

1901.

QUEENSLAND.

ANNUAL REPORTS OF THE DIRECTOR OF THE  
BUREAU OF SUGAR EXPERIMENT STATIONS.

(“THE SUGAR EXPERIMENT STATIONS ACT OF 1900.”)

Presented to both Houses of Parliament by Command.

TO THE HONOURABLE THE SECRETARY FOR AGRICULTURE, BRISBANE.

Bureau of Sugar Experiment Stations,  
Bundaberg, 12th December, 1901.

SIR,—I have the honour to submit to you a brief and summary Report of the initial work of the Sugar Experiment Stations during the past year.

This report has been delayed by reason of occupation with matters in connection with the Commonwealth Government, the greater part of the time during the past several months having been placed under requisition by the Federal Prime Minister, by arrangement with the Chief of the Queensland Government.

I have, &c.,  
WALTER MAXWELL, Director.

REPORT.

The Bureau of Sugar Experiment Stations, established by the Act designated “*The Sugar Experiment Stations Act of 1900*,” commenced operations on 1st November, 1900.

According to plans previously formed, it was decided to resolve into and consider the sugar areas of Queensland within three districts—viz., Bundaberg, including all sugar localities south of Mackay; the Mackay district; and the Cairns district, including all localities north of Mackay.

In Mackay an Experiment Station, with laboratory attached, was already in existence, and it was decided to make an immediate and full use of that station and laboratory until other laboratories determined upon could be built and put into operation. Consequently, the first assistant chemist, with one junior assistant, were established in the Mackay laboratory, and soil examinations were immediately begun. The next step was to build central laboratories in Bundaberg, where it was intended that the whole work of the chemical and other examinations should be carried on. The main purpose of this centralisation of the laboratory work is to have the whole operations under one control, and thus to lessen the cost of the same. To distribute the scientific work among the three districts, by establishing laboratories and locating staffs in each, would double the cost of the work.

An outline of the new laboratory requirements was placed by the Director in the hands of the Works Department, whereupon plans were drawn for the building of the central laboratories in Bundaberg. The buildings were completed, approved, and handed over ready for occupation about the end of August, when the two chemists, who were engaged at Mackay, were transferred to Bundaberg, and a third chemist appointed, and the chemical work began in the new building on 1st September of this year, 1901.

SOIL EXAMINATIONS.

The work of the laboratory, so far, has been chiefly devoted to soil analyses and examinations.

In the first place, the Director, or his first assistant, Mr. Firman Thompson, went round the district of Mackay, and examined the lands, and took typical samples of the soil found within that district. Altogether some 300 sub-samples were taken, these being reduced to 102 samples for examination. Very exhaustive analyses are being made, and by two distinct methods; the first method having for its purpose the determination of the total amount of the elements contained in the soil that are

required for plant food, and the second method having to indicate the proportions of those elements that are immediately ready for the use of the cane crop. Up to the present date, the actual analytical work done includes:—

- 40 complete agricultural analyses
- 90 analyses by Maxwell's aspartic acid method
- 95 analyses of Humus
- 99 analyses of nitrogen bodies
- 99 general mechanical analyses
- 37 analyses of manures and waters
- 75 analyses of canes.

All analyses are made in duplicate, and certain delicate determinations in triplicate.

The result of the soil examinations will be published fully in a following report. It may be said, now, however, that these results will be of the highest value, and will afford the most reliable guide in the highly important matter of deciding upon the manures required by each kind of soil and by the cane crop.

In addition to the examination of the land and obtaining of samples of soil in the Mackay district, the Northern district of Cairns has also been visited by the Director, accompanied by Junior Assistant Anderson. Samples of soil were taken of the Herbert, Johnstone, Mulgrave, and Mosman River lands; the total number of sub-samples amounting to 507, and the actual samples for analysis being 169. These soil samples, when the analyses are completed, will give the Director a very general knowledge of the nature of the soils in those respective localities, and will at once enable him to base recommendations of manures upon the known requirements of the soil. The analyses of the Cairns district soils are now being entered upon in the Bundaberg laboratory. In this place it may be stated, for the information of the farmers, that it is not advisable for samples of soil to be taken without instruction, since such samples may not fairly represent the soil that the farmer is asking advice upon. The object of the Director in taking Assistant Anderson with him was that the samples should be taken where the Director advised, and by Mr. Anderson under the Director's instructions, the samples being thoroughly sun-dried before shipment to Bundaberg, a very necessary condition. The laboratory is analysing only such soils as are taken by its officials, and no special charge is being made.

#### EXPERIMENT STATIONS.

In addition to the establishment of laboratories for the analysing of soils, manures, and any other products belonging to the sugar industry, the general plan of the Sugar Experiment Stations Bureau, included the establishment of stations for field experimental work, including experiments with manures, with different modes of cultivation, in testing of the relative value of different varieties of cane, in irrigation, and in all other matters belonging to and concerning the industry. It was not possible however, to have everything begun during the first year's operations. As has already been explained, attention was first given to the building of laboratories, and to the examination of soils, thus furnishing the director with the information necessary for him to give direct advice to the farmers.

One other reason for not having pushed the work of locating and establishing experimental centres was the uncertainty apparently attaching to the future of the industry, especially in the Northern districts, in view of prospective legislation. To build a laboratory, and to establish a station, with the necessary staff, in the district of Cairns, would have involved an outlay without guarantee of a corresponding value being derived therefrom. The Director, therefore, instead of locating and conducting three chief experimental stations, including one at Bundaberg, the existing one at Mackay, and a further one in or near Cairns, decided to locate an experimental field on a small scale in each of the important sugar sub-districts. As a matter of fact, the land for such experimental work was selected by the Director at Halifax, on the Herbert River; and a second one has been decided on at Ripple Creek in the same district. Arrangements have been made for another small station on the Johnstone River, near Geraldton; also one on the Mulgrave River, in the neighbourhood of the Mulgrave Central Mill; and another further North, on the Mosman River, near the Mosman Central Mill.

The farmers in the localities named, and visited by the Director, interested themselves in this scheme of small experimental fields, and an arrangement was entered into whereby they (the farmers) undertook to find the land, horse and manual labour, and strictly carry out the instructions laid down as to cultivation and manuring; the Sugar Bureau, on its part, agreeing to furnish any special implements that might be required, such as subsoil ploughs, lime, and all artificial manures to be used in the experiments. The farmer who was selected, and who undertook to carry out the experiments, was to receive the value of any additional crop that resulted from better cultivation, and from the use of manures, as compensation for his extra labour.

Two more such small experimental fields have been started in the district of Bundaberg, and it is intended that wherever cane farmers in any locality exhibit a pronounced wish for such experimentation, further small experimental fields will be located.

It has already been stated that an experimental station was in existence at Mackay previous to the passing of the Sugar Experiment Stations Act, under which the present work is being administered. A year ago the Mackay Station was included within the work undertaken by the Bureau of Experiment Stations, and was handed over by the late Hon. J. V. Chataway, Secretary for Agriculture, to the care of the Director. The Mackay Station had conducted experiments along general nursery lines, also making tests of varieties of cane, the results of which have been made known through reports submitted to the Department of Agriculture. It is intended to continue any general nursery experiments that may appear to be of value to the State.

The main purpose and work of the Mackay Station, however, will be experimentation along the lines of sugar production, which will include methods of cultivation, manuring, and irrigation tests, and also the introduction and determination of the value of different varieties of cane, and a selection of special varieties for special localities in respect of the nature of the soil and climatic conditions of such localities.

A year ago, when the Director took charge of the Mackay Station, the varieties of cane under growth were exclusively such as had been introduced from New Guinea, of which there were some seventy different kinds. The condition of those varieties when the Director first visited the station was extremely unpromising, which was in a large measure due to the extreme drought that had prevailed. The cane of some of the varieties was in a dying state, and such as showed more life had made very little growth, and the promise of a crop was in the highest degree unfavourable.

The cultivation, however, was changed, and certain special mixtures of manures were applied, these manures being composed of the most vital manurial elements, and in a state immediately available for the use of the cane. Fortunately, good rains set in at the time of the application of the manure, the rain continuing in abundance through the growing season, the result being that an immediate growth began which continued, and at a rate that the Director had never observed, even in countries such as Hawaii. Between January 1st and June a growth had been made which was simply astounding, the cane which at the end of December did not show one joint, and was actually dying out, having developed so as to yield a crop of a very notable character. In the month of August the whole of these seventy varieties of cane were cut, weighed, and analysed by Mr. H. T. Easterby, Assistant Director of the Mackay Station, and Mr. Firman Thompson, First Assistant Chemist, and the weight of cane and the weight of sugar produced per acre by each variety determined. It is necessary, however, to repeat the experiments before making a full publication of the behaviour of each variety, as it does not do to draw conclusions from single tests, especially if these are made on a small scale. Nevertheless, these determinations of the value of the different New Guinea varieties as sugar-producing canes indicate variations between very wide extremes. One variety gave less than 12 tons of cane per acre, while another gave between 60 and 70 tons, under the same conditions of cultivation and manuring. We have to consider, however, not only the weight of cane produced, but the sugar content of the cane and the production of sugar per acre. One variety produced only a trifle over 1 ton of sugar per acre, while another actually produced 10 tons of sugar per acre; and fifteen varieties produced over 6 tons of sugar per acre each. When the tests have been repeated, and the relative value of these varieties, and all other introduced varieties, have been more accurately determined, a fully detailed report will be made, and the most promising varieties will be distributed among canegrowers. At this place, however, it may be safely said that this experiment in good cultivation, and with manures adapted to the nature of the soil and to the crop, at the Mackay Station during the past year, fully confirms the Director's statement made in his report to the Queensland Government two years ago concerning the possibility of sugar production upon the Queensland soils, if the most modern practices in cane cultivation and in the application of manures are followed.

#### FINANCIAL STATEMENT.

Section 7 of the Sugar Experiment Stations Act provides "that the Minister may in each year make and levy an assessment not exceeding one penny on each ton of sugar-cane received at a sugar-works. Such assessment shall be paid to the Minister in the first instance by the owner of every sugar-works upon the actual number of tons of sugar-cane received during the season, with respect to which notice of assessment has been given as hereinafter provided. But such assessment shall be paid and borne by the owner of the sugar-works and the grower of the cane, respectively, in equal proportions of not exceeding one half-penny for every ton of such sugar-cane so received."

It thus became necessary to establish an exact means of ascertaining the weight of cane delivered at each mill, and in order to do this it was further provided by the Regulations under the Sugar Experiment Stations Act that a system of inspection should be carried out under the authority of the Director of Experiment Stations. The Director, therefore, appointed an inspector to examine the weighbridges in use by each of the mills. The gentleman appointed to this office was Mr. R. W. McCulloch, who was selected on account of his office under "The Sugar Works Guarantee Acts of 1893-95," and also because of his familiarity with the operations of the Queensland sugar-mills in general. Moreover, by combining the functions of two offices in the one officer, the cost of the inspection is notably reduced. Notices were issued by the Director to the managing officers of all sugar-mills, according to the requirements of the Sugar Experiment Stations Act, viz. :—

"You are hereby notified that, by the authority vested in him by the above Act, the Minister has fixed the assessment to be paid by all sugar-works during the coming season at 1d. per ton of cane."

The Inspector of Weighbridges was instructed to visit each mill, examine its weighbridge, and to report, according to the following form contained in the Regulations of the Act.

#### FORM C.

"The Sugar Experiment Stations Act of 1900."

#### INSPECTOR'S CERTIFICATE.

I, \_\_\_\_\_ hereby certify that I have examined and tested the weighbridge at \_\_\_\_\_  
sugar-works in the \_\_\_\_\_ district, and found it to be \_\_\_\_\_ (And I further certify that up to  
and including the \_\_\_\_\_ day of \_\_\_\_\_ 19 \_\_\_\_\_ tons of cane had been received at the  
above works.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 19 \_\_\_\_\_

Inspector.

The inspector will be further required to visit each mill at the conclusion of the crushing season, and to inspect the book containing the entries of weights of cane received, and to report to the Director of the Sugar Bureau upon the same, according to Form D under the Regulations of the Act, namely:—

## FORM D.

## "The Sugar Experiment Stations Act of 1900."

INSPECTOR'S CERTIFICATE OF CANE RECEIVED AT WORKS.  
I, \_\_\_\_\_, hereby certify that I have examined and checked the books and documents of the \_\_\_\_\_ sugar-works in the \_\_\_\_\_ district, and certify that the amount of sugar-cane received at these works for the season ending \_\_\_\_\_, 19\_\_\_\_, was \_\_\_\_\_ tons, and in accordance with the return furnished by the owner thereof on the \_\_\_\_\_, 19\_\_\_\_, and that the sum of £ \_\_\_\_\_ is the assessment payable by such owner under the provisions of the above Act.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_.

The examination of weighbridges has already been made by the inspector, who reports to the Director as follows:—

Number of mills visited	...	...	...	...	...	...	...	...	60
Number of weighbridges—									
Examined	...	...	...	...	...	...	...	...	83
In correct adjustment	...	...	...	...	...	...	...	...	36
Showing overweights	...	...	...	...	...	...	...	...	31
Showing underweights	...	...	...	...	...	...	...	...	11
Mills not working, cane going elsewhere this season	...	...	...	...	...	...	...	...	5
Number of mills without weighbridges	...	...	...	...	...	...	...	...	Nil.

From the figures given it will be seen that the greater number of the weighbridges are in correct adjustment. It is further seen that a large number are giving overweights, and a relatively small number underweights. Consequently it appears that the canegrower in general, but with notable exceptions, has been receiving an advantage from the scales in their present condition.

The Director will issue notices to all mills requiring such notice, calling attention to the condition of their weighbridges, and requesting that all such out of adjustment shall be readjusted in the interests of the canegrower and also of the mill. It will be urged that each mill shall provide standard check weights for the use of the Weighbridge Inspector during his visit, and also in order that the mill management itself can at frequent intervals test the weighing machinery.

Under the system of inspection required by the Sugar Experiment Stations Act, a very correct basis will be attained for the levying of assessment upon the tonnage received by the mill, and a guarantee will also be furnished to the canegrower that the cane supplied is correctly weighed and accounted for; in fact, the Director is quite sure that so soon as the requirements of the Sugar Experiment Stations Act are in full operation a more complete control of the product of the Queensland sugar industry will be possible than exists in any other cane-sugar country.

The outline of the work of the Bureau of Sugar Experiment Stations submitted by the Director to the late Secretary for Agriculture, the Hon. J. V. Chataway, caused the Minister to provide for an

Estimated annual expenditure of	...	...	...	£	s.	d.
				8,000	0	0

The actual expenditure for the year from November 1st, 1900, to October 31st, 1901, was as follows:—

Salaries	...	...	...	...	...	£	s.	d.
Wages	...	...	...	...	...	3,893	1	7
Travelling expenses	...	...	...	...	...	354	7	6
Laboratory equipments	...	...	...	...	...	436	5	3
Office	...	...	...	...	...	553	16	6
Goods purchased	...	...	...	...	...	186	2	9
Miscellaneous expenses	...	...	...	...	...	158	3	8
						177	12	0

Total expenditure for year	...	...	...	£5,759	9	3
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The item of travelling expenses, in addition to the regular expenses, includes the cost of bringing two officers from foreign countries, and other assistants from distant parts of Australia.

The items "laboratory equipments" and "office equipments" include initial outlays incident to the establishment of new institutions, the greater part of which are permanent, and will not require renewal. One-fourth of the amounts given under these two items will be ample as annual expenditures to maintain the institution henceforth in running order.

As provided by the Sugar Experiment Stations Act, the funds for meeting expenditure are obtained, in one part, by assessments levied upon cane grown and delivered at the mills, one-half of the assessment being payable by the canegrower, and one-half by the manufacturer. The other equal part of the funds is furnished by the Government, which gives £1 for each £1 obtained by assessment from the cane producers.

It is not yet known what the total amount of revenue derivable from the assessment on cane delivered at the mills will amount to for the current year, as the crushing season is not done, and the returns have not been received in full. The amount received from assessments on cane up to the present date, 12th December, with some small items of revenue from other sources, are given as follows:—

	£	s.	d.
Revenue received from an assessment of 1d. per ton upon 627,937 tons of cane	2,612	13	1
Revenue derived from the sale of 1½ acres of cane, or 40 tons 14 cwt. 2 qr. at 13s. 9d. per ton, to W. Hyne and Co., Mackay	28	0	0
Revenue from analysis of lime for outside client	3	0	0

Total receipts to date, 12th December	...	£2,643	13	1
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The Director wishes to express his great gratification with the manner in which the canegrowers and the management of the mills have assisted in carrying out the provisions of the Sugar Experiment Stations Act. Not only have the farmers and mill managers very generally entered into and aided the Director in all questions of the field and of the mill with which he is engaged, the statement of moneys received from assessments indicates the general readiness to furnish funds for carrying on the work. The assessments are not necessarily payable until the month of January, yet it is seen that more than £2,600 are already in the hands of the Treasurer.

The immediate future work of the Experiment Station will comprise the continuance of soil analyses and examinations in the laboratories, where additional assistants will be engaged. It is expected that the number of samples of manures sent in for examination will constantly increase, as the Director, on the one hand, is endeavouring to get the farmers to buy just such mixtures of manure as their respective soils and the cane crop actually require; and, on the other hand, he is urging buyers not to accept manures without analysis, nor without a guarantee that they contain what was ordered, and has to be paid for.

The Director expects to be able to give much more time to farm inspection, and to meeting the canegrowers and talking over questions with them in their respective localities. His plans for out-door inspection during the past year have been very greatly interrupted by reason of the claims made upon him by the Federal Prime Minister and by the Queensland Prime Minister in connection with current legislation.

Attention will now be given to more definite experimentation in the field and in the localities and districts that have already been mentioned. The Director is of opinion that, under the operation of the local Sugar Experiment Stations Act, combined with what is likely to be the action of the technical sugar provisions of the Federal Tariff Bill, the relative positions of the canegrowers and of the manufacturers will be put upon a satisfactory basis. Several attempts have been made by canegrowers and by mills to get the Experiment Station to settle disputes that have arisen, chiefly concerning the value of the cane. The Experiment Station has uniformly declined to do so. First, because a third party could not come in without the consent of both the contracting parties, and further, because it is not possible to furnish analyses that represent the natural and true value if the cane has been shipped and handled several days since the date of cutting. Analyses, under such conditions, only mislead and accentuate error. Also a few manufacturers of raw sugars have appealed to the Experiment Station for analyses of their sugars in order to see whether the refineries were making correct returns. In every case the application has been refused, and for the reason that the sugars were sold under agreement, *subject to the control analyses of the refineries*, under which contracts no third party could come in excepting by request of both contracting parties. The justice of the action of the Experiment Station is being conceded, and it is also being observed that the Sugar Bureau is conducted upon every-day business principles and along lines of common fairness all round.

Price 5s.]

By Authority of GEORGE ARTHUR VAUGHAN, Acting Government Printer, Wellington Street, Brisbane.