

CEYLON.



SESSIONAL PAPER X.—1937.

Report and Accounts of
the Coconut Research
Scheme for 1936.

APRIL, 1937.

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1937.

CEYLON SESSIONAL PAPERS, 1937.

Mr. S. Ramanathan left the service of the Scheme on August 20, to take up appointment as Instructor in Chemistry at the Technical College, Colombo. The vacancy had not been filled at the end of the year, the selected candidate, Mr. T. Mylvaganam, B.Sc., taking up duties on January 4, 1937.

Mr. P. J. Nonis has held the post of Estate Superintendent throughout the year. The secretarial and accounting work has been carried out as usual at Bandirippuwa estate under the supervision of the Officiating Chief Technical Officer until August 13, and since then under the supervision of the Director of Research.

TECHNICAL WORK.

I. *Technological Chemist.*—The work of this Department has necessarily been somewhat held up during 1936, owing to Dr. Child's absence on leave until August 14 and the lack of a Technical Assistant after Mr. Ramanathan's departure in August, the vacancy not having been filled by the end of the year.

(i.) *Ceylon Estate Copra.*—The investigation referred to in paragraph 1 (vi.) of last year's report has been completed. Analyses were carried out on 52 samples of Ceylon Estate Copra, 48 of which were sent at regular intervals by estates in widely different parts of Ceylon. No significant differences in composition (in particular the oil content) are observed between samples from different districts, or between samples from nuts picked at different seasons. The average composition of Ceylon Estate Copra, based on these analyses, is: Moisture 6.8 per cent., Oil 63.7 per cent., Oil (dry basis) 68.3 per cent. Constants of the Oil: Iodine Value 8.16, Saponification Value 259.1, Free fatty acid below 0.1 per cent. These figures are compared with recorded figures for Malayan Estate Copra, which averaged Moisture 6.9 per cent., Oil (dry basis) 65.6 per cent. There seems little need to recommend more stringent drying of Ceylon Estate Copra. The only direction in which improvement is aimed at is in the colour, i.e., preparation of white copra.

A full account of this investigation has been submitted for publication in "The Tropical Agriculturist".

(ii.) *Soap.*—Less work was done on soap during 1936. Five samples of local manufacture were analysed and advice given where necessary. Little of interest attaches to these samples, as they are all similar to those previously described in Bulletin No. 1. Information was supplied to the Inspector-General of Prisons on soap manufacture in the prisons, particularly on the use of Jeyes' fluid in disinfectant soap.

(iii.) *Other Soap-making Oils.* (a) *Margosa Oil.*—The study on this oil referred to in last year's report was written up for publication by Dr. Child whilst in England and appeared in May, 1936. As there is a small export of this oil, the Scheme offered to examine samples for the Marketing Commissioner, and, after analysis, one sample was reported on as satisfactory.

(b) *Mee Oil.*—By courtesy of Professor T. P. Hilditch, Dr. Child carried out a chemical investigation of the seed oil of *Madhuca longifolia* (*Bassia longifolia*) in the Industrial Chemical Laboratories of the University of Liverpool, in February to April, 1936. It is hoped to publish this in 1937.

(c) *Kekuna Oil.*—A paper on the seed oil of *Aleurites moluccana*, embodying work carried out in 1935, is in preparation.

Of these oils, Mee oil is the most likely to be useful in soap-making, in conjunction with coconut oil; margosa oil also is used in soap, partly for its antiseptic properties.

(iv.) *Coir Fibre Dust.*—Work on coir fibre dust was discontinued during 1936. Study of its combination with rubber for flooring and the like has been carried out by the Rubber Research Scheme and attention is drawn to the article by Mr. M. W. Philpott on "Coir as a constituent of rubber flooring materials", which appeared in the First Quarterly Circular of the Rubber Research Scheme, April, 1936.

(v.) *Vinegar.*—Coconut toddy vinegar, as usually sold, is frequently adulterated with acetic acid and water. No analyses had previously been recorded on genuine samples, so that no standard of comparison was available. During 1936, special attention was paid to this and analytical methods worked out. Genuine samples were collected directly from manufacturers' vats, their analyses compared with those of casual samples purchased locally, and it is now possible to lay down criteria for

genuine samples. This information has been passed on to the Excise Department and the Government Analyst, but it is not thought expedient at present to publish the details since it would not be difficult to add adulterants to make sophisticated samples comply with the tests now available.

Advice has been given to some manufacturers. Two or three difficulties seem to be common, (a) a pronounced tendency to turbidity on keeping, which is apparently due to continued growth of acetic bacteria on the surface of the liquid. A method for preventing this has given promising results on a laboratory scale. (b) Occasional appearance of small worms which are or resemble "vinegar eels". Attention to cleanliness of the vats would probably improve this. (c) When the original toddy is of normal strength, the concentration of alcohol in the first fermentation increases rapidly enough to inhibit deleterious bacteria, but if it is diluted, say with rain water in the wet season, trouble is often experienced later by the vinegar more or less putrefying. The remedy is to prevent rain water entering the toddy pots.

(vi.) *Development of the Coconut.*—Work on this study has been continued and formal analyses completed on samples of kernel and husk from nuts of different ages. Analysis of the shell presented some difficulties, particularly cellulose estimation; however, satisfactory methods are available and examination of the shell samples is proceeding, and with their completion this preliminary study will be ready for report.

Coconut Shells.—It has been reported that when coconut shell is steam-distilled an oil of medicinal use, having a commercial value in America, is obtained. No such oil was obtained when finely ground coconut shell was steam-distilled at ordinary pressure in our laboratory.

(vii.) *Advisory.*—Apart from that already referred to, less advisory work involving laboratory work than usual was taken up in 1936. Samples of desiccated coconut were reported on for salt water damage, and for other reasons. Other materials examined included whole copra meal, poonac and a sample of coconut protein from a patented process.

2. *Geneticist.*—(i.) The yield records on individual palms in Geneticist's Block B have been continued. The selected seed palms on this block, from which a portion of the planting material is supplied to customers, continue to yield well. The block was treated with a general mixture when the whole estate was manured in October–November.

(ii.) The "weight of husked nuts—weight of copra" ratio, according to which the weight of copra is taken as being approximately equivalent to 32 per cent. of the weight of husked nuts, has been adopted for calculating copra yields of individual palms in the Soil Chemist's manual experiment, and also for obtaining figures of copra-outturn for the whole estate.

(iii.) The whole series of germination experiments, the results of which were given in previous reports, has been repeated in order to confirm the results.

(iv.) The yield recordings of individual selected palms on estates under private ownership have been continued and a great number of such selections have proved uniformly high-yielders. These may be used as mother palms for future plantations. It is proposed that further selections will be made in 1937, in order to increase the number of proved high yielders recorded under the supervision of the Coconut Research Scheme, to be utilized as guaranteed sources of planting material. Since the original standards adopted in the selection of mother palms have been proved to be satisfactory, it is recommended that all estate owners should have a number of such selected palms on their own properties. The Geneticist will be prepared to help with advice or with personal service in such work.

(v.) The five-acre experimental plantation, mentioned in the 1935 report, has made good progress during 1936. This area is inspected monthly and records are kept on rate of growth, disease and pest infestation, resistance to climatic conditions, &c. A study of petiole colour was made both on the nine mother palms from which seedlings were taken for the plantation and on the seedlings themselves. The area was manured with a general mixture in November–December. A detailed report on this experimental plantation will be included in the Geneticist's Technical Report for 1936.

(vi.) Considerable progress has been made during the year in connection with the acquisition of an area of jungle land for further work on the genetical study of the coconut palm. An application for a portion of crown jungle in the neighbourhood of Madampe was unsuccessful, and a portion of crown jungle in the neighbourhood of Dandagammuwa was found to be unsatisfactory for experimental work with coconuts. Attention was then turned to jungle land in private ownership. Six such areas were visited and reported upon, and it is hoped that one of them will be acquired early in 1937. As stated in previous reports, the work of the Geneticist's department has been seriously handicapped owing to the lack of land for the propagation and study of selected strains.

(vii.) 15,432 selected seed nuts and 3,927 selected seedlings have been sold during the year. The local demand for selected seed nuts and seedlings has increased considerably and many orders could not be accepted. As stated in section iv. above, and since it is expected that the demand for selected planting material will increase still further as time passes, it is proposed to extend the selections on private estates which are under reliable supervision, so that a large number of seed nuts and seedlings guaranteed by the Coconut Research Scheme may be available for distribution.

(viii.) The bibliography of the literature on coconuts has been brought up to the end of the year 1935, and it will be published early in 1937.

(ix.) Sixty-five visits to estates were paid during the year, some of them in an advisory capacity in the company of the Soil Chemist. Advisory correspondence consisted mainly of replies to inquiries regarding nursery management, transplantation, pests and diseases.

3. *Soil Chemist.*—(i.) A year's detailed yield-recording of the Nitrogen-Phosphate-Potash experiment from the time of manuring in November, 1935, was completed with the October pick of 1936. The data will be statistically analysed in due course, but it is not expected that any significant differences due to treatments will be observed during this first year of manuring.

A few trees of Plot No. 11 of this experiment were damaged by lightning towards the end of December, 1936.

All the composite "top" samples taken from the plots were analysed for total exchangeable bases and exchangeable calcium. Four determinations of exchangeable potash were also completed.

(ii.) An investigation into the composition of the butt-ends, petiole and leaflets of coconut fronds has been completed.

(iii.) Considerable progress has been made in an investigation into the composition of bunch stalks with special reference to the strength of bunch stalks in relation to propping and immature nut fall; and also the manurial value of the ash.

(iv.) (a) The *Pueraria javanica* and *Centrosema pubescens* demonstration blocks on the gravelly north portion of the estate were treated in various ways (harrowing, and turning, &c.) and their effects studied on regeneration and die-back of these covers.

(b) Demonstration plots of *Pueraria*, *Centrosema*, *Calapogonium* and mixtures of these were planted under different conditions of manuring, cultivation and seed rates on the sandy portion near the stream. These plots will be used for an investigation into the influence of covers on soil conditions, particularly soil moisture.

(c) Experiments on the germination of green manure seeds were commenced.

(d) The results of the questionnaire on green manures and cover crops issued in 1935-36 were tabulated and a summary of results published.

(v.) One series of plots of the Husk Decomposition Experiment were opened and the root development and decay of husks was studied.

A demonstration experiment on Husk Burying has been nearly completed on the gravelly field in the south-western portion of the estate.

The results of the Husk Ash investigations were published in March.

(vi.) An experiment to study the cause of and soil treatments for the tapering disease of coconuts was planned on an estate in Rajakadalawa in co-operation with the proprietor of the estate.

(vii.) There has been a very large increase in advisory correspondence relating to manuring, cover crops, composts, &c. The number of samples of manures of interest submitted for analysis and report showed however little increase compared to the previous years.

(viii.) Visits were paid to twenty-six estates in connection with advisory work, and several visits in connection with the inspection of jungle blocks for genetic work were also made.

(ix.) During the absence of Dr. Child on leave, the work of the Technological Chemist's laboratory was supervised by the Soil Chemist.

The resignation of Mr. Ramanathan, Technical Assistant to the Technological Chemist, necessitated the Technical Assistant to the Soil Chemist devoting a considerable amount of time to the analysis of copra samples.

4. *Library.*—The most important additions to the library by purchase during 1936 were: a complete set of the "Journal of the Society of Chemical Industry", including "Chemical Abstracts B", 1882 to date; Vols. XXVI. to XXXV., 1906-1910 of the "Tropical Agriculturist". The Scheme now possesses of the latter Journal Vols. I.-VII., XIX, XXVI.-LXXXVII., and is prepared to purchase any or all of the volumes required to complete the set. A set of Thorpe's "Dictionary of Applied Chemistry" (new edition, 7 volumes) has also been purchased.

Among the odd numbers of journals given to the Scheme by the Library Committee of the Ceylon Department of Agriculture and acknowledged in last year's report, were several complete and partly complete unbound volumes of the "Bulletin of the Imperial Institute". By purchase of some missing numbers this has now been made up to a set of volumes IV.-VII., X.-XXI., XXXIII.-XXXIV. (1906-9; 1912-1923; 1935-6). It is proposed to complete this set as far as possible if funds are available.

On December 31, 1936, the library contained 312 books and 503 bound volumes of periodicals. (The latter number includes 79 volumes loaned by the Director of Research.) The corresponding figures on December 31, 1935, were 244 books and 321 bound volumes (including 72 loaned by the Director of Research).

Sixty-six current periodicals, including those loaned by the Technical Staff, were received during the year, as well as a number of periodical Reports from Government Departments, &c., both in Ceylon and overseas. These are acknowledged individually by post, but a general acknowledgment is made here to all those Departments and Institutes which supply their publications gratis.

5. *Publications.*—

M. L. M. Salgado: "Studies on the Coconut Palm III. Coconut Husk: A. The Manurial Value of Coconut Husk Ash." *Tropical Agriculturist*, Vol. LXXXVI., No. 3, March, pp. 131-8.

B. Child & S. Ramanathan: "The Fatty Acids of Margosa Oil". *Journal of the Society of Chemical Industry*, Vol. LV. pp. 124-127 T.

M. L. M. Salgado: "Questionnaire on Cover Crops and Green Manures (in relation to Coconut Cultivation)". *Tropical Agriculturist (Ceylon)*, Vol. LXXXVII., pp. 202-209.

R. Child: "Production of Sugar from Sweet Coconut Toddy", *Ceylon Trade Journal*, Vol. I., p. 410.

W. V. D. Pieris: "Illustrated Guide to Coconuts", pp. ii. + 12 & 50 plates. Price Re. 1.50. (Published by the Coconut Research Scheme.)

R. Child: "Chemical and Agricultural Notes from the Coconut Research Scheme (Ceylon). Introductory & I. Analyses of Some Samples of Maldiva Copra".

M. L. M. Salgado and E. Chinnarasa: "Chemical and Agricultural Notes from the Coconut Research Scheme (Ceylon). II. Note on the Manurial Value of Two Ceylon Sea Weeds", *Tropical Agriculturist (Ceylon)*, Vol. LXXXVII., No. 6, December, 1936, pp. 384-387.

R. Child: "Ceylon Estate Copra", accepted for publication in "*Tropical Agriculturist*", in February, 1937.

Leaflets, &c.—

No. 1. "Seed Selection" b;

No. 3. "Cover Crops suits

published December, 1936.

is, published November, 1936.

Estates", by M. L. M. Salgado,

1937.

Nos. 2 & 4 on Nursery Management and Transplantation respectively by W. V. D. Pieris are ready for publication in 1937, and other leaflets are in course of preparation.

Mr. W. V. D. Pieris wrote the text of the Copra Leaflet issued by the Ceylon Coconut Board, and Dr. R. Child wrote the text of the Propaganda Pamphlet on Desiccated Coconut published by the same body.

6. Lectures—

The following lectures have been given by officers during the year :—

1. "Manurial Experiments in Coconuts" by the Officiating Chief Technical Officer, at the meeting of the Chilaw Planters' Association on April 2, 1936.

2. "Summary of Replies received to the Questionnaire on Green Manures," prepared by the Soil Chemist and read at the meeting of the Chilaw Planters' Association on June 17, by the Officiating Chief Technical Officer.

3. "A Short Review of the activities of the Coconut Research Scheme" by the Geneticist (in the absence of the Director of Research, through illness) at the meeting of the Southern Province Planters' Association on September 19.

4. "Ceylon Estate Copra," by the Director of Research at the meeting of the Chilaw Planters' Association on December 11.

7. Meetings—

The three Senior Officers of the Scheme, continue to be honorary members of the Chilaw and Kurunegala Planters' Associations and they have attended the meetings of these bodies whenever possible.

The Officiating Chief Technical Officer attended 3 meetings of the Board of Management as Secretary, 2 meetings of the Central Board of Agriculture, 1 meeting of the Southern Province Planters' Association, 2 meetings of the Coconut Planters' Joint Committee, and two meetings called in Colombo by the Registrar-General to consider whether Ceylon should take part officially in the Johannesburg and Paris Exhibitions respectively.

The Director of Research has attended 2 meetings of the Board of Management as Secretary, 1 meeting of the Central Board of Agriculture and 1 meeting in Colombo to discuss whether an All-Ceylon Exhibition should be held in 1937 in connection with the Coronation Celebrations.

THE ESTATE.

Following the practice started in the corresponding report last year, the estate finances are considered in two parts; the first relates to the portion of the estate under normal estate management, and the second to that under research management, in which special expenditure is incurred outside ordinary routine.

The crops harvested in 1936 were as follows :—

	Nuts from Blocks under Estate Management.	Nuts from Blocks under Research Management.	Total Number of Nuts.
1st Crop ..	38,804	7,770	46,574
2nd Crop ..	80,702	17,978	98,680
3rd Crop ..	91,158	21,017	112,175
4th Crop ..	91,024	25,626	116,650
5th Crop ..	50,948	13,902	64,850
6th Crop ..	49,533	13,675	63,208
	402,169	99,968	502,137

The average yield per acre (total area 152 acres 2 roods and 9 perches) was 2,887 and per bearing palm (9,393) 51.8. Corresponding figures for previous years were—

Year.	Number of Nuts.	Per Acre.	Per Palm.
1931 ..	583,155	3,887	59.2
1932 ..	447,191	2,981	49.7
1933 ..	632,106	4,143	59.2
1934 ..	575,755	3,774	59.2
1935 ..	54	3,564	59.2

I.—RECEIPTS.

2. The total revenue received during the year amounted to Rs. 93,068. It exceeded the estimate of Rs. 85,020 by Rs. 8,048 but fell below the revenue of the previous year by Rs. 3,898.

3. *Cess Collections.*—The total receipts on account of cess collections during the year amounted to Rs. 38,313 as compared with Rs. 47,555 received during the previous year. The receipts in 1936 include a sum of Rs. 3,044 which represents the amount of the cess recovered in respect of 1935 paid into revenue during the year but do not include the collections made by the Treasury during December, 1936, amounting to Rs. 1,788 which were credited to revenue in January, 1937. The amounts received on this account have been compared and found to agree with the corresponding figures in the Treasury books.

4. The following is a statement of the receipts on account of the cess collected each year since 1931 :—

		Rs.			Rs.
1931	..	55,252	1934	..	66,327
1932	..	42,255	1935	..	47,555
1933	..	47,993	1936	..	38,313

The decrease in the collections for 1936 is due to the drop in the exports of desiccated nuts, fresh coconuts and coconut oil.

5. *Grants—Rs. 30,000:* This amount represents the annual grant received from Government under section 6 (i.) (b) of Ordinance No. 29 of 1928 for the financial year 1935–1936.

II.—PAYMENTS.

6. The details of expenditure are shown in the Statement of Payments. The whole of this expenditure was checked with the supporting vouchers. The total expenditure incurred during the year exclusive of capital expenditure was Rs. 78,228 as compared with Rs. 70,821 of the previous year. This sum includes Rs. 14,443 transferred to the Reserve Account for depreciation of buildings, plant, &c. The amount spent on Capital Works during the year was Rs. 10,282.

7. The following is a comparison between the original estimate and the expenditure incurred during the year :—

Account.	Estimated.	Actual.	Excess.	Supplementary.
	Rs. e.	Rs. e.	Rs. c.	Rs. e.
A.—Capital :				
<i>Buildings—</i>				
Jungle area for nursery work ..	10,000 0 ..	— ..	— ..	— ..
Weighing machine shed ..	— ..	282 71 ..	282 71 ..	282 ..
Concrete barboque ..	— ..	590 22 ..	590 22 ..	600 ..
Cattle shed ..	— ..	1,179 21 ..	1,179 21 ..	1,200 ..
Equipment of laboratory ..	1,500 0 ..	1,816 36 ..	316 36 ..	850 ..
Additional electric installation ..	— ..	6,413 55 ..	6,413 55 ..	— ..
B.—Personal Emoluments :				
Salaries of senior staff ..	24,538 0 ..	24,838 85 ..	300 85 ..	300 ..
Salaries of junior staff ..	11,674 0 ..	11,015 55 ..	— ..	— ..
Provident fund contribution and interest ..	2,000 0 ..	1,990 51 ..	— ..	— ..
Rent allowance ..	377 0 ..	285 61 ..	— ..	— ..
C.—Other Charges :				
Travelling expenses of staff ..	2,500 0 ..	2,152 93 ..	— ..	— ..
Travelling expenses of Board Members ..	750 0 ..	496 50 ..	— ..	— ..
D.—Office :				
Stationery ..	700 0 ..	640 72 ..	— ..	— ..
Postages ..	500 0 ..	494 58 ..	— ..	— ..
Printing and advertising ..	1,200 0 ..	2,267 25 ..	1,067 25 ..	1,067 ..
Incidental expenses ..	750 0 ..	840 24 ..	90 24 ..	— ..
Legal expenses ..	— ..	53 50 ..	53 50 ..	— ..
Telephone ..	420 0 ..	447 55 ..	27 55 ..	— ..

COCONUT RESEARCH SCHEME.

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Account	Estimated. Rs. c.	Actual. Rs. c.	Excess. Rs. c.	Supplementary. Rs. c.
E.—Laboratory :				
Upkeep, chemicals, &c.	2,000 0	1,407 41	—	—
Scientific books and periodicals	2,500 0	2,255 9	—	—
F.—Buildings :				
Upkeep	1,000 0	992 32	—	—
Insurance	452 0	450 25	—	—
Running expenses of electric plant	2,000 0	2,982 40	982 40	1,000 0
G.—Estate :				
General charges	1,500 0	1,791 77	291 77	300 0
Upkeep	1,500 0	1,102 13	—	—
Cultivation	5,500 0	4,570 56	—	—
Collection	600 0	472 73	—	—
H.—Research Account :				
General and nursery	1,000 0	812 1	—	—
Manurial experiments	1,500 0	1,416 6	—	—
K.—Reserve for Depreciation				
	14,000 0	14,449 25	449 25	—

8. The excesses under the different items save the following have been approved by the Board of Management :—

	Rs. c.
A.—Capital account—Additional electric installation	6,413 55
J.—Reserve for depreciation	449 25

9. As required by the provisions of section 8 (i) of Ordinance No. 29 of 1928 the original estimates for the year have been tabled in the State Council but a statement of the supplementary provision made by the Board of Management during the year to cover the excesses under the different items has not been so tabled.

10. The following outstanding liabilities in respect of the expenditure during 1935 are not included in these accounts :—

	Rs. c.
Bacteriological Institute for services rendered	95 0
Supply of manure	13 34
Cost of advertisement of publications	11 25
Printing, &c.	72 10
Materials purchased	11 10
Cost of fuel, &c.	69 9
Cost of Audit	382 68

III.—ESTATE WORKING ACCOUNT.

11. The total income earned from the estate and the research blocks during the year amounted to Rs. 21,168 as compared with Rs. 16,078 earned during 1935. Of this income a sum of Rs. 16,118 was derived from the estate and Rs. 5,050 from the research blocks. The cost of maintenance, upkeep, and production of the estate during the year amounted to Rs. 9,737 as compared with Rs. 5,428 in 1935. The profit on working was Rs. 9,203 in 1936 as compared with Rs. 7,593 of the previous year.

IV.—BALANCE SHEET.

Liabilities.

12. *Passage Fund Reserve Account: Rs. 3,986.*—This amount represents the balance lying to the credit of the fund for meeting the cost of passages to officers. No contributions were made to this fund during the year under review.

13. *Provident Fund Account: Rs. 13,729.*—The balance to the credit of this fund at the beginning of the year was Rs. 10,478. The contributions made by the officers during the year amounted to Rs. 1,627 and those made from the funds of the Scheme amounted to Rs. 1,991. Of the amount contributed by the officers Rs. 1,554 represented the bonus equivalent to the sum contributed by the officers during 1935 and Rs. 437 the interest due on the balance of the fund for 1935.

14. *Cash Reserve for Depreciation: Rs. 57,151.*—The balance of this Reserve which stood at Rs. 42,702 at the close of 1935 has been augmented by the transfer of a sum of Rs. 14,449 from revenue to this account. The amount transferred was made up as follows:—

	Rs.	c.
Buildings at 5 per cent. on Rs. 151,951·80	7,597	50
Laboratory structures at 5 per cent. on Rs. 55,126·91	2,756	35
Laboratory equipment at 10 per cent. on Rs. 18,096·52	1,809	65
Gas plant at 10 per cent. on Rs. 2,505·46	250	55
Furniture for bungalows at 10 per cent. on Rs. 3,035·92	303	59
Office furniture and equipment at 10 per cent. on Rs. 1,129·13	112	91
Accumulators at 12½ per cent. on Rs. 12,948·88	1,618	61
	14,449	25

15. *Development Reserve Account: Capital Expenditure—Rs. 475,081.*—This amount represents the total capital expenditure incurred up to the end of 1936. During the year under review the expenditure incurred under this account amounted to Rs. 10,282.

16. *Surplus: Rs. 66,398.*—This amount represents the accumulated surplus of the Scheme at December 31, 1936. The surplus at the commencement of the year under review was Rs. 61,837. The excess of income over expenditure for the year was Rs. 4,561.

Assets.

17. *Land Acquisition: Rs. 187,555.*—This amount represents the purchase price of the Bandiruppuwa Estate.

18. *Buildings: Rs. 176,672.*—This amount represents the total cost of the buildings constructed by the Scheme. During the year under review a weighing machine shed, a concrete barbecue and a cattle shed were constructed at a cost of Rs. 2,052. The provision so far made for depreciation of this asset amounts to Rs. 32,318.

19. *Laboratory: Rs. 87,010.*—The balance on December 31, 1935, was Rs. 85,194. A sum of Rs. 1,816 has been spent during the year on further equipments to the laboratory bringing the total cost to Rs. 87,010. A sum of Rs. 18,353 has been reserved for the depreciation of this asset.

20. *Gas Plant: Rs. 3,437.*—This sum represents the cost of the gas plant installed for the Scheme. The provision made for the depreciation of this plant amounts to Rs. 1,182.

21. *Furniture for Bungalows: Rs. 4,164.*—This amount represents the purchase price of the furniture supplied to the bungalows of the senior staff of the Scheme. A sum of Rs. 1,432 has so far been reserved for the depreciation of this item.

22. *Office Furniture and Equipment: Rs. 1,500.*—This amount represents the cost price of the furniture and equipment of the Office. No expenditure was incurred on this account during the year under review. The reserve for the depreciation of this asset amounts to Rs. 484.

23. *Accumulators: Rs. 14,712.*—This sum represents the total cost of accumulators installed since the inception of the Scheme. A sum of Rs. 6,414 was spent during the year on the purchase of additional accumulators. The reserve for the depreciation of the accumulators amounts to Rs. 3,382.

24. *Loan to Director of Research: Rs. 2,324.*—This amount represents the balance of the loan of Rs. 3,000 granted to the Director of Research for the purchase of a motor car. The loan is being repaid in instalments with interest.

25. *Cash Balances: Rs. 138,940.*—The receipts in support of the sum of Rs. 100,000 in fixed deposit at the National Bank of India, Limited, Colombo, were seen at the inspection of the Office in January, 1937. The balance in the current account at the National Bank of India, Limited, Colombo, was verified by reference to the bank certificate. The cash in hand on December 31, 1936, was not verified but a surprise verification of cash, &c., in hand was made on January 22, 1937.

V.—GENERAL.

26. The accounts were received quarterly and were examined in this Office. The books and accounts kept at the Office of the Coconut Research Scheme at Bandiruppuwa were inspected on two occasions during the year. A verification of the labour gang and a test check of the inventory balances in addition to the verification of the cash balances in hand at the time were also made at these inspections.

I am, Sir,
Your obedient Servant,
J. JOS. JACOB,
Acting Auditor-General.

COCONUT RESEARCH SCHEME.

Statement of Receipts and Payments for the Year 1936.

RECEIPTS.		PAYMENTS.	
Rs.	c.	Rs.	c.
Receipts Account:		Expenditure Account:	
Annual grant from Government under section 6 (1) (b) of Ordinance No. 29 of 1928 .. 30,000 0		Capital Account:	
Cess collections .. 38,313 34		Buildings: Weighing machine shed .. 282 71	
Interest .. 2,392 10		Concrete barbecue .. 500 22	
Income from Bandiruppuwa estate .. 21,167 97		Cattle shed .. 1,179 31	
Charges to staff for electricity .. 754 73		Equipment of laboratory .. 1,810 36	
Sale of publications .. 27 0		Additional electric installation .. 6,413 55	
Charge for telephone .. 10 5			
Sundry receipts .. 403 13		Personal Emoluments:	
		Salaries: Senior staff .. 24,835 85	
		Junior staff .. 11,015 55	
		Provident Fund contributions for 1935 and interest .. 1,090 51	
		Rent allowance .. 285 61	
		Other Charges:	
Advance Account:		Travelling expenses: Staff .. 2,132 93	
Repayment of loan to Director of Research .. 676 0		Board Members .. 496 50	
Deposit Account:		Office expenses:	
Provident Fund .. 3,617 1		Stationery .. 640 72	
Depreciation reserve account .. 14,449 25		Postage .. 494 58	
		Printing and advertising .. 2,267 25	
		Incidental expenses .. 840 24	
		Legal expenses .. 53 50	
		Telephone .. 447 55	
Balance at January 1, 1936 .. 119,003 17			
		Laboratory:	
		Upkeep, chemicals, &c. .. 1,407 41	
		Scientific books and periodicals .. 2,255 9	
		Buildings:	
		Upkeep of buildings .. 902 32	
		Insurance of buildings .. 450 25	
		Running expenses of electric plant .. 2,982 40	
		Estate:	
		General charges .. 1,791 77	
		Upkeep .. 1,102 13	
		Cultivation .. 4,570 50	
		Collection .. 472 73	
		Research:	
		General and nursery .. 812 1	
		Manual experiments .. 1,416 6	
		Reserve for Depreciation Fund .. 14,449 25	
		Advance account:	
		Loan to Director of Research .. 3,000 0	
		Deposit account:	
		Provident Fund: Refund of Contributions .. 306 5	
		Balance at December 31, 1936:	
		In fixed deposit at bank .. 100,000 0	
		In current account at bank .. 38,881 27	
		Cash in hand .. 58 01	
		230,813 75	
		230,813 75	

Checked and found correct:
J. JOS. JACOB,
Acting Auditor-General.
Audit Office,
Colombo, January 29, 1937.

E. RODRIGO,
Chairman, Board of Management, Coconut Research Scheme.
Peradeniya, February 4, 1937.

CEYLON SESSIONAL PAPERS, 1937.

COCONUT RESEARCH SCHEME.

Estate Working Account for the Year ended December 31, 1936.

Dr.	Rs. c.	Rs. c.	Cr.	Rs. c.	Rs. c.
<i>To Estate Expenditure:</i>			<i>By Sale of Produce:</i>		
General charges ..	3,591 77		(a) Estate:		
Upkeep ..	1,102 14		Nuts ..	12,047 92	
Cultivation ..	4,570 56		Copra ..	3,496 84	
Collection ..	472 73	9,737 19			
			Copra from rejections ..	15,544 76	
			Leaf butts, husks, &c. ..	167 45	
				405 97	
					16,118 18
<i>Research Expenses I.:</i>			(b) Research:		
General and nursery ..	812 1		Copra from experiments ..	2,733 24	
<i>Research Expenses II.:</i>			Sale of husks and charcoal ..	199 88	
Manuerial experiments ..	1,416 6	3,228 7	Seed nuts and seedlings ..	2,176 67	
Profit on working ..		9,292 71			6,019 79
					21,167 97
					21,167 97

Balance Sheet as at December 31, 1936.

LIABILITIES.	Rs. c.	Rs. c.	ASSETS.	Rs. c.	Rs. c.
Passage Fund Reserve Account		3,085 86	<i>Land Acquisition:</i>		
<i>Provident Fund Account:</i>			Purchase price of Bandrippawa		
As per balance sheet, December			estate as per balance sheet,		
31, 1935 ..	10,478 34		December 31, 1935 ..		187,354 68
Receipts in 1936 ..	3,617 1		<i>Buildings:</i>		
			As per balance sheet, December		
	14,095 35		31, 1935 ..	174,619 81	
Less refund of contributions			Additions in 1936 ..	2,052 14	
in 1936 ..	366 5	13,729 30			176,671 95
<i>Cash Reserve for Depreciation:</i>			<i>Laboratory:</i>		
As per balance sheet, December			As per balance sheet, December		
31, 1935 ..	42,701 56		31, 1935 ..	85,194 1	
Reserved in 1936 ..	14,449 25	57,150 81	Additions in 1936 ..	1,818 36	
					87,012 37
<i>Development Reserve Account—</i>			Gas plant ..		3,436 82
<i>Capital Expenditure:</i>			Furniture for bungalows ..		4,164 49
As per balance sheet, December			Office furniture and equipment ..		1,500 37
31, 1935 ..	464,768 81		<i>Accumulators:</i>		
Addition in 1936 ..	19,232 5	475,000 86	As per balance sheet, December		
			31, 1935 ..	4,298 82	
<i>Surplus Account:</i>			Additions in 1936 ..	6,412 55	
Excess of income over expendi-					14,712 37
ture up to December 31, 1935	61,837 41		Loan to Director of Research ..		2,321 0
			Cash in fixed deposit in the		
			National Bank of India, Ltd.,		
			Colombo ..	100,000 0	
			Cash in current account in the		
			National Bank of India, Ltd.,		
			Colombo ..	28,881 27	
			Cash, &c., in hand ..	58 61	
					139,939 86
					416,214 74
					416,214 74

I hereby certify that the accounts of the Coconut Research Scheme have been audited and that in my opinion the above Balance Sheet correctly sets forth the position of affairs as shown by the books at December 31, 1936.

Audit Office,
Colombo, January 29, 1937.

J. JOS. JACOV,
Acting Auditor-General.