12 feet.
3. Long—12 to 18 feet.
4. Extra long—Over 18 feet.

D. Colour of Stem—
1. Green.
2. Green, with purple around axil of leaves.
3. Greenish-brown to purple.
4. Purple.

E. Size of Stem—
1. Thin—Less than $\frac{1}{8}$ inch in diameter.
2. Thick—More than $\frac{1}{8}$ inch in diameter.

F. Presence of Star—
1. Star present.
2. Star absent.

G. Colour of Lower Surface of Veins—
1. Veins purple.
2. Midrib pinkish.
3. Purple spot at base of leaves.
4. Veins all green.

H. Arrangement of Hairs on Leaf, &c.—
1. Hairs all over.
2. Chiefly marginal, and along veins. 2A. On stem.
3. Marginal only.
4. Absent.

I. Outside Colour of Tuber—
1. White. 1A. Pinkish.
2. Yellow. 2A. Golden. 2B. Bronze.
3. Yellowish-red. 3A. Pinkish.
4. Red. 4A. Purple.

J. Colour of the Flesh of Tubers—
1. White. 1A Yellowish-white.
2. Cream coloured, 2A Golden-yellow.
3. Pinkish-yellow. 3A Greenish-yellow.
4. Pink-orange.
5. Marked with purple.

K. Distinctness of Wood Elements in Tuber—
1. Distinct.
2. Blurred.
3. Not visible.

L. Maturing Habit—
1. Early.
2. Medium.
3. Late.

M. Cropping Qualities—
1. Light—under 10 tons.
2. Good—10 to 20 tons.
3. Heavy—over 20 tons.

N. Culinary Qualities—
1. Good flavour boiled. 1 A. Baked.
2. Poor flavour boiled. 2A. Baked.
3. Dry cooker. 3A. Medium dry.
4. Moist Cooker.

O. Habit of Growth (Arrangement of Tubers on Stem)—
1. Bunch.
2. Medium.
3. Spreading.

AROMATIC.

KEY. A 4A B 1 C 3 D 2-3 E 1 F 1 G 1 H 2A I 4 J 4 K 2 L 1 M 1 N 2-4 O 1.

DESCRIPTION—

*Leaf.*—Broad, shouldered; young foliage purple; mature leaves purplish edge; veins purple; star present.

*Stem.*—Long; thin; greenish-brown to purple.

*Tuber.*—Medium long; large; colour red; flesh pink-orange.

*Cooking Qualities.*—Moist; peculiar aromatic flavour.

*Habit of Growth.*—Tubers bunched.

*Maturing Habit.*—Early.

*Cropping Qualities.*—Rather poor.

*Composition.*—Starch very low, 10·10; protein, 1·61.

ABUNDANCE.

KEY. A 3A B 1 C 1 D 1 E 1 F 2 G 4 H 1 I 4 J 2A K 1 L 3 M 1 N 1–4 O 1.

DESCRIPTION—

*Leaf.*—Small; long; shouldered; veins all green; star absent.

*Stem.*—Short; thin; green colour.

*Tuber.*—Small; medium long; red colour; flesh deep cream.

*Cooking Qualities.*—Moist cooker; flavour good.

*Habit of Growth.*—Very bunched; producing a large number of small tubers having fine fibrous roots.

*Maturing Habit.*—Very late.

*Cropping Qualities.*—So far, poor, probably due to late planting.

*Composition.*—Starch contents fair, 15·56; protein, 2·76.

ACME.

KEY. A 2–3 B 1 C 3 D 1 E 2 F 1 G 3 H 3 I 1A J 1 K 2 L 3 M 2 N 2–4 O 1.

DESCRIPTION—

*Leaf.*—Small; round; veins green; purple spot at base of leaf.

*Stem.*—Thick; long; green colour.

*Tubers.*—Medium-size; round; yellowish-white colour; flesh white.

*Cooking Qualities.*—Moist cooker; fair flavour.

*Habit of Growth.*—Bunched.

*Maturing Habit.*—Late.

*Cropping Qualities.*—Poor in heavy soil, good in sandy loam.

*Composition.*—Starch good—22·72; protein, 2·05.

ALTON DOWNS RED.

KEY. A 3A B 1 C 2 D 2–3 E 1 F 1 G 1 H 4 I 4 J 2 K 2 L 3 M 1 N 1–3 O 1.

DESCRIPTION—

*Leaf.*—Small; long; shouldered; veins purple; star present.

*Stem.*—Medium long, thin; green, with deep purple patches at axil of leaf.

*Tuber.*—Elongated; small; red colour; flesh deep cream.

*Culinary Qualities.*—Medium dry, good flavour.

*Habit of Growth.*—Bunched.

*Maturing Habit.*—Late season.

*Cropping Qualities.*—Light; one crop test only.

*Composition.*—Starch low—13·30; protein, 1·50.

BOYNE RIVER.

KEY. A 1 B 2 C 1 D 2 E 2 F 1 G 1 H 3 I 2 J 1A K 1 L 1 M 2 N 1–3 O 2.

DESCRIPTION—

*Leaf.*—Large; cut type; veins purple; star present.

*Stem.*—Short; thick; green, with purple spot at axil of leaf.

*Tuber.*—Large; pear-shaped; yellow skin; flesh white.

*Culinary Qualities.*—Dry; good flavour.

*Habit of Growth.*—Medium bunch.

*Maturing Habit.*—Early season.

*Cropping Qualities.*—Good.

*Composition.*—Starch, 19·43; protein, 2·06.

BROOKS'S GEM.

KEY. A 2 B 2 C 2 D 2 E 2 F 1 G 1 H 2 I 2 J 1 K 1 L 2 M 3 N 1–3 O 1.

DESCRIPTION—

*Leaf.*—Large ; fan-shaped ; very distinct frill ; veins purple ; star present.

*Stem.*—Medium long ; thick ; green colour ; purple spot at axil of leaf.

*Tuber.*—Elongated ; skin yellow ; flesh white.

*Culinary Qualities.*—Dry cooker ; good flavour.

*Habit of Growth.*—Bunchy.

*Maturing Habit.*—Mid-season.

*Cropping Qualities.*—Excellent.

*Composition.*—Starch good, 21·74 ; protein, 2·34.

BON ACCORD.

KEY. A 2 B 1 C 4 D 4 E 1 F 2 G 2 H 1 I 3A J 3 K 2 L 1 M 3 N 3–1 O 3.

DESCRIPTION—

*Leaf.*—Long ; shouldered ; mid-rib pinkish.

*Stem.*—Extra long ; thin ; purple.

*Tuber.*—Very large ; round, ribbed surface ; flesh pinkish-yellow.

*Culinary Qualities.*—Dry ; good flavour.

*Habit of Growth.*—Spreading.

*Maturing Habit.*—Early.

*Cropping Qualities.*—Heavy.

*Composition.*—Starch, 19·33 ; protein, 2·09.

BIG BUNGE.

KEY. A 2–4 B 1 C 1 D 2 E 1 F 1 G 1 H 1 I 2 J 3 K 1 L 1 M 2 N 1–3 O 2.

DESCRIPTION—

*Leaf.*—Small ; broad ; veins purple ; star present.

*Stem.*—Short ; thin ; green, with purple spots at axil of leaf.

*Tuber.*—Large pear-shaped ; medium smooth surface ; colour yellow ; flesh pinkish-yellow.

*Culinary Qualities.*—Dry ; good flavour.

*Habit of Growth.*—Tubers medium spreading.

*Maturing Habit.*—Early.

*Cropping Qualities.*—Good.

*Composition.*—Starch, 19·64 ; protein, 2·46.

BIG STEM YELLOW.

KEY. A 3 B 1 C 2 D 1 E 1 F 2 G 3 H 1 I 2 J 2 K 1 L 3 M 2 N 2–4 O 2.

DESCRIPTION—

*Lea .*—Long ; veins green, with purple spot at base of leaf ; star absent.

*Stem.*—Long ; thin ; green colour.

*Tuber.*—Medium size ; egg-shaped ; yellow skin ; flesh cream colour.

*Culinary Qualities.*—Moist cooker ; fair flavour.

*Habit of Growth.*—Medium bunch.

*Maturing Habit.*—Late season.

*Cropping Qualities.*—Medium.

*Composition.*—Not yet determined.

BLANCIA (AMERICAN VARIETY).

KEY. A 3 B 2 C 3 D 4 E 2 F 1 G 2 H 1 I 1 J 1 K L M N O.

DESCRIPTION—

*Leaf.*—Large; round; toothed; some shouldered; veins pinkish; star present.

*Stem.*—Long; vigorous; purple colour; tips green; medium thick.

*Tuber.*—Flesh white; not sufficiently matured for further classification.

CAPRICORN.

KEY. A 4A B 1 C 2 D 2 E 2 F 2 G 1 H 4 I 2A–3A J 1 K 2 L 3 M 2 N 1–4 O 3.

DESCRIPTION—

*Leaf.*—Small; shouldered; mid-rib pinkish.

*Stem.*—Medium long; thick; green, with purple spot at axil of leaf.

*Tuber.*—Short; ribbed surface; golden-yellow; pinkish-cream flesh.

*Culinary Qualities.*—Moist cooker; good flavour.

*Habit of Growth.*—Tubers medium spreading.

*Maturing Habit.*—Mid-season.

*Cropping Qualities.*—Good.

*Composition.*—Starch, 17·89; protein low, 0·50.

COOK'S FAVOURITE.

KEY. A 2 B 2 C 1 D 2 E 2 F 1 G 1 H 1 I 2A J 2 K 1 L 2 M 2 N 1–3A O 3.

DESCRIPTION—

*Leaf.*—Round; slightly shouldered and toothed; veins purple; star present.

*Stem.*—Short; thick; green, with purple patch at axil of leaf.

*Tuber.*—Round, with smooth surface; yellow skin; flesh mottled; pinkish-cream.

*Culinary Qualities.*—Medium dry; excellent flavour.

*Habit of Growth.*—Tubers spreading.

*Maturing Habit.*—Mid-season.

*Cropping Qualities.*—Good.

*Composition.*—Starch, 20·83; protein, 2·49.

Good table variety. Similar in type to Big Bunge, Star of Warren, and Yellow Fitzroy.

COLLEGE ECLIPSE.

KEY. A 2 B 1 C 2 D 1 E 2 F 2 G 4 H 2A I 2 J 1 K 1 L 1 M 2 N 2–4 O 3.

DESCRIPTION—

*Leaf.*—Round; medium-size; veins and midrib green; star absent.

*Stem.*—Medium length; green.

*Tuber.*—Large; tapering; yellow colour; flesh white.

*Culinary Qualities.*—Moist cooker; poor flavour.

*Habit of Growth.*—Very spreading.

*Maturing Habit.*—Early.

*Cropping Qualities.*—Excellent.

*Composition.*—Starch low, 14·82; protein, 1·50.

Good stock variety.

CAPTAIN PAGE.

KEY. A 3A B 1 C 2 D 4 E 1 F 2 G 1 H 1 I 3A J 4 K 3 L 1 M 2 N 3-1 O 2-3.

DESCRIPTION—

*Leaf.*—Long ; medium size ; veins and margin of leaf purple.
*Stem.*—Medium length ; thin, purple, and hairy.
*Tuber.*—Medium round to pear-shaped ; yellow colour, with pinkish tip ; flesh pinkish-yellow.
*Culinary Qualities.*—Dry ; good flavour.
*Habit of Growth.*—Medium spreading.
*Maturing Habit.*—Early.
*Cropping Qualities.*—Fair.
*Composition.*—Starch good, 19·30 ; protein, 1·25.

DIRECTOR.

KEY. A 2 B 2 C 2 D 2 E 2 F 1 G 1 H 4 I 2 J 1 K 1 L 1 M 3 N 1-3 O 1.

DESCRIPTION—

*Leaf.*—Large ; broad ; shouldered ; veins purple ; star present.
*Stem.*—Medium length ; thick ; green, with purple patch at base of leaf.
*Tuber.*—Large ; long ; tapering ; yellow skin ; flesh white.
*Culinary Qualities.*—Dry ; good flavour.
*Habit of Growth.*—Bunchy.
*Maturing Habit.*—Early.
*Cropping Qualities.*—Excellent.
*Composition.*—Starch very good, 23·00 ; protein, 1·14.
A variety very suitable to sandy loam soil.

DON RIVER.

KEY. A 3A B 1 C 3 D 1 E 2 F 1 G 3 H 3 I 1-2—J 1 K 2 L 3 M 2 N 2-3 O 2.

DESCRIPTION—

*Leaf.*—Medium size ; wide ; shouldered ; veins green ; purple spot at base of leaf.
*Stem.*—Long ; thick ; green in colour.
*Tuber.*—Very large ; pear-shaped ; yellowish-white colour ; flesh white ; pink eyes.
*Culinary Qualities.*—Moist cooker ; fair flavour.
*Habit of Growth.*—Medium bunch.
*Maturing Habit.*—Late.
*Cropping Qualities.*—Excellent.
*Composition.*—Starch, 15·25 ; protein, 1·70.

EMERALD.

KEY. A 4A B 2 C 2 D 2 E 2 F 2 G 2 H 4 I 2A J 1 K 2 L 2 M 1 N 1A-4 O 2-3.

DESCRIPTION—

*Leaf.*—Large ; broad ; shouldered ; midrib pinkish ; star absent.
*Stem.*—Medium thick ; green, with purple spot at axil of leaf.
*Tuber.*—Medium size ; long ; tapering ; yellow skin ; flesh white.
*Culinary Qualities.*—Moist if boiled ; good table variety if baked.
*Habit of Growth.*—Medium spreading.
*Maturing Habit.*—Mid-season.
*Cropping Qualities.*—Good.
*Composition.*—Starch low, 13·28 ; protein, 1·50.

FARMERS' SPECIAL.

KEY. A 3 B 1 C 2 D 2 E 1 F 1 G 1 H 2 I 2 J 1A K 2 L 3 M 1 N 1A–4A O 1.

DESCRIPTION—

*Leaf.*—Long ; veins purple ; star present.
*Stem.*—Medium length ; thin ; green, with purple patch at axil of leaf.
*Tuber.*—Small, long, tapering ; skin yellow ; flesh pale yellow.
*Culinary Qualities.*—Rather moist ; good table variety if baked.
*Habit of Growth.*—Very bunchy, projecting on surface of soil.
*Maturing Habit.*—Late.
*Cropping Qualities.*—Good.
*Composition.*—Starch excellent, 24·10 ; protein very good, 2·56.

FLOURBALL.

KEY. A 1 B 2 C 2 D 2 E 2 F 1 G 1 H 3 I 2 J 1 K 1 L 2 M 2 N 1–3A O 1.

DESCRIPTION—

*Leaf.*—Large ; cut-shape ; veins purple ; star present.
*Stem.*—Medium length, thick ; green, with purple patch at axil of leaf.
*Tuber.*—Small, elongated ; yellow skin ; flesh white.
*Culinary Qualities.*—Excellent.
*Habit of Growth.*—Bunch.
*Maturing Habit.*—Very late season.
*Cropping Qualities.*—Light.
*Composition.*—Not yet determined.

GOLDEN CASKET.

KEY. A 2 B 2 C 1 D 2 E 1 F 1 G 1 H 1 I 2 J 2A K 1 L 2 M 2 N 1A–3A O 3.

DESCRIPTION—

*Leaf.*—Round, toothed ; veins purple ; star present ; hairy all over.
*Stem.*—Short ; thin ; green, with purple patch at axil of leaf.
*Tuber.*—Medium size ; round ; skin yellow ; flesh golden-yellow, pinkish markings ; very distinct ring.
*Culinary Qualities.*—Very good baked ; rather soft boiled.
*Habit of Growth.*—Spreading.
*Maturing Habit.*—Mid-season.
*Cropping Qualities.*—Fair.
*Composition.*—Starch good, 23·00 ; protein high, 2·49.

GOLDEN NUGGET.

KEY. A 3A B 2 C 3 D 4 E 2 F 2 G 3–4 H 2 I 3A–4 J 2A K 1 L 1 M 2 N 1–3 O 3.

DESCRIPTION—

*Leaf.*—Long, shouldered, large ; veins green ; star absent ; purple patch at base of leaf.
*Stem.*—Long, thick ; purple colour.
*Tuber.*—Small, round ; smooth surface ; skin pinkish-yellow ; flesh golden-yellow.
*Culinary Qualities.*—Good flavour ; dry cooker ; bakes well.
*Habit of Growth.*—Spreading.
*Maturing Habit.*—Early.
*Cropping Qualities.*—Good.
*Composition.*—Starch low, 12·21 ; protein, 1·83.

GIANT GINDIE.

KEY. A 3A B 1 C 2 D 2 E 1 F 1 G 1 H 2A I 1 J 1 K 1 L 1 M 1 N 2–4 O 2–3.

DESCRIPTION—

*Leaf.*—Round, small ; veins purple ; star present.

*Stem.*—Thin, medium length ; green, with purple patch at base of leaf.

*Tuber.*—Large, tapering ; ribbed surface ; skin white ; flesh white.

*Culinary Qualities.*—Moist cooker ; poor flavour.

*Habit of Growth.*—Medium spreading.

*Maturing Habit.*—Early.

*Cropping Qualities.*—Good.

*Composition.*—Not yet determined.

Good variety for stock use.

HOMEHILL—

KEY. A 4A B 1 C 2 D 2 E 2 F 2 G 2–3 H 4 I 3A J 2 K 2 L 2 M 2 N 2–4 O 1.

DESCRIPTION—

*Leaf.*—Broad, shouldered ; medium size ; veins green ; star absent.

*Stem.*—Short, thick ; green, with purple around axil of leaf.

*Tuber.*—Very large ; slightly tapering ; yellow ; white flesh.

*Culinary Qualities.*—Moist cooker ; poor flavour.

*Habit of Growth.*—Spreading.

*Maturing Habit.*—Early.

*Cropping Qualities.*—Very good.

*Composition.*—Starch low, 13·75 ; protein, 1·52.

Good variety for stock use.

HERMITAGE.

KEY. A 4A B 1 C 2 D 2 E 2 F 2 G 2–3 H 4 I 3A J 2 K 2 L 2 M 2 N 2–4 O 1.

DESCRIPTION—

*Leaf.*—Broad, shouldered ; medium size ; midrib pinkish ; purple at base of leaf.

*Stem.*—Medium length ; thick ; green, with purple patch at axil of leaf.

*Tuber.*—Small ; medium long ; cream ; flesh pinkish-yellow.

*Culinary Qualities.*—Moist cooker ; rather poor flavour.

*Habit of Growth.*—Bunched.

*Maturing Habit.*—Mid-season.

*Cropping Qualities.*—Fair.

*Composition.*—Starch good, 17·92 ; protein, 1·18.

IMPROVED LONG BUNCH.

KEY. A 1 B 2 C 2 D 2 E 2 F 1 G 1 H 4 I 2 J 1 K 1 L 2 M 3 N 1–3 O 1.

DESCRIPTION—

*Leaf.*—Long, cut, large ; veins purple ; star present.

*Stem.*—Medium length, thick ; green, with purple patch at base of leaf.

*Tuber.*—Very long ; medium size ; yellow colour ; flesh white.

*Culinary Qualities.*—Dry cooker ; good flavour.

*Habit of Growth.*—Bunched.

*Maturing Habit.*—Mid-season.

*Cropping Qualities.*—Good.

*Composition.*—Starch good, 17·95 ; protein, 1·63.

KAIRI.

KEY. A 2–3 B 2 C 2 D 1 E 2 F 2 G 4 H 4 I 3A J 2 K 2 L 1 M 2 N 1–3 O 2.

DESCRIPTION—

*Leaf.*—Large, long ; veins all green ; star absent.
*Stem.*—Medium length, thick ; green colour.
*Tuber.*—Small ; slightly tapering ; very distinctive deep-ribbed rough surface ; colour pinkish-yellow ; flesh white.
*Culinary Qualities.*—Dry cooker ; good flavour.
*Habit of Growth.*—Medium bunch.
*Maturing Habit.*—Early.
*Cropping Qualities.*—Fair.
*Composition.*—Starch good, 17·19 ; protein, 1·59.

MAMMOTH CATTLE.

KEY. A 3A B 2 C 2 D 1 E 1 F 2 G 4 H 2 I 3A J 1 K 3 L 1 M 3 N 1–3A O 2.

DESCRIPTION—

*Leaf.*—Medium size ; long ; shouldered ; veins green ; star absent.
*Stem.*—Medium length ; thin ; green colour.
*Tuber.*—Very large ; pear-shaped ; ribbed ; yellowish white-pink tinge in depression ; flesh white.
*Culinary Qualities.*—Dry cooker ; good flavour.
*Habit of Growth.*—Medium bunch.
*Maturing Habit.*—Early.
*Cropping Qualities.*—Excellent.
*Composition.*—Starch good, 18·91 ; protein, 1·75.
Excellent variety for stock use.

MATCHLESS.

KEY. A 3 B 2 C 2 D 1 E 2 F 1 G 2 H 1 I 3A J 1 K 2 L 1 M 2 N 1–3 O 1.

DESCRIPTION—

*Leaf.*—Round ; long ; mid-rib pinkish ; star present.
*Stem.*—Medium length ; thick ; green.
*Tuber.*—Large ; tapering ends ; slightly ribbed ; pinkish-yellow colour ; flesh white.
*Culinary Qualities.*—Dry cooker ; good flavour.
*Habit of Growth.*—Very spreading.
*Maturing Habit.*—Early.
*Cropping Qualities.*—Good.
*Composition.*—Starch good, 17·94 ; protein, 1·61.

MAMMY.

KEY. A 2 B 2 C 3 D 1 E 2 F 2 G 3 H 1 I 2 J 1 K L M N O.

DESCRIPTION—

*Leaf.*—Very large ; heart-shaped ; veins green ; star absent.
*Stem.*—Long, thick ; green in colour.
*Tuber.*—Pinkish-yellow flesh ; not sufficiently matured for classification.
American variety.

NANCY HALL.

KEY. A 3A B 2 C 2 D 3 E 2 F 2 G 4 H 4 I J K L M N O.

DESCRIPTION—

*Leaf.*—Very large ; toothed ; veins green ; star absent.
*Stem.*—Medium length ; thick ; very robust ; olive-green colour.
*Tuber.*—Not sufficiently matured for classification.
American variety.

PROSPECTOR.

KEY. A 3 B 1 C 2 D 4 E 1 F 1 G 3 H 3 I 2 J 2 K 1 L 2 M 2 N 1A–3A O 2.

DESCRIPTION—

*Leaf.*—Long, round, large ; veins green ; purple patch at base of leaf.
*Stem.*—Thin ; medium length ; purple in colour.
*Tuber.*—Large ; bright yellow in colour ; flesh cream.
*Culinary Qualities.*—Dry cooker ; good flavour.
*Habit of Growth.*—Spreading.
*Maturing Habit.*—Mid-season.
*Cropping Qualities.*—Very good.
*Composition.*—Starch fair, 15·69 ; protein high, 2·06.

PINK RAMBLER.

KEY. A 3A B 2 C 3 D 4 E 2 F 2 G 3 H 2 I 3A J 2 K 1 L 2 M 2 N 1–3A O 3.

DESCRIPTION—

*Leaf.*—Long ; shouldered ; large ; light green-purple spot at base of leaf ; star absent.
*Stem.*—Thick ; very long ; purple colour.
*Tuber.*—Medium size ; egg-shaped ; pinkish-yellow colour ; flesh cream.
*Culinary Qualities.*—Medium dry cooker ; good flavour.
*Habit of Growth.*—Medium spreading.
*Maturing Habit.*—Mid-season.
*Cropping Qualities.*—Fair.
*Composition.*—Starch good, 18·96 ; protein, 1·94.
Good variety to grow as a smother crop for weeds.

RUBY.

KEY. A 2 B 2 C 2 D 1 E 2 F 1 G 4 H 2A I 4A J 1 K 1 L 1 M 3 N 1–3A O 1.

DESCRIPTION—

*Leaf.*—Round, large ; veins green ; midrib pinkish ; star present.
*Stem.*—Medium length ; thick ; green in colour.
*Tuber.*—Large, medium length ; rough skin ; purple colour ; flesh white ; often fissured.
*Culinary Qualities.*—Very dry ; good flavour ; fibrous when old.
*Habit of Growth.*—Bunched.
*Maturing Habit.*—Early.
*Cropping Qualities.*—Good.
*Composition.*—Starch good, 20·00 ; protein, 1·41.
Good all-round variety ; grows to a large size in sandy loam soil.

RUSSELL ISLAND.

KEY. A 3 B 1 C 2 D 2 E 2 F 1 G 4 H 4 I 2 J 1 K 1 L 3 M 2 N 2–4 O 2.

DESCRIPTION—

*Leaf.*—Long ; sometimes shouldered ; large ; veins green ; star present.
*Stem.*—Medium length ; thick ; green, with purple patch at base of leaf.
*Tuber.*—Large ; long ; round ends ; yellow colour ; flesh white ; fibre bundles very distinct yellow.
*Culinary Qualities.*—Boils soft ; bakes well.
*Habit of Growth.*—Medium bunch.
*Maturing Habit.*—Mid-season.
*Cropping Qualities.*—Very good.
*Composition.*—Starch low, 14·76 ; protein, 1·75.
Good all-round stock variety.

RECORD.

KEY. A 3 B 2 C 2 D 1 E 1 F 2 G 1–4 H 3 I 3 J 1 K 2 L 1 M 2 N 3A–1 O 2.

DESCRIPTION—

*Leaf.*—Long; large; veins green; midrib pinkish; star absent.

*Stem.*—Medium length; thick; green in colour.

*Tuber.*—Rather small; pear-shaped; pinkish-yellow in colour; flesh white.

*Culinary Qualities.*—Dry cooker; good flavour.

*Habit of Growth.*—Spreading.

*Maturing Habit.*—Very early.

*Cropping qualities.*—Good.

*Composition.*—Starch good, 20·90; protein, 1·70.

RUMSEY'S YELLOW.

KEY. A 2 B 2 C 2 D 2 E 1 F 1 G 2 H 2 I 2 J 2 K 2 L 1 M 1 N 2–4 O 3.

DESCRIPTION—

*Leaf.*—Round; large; veins midrib pinkish; star present.

*Stem.*—Medium length; thin; colour green, with purple patch at base of leaf.

*Tuber.*—Medium size; elongated; pinkish-white colour; flesh cream.

*Culinary Qualities.*—Boils soft; rather poor flavour.

*Habit of Growth.*—Spreading.

*Maturing Habit.*—Early.

*Cropping Qualities.*—Rather poor; only one test carried out.

*Composition.*—Starch low, 12·85; protein, 1·44.

ROYAL PURPLE.

KEY. A 3A B 1 C 2 D 2 E 1 F 2 G 1 H 3 I 2B J 3 K 2 L 1 M 2 N 2–4 O 2.

DESCRIPTION—

*Leaf.*—Long; sometimes slightly shouldered; veins purple; star abse

*Stem.*—Medium long; thin; colour green, with purple patch at base of leaf.

*Tuber.*—Medium size; long; round ends; bronze colour; flesh pinkish-white.

*Culinary Qualities.*—Moist cooker; rather poor flavour.

*Habit of Growth.*—Medium bunch.

*Maturing Habit.*—Early.

*Cropping Qualities.*—Good.

*Composition.*—Starch rather low, 15·88; protein, 1·78.

SNOW QUEEN.

KEY. A 1 B 2 C 2 D 2 E 2 F 1 G 1 H 2 I 2 J 1 K 1 L 2 M 2 N 1–3 O 1.

DESCRIPTION—

*Leaf.*—Cut, large; veins purple; star present.

*Stem.*—Medium long, thick; colour green, with purple patch at base of leaf.

*Tuber.*—Medium size, very long; yellow colour; flesh white.

*Culinary Qualities.*—Boils dry; fine flavour.

*Habit of Growth.*—Bunch.

*Maturing Habit.*—Mid-season.

*Composition.*—Starch good, 17·39; protein, 1·96.

Variety known in several localities as W. Maltese and Madagascar.

STAR OF WARREN.

KEY. A 2 B 2 C 1 D 2 E 2 F 1 G 1 H 1 I 2 J 2A K 3 L 2 M 2 N 1–3A O 3.

DESCRIPTION—

*Leaf.*—Round ; toothed ; veins purple ; star present.

*Stem.*—Short, thick ; green, with purple patch at base of leaf.

*Tuber.*—Round ; smooth, even surface ; rather small ; yellow colour flesh light-cream ; fibre bundles forming distinct pattern.

*Culinary Qualities.*—Dry cooker ; good flavour ; bakes well.

*Habit of Growth.*—Very spreading.

*Maturing Habit.*—Mid-season.

*Cropping Qualities.*—Fair.

*Composition.*—Starch good, 19·70 ; protein, 1·94.

Very good table variety.

SPRINGFIELD PROLIFIC.

KEY. A 3 B 2 C 2 D 2 E 2 F 1 G 1 H 2A I 2 J 1A K 1 L 2 M 2 N 1A–4A O 1.

DESCRIPTION—

*Leaf.*—Long, large ; veins purple ; star present.

*Stem.*—Medium length ; thick ; green, with purple patch at axil of leaf.

*Tuber.*—Medium length ; tapering ; fair size ; colour yellow ; flesh light-cream.

*Culinary Qualities.*—Medium dry ; bakes well ; good flavour.

*Habit of Growth.*—Bunch.

*Maturing Habit.*—Mid-season.

*Cropping Qualities.*—Good.

*Composition.*—Starch fair, 16·46 ; protein high, 2·17.

STAR OF QUEENSLAND.

KEY. A 1 B 2 C 2 D 2 E 2 F 1 G 1 H 3 I 2 J 1 K 1 L 1 M 2 N 1–3 O 1.

DESCRIPTION—

*Leaf.*—Cut ; veins purple ; star present.

*Stem.*—Medium length ; thick ; colour green, with purple patch at axil of leaf.

*Tuber.*—Medium size ; tapering shape ; yellow ; numerous eyes, deeply indented ; flesh pinkish-yellow ; fibre bundles forming star.

*Culinary Qualities.*—Dry cooker ; good flavour.

*Habit of Growth.*—Bunch.

*Maturing Habit.*—Early.

*Cropping Qualities.*— Poor.

*Composition.*—Starch good, 18·70 ; protein high, 2·33

SOKKAR.

KEY. A 3A B 2 C 1 D 1 E 2 F 2 G 3 H 4 I 2 J 1 K 2 L 2 M 2 N 2-4 O 2.

DESCRIPTION—

*Leaf.*—Cut; large; veins green; purple spot at base of leaf; star absent.

*Stem.*—Short; thick; green colour.

*Tuber.*—Small; medium long; usually deep fissured; cream colour; flesh yellow.

*Culinary Qualities.*—Boil soft; sweetish taste; sometimes attacked by ants.

*Habit of Growth.*—Medium spreading.

*Maturing Habit.*—Mid-season.

*Cropping Qualities.*—Fair.

*Composition.*—Starch low, 11·67; protein, 1·98.

Light frost kills vines completely.

SUPERFINE.

KEY. A 1 B 1 C 2 D 2 E 2 F 1 G 1 H 2 I 1-2 J 2A K 1 L 1 M 2 N 1-3 O 1.

DESCRIPTION—

*Leaf.*—Cut; narrow; long; veins purple; star present.

*Stem.*—Medium length; thick; green, with purple patch at base of leaf.

*Tuber.*—Very long; medium size; yellow skin and flesh.

*Culinary Qualities.*—Dry cooker; excellent flavour.

*Habit of Growth.*—Bunch.

*Maturing Habit.*—Early.

*Cropping Qualities.*—Good.

*Composition.*—Starch very good, 22·00; protein, 2·19.

Excellent table sort.

SMALL STEM JERSEY.

KEY. A 3 B 1 C 1 D 1 E 1 F 2 G 4 H 1 I 2 J K L M N O.

DESCRIPTION—

*Leaf.*—Long; small; veins green.

*Stem.*—Vines short; green colour.

*Tuber.*—Not sufficiently mature to determine characteristics.

VITAMINE.

KEY. A 1 B 2 C 2 D 2 E 2 F 1 G 1 H 2 I 2 J 1 K 1 L 2 M 2 N 1-3 O 1.

DESCRIPTION—

*Leaf.*—Cut; large; veins purple; star present.

*Stem.*—Medium length; thick; purple patch at axil of leaf.

*Tuber.*—Large; slightly tapering; yellow colour; flesh light yellow.

*Culinary Qualities.*—Dry cooker; good flavour.

*Habit of Growth.*—Bunch.

*Maturing Habit.*—Mid-season.

*Cropping Qualities.*—Good.

*Composition.*—Starch highest of any variety so far tested, 24·27; protein, 1·20.

WHITE KUMURA.

KEY. A 2 B 2 C 2 D 3 E 2 F 1 G 1 H 4 I 2 J 2 K 1 L 1 M 1 N 1–3 O 1.

DESCRIPTION—

*Leaf.*—Large ; round ; veins purple ; star present.

*Stem.*—Medium length ; thick ; greenish-brown to purple colour.

*Tuber.*—Large ; ovoid shape ; yellow ; flesh white ; wood fibres yellow.

*Culinary Qualities.*—Fair table variety, but better adapted for stock use.

*Habit of Growth.*—Bunch.

*Maturing Habit.*—Early.

*Cropping Qualities.*—Very good.

*Composition.*—Starch low, 11·22 ; protein, 1·44.

WHITE AUSTRALIA.

KEY. A 1 B 2 C 2 D 2 E 2 F 1 G 1 H 2A I 1 J 1 K 1 L 2 M 2 N 1–3 O 2.

DESCRIPTION—

*Leaf.*—Cut ; large ; veins purple ; star present.

*Stem.*—Medium length ; thick ; green, with purple patch at axil of leaf.

*Tuber.*—Medium size ; tapering ; colour white ; flesh white.

*Culinary Qualities.*—Dry cooker ; good flavour.

*Habit of Growth.*—Medium spreading.

*Maturing Habit.*—Mid-season.

*Cropping Qualities.*—Good.

*Composition.*—Starch low, 14·00 ; protein, 1·44.

YELLOW FITZROY.

KEY. A 2 B 1 C 1 D 1 E 2 F 1 G 3 H 1 I 2 J 2A K 2 L 1 M 2 N 1A–3A O 2.

DESCRIPTION—

*Leaf.*—Round ; small ; toothed edge ; veins green ; purple spot at base of leaf.

*Stem.*—Short ; thick ; green colour.

*Tuber.*—Medium size ; slightly tapering ; yellow ; cream flesh, with golden coloured ring.

*Culinary Qualities.*—Medium dry ; bakes well ; good flavour.

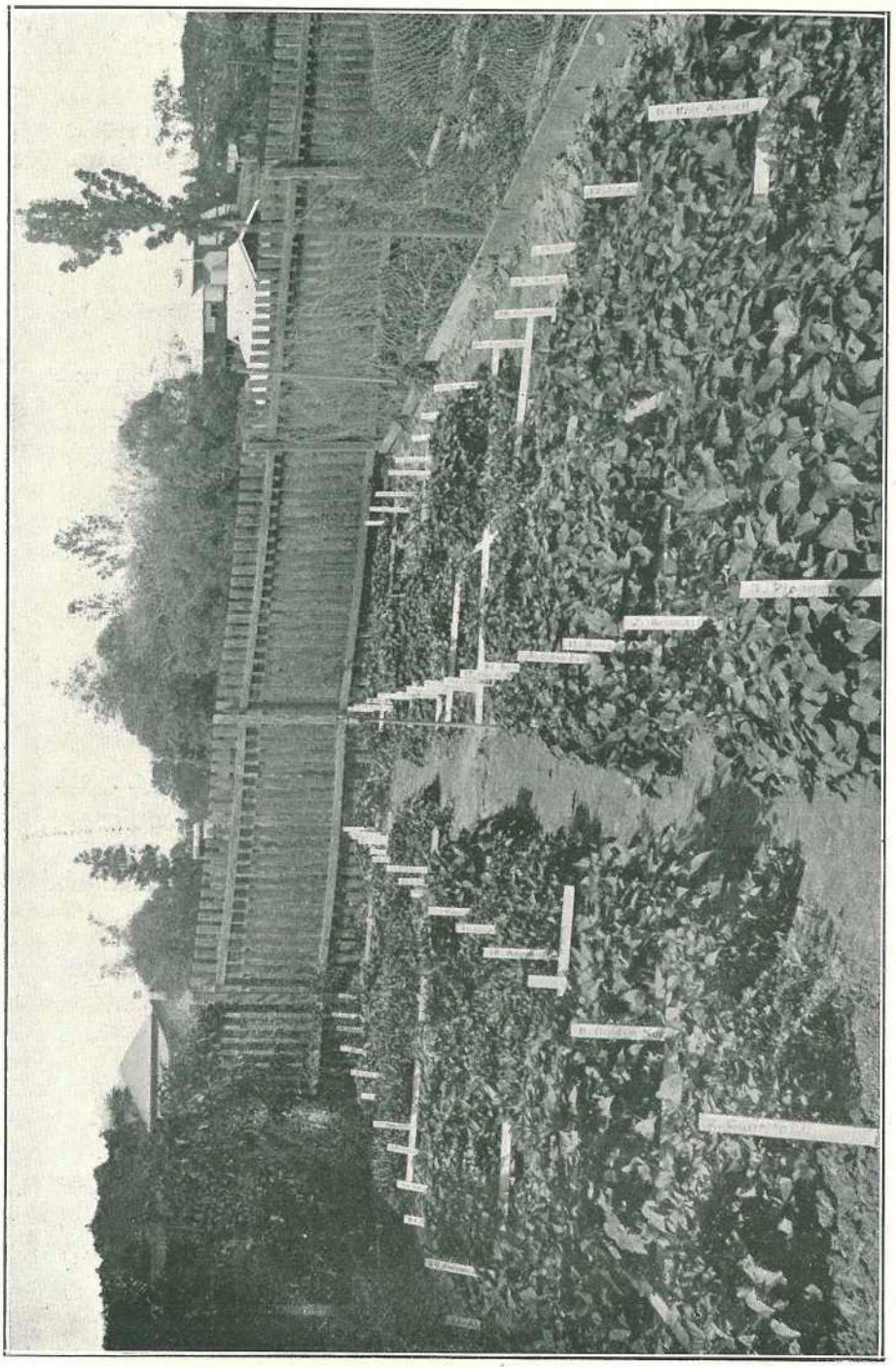
*Habit of Growth.*—Medium spreading.

*Maturing Habit.*—Early.

*Cropping Qualities.*—Good.

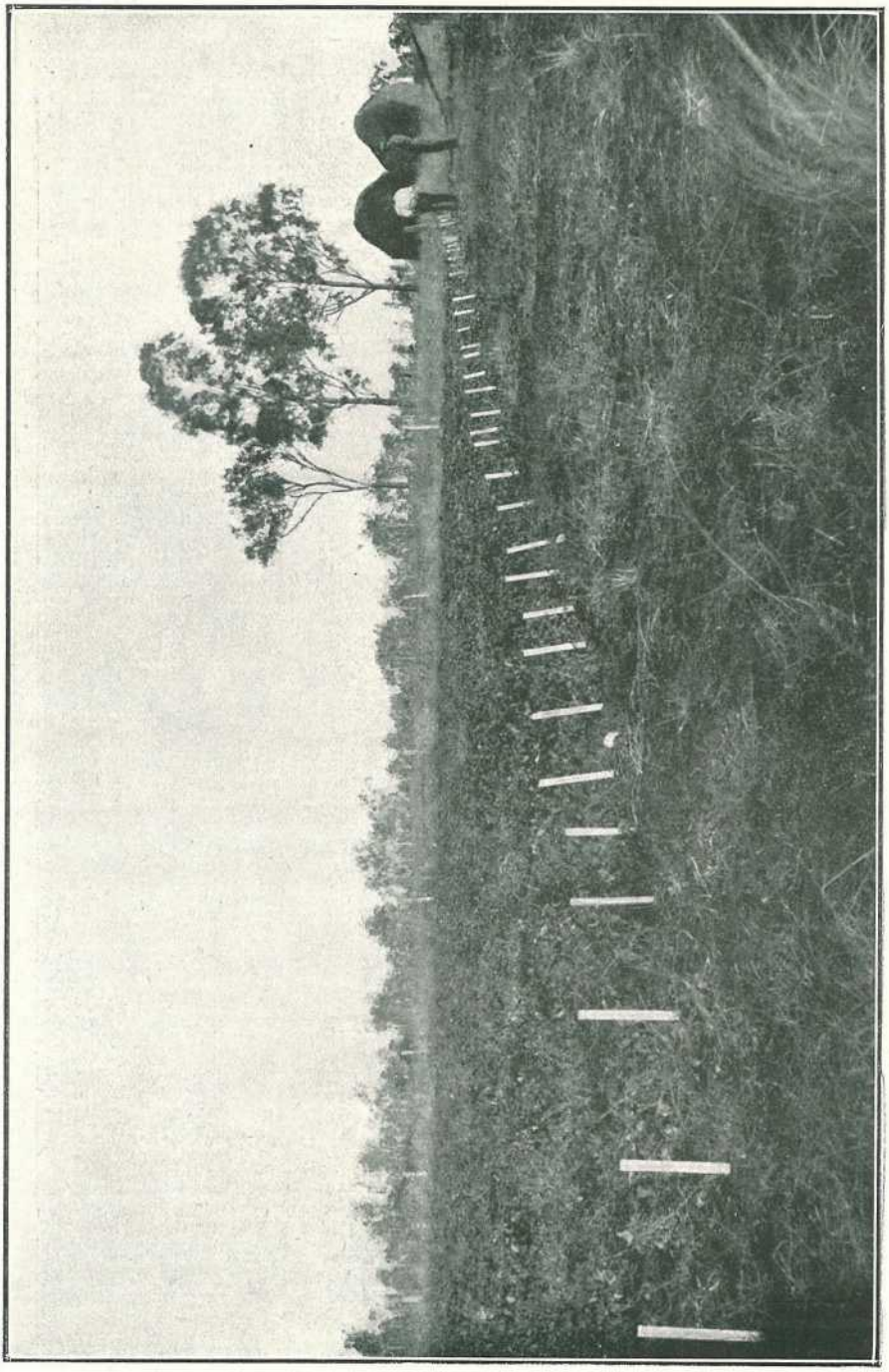
*Composition.*—Starch, 17·23 ; protein high, 2·44.

PLATE 1.



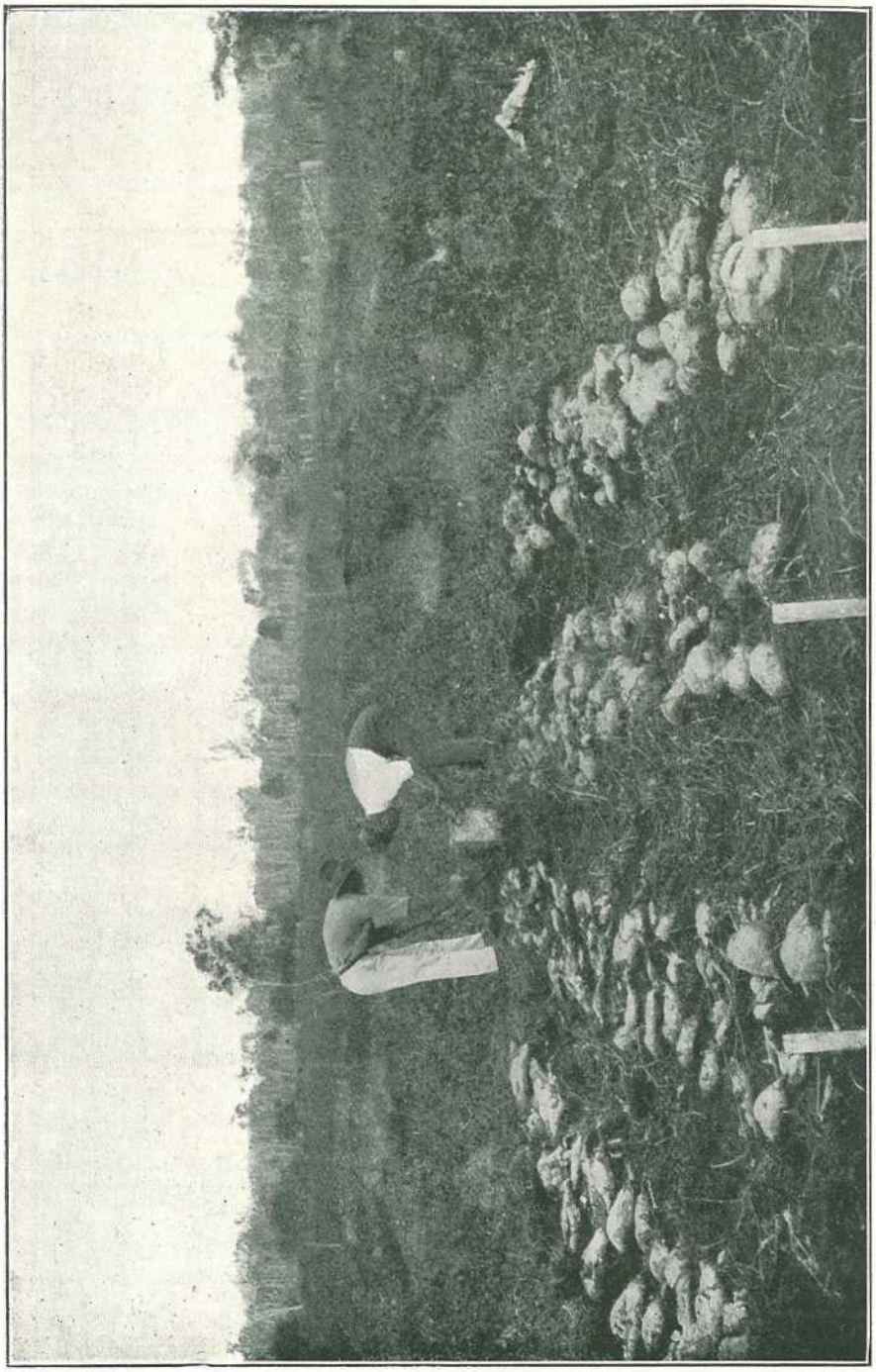
SWEET POTATO PROPAGATING BED.

PLATE 2.



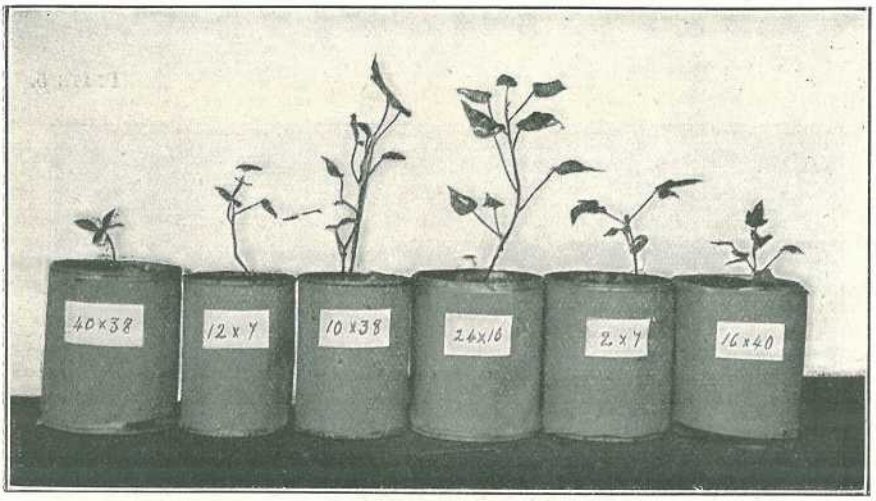
SWEET POTATO CLASSIFICATION PLOT.

PLATE 3.

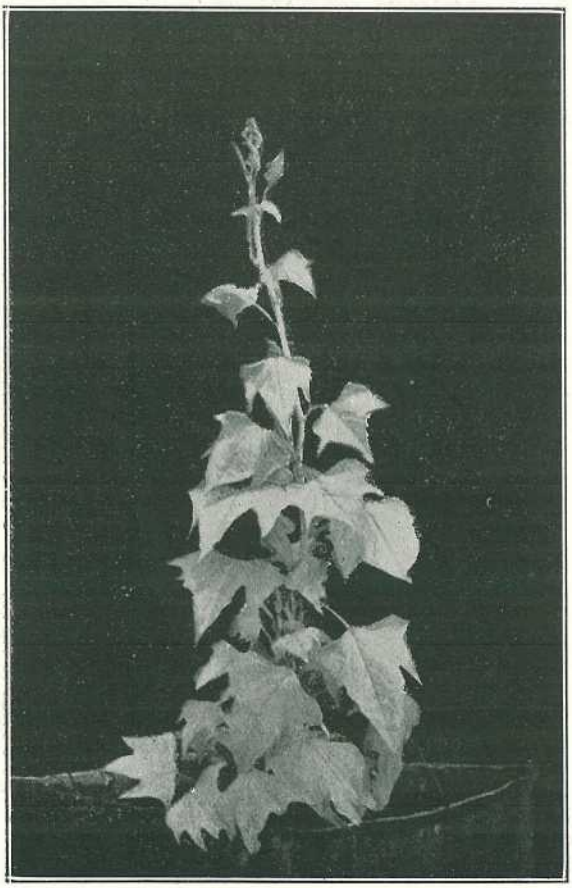


ASCERTAINING YIELD PER ACRE.

PLATE 4.

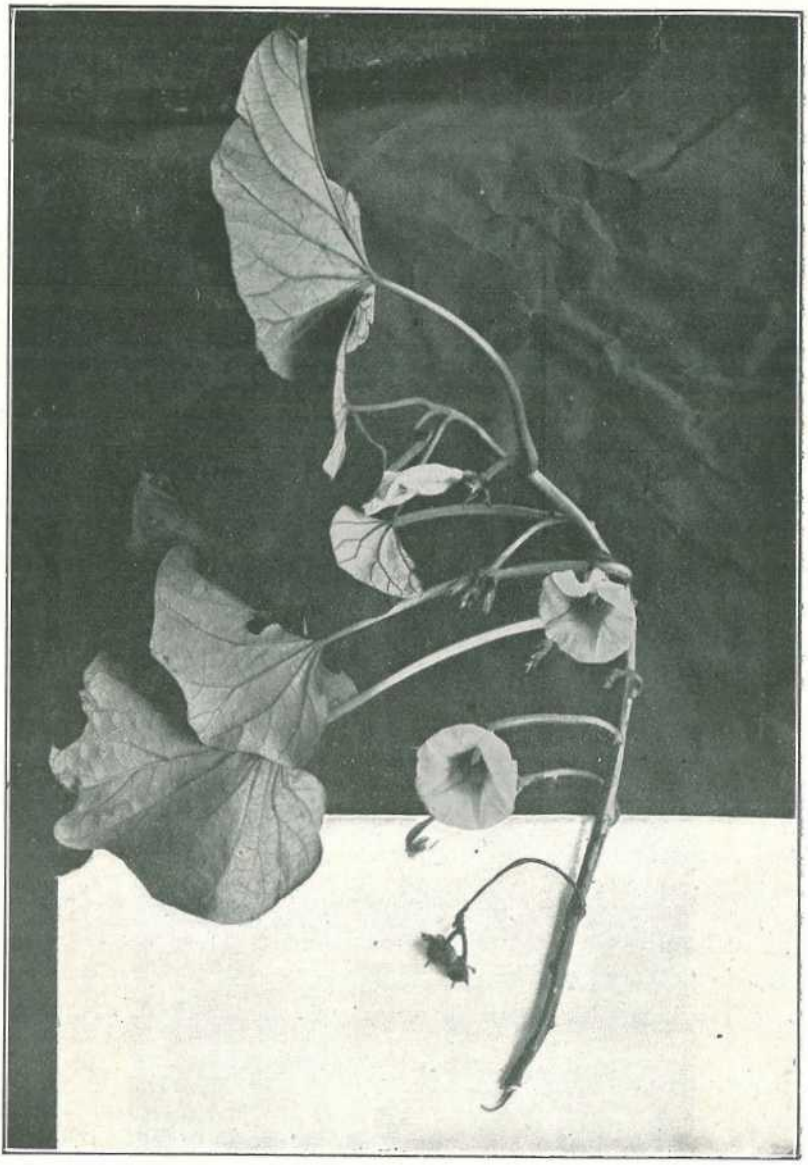



BATCH OF CROSSBRED SEEDLINGS

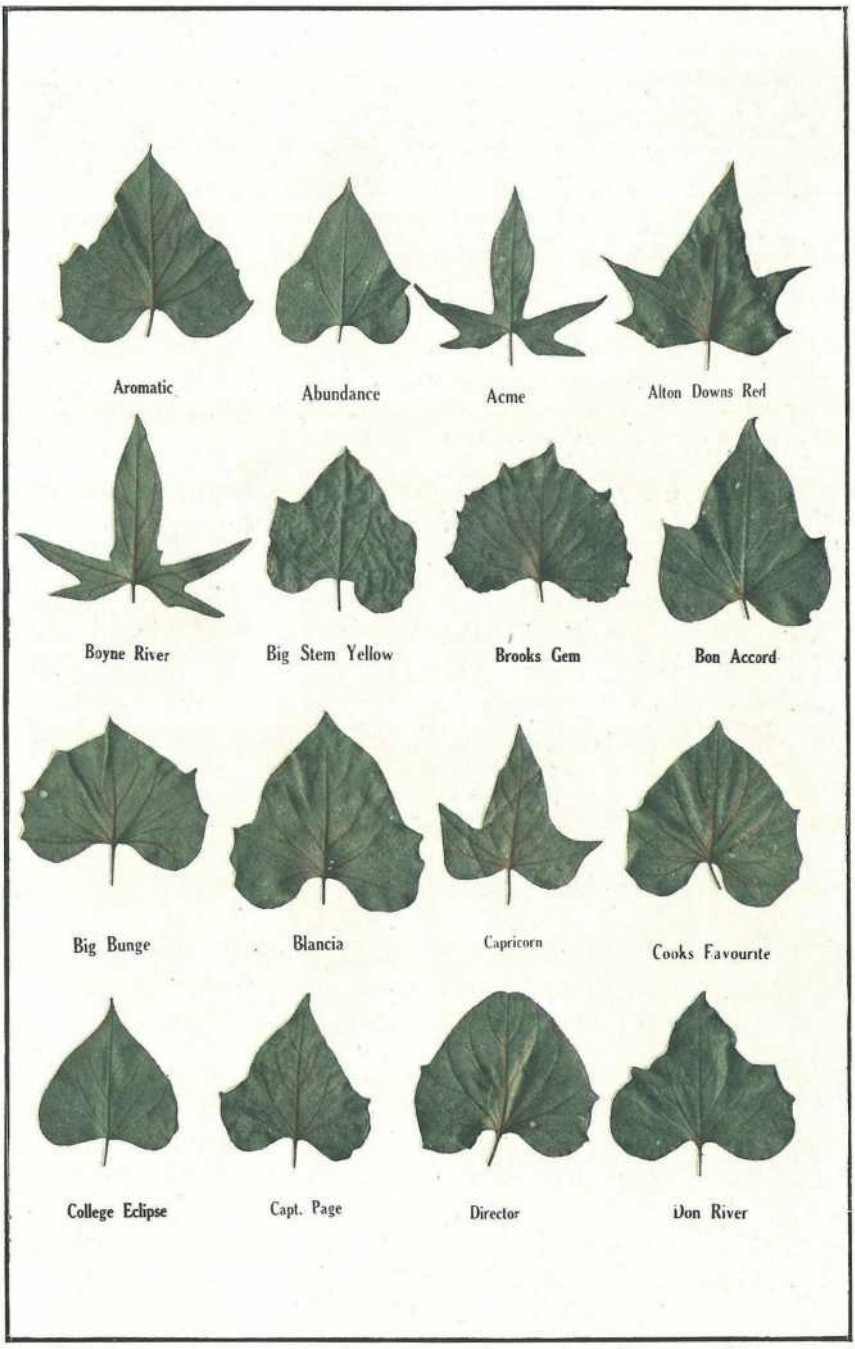


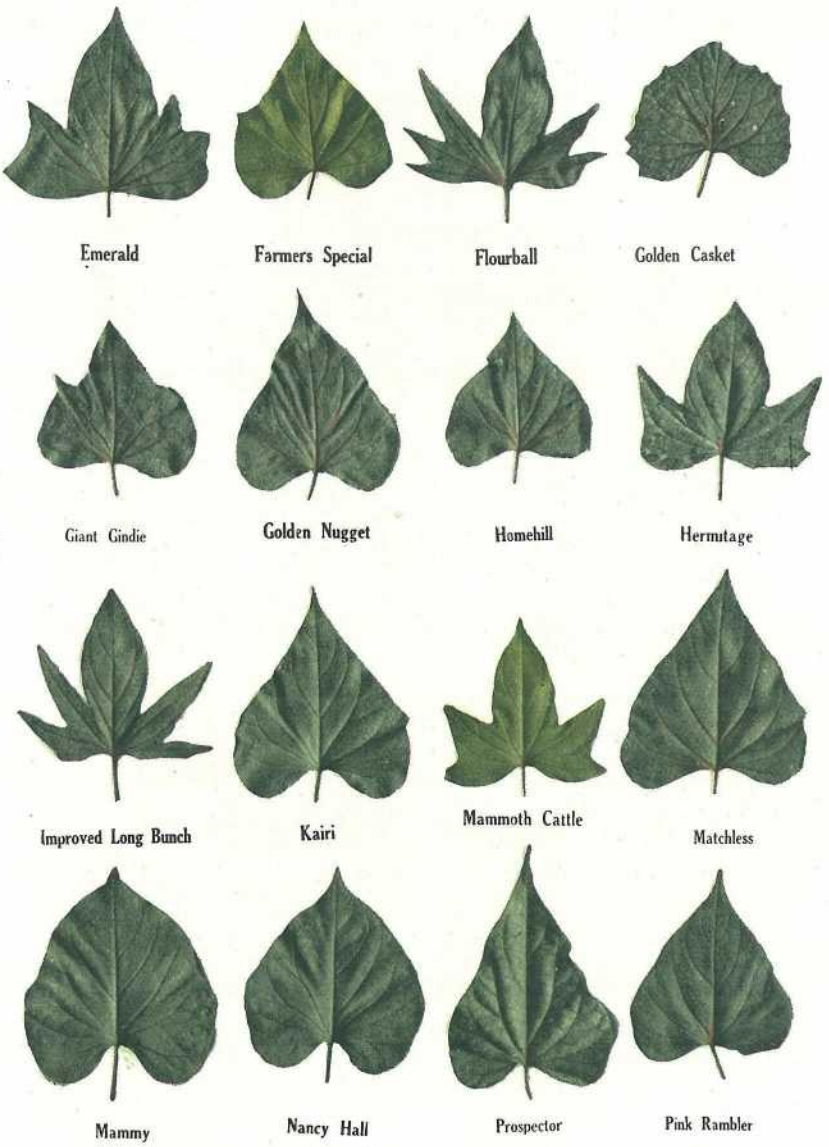
VARIETY WITH IVORY WHITE LEAVES.

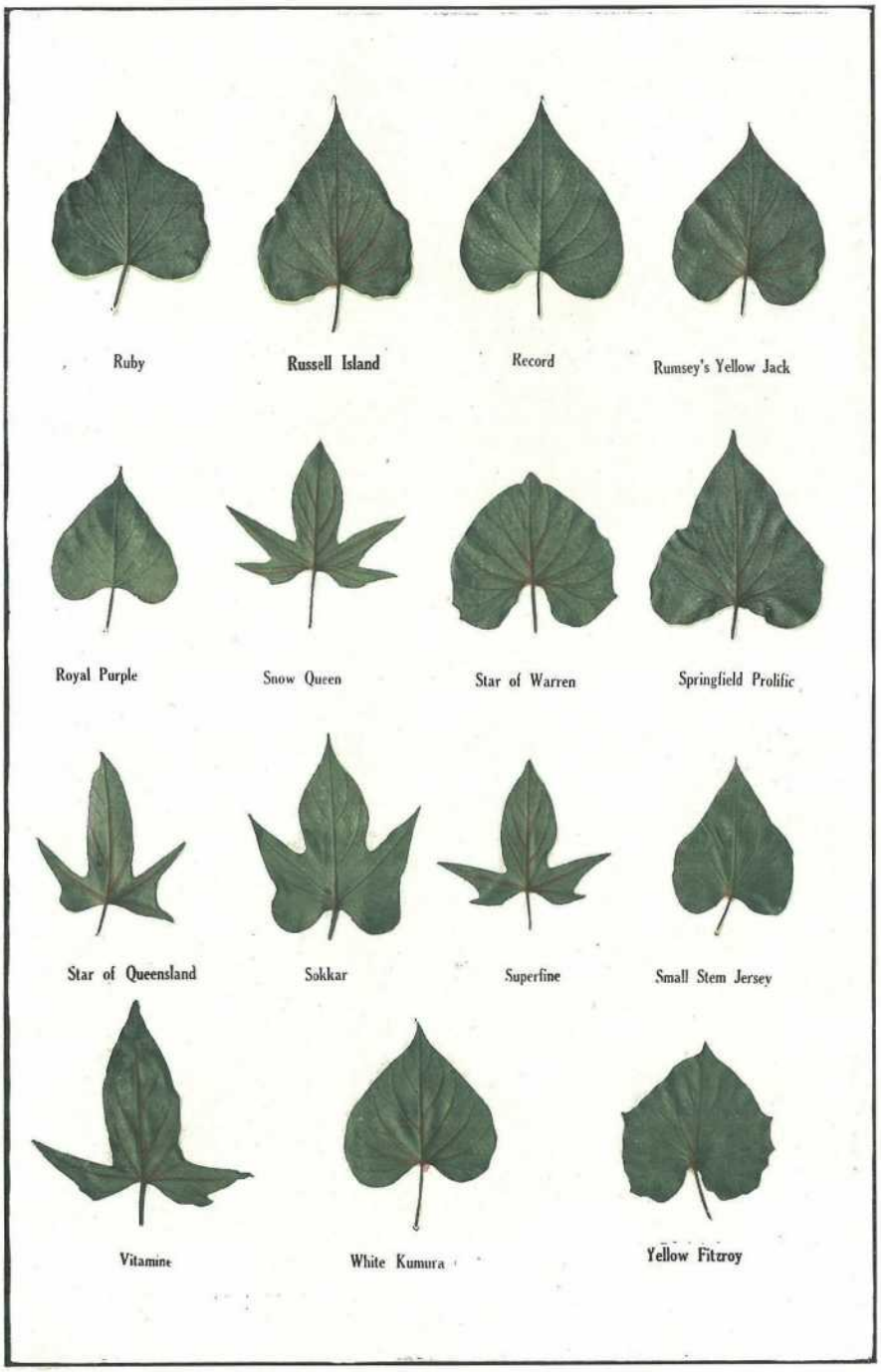
PLATE 5.

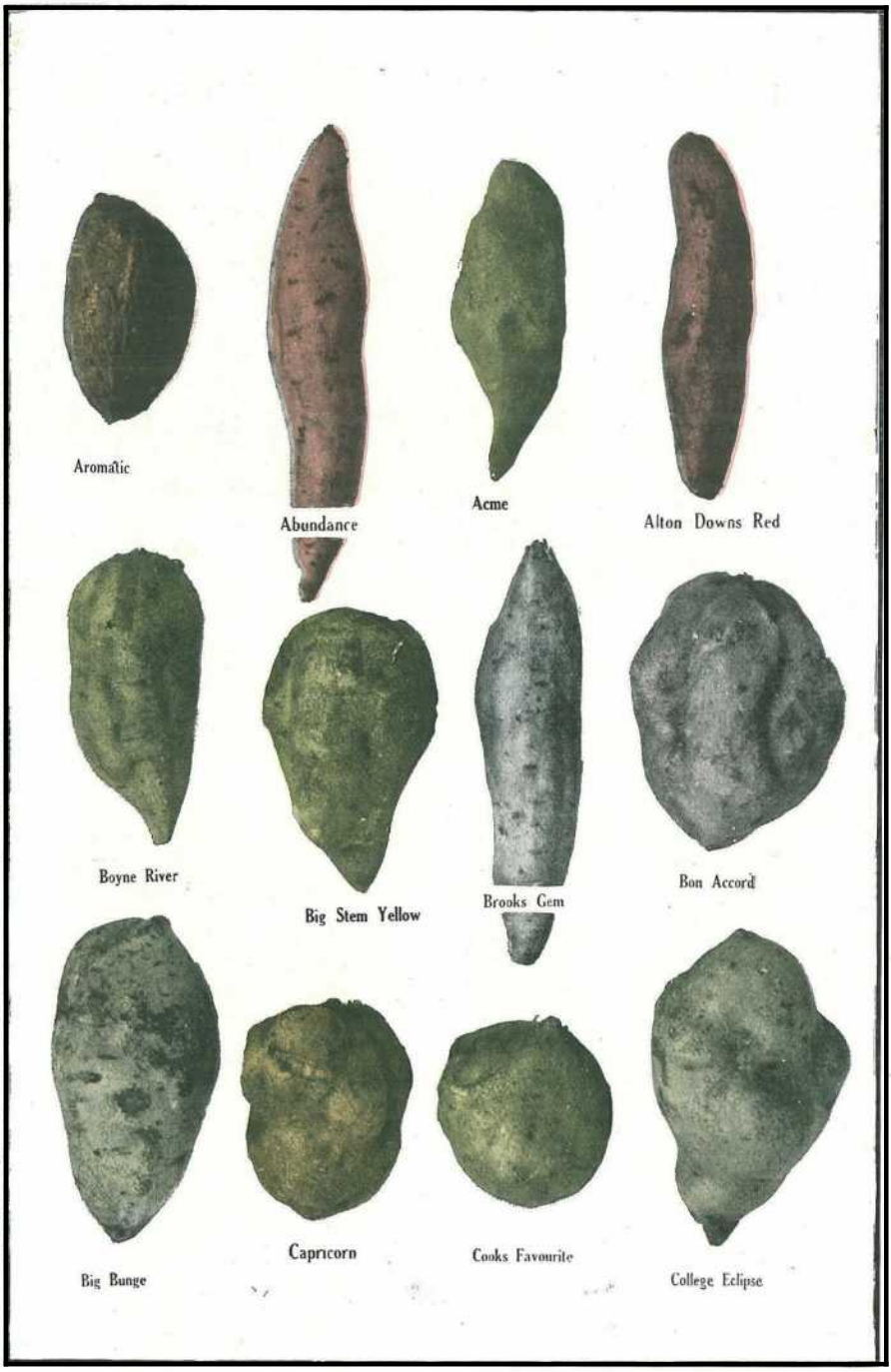


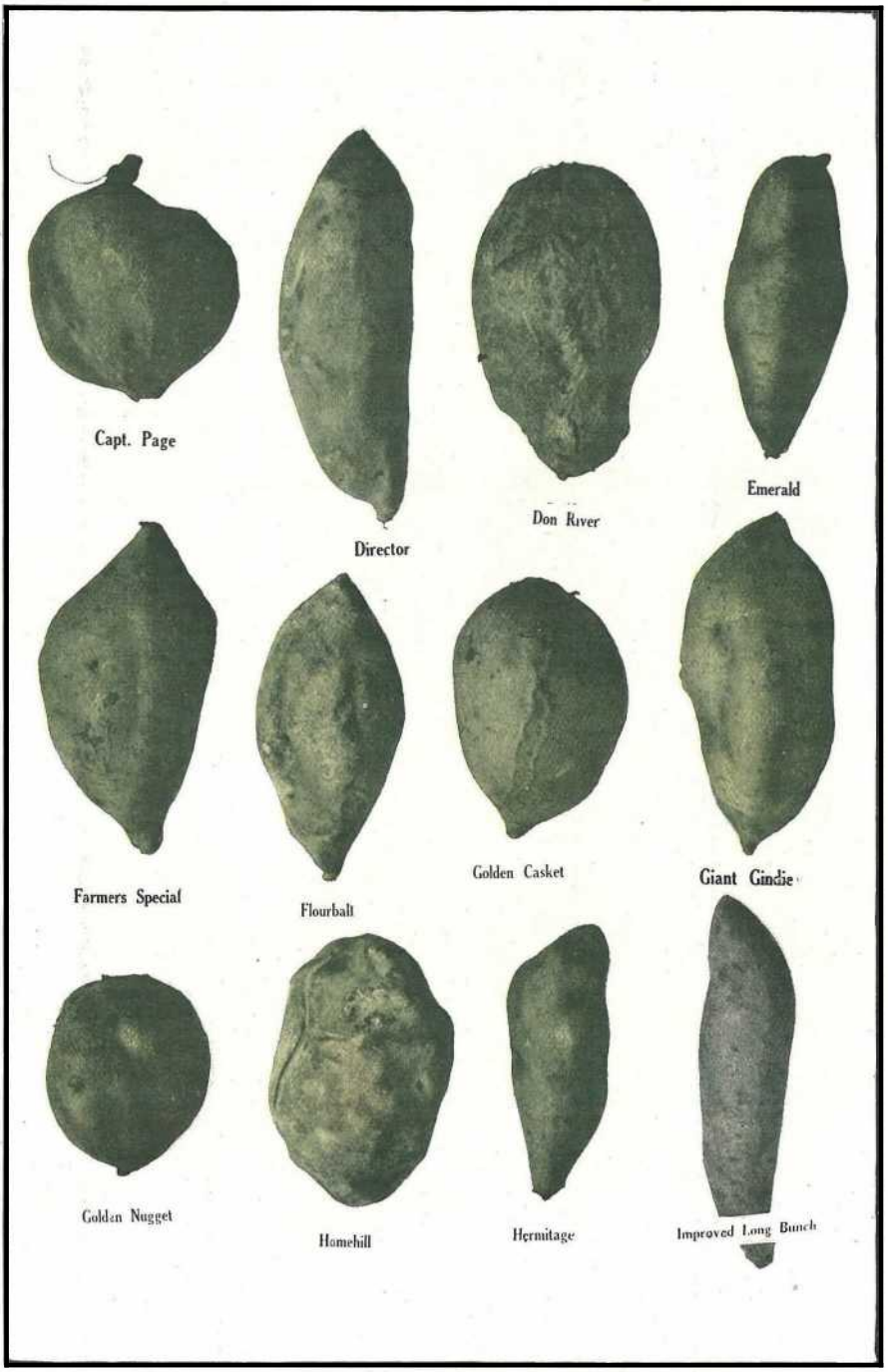
FLOWER AND SEED OF SWEET POTATO.

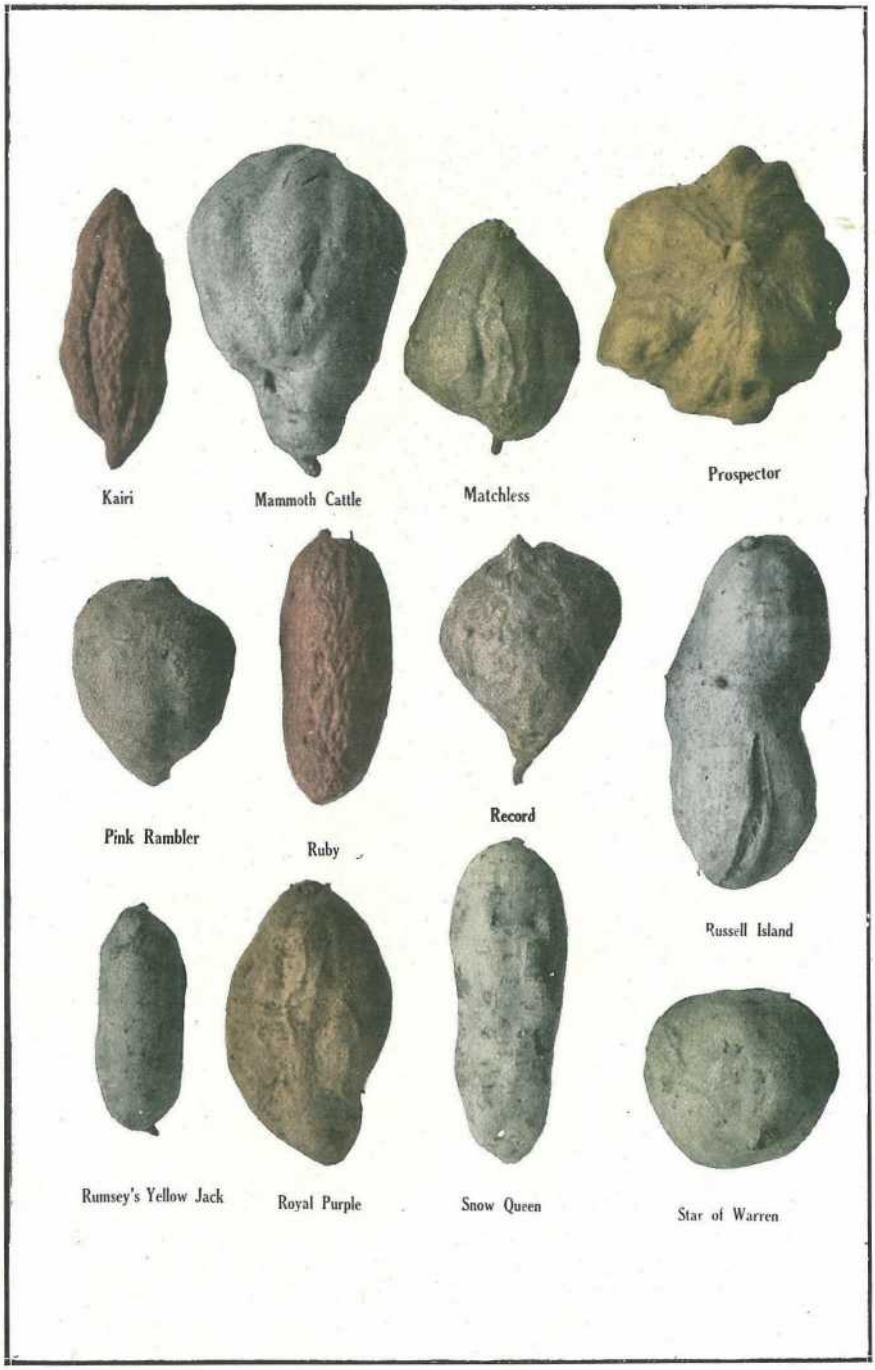

Aromatic
Abundance
Acme
Alton Downs Red
Boyne River
Big Stem Yellow
Brooks Gem
Bon Accord
Big Bunge
Blancia
Capricorn
Cooks Favourite
College Eclipse
Capt. Page
Director
Don River

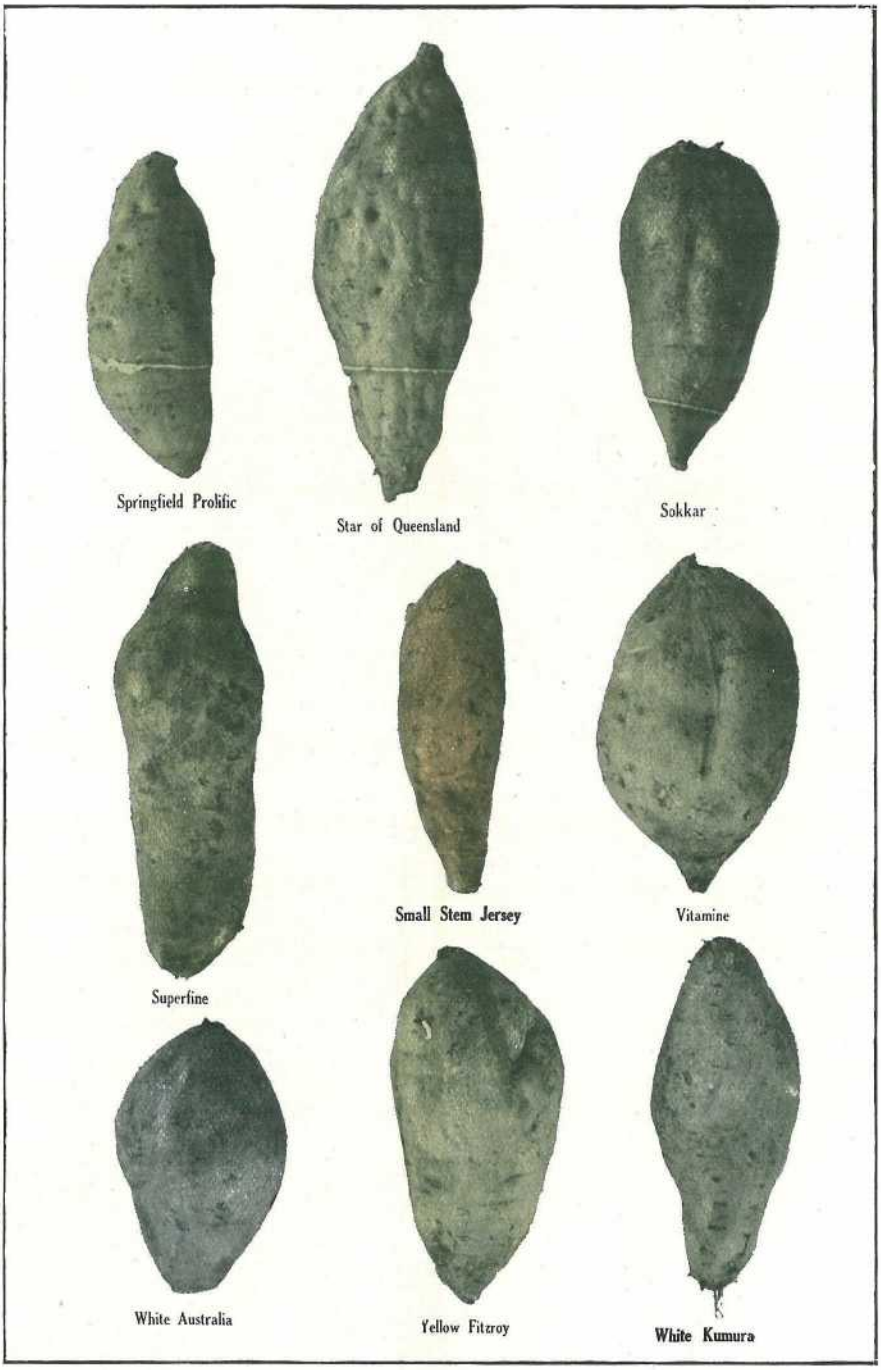

Emerald
Farmers Special
Flourball
Golden Casket
Giant Gindie
Golden Nugget
Homehill
Hermitage
Improved Long Bunch
Kairi
Mammoth Cattle
Matchless
Mammy
Nancy Hall
Prospector
Pink Rambler


Ruby
Russell Island
Record
Rumsey's Yellow Jack
Royal Purple
Snow Queen
Star of Warren
Springfield Prolific
Star of Queensland
Sokkar
Superfine
Small Stem Jersey
Vitamine
White Kumura
Yellow Fitzroy

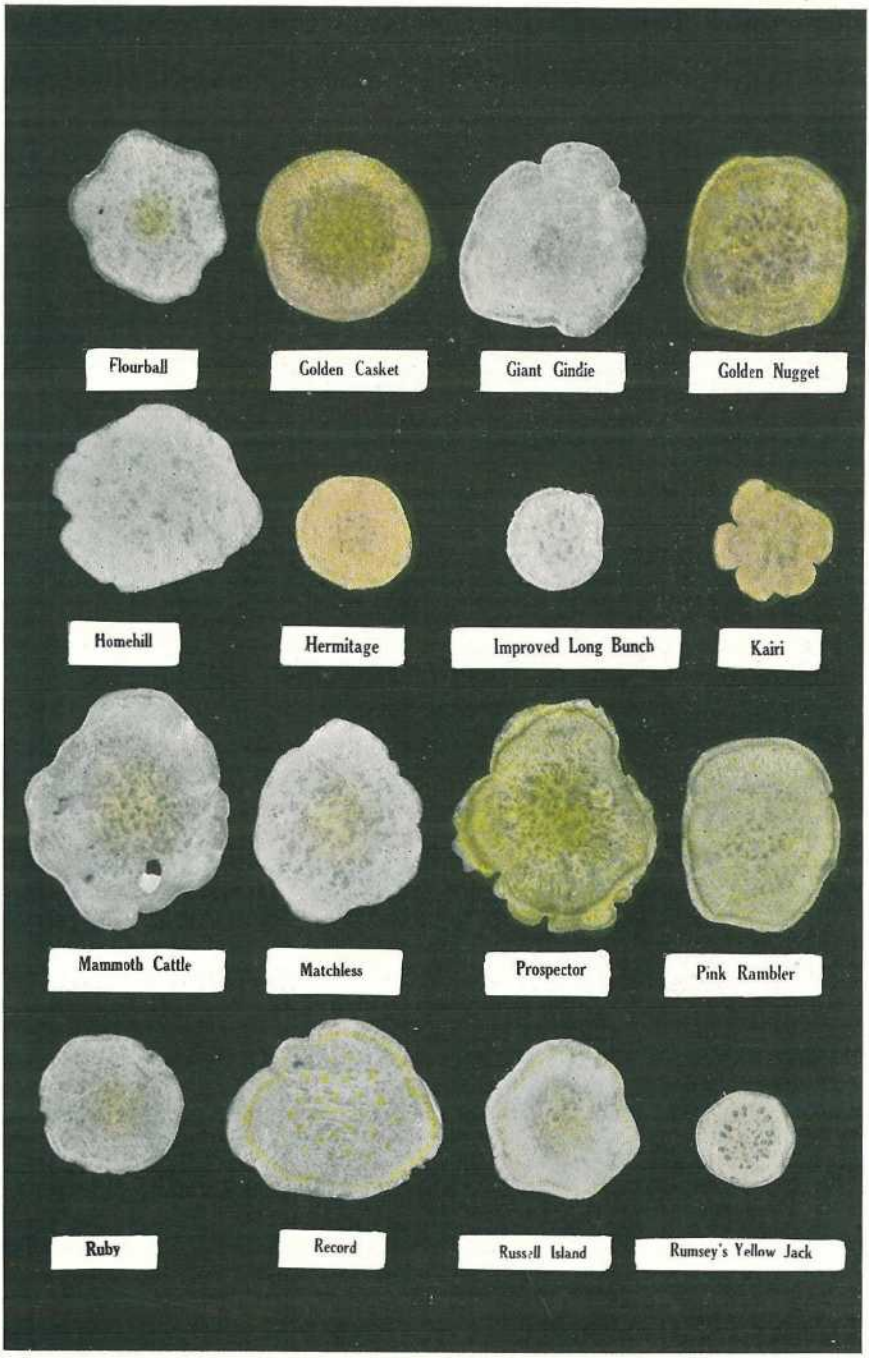

Aromatic
Abundance
Acme
Alton Downs Red
Boyne River
Big Stem Yellow
Brooks Gem
Bon Accord
Big Bunge
Capricorn
Cooks Favourite
College Eclipse


Capt. Page
Director
Don River
Emerald
Farmers Special
Flourball
Golden Casket
Giant Gindie
Golden Nugget
Homehill
Hermitage
Improved Long Bunch


Kairi
Mammoth Cattle
Matchless
Prospector
Pink Rambler
Ruby
Record
Russell Island
Rumsey's Yellow Jack
Royal Purple
Snow Queen
Star of Warren


Springfield Prolific
Star of Queensland
Sokkar
Superfine
Small Stem Jersey
Vitamine
White Australia
Yellow Fitzroy
White Kumura


Aromatic
Abundance
Acme
Alton Downs Red
Boyne River
Big Stem Yellow
Brooks Gem
Bon Accord
Big Bunge
Cooks Favourite
College Eclipse
Capt. Page
Director
Don River
Emerald
Farmers Special


Flourball
Golden Casket
Giant Gindie
Golden Nugget
Homehill
Hermitage
Improved Long Bunch
Kairi
Mammoth Cattle
Matchless
Prospector
Pink Rambler
Ruby
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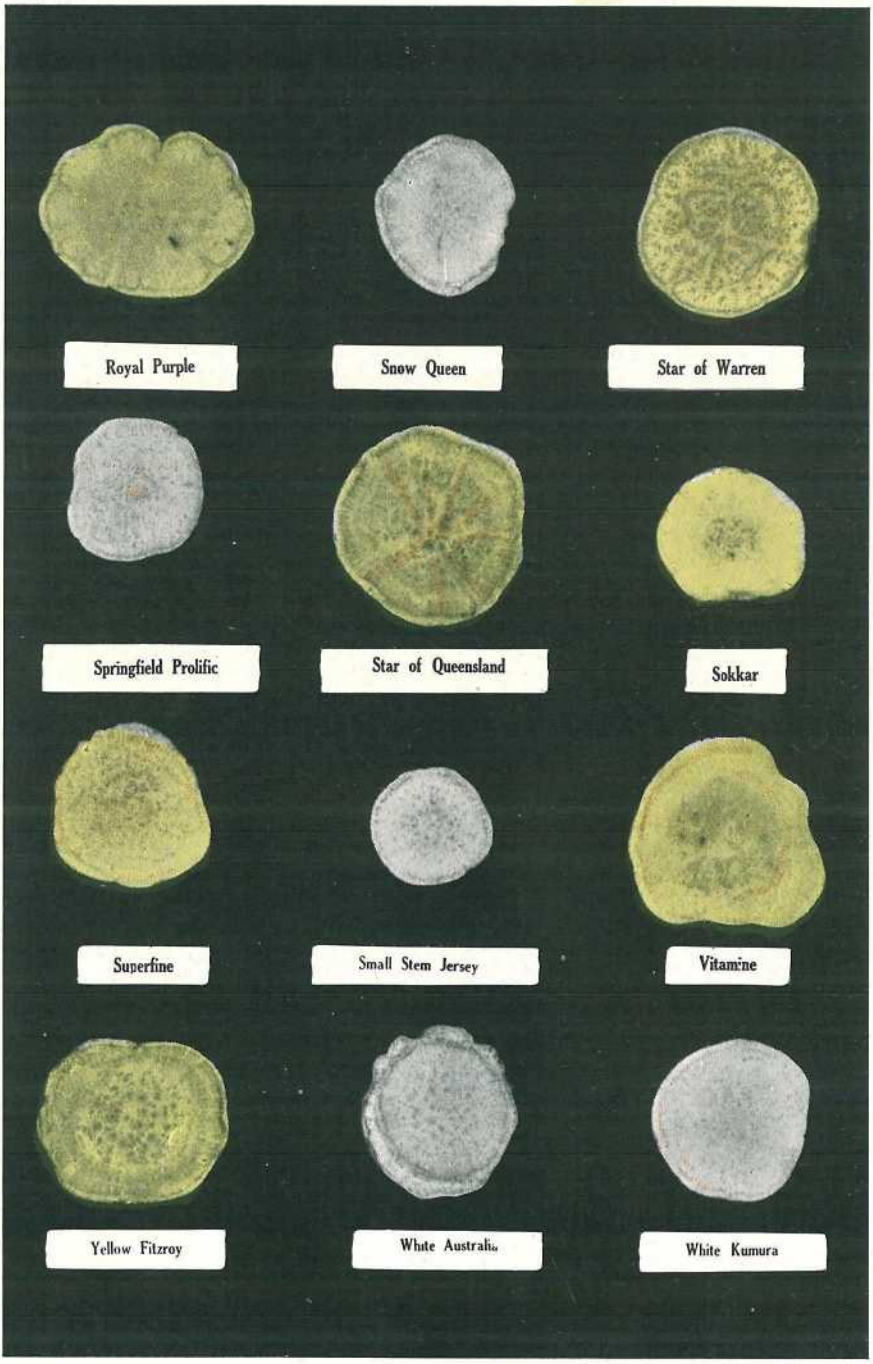
Rumsey's Yellow Jack


Royal Purple
Snow Queen
Star of Warren
Springfield Prolific
Star of Queensland
Sokkar
Superfine
Small Stem Jersey
Vitamine
Yellow Fitzroy
White Australia
White Kumura

# Farm and Garden Notes for September.

With the advent of spring, cultivating implements play an important part in farming operations.

The increased warmth of soil and atmosphere is conducive to the growth of weeds of all kinds, particularly on those soils that have only received an indifferent preparation.

Potatoes planted during last month will have made their appearance above the soil, and where doubt exists as to their freedom from blight, they should be sprayed with either Burgundy or Bordeaux mixture as soon as the young leaves are clear of the soil surface.

Land which has received careful initial cultivation and has a sufficiency of sub-surface moisture to permit of a satisfactory germination of seeds may be sown with maize, millets, panicum, sorghums, melons, pumpkins, cowpeas, broom millets, and crops of a like nature, provided, of course, that the areas sown are not usually subjected to late frosts.

Rhodes grass may be sown now over well-prepared surfaces of recently cleared forest lands or where early scrub burns have been obtained, and the seed is sown subsequent to showers. More rapid growths, however, are usually obtainable on areas dealt with, say, a month later.

In connection with the sowing of Rhodes grass, farmers are reminded that they have the Pure Seeds Act for their protection, and in Rhodes grass, perhaps more than any other grass, it is necessary that seed of good germination only should be sown. A sample forwarded to the Department of Agriculture will elicit the information free of cost as to whether it is worth sowing or not.

Where the conditions of rainfall are suited to its growth, paspalum may be sown this month.

The spring maize crop, always a risky one, requires to be sown on land which has received good initial cultivation and has reserves of soil moisture. Check-row seeding in this crop is to be recommended, permitting as it does right-angled and diagonal cultivation by horse implements, minimising the amount of weed growth, and at the same time obtaining a soil mulch that will, with the aid of light showers, assist to tide the plant over its critical period of "tasselling."

Although cotton may be sown this month, it usually stands a better chance if deferred until October. The harvesting of cotton during the normal rainy season is, if possible, to be avoided.

The sowing of intermediate crops prior to the preparation of land for lucerne sowing should be carried out in order that early and thorough cultivation can take place prior to the autumn sowing.

The following subsidiary crops may be sown during the month:—Tobacco and peanuts, plant sweet potatoes, arrowroot, sugar-cane, and cow cane (preferably the 90-stalked variety), and in those districts suited to their production yams and ginger. Plant out coffee.

KITCHEN GARDEN.—Now is the time when the kitchen garden will richly repay all the labour bestowed upon it, for it is the month for sowing many kinds of vegetables. If the soil is not naturally rich, make it so by a liberal application of stable manure and compost. Manure for the garden during summer should be in the liquid form for preference. Failing a sufficient supply of these, artificials may be used with good results. Dig or plough the ground deeply, and afterwards keep the surface in good tilth about the crops. Water early in the morning or late in the evening, and in the latter case, stir the soil early next day to prevent caking. Mulching with straw, leaves, or litter will be of great benefit as the season becomes hotter. It is a good thing to apply a little salt to newly dug beds. What the action of salt is, is not exactly known, but when it is applied as a top dressing it tends to check rank growth. A little is excellent for cabbages, and especially for asparagus, but too much renders the soil sterile, and causes hardpan to form. French or kidney beans may now be sown in all parts of the State. The Lima bean delights in the hottest weather. Sow the dwarf kinds in drills 3 ft. apart and 18 in. between the plants, and the climbing sorts 6 ft. each way. Sow Guada bean, providing a trellis for it to climb on later. Sow cucumbers, melons, marrows, and squash at once. If they are troubled by the red beetle, spray with Paris green or London purple. In cool districts, peas and even some beetroot may be sown. Set out egg plants in rows 4 ft.

apart. Plant out tomatoes 3½ ft. each way, and train them to a single stem, either on stakes, trellis, or wire netting. Plant out rosellas. Sow mustard and cress, spinnach, lettuce, vegetable marrows, custard marrows, parsnips, carrots, chicory, eschalots, cabbage, radishes, kohl-rabi, &c. These will all prove satisfactory, provided the ground is well worked, kept clean, and that water, manure, and, where required, shade are provided.

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# Orchard Notes for September.

## THE COAST DISTRICTS.

September is a busy month for the fruitgrowers in the coastal districts of this State, as the returns to be obtained from the orchards, vineyards, and plantations depend very largely on the trees, vines, and other fruits getting a good start now.

In the case of citrus orchards—especially in the Southern half of the State—it is certainly the most important month in the year, as the crop of fruit to be harvested during the following autumn and winter depends not only on the trees blossoming well but, what is of much more importance, that the blossoms mature properly and set a good crop of fruit.

This can only be brought about by keeping the trees healthy and in vigorous growth, as, if the trees are not in this condition, they do not possess the necessary strength to set their fruit, even though they may blossom profusely. The maintenance of the trees in a state of vigorous growth demands—first, that there is an adequate supply of moisture in the soil for the requirements of the tree; and, secondly, that there is an adequate supply of the esential plant-foods available in the soil.

With respect to the supply of moisture in the soil, this can only be secured by deep and systematic cultivation, excepting in seasons of good rainfall or where there is a supply of water for irrigation. As a rule, September is a more or less dry month, and when it is dry there is little chance of securing a good crop of fruit from a neglected orchard.

If the advice that was given in the Notes for August regarding the conservation of moisture in the soil has been carried out, all that is necessary is to keep the soil stirred frequently, so as to prevent the loss of moisture by surface evaporation. If the advice has been ignored, then no time should be lost, but the soil should be brought into a state of good tilth as quickly as possible.

Where there is a supply of water available for irrigation, the trees should receive a thorough soaking if they require it. Don't wait till the trees show signs of distress, but see that they are supplied with an adequate supply of moisture during the flowering and setting periods.

It is probable that one of the chief causes why navel oranges are frequently shy bearers in the coastal districts is that the trees, though they produce a heavy crop of blossoms, are unable to set their fruit, owing to a lack of sufficient moisture in the soil at that time, as during seasons when there is a good rainfall and the trees are in vigorous growth or where they are grown by irrigation, as a rule they bear much better crops. The importance of maintaining a good supply of moisture in the soil is thus recognised in the case of this particular variety of citrus fruit.

When the trees show the want of sufficient plant-food—a condition that is easily known by the colour of the foliage and their weekly growth, the orchard should be manured with a quick-acting, complete manure; such as a mixture of superphosphate, sulphate of ammonia, and sulphate of potash, the plant-foods in which are soluble in the water contained in the soil and are thus readily taken up by the feeding roots.

Although the above has been written mainly in respect to citrus orchards, it applies equally well to those in which other fruit trees are grown. Where the land has been prepared for bananas, planting should take place during the month. If the plantation is to be made on old land, then the soil should have been deeply ploughed and subsoiled and brought into a state of perfect tilth prior to planting. It should also receive a good dressing of a complete manure, so as to provide an ample supply of available plant-food. In the case of new land, which has, as a rule, been scrub that has been recently fallen and burnt off, the first operation is to dig the holes for the suckers at about 12 ft. apart each way. Good holes should be dug, and they should be deep enough to permit the top of the bulb or corm of the sucker to be 6 in. below the surface of the ground.

Take great care in the selection of the suckers, and see that they are free from beetle borers or other diseases.

As a precaution it is advisable to cut off all old roots and to dip the corms for two hours in a solution of corrosive sublimate, made by dissolving 1 oz. of this substance in 6 gallons of water.

In old banana plantations keep the ground well worked and free from weeds and remove all superfluous suckers.

Where necessary, manure—using a complete fertiliser rich in potash, nitrogen, and phosphoric acid, such as a mixture of meatworks manure and sulphate of potash, 4 of the former to 1 of the latter.

Pineapples can also be planted now. The ground should be thoroughly prepared —viz., brought into a state of perfect tilth to a depth of at least 1 ft., more if possible—not scratched, as frequently happens; and when the soil requires feeding, it should be manured with a complete manure, which should, however, contain no superphosphate.

Old plantations should be kept in a good state of tilth and be manured with a complete fertiliser in which the phosphoric acid is in the form of bones, basic phosphate, or finely ground phosphatic rock, but on no account as superphosphate.

The pruning of custard apples should be carried out during the month, leaving the work, however, as late in the season as possible, as it is not advisable to encourage an early growth, which often means a production of infertile flowers. If the weather conditions are favourable, passion vines can also be pruned now, as if cut back hard they will make new growth that will bear an autumn crop of fruit instead of one ripening during the summer.

Grape vines will require careful attention from the time the buds start, and they should be regularly and systematically sprayed from then till the time the fruit is ready to colour with bordeaux mixture, in order to prevent loss by downy mildew or anthracnose.

Where leaf-eating beetles, caterpillars, or other insects are present, the trees or plants on which they are feeding should be sprayed with arsenate of lead. All fruit-fly infested fruit must be gathered and destroyed and on no account be allowed to lie about on the ground, as, if the fly is allowed to breed unchecked at this time of the year, there is very little chance of keeping it in check later in the season.

## THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Where not already completed, the winter spraying with lime-sulphur should be finished as early in the month as possible. Black aphis should be fought wherever it makes its appearance by spraying with a tobacco wash, such as black-leaf forty, as if these very destructive insects are kept well in hand the young growth of flowers, leaves, wood, and fruit will have a chance to develop. Wooly aphis should also be systematically fought wherever present, as once the trees are in leaf it is much more difficult to treat.

The working over of undesirable varieties of fruit trees can be continued. The pruning of grape vines should be done during the month, delaying the work as long as it is safe to do so, as the later the vines are pruned the less chance of their young growth being killed by late frosts. Keep the orchards well worked and free from weeds of all kinds, as the latter not only deplete the soil of moisture but also act as a harbour for many serious pests, such as the Rutherglen bug.

Grape vines should be swabbed with the sulphuric acid solution, mentioned in the Notes for August, when the buds begin to swell and just before they burst, as a protection against black spot and downy mildew.

New vineyards can be set out, and, in order to destroy any fungus spores that may be attached to the cuttings, it is a good plan to dip them in bordeaux mixture before planting. The land for vines should be well and deeply worked, and the cutting should be planted with one eye only out of the ground and one eye at or near the surface of the ground.

In the warmer parts which are suitable for the growth of citrus fruits, the land must be kept well cultivated, and if the trees need irrigating they should be given a good soaking, to be followed by cultivation as soon as the land will carry a horse without packing.

In these parts fruit-fly should be systematically fought, as it will probably make its appearance in late citrus fruits and loquats; and if this crop of flies is destroyed, there will be every chance of the early crops of plums, peaches, and apricots escaping without much loss.

# ASTRONOMICAL DATA FOR QUEENSLAND.

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

## TIMES OF SUNRISE AND SUNSET.

AT WARWICK.

| 1923. | JULY. | | AUGUST. | | SEPTEMBER. | |
|---|---|---|---|---|---|---|
| Date. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·46 | 5·6 | 6·36 | 5·20 | 6·9 | 5·36 |
| 2 | 6·46 | 5·6 | 6·35 | 5·21 | 6·8 | 5·36 |
| 3 | 6·46 | 5·6 | 6·34 | 5·22 | 6·7 | 5·37 |
| 4 | 6·46 | 5·6 | 6·33 | 5·23 | 6·6 | 5·37 |
| 5 | 6·46 | 5·6 | 6·32 | 5·24 | 6·4 | 5·38 |
| 6 | 6·46 | 5·7 | 6·31 | 5·24 | 6·3 | 5·38 |
| 7 | 6·46 | 5·7 | 6·31 | 5·24 | 6·2 | 5·39 |
| 8 | 6·46 | 5·7 | 6·31 | 5·24 | 6·0 | 5·39 |
| 9 | 6·46 | 5·8 | 6·30 | 5·24 | 5·59 | 5·40 |
| 10 | 6·45 | 5·8 | 6·29 | 5·25 | 5·58 | 5·40 |
| 11 | 6·45 | 5·9 | 6·29 | 5·25 | 5·57 | 5·41 |
| 12 | 6·45 | 5·10 | 6·28 | 5·26 | 5·56 | 5·42 |
| 13 | 6·44 | 5·11 | 6·27 | 5·27 | 5·54 | 5·43 |
| 14 | 6·44 | 5·12 | 6·26 | 5·28 | 5·53 | 5·44 |
| 15 | 6·43 | 5·12 | 6·25 | 5·29 | 5·52 | 5·44 |
| 16 | 6·43 | 5·12 | 6·25 | 5·29 | 5·51 | 5·44 |
| 17 | 6·43 | 5·12 | 6·24 | 5·29 | 5·50 | 5·44 |
| 18 | 6·43 | 5·13 | 6·23 | 5·30 | 5·49 | 5·45 |
| 19 | 6·43 | 5·13 | 6·22 | 5·30 | 5·48 | 5·45 |
| 20 | 6·43 | 5·13 | 6·21 | 5·30 | 5·47 | 5·45 |
| 21 | 6·42 | 5·14 | 6·20 | 5·31 | 5·46 | 5·45 |
| 22 | 6·42 | 5·14 | 6·19 | 5·31 | 5·45 | 5·46 |
| 23 | 6·42 | 5·14 | 6·18 | 5·31 | 5·44 | 5·46 |
| 24 | 6·42 | 5·15 | 6·17 | 5·32 | 5·43 | 5·46 |
| 25 | 6·41 | 5·15 | 6·16 | 5·32 | 5·42 | 5·46 |
| 26 | 6·41 | 5·16 | 6·15 | 5·33 | 5·41 | 5·47 |
| 27 | 6·40 | 5·17 | 6·14 | 5·33 | 5·39 | 5·47 |
| 28 | 6·40 | 5·17 | 6·13 | 5·34 | 5·38 | 5·48 |
| 29 | 6·39 | 5·18 | 6·12 | 5·35 | 5·36 | 5·48 |
| 30 | 6·38 | 5·18 | 6·11 | 5·35 | 5·25 | 5·49 |
| 31 | 6·37 | 5·19 | 6·10 | 5·36 | ... | ... |

## PHASES OF THE MOON, OCCULTATIONS, &c.

| | | | |
|---|---|---|---|
| 6 July | ☽ | Last Quarter | 11 56 a.m. |
| 14 „ | ● | New Moon | 10 45 a.m. |
| 21 „ | ☾ | First Quarter | 11 32 a.m. |
| 28 „ | ○ | Full Moon | 8 33 a.m. |

7th July, Apogee, 9·48 p.m.
22nd „ Perigee 11·54 a.m.

| | | | |
|---|---|---|---|
| 5 Aug | ☽ | Last Quarter | 5 22 a.m. |
| 12 „ | ● | New Moon | 9 17 p.m. |
| 19 „ | ☾ | First Quarter | 4 7 p.m. |
| 26 „ | ○ | Full Moon | 8 29 p.m. |

4th Aug. Apogee, 4·24 p.m.
16th „ Perigee, 8·0 p.m.

| | | | |
|---|---|---|---|
| 3 Sept. | ☽ | Last Quarter | 10 47 p.m. |
| 11 „ | ● | New Moon | 6 53 a.m. |
| 17 „ | ☾ | First Quarter | 10 4 p.m. |
| 25 „ | ○ | Full Moon | 11 16 a.m. |

1st Sept. Apogee, 10·54 a.m.
13th „ Perigee, 8·24 a.m.
29th „ Apogee, 3·24 a.m.

During July the planet Mercury will pass eastwards, apparently from the constellation Taurus, through Gemini and Cancer into Leo. Venus will also appa ently pass from Taurus through Gemini into Cancer, Mars from Gemini into Cancer. Jupiter will seem to move only about one degree eastward in Libra, while Saturn will apparently move about a degree and a half further east amongst the stars of Virgo.

From 1st August to 30th September Mercury and Venus will apparently move on through Leo into Virgo, and Mars from the eastern part of Cancer to that of Leo. Jupiter will apparently move only about eight degrees further east in Libra, and Saturn about five and a half degrees in Virgo.

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A partial eclipse of the moon, visible in Queensland, will take place about 9 o'clock in the evening of 26th August.

A total eclipse of the sun will take place a fortnight later, visible only in the North Pacific, Central America and Gulf of Mexico.

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For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter, and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises 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.