CEYLON

SESSIONAL PAPER I.—1948

Annual Report of the Coconut Research Scheme for 1944

JANUARY, 1948

Printed on the Orders of Government

PRINTED AT THE CEYLON GOVERNMENT PRESS, COLOMBO

To be purchased at the GOVERNMENT RECORD OFFICE, COLOMBO; *price 40 cents*

1948

1——J. N. A 75737-678 (11/47)

"Copy" received : November 11, 1947.

Proof sent : December 19, 1947.

Proof returned : January 10, 1948

Published : January 19, 1948.

COCONUT RESEARCH SCHEME.

ANNUAL REPORT OF THE BOARD OF MANAGEMENT FOR THE YEAR 1944.

(In terms of Section 8 (2) of the Coconut Research Ordinance (Cap. 303)).

Board of Management.

On January 1, 1944, the Board of Management consisted of the following members:—

Chairman: The Acting Director of Agriculture (Mr. E. Rodrigo, C.C.S.).
The Deputy Financial Secretary: (Mr. C. E. Jones, C.C.S.).
The Chairman of the Low-Country Products Association of Ceylon: (Mr. S. Pararajasingham).

Members of the State Council nominated by His Excellency the Governor.	Mr. Dudley S. Senanayake, B.A. Mr. S. Dharmaratnam.
Representatives of the Low-Country Products Association	Mr. C. A. M. de Silva. Sir Wilfred de Soysa.
Representatives of the Planters' Association of Ceylon	Mr. O. B. M. Cheyne. Mr. W. P. H. Dias, J.P.
Representing the Small-holders nominated by His Excellency the Governor.	Mr. G. Panditteseker a, J.P., U.M. Mr. D. D. Karunaratne, J.P.

Mr. L. J. de S. Seneviratne, C.C.S., assumed duties as Acting Director of Agriculture and *ex officio* Chairman of the Board from February 12, 1944.

At the 66th meeting of the Board held on March 20, 1944, Mr. G. Panditte-sekera, the senior member of the Board, moved a vote of appreciation of the services of Mr. E. Rodrigo, C.C.S., as Chairman from March 16, 1936, to February 12, 1944.

Mr. G. Panditteseker a was renominated by His Excellency the Governor as representative of the Small-holders from January 1, 1944.

Mr. S. Pararajasingham was re-elected Chairman of the Low-Country Products Association in March and so continued to be an *ex-officio* member of the Board.

Mr. D. D. Karunaratne, J.P., who represented the Small-holders from September 1, 1935, ceased to be a member of the Board from October 31, 1944. A vote of appreciation on the services rendered to the Board by Mr. D. D. Karunaratne was passed at the 71st meeting of the Board held on January 22, 1945.

Mr. C. A. M. de Silva who represented the Low-Country Products Association from November 1, 1941, to October 31, 1944, was nominated by His Excellency the Governor as a Representative of the Small-holders from November 1, 1944.

Mr. Stanley Dias was nominated by the Low-Country Products Association as its Representative on the Board from November 1, 1944.

The Board of Management held six meetings, one an adjourned meeting, during the year, on March 20, April 27, July 28, September 1 and 18, and October 9. All meetings were held in Colombo.

Six members of the Board visited Ratmalagara and Bandirippuwa estates and the laboratories of the Scheme on August 12, 1944. They also visited, through the courtesy of the Director of Commerce and Industries, the Government Acetic Acid Factory, Madampe, where the Coconut Research Scheme is carrying out certain experiments in co-operation with the staff of the factory.

Committees.

Buildings Sub-Committee.—Personnel: Mr. G. Panditteseker a (Chairman), Mr. O. B. M. Cheyne, and Mr. W. P. H. Dias.

The Committee held one meeting during the year at Bandirippuwa Estate on October 24, 1944.

2. **Staff.—**

Director of Research and Technological Chemist: Dr. R. Child, B.Sc., Ph.D. (Lond.), F.I.C.

Geneticist: Mr. W. V. D. Peiris, M.A. (Cantab.), B.Sc. (Lond.), Dip. Agric. (Cantab.).

Soil Chemist: Dr. M. L. M. Salgado, B.Sc. (Lond.), Ph.D. (Cantab.), Dip. Agric. (Cantab.).

Secretary-Accountant: Mr. S. C. Kahawita, B.Com. (Lond.).

Superintendent of Estates: Mr. P. J. Nonis.

Research Assistant to Technological Chemist: Mr. W. R. N. Nathanael, B.Sc. (Lond.).

Mechanic: Mr. R. Werapermall.

Mr. Y. Elikawela was appointed Technical Assistant to the Soil Chemist from March 20, 1944.

Mr. S. C. Kahawita took up duties as Secretary-Accountant of the Scheme from July 1, 1944.

The Technical Assistant to the Technological Chemist, Mr. W. R. N. Nathanael, B.Sc. (Lond.), was promoted to Research Assistant to the Technological Chemist from January 1, 1945.

The Conductor of Bandirippuwa Estate, Mr. W. D. Frederick, left the service of the Scheme to take up employment as Superintendent of Siyambalape Estate, on November 11.

Mr. W. P. Boteju, Nursery Attendant to the Geneticist, resigned on December 23 at short notice.

Mr. P. J. Nonis, Superintendent of Estates, was transferred to Ratmalagara Estate and Mr. W. Nanayakkara, Conductor in Charge of Ratmalagara Estate, was brought back to Bandirippuwa from September 1.

Dr. R. Child, the Director of Research, was elected President of the Chemical Society of Ceylon for the 1944-45 Session.

3. **Memorandum on the Future of the Coconut Research Scheme.—**

The Draft Memorandum was discussed by the Board at two meetings held on September 1, 1944, and September 18, 1944. The revised and amended Memorandum was approved by the Board at its 70th meeting held on October 9. The Chairman approved the printing of the Memorandum on December 7, 1944, and it was sent to the Printers on December 11, 1944.

4. **Summarised Departmental Reports.—**

A. *Technological Chemist's Department.—*

(i.) *Copra:* (*a*) *Copra from Dwarf Palms.*—The examination of copra from 14 dwarf palms on Bandirippuwa Estate has been completed for six consecutive picks; preliminary results were reported last year. The productivity of dwarf palms shows much more variation throughout the year than does that of tall palms, and further details will be collected for the Geneticist's report next year.

Crop.		Date.	No. of Nuts.	Weight of Copra. lb.	No. of Nuts/Candy.
1943 ..	3 ..	May ..	268 ..	75·83 ..	1,979
	4 ..	July ..	231 ..	61·67 ..	2,098
	5 ..	October ..	138 ..	40·58 ..	1,904
	6 ..	December ..	41 ..	10·19 ..	2,253
1944 ..	1 ..	February ..	30 ..	9·85 ..	1,706
	2 ..	April ..	52 ..	16·56 ..	1,760
			760	214·67	1,982
		Per Palm ..	54·3	15·33	—

It may be taken that a usual out-turn for these dwarf nuts is about 2,000 nuts per candy, which agrees with the finding of H. W. Jack in Malaya (*Malayan Agric., J.* 1924, **12**, 371).

The average oil percentage (dry weight) of 56 samples of dwarf copra was 68.7 per cent. and 41 samples lay between 67.1 and 70.0 per cent. This may be compared with figures for 52 samples of ordinary estate copra from tall palms of Island-wide origin (*Trop. Agric.* (*Ceylon*) 1937, **88**, 137) which averaged 68.3 per cent. oil (dry basis) with 48 between 67.1 and 70.0 per cent. and from 96 samples of tall palm copra from the Bandirippuwa manurial experiment (*Ibid*, 1943, **99**, 203) which averaged 69.3 per cent. (dry basis) with 75 within the range stated. The oil content of copra is affected by the maturity of the nut but varietal differences are not large and manuring and other treatments do not seem to have much effect.

The iodine and saponification values of the oils showed no striking difference from those usual for coconut oil; 14 samples (the first lot) averaged I.V.8.7 and Sap. Val. 256.9.

(*b*) *Copra from Large Variety Nuts.*—Two further samples of San Ramon and Marandique copra were examined with the following results:

Sample.	No. of Halves.	Wt. (Gm.).	Calculated Outturn Nuts per Candy.	Moisture.	Oil Per Cent. (Dry Wt.).
San Ramon	8	1,363	745	7·9	69·2
Marandique	6	1,035	737	6·9	68·4

The outturn of these large Philippine varieties may range between 700 and 750 nuts per candy. The oil content may tend to be slightly lower than usual with ordinary varieties. The composition of the oil is normal.

(*c*) *Chekku Pressing of Copra.*—Samples of oil and of poonac obtained by chekku pressing No. 3 copra were sent by Mr. O. B. M. Cheyne, who had recorded the following crushing figures:

Oil obtained	59·5 per cent.
Poonac	39·9 ,,
Loss (moisture)	0·7 ,,

The oil had moisture 0.7, sediment 0.04, free fatty acid (lauric) 1.7, iodine value 8.8 per cent. The poonac had moisture 12.0, oil 16.7 per cent. The extracted oil had f.f.a 1.2 per cent. (lauric).

The oil if settled and filtered would meet specifications for mill oil, except that it was somewhat off colour. The percentage oil obtained was good and probably represents nearly the maximum obtainable with the country chekku. Expeller poonac from oil machinery not infrequently contains as much as 16 per cent. of oil.

(*d*) *Miscellaneous.*—Three other samples of copra analysed in connection with inquiries presented no special features of interest. One from the Cocos Islands was similar to that reported last year, and had moisture 8.1, oil 64.4, oil (dry weight) 70.0 per cent.

(ii.) *Coconut Water.*—(*a*) A product described as " Hardened Coconut water " (five samples) was sent for report though the Hon. Minister of Agriculture and Lands. The material had moisture 23.4 per cent. and contained 15.6 per cent. of starch; sulphated ash was 15.0 per cent. of which 26.7 per cent. was potash (K_2O). The indications were that the product was derived from coconut water by evaporation and addition of starch. It could not be described as palatable and it was not clear for what purpose the product could be used.

(*b*) In connection with the foregoing it was remarked that the literature information on coconut water was not extensive, and further work was projected. As a preliminary some analyses were recorded on water from the unripe King Coconut (Ran Tembili) at the stage it is used for drinking. Three nuts were examined from Tree No. V.139 (Bandirippuwa).

Nut.	Volume of Water.	Acidity cc. Normal acid/100cc.	Total Solids gms/100cc.	Ash gm/100cc.	K^2O gm/100cc.	Cl. gm/100cc.	Soluble ash per cent. Total Ash.
A	410	0·94	3·68	0·42	0·24	0·15	77·4
B	425	0·76	3·90	0·44	0·22	0·15	82·7
C	445	0·94	3·78	0·43	0·25	0·14	82·4
Mean	427	0·88	3·79	0·43	0·24	0·15	80·9

An investigation of the sugars was commenced and both sucrose and reducing sugars found to be present.

(iii.) *Coconut Shells.*—(*a*) The main investigation during the year was a study of the course of the dry distillation of coconut shells on a commercial scale. Laboratory scale results had previously been reported and summarised in a paper published in 1939 (*Trop. Agric., Ceylon*, 1939, **93**, 195).

At the Government Acetic Acid Factory (with the co-operation of the Departmental officers) samples were collected throughout the distillation of 940 Kilos of shells. The yields of primary products were as follows:

Charcoal	329 Kg.	35·0 per cent.	of shells
Pyroligneous acid	358¼ ,,	38·2 per cent.	,,
Settled tar	52¾ ,,	5·6 per cent.	,,

Acid (crude as acetic)	13·9 per cent. of pyroligneous acid	= 5·18 per cent.	of shells
Wood spirit	2·9 ,,	= 1·09	,,
(including acetone)	0·28 ,,	= 0·11	,,

The distillation took 290 minutes. The following table shows the analytical results on the samples of pyroligneous acid for content of acetic acid and wood spirit.

Sample No.	Time (Mins.) from commencement of Distillation	Volume of Distillate (Litres.) Total at Given Time.	Volume of Distillate (Litres.) Total represented by sample.	Total Acid as acetic per cent. W/V.	Total Acid (as acetic) after distillation per cent. W/V.	Wood Spirit per cent. W/V.
I	20	2·27	2·27	2·5	2·4	0·63
II	35	25·00	22·73	3·6	3·6	0·53
III	48	47·73	22·73	6·3	5·9	0·58
IV	60	71·22	23·49	9·5	9·0	0·81
V	70	93·95	22·73	12·8	12·1	1·29
VI	82	117·44	23·49	15·1	13·2	2·44
VII	91	140·17	22·73	16·1	14·0	2·50
VIII	102	162·90	22·73	17·0	14·5	3·30
IX	112	186·38	23·49	17·8	14·8	3·09
X	122	209·11	22·73	17·8	14·5	3·74
XI	135	231·84	22·73	17·7	14·5	3·84
XII	153	255·33	23·49	17·3	14·8	3·63
XIII	170	278·82	23·49	18·1	15·4	3·64
XIV	190	301·55	22·73	17·8	14·7	4·53
XV	220	325·04	23·49	14·5	12·2	5·00
XVI	290	350·04	25·00	8·9	7·8	5·07
	—	—	350·04 (77 Gallons)	13·9	11·6	2·93

After 220 minutes, there had been collected 92.9 per cent. of the distillate, with 95.5 per cent. of the acetic acid and 87.7 per cent. of the wood spirit recoverable. Continuation of distillation beyond this point would be uneconomic for by-products recovery, but would only be concerned with charcoal quality.

Figures were also recorded for " Acetone ", dissolved tar, " Phenols " in the pyroligneous acid, and for the proportions of settled tar. Detailed results will be published elsewhere.

(*b*) *Coconut Shell Tar.*—4,495 grms. of settled tar from the foregoing study were fractionally distilled in batches of 750 gms. The following fractions were obtained:—

B. Pt. up to 130°C	Aqueous fraction 1,335 gms.	..	29·7 per cent.
B. Pt. 130–230°C	Oil 65 gms. / 1,863 gms. combined 1·4 per cent.		42·9 „
	41·5 „		
	Pitch	..	27·4 „
			100·0

The 1,928 grms. of tar oils were reserved for further investigations. It is known that from this a considerable amount of phenol is recoverable and the material is deserving of fuller investigation than it has yet received.

(*c*) *Furfural from Coconut Shells.*—Coconut shells contain a high proportion (about 30 per cent.) of pentosans and might be expected to be a good starting material for the preparation of furfural. When treated by the method described for corn-cobs as raw material in *Organic Syntheses*, Collective Vol. I. p. 274, however, poor yields of furfural were obtained; apparently, under the conditions used, secondary condensations occur.

(iv.) *Miscellaneous.*—(*a*) A new supply of calcium cyanamide received in January was analysed before application to the NPK Experiment (see Soil Chemist's Report) and found to contain 20.8 per cent. nitrogen.

(*b*) Two samples of shark liver oil were analysed for the Medical Department.

(*c*) Consultative work was done for the services, most of which cannot be reported here. A sample of tung oil submitted was found not to be adulterated but to have deteriorated owing to bad storage. Advice on storage was given.

(v.) *Cost of Production.*—At the request of the Hon. Minister for Labour, Industry and Commerce and with the consent of the Board of Management, in October, the Director of Research took in hand the preparation of a statement on costs of production of coconuts and copra in Ceylon in order to assist the Minister in negotiating with the Secretary of State for the Colonies for an increase in the price for copra paid by the U. K. Ministry of Food. Collection of the information and collating it took up a good deal of time in the last three months of the year.

B. *Department of Genetics.*

(i.) *Bandirippuwa and Ratmalagara Estates.*

(*a*) *Yield Recording and Mother Palms.*—In spite of difficulties with labour and shortage of pickers, routine field observations and yield-recording were continued without a break on Bandirippuwa Estate during the year. This estate contains 121 selected palms, and the number of Grade I seed-bearers (66 palms) has been maintained.

(*b*) *Latin Square Experiment.*—This experimental block, to which reference has been made in previous reports, has now completed its fifth year after transplantation of seedlings. Flowering commenced in 1944 and, in addition to other field observations kept up to that date, the dates of emergence and opening of spathes are also being recorded for individual palms. Thirty-four palms, out of a total of 576 palms making up the block, came into flower in the fifth year, and they developed a total number of 203 spathes. The distribution of flowering and spathe number among the six classes of seedlings under comparison are given in the following Table.

A—Selected seedlings derived from high-yielding palms.
B—Unselected seedlings derived from high yielding palms.
C—Selected seedlings derived from low-yielding palms.
D—Unselected seedlings derived from low-yielding palms.
E—Selected seedlings derived from nuts of estate heaps.
F—Unselected seedlings derived from nuts of estate heaps.

Distribution of Flowering, Emergence and Opening of Spathes.

	Selected Seedlings.				Unselected Seedlings.			
	A	C	E	Total.	B	D	F	Total.
No. of Palms in Flower	7	8	9	24	0	5	5	10
No. of Spathes Emergent	46	53	64	163	0	18	22	40
No. of Spathes open	30	33	43	106	0	9	14	23

It is too early to carry out a statistical analysis of these results, but it will be seen that although there is little to choose between seedlings from selected high-yielders, low-yielders and heap-nuts in relation to early flowering, emergence and opening of spathes, there is a great difference in these respects as between selected and unselected seedlings. The ratios of flowering, emergence of spathes and opening of spathes, respectively, are roughly 2 : 1, 4 : 1, and 5 : 1 in favour of selected seedlings. It should be noted that the term " unselected seedlings" does not connote " rejected seedlings " but seedlings taken wholesale from nurseries without selection. If such selection were carried out, about 50 per cent. of the number of seedlings in the unselected class would fall into the " selected " class.

(c) *Catch-Crops.*—The demonstrational catch-cropping of the Latin Square, as a food-production measure, consisted of the sowing of brown-seeded Bombay Cowpea (*Vigna unguiculata*) between palms (November, 1943) in ploughed and harrowed strips.

As stated in last year's report, this method was unfruitful as the weeds sprang up on the fertile built-up soil of this block and choked the young cow-pea plants. The harvest was, consequently, extremely poor. Leguminous seed-crops can be grown successfully and economically on young coconut plantations after the second maha season after clearing and up to and including the fifth year if ploughs, harrows, seed-drills and hoes are used on the land and, of course, if the rain does not fail as it has done too often in the near past. The chena-cultivator, who shifts his ground after three or four consecutive planting seasons, knows what he is about. (But see last three paragraphs of sub-section II. below.)

The pineapples on the catch-water drain bunds were successfully maintained and were in excellent condition during the year. Flowering commenced and was profuse. A great harvest was gathered in 1945, details regarding which will be given in the report for that year. There is no doubt that pineapples pay in young plantations. They are an easy crop to grow.

(ii.) *Nurseries and Issue of Planting Material.*

The nurseries at Bandirippuwa and Ratmalagara Estates have been maintained and no extensions were found necessary during the year, but it is now becoming clear that the present nurseries are too localized to form convenient centres of supply to coconut growers in all the different coconut areas of the Island, who require seedlings either for replanting senile properties or new planting. It is, therefore, hoped that, in the not too distant future, it will be possible for the Scheme to have a number of other Nursery Centres suitably distributed in the more important coconut districts.

As stated in last year's report, the heavy demand for seed-nuts and seedlings in 1942 was not repeated in 1943, mainly owing to the comparatively smaller area of new land opened up for food production in that year than in the previous year. The issue of planting material in the year under review was, however, maintained at a reasonably high level. 16,706 seed-nuts and 17,959 seedlings were released to growers, representing a minimum area of 440 acres planted under the crop. It is surmised that the demand for planting material would have been considerably greater than what it was, if proprietors had been able to put into effect their normal programmes of work, but 1944 was perhaps the worst year of war, with rising costs and an acute labour shortage, and it is quite likely that much that was planned in all branches of estate management could not be executed by the end of the year. It is known, for instance, that the general costs of new planting and replanting were more than 300 per cent. higher in 1944 than in 1938-39 and the contract price for copra received at that time was not regarded by growers as a sufficient incentive to bringing new land under coconuts or replanting old areas.

Mention was made in last year's report of an attempt to utilize the nursery-beds at Bandirippuwa Estate in off-seasons, in between seasonal plantings of seed-nuts, for the cultivation of brown-seeded Bombay cowpea as a food crop. A previous attempt at growing the white-seeded variety on the nursery-beds at Ratmalagara Estate in 1942 had failed to produce pods and

seeds, although the heavy leafage did, no doubt, enrich the soil. But since the brown-seeded variety had done remarkably well as a food-crop, both under adult coconuts and in new clearings, it was thought that it should do equally well as an " off-season " crop on coconut nurseries.

Roughly one-eighth of an acre was planted on December 15, 1943, in the Bandirippuwa nurseries with 1.2 lb. of seed, which was dibbled at one foot intervals in rows two feet apart. At the end of one month after planting, the crop was clean-weeded and top-dressed with cattle-manure and fibre-dust. Growth and flowering were very rapid thereafter, assisted by unusually showery weather. The first pick of pods was taken on February 15, 1944, exactly two months after planting and five more pickings were done subsequently, the last of them being on April 11, four months after planting. Vegetative growth was profuse and completely covered the ground thereby smothering all weeds and grasses and fresh crops of flowers appeared continuously throughout the period. 91½ measures (160 lb.) of seed (133-fold) were obtained, equivalent to roughly 23 bushels per acre. The residual effects of the cattle-manure and fibre-dust, applied as a top-dressing to the crop, as well as the value of the organic matter and nodule-nitrogen left in the ground by the heavy vegetative growth of the crop must also have been considerable.

The brown-seeded Bombay cowpea must be regarded as a valuable leguminous food-crop superior to green gram both in vegetative growth and yield of seed.

(iii.) *Co-operative Activities.*

(*a*) *Co-operative yield-recording* of selected mother palms on private estates suffered a little setback owing to the shortage of pickers and difficulties of transport which became most acute in the year under review. The extreme helpfulness of estate-owners and Superintendents, however, made it possible to continue this work on 21 estates, 1,613 selected palms being yield-recorded during the year. Yield recording on three estates, involving 68 selected palms had to be suspended until the return of more normal times.

Expansion of co-operative yield-recording on private estates and the consequent increase of the Scheme's seed supply were rendered impossible by the curtailment of travelling owing to petrol rationing.

(*b*) *Experimental Plantation No. 1.*—Attention has been drawn in reports for previous years to this plantation, put down in 1934 and consisting of the total progeny of nine high-yielding mother-palms (292 palms on roughly 5 1/3 acres). By the end of the 5th year after transplantation, 13.3 per cent. of the palms had come into flower and by the end of the 9th year (1944) 100 per cent. were in flower and 99.3 per cent. in bearing. These figures include the original seedlings put down in 1934 as well as a number of later supplies.

Complete summaries of yields per acre and the frequency distributions of palms in relation to their yields have been given for each year up to the end of the 8th year in last year's report. In the 9th year, the yield per bearing palm was 51.7 nuts and per acre 2,807 nuts. In the 10th year, the yield per palm was 53.1 nuts and per acre, 2,907 nuts. Of the 290 palms in bearing in the 10th year, 65 palms or 22.4 per cent. of the total number yielded over 70 nuts per palm, 27 palms over 80 nuts, 12 palms over 90 nuts and 3 palms over 100 nuts.

Although the yield per palm is increasing from year to year in this plantation, the increase from the 9th year (1943) to the 10th year (1944) was disappointing. This has been due to two main reasons. 1943 was a bad rainfall year in the district where this plantation is situated and the palms suffered from leaf-droop and immature nut-fall from August onwards. Droughty conditions were aggravated by the presence of a heavy cover of *Centrosema* and *Calopogonium*, which had been planted in 1937 when the plantation was three years old, in order to keep down the noxious weed-grass, *Cenchrus echinatus*, L. As a weed-smotherer, the cover-crop proved to be most useful, but as time passed and the palms commenced to come into flower, it was found that the cover-crop was affecting the health of the palms and in 1942 it became clear that there was serious competition for soil moisture between the cover-crop

and the palms, leading to excessive leaf-droop and nut-fall, in spite of the annual manuring of the palms and regular treatment of the cover. The cover was harrowed in August and ploughed into the ground in October, 1942, but underwent a complete regeneration from self-sown seed by January, 1943. The regenerated cover formed a perfect carpet which was completely harrowed in January, 1943, but some leaf-droop and immature nut-fall were observed in August-September of that year. Leaf-droop and immature nut-fall were again observed in July and August, 1944, as stated above, and the regenerated cover was kept down by grazing. By the end of that year and in view of the long droughts experienced by the plantation previously, the indication was that the cover should be completely eradicated and husk-burying adopted as a preliminary measure to the possible later re-establishment of the cover. It was also plain that maximum yields from young plantations in dry areas could not be obtained without prompt and extensive propping of bunches.

Once again, we have to express our gratitude to Messrs. H. L. de Mel & Co., Colombo, for their courtesy and generosity in allowing us the use of this block on one of their estates for experimental purposes.

(iv.) *Replantation.*—Interest in the possible necessity for the extensive replantation of senile coconut holdings in the Island was revived as a result of an annual and progressive decline in exports of coconut products, to which attention was drawn by the Director of Research in an address delivered to the Chilaw Planters' Association on June 9, 1944. The urgency of the problem was again emphasised by the Geneticist in a paper read before the same association on August 4, 1944. Subsequently the Board of Management, Coconut Research Scheme, paid some attention to the matter during their discussions on the projected reorganization of the Scheme and it was agreed that a general and Island-wide replantation venture was a matter for Government, but that the Scheme should be prepared to supply all the planting material required.

C. *Soil Chemist's Department.*

(i.) *Field Experiments.*—Six manurial experiments were maintained during the year.

(ii.) *N. P. K. Experiment: Bandirippuwa Estate.*—The ninth year of this experiment was completed in November, 1944. The results for 1944 were very similar to those of the previous years, except that the potash response was even more marked.

(*a*) The yield data for 1944 are as follows:—

	Lb. Copra Per Acre.	Calculated as Percentage.
N_0	1,718	100
N_1	1,794	104·42
N_2	1,723	100·29
P_0	1,786	100
P_1	1,694	94·85
P_2	1,734	97·09
K_0	1,442	100
K_1	1,804*	125·10
K_2	1,989*	139·93

* Significant at P· 01 ; General mean = 1,745 ;
Significant difference = 140 lb. per acre.

(*b*) For the nine years since the first manuring the mean yields are as follows:—

	Lb. per acre.	Calculated as Percentage.
N_0	1,733	100
N_1	1,842	106·29
N_2	1,815	104·73
P_0	1,816	100
P_1	1,759	96·86
P_2	1,811	99·72
K_0	1,665	100
K_1	1,823	109·49
K_2	1,902	114·23

(c) The progressive increase of yield due to potash manuring is shown below calculated as lbs. copra per acre.

Year.		(K_1-K_0)	(K_2-K_0)
I 1936	..	26 ..	50
II 1937	..	47 ..	80
III 1938	..	47 ..	114*
IV 1939	..	28 ..	120*
V 1940	..	190* ..	249†
VI 1941	..	122† ..	196†
VII 1942	..	352† ..	470†
VIII 1943	..	300† ..	407†
IX 1944	..	362† ..	546†
Total 9 years		1,474	2,232
Mean/Annum		163	248

* Significant at P·05 ; † Significant at P·01

(d) *Influence of Manuring on Copra Outturns.*—Eight year's data have been examined to determine the influence of manuring on copra outturns, from which the following conclusions can be drawn: (i) Copra outturns were influenced from the fourth year; (ii) Nitrogen consistently affected the outturn adversely *i.e.*, more nuts are required per candy and, for N 2 the difference averages about 75 nuts a candy. (iii) On the other hand potash improves out-turn to a corresponding degree; (iv) Phosphoric acid seems to have no effect at all.

(e) *Influence of Manuring on the Development of Female Flowers and Setting of Nuts.*—The following data show the influence of manuring on the development of Female Flowers and Setting of Nuts:—

Mean of 6 years (iii. to viii.)

Treatment.	Nuts per Acre.	Female Flowers per Acre.	Percentage of Female Flowers formed into nuts.
N_0 ..	3,636 ..	11,367 ..	31·99
N_1 ..	3,976 ..	13,118 ..	30·31
N_2 ..	3,962 ..	13,112 ..	30·32
P_0 ..	3,869 ..	13,231 ..	29·24
P_1 ..	3,826 ..	11,971 ..	31·95
P_2 ..	3,880 ..	12,399 ..	31·29
K_0 ..	3,602 ..	12,824 ..	28· 9
K_1 ..	3,923 ..	12,503 ..	31·38
K_2 ..	4,049 ..	12,288 ..	32·95

The following conclusions can be drawn: (i) While nitrogen increases the total female flowers formed by nearly 16 per cent. potash seems to have very little influence, and phosphoric acid depresses the formation; (ii) Potash improves the percentage setting of female flowers into nuts; (iii) On the average about 30 per cent. of the female flowers are developed into mature nuts after fertilization.

(iii.) *Co-operative Experiments.*—

(a) *Southern Province (Ahangama) and Western Province (Siyane Korale).*—The following Table summarises the results of the fifth year of these two manurial experiments:—

Southern Province.					Western Province.				
Treatments.	Nuts per Acre.	Lb. Copra per Acre.	Per Cent.	Copra Out-turn.	Treatments.	Nuts per Acre.	Lb. Copra per Acre.	Per Cent.	Copra Out-turn.
O ..	1,100..	476..	100..	1,295	O ..	394..	161..	100..	1,367
NK ..	1,646..	774..	162..	1,190	NK ..	391..	179..	111..	1,225
NPK ..	2,280..	1,096..	230..	1,165	NPK ..	1,393..	642..	397..	1,216
NPK–O ..	1,180	620	130	130		999	481	297	151

Influence of manuring on Female Flowers and setting of Nuts.—Counts of female flowers were kept from July, 1944, in the Southern Province Experiment and from September, 1944, in the Western Province Experiment. The following summary of the results are of interest in comparison with the data of the NPK Experiment at Bandirippuwa Estate given in a previous section.

Southern Province (Ahangama).

Date of Pick.	Treatment.	Nuts.	Per Cent.	Female Flowers.	Per Cent.	Per Cent. of Female Flowers formed into Nuts.
June 30, 1944	O	774	100	1,976	100	39·7
	NPK	1,851	239	3,386	171	54·7
August 29, 1944	O	683	100	1,813	100	37·7
	NPK	1,338	196	2,708	149	49·4

Western Province (Siyane Korale).

September, 1944	O	438	100	986	100	44·4
	NPK	1,247	285	2,489	252	50·1
November, 1944	O	216	100	516	100	41·9
	NPK	716	331	1,406	272	50·9

On the poor soils, manuring produces a marked increase in the number of female flowers.

The design of the experiment is such that the separate effects of N,P & K cannot be disentangled.

(*b*) *Manurial Experiment on Young Palms* (*Nattandiya*).—Height measurements were not carried out after November, 1943, as the seedlings had reached a height at which accurate measurements could not be made.

Leaf counts were carried out in March, 1944. The mean number of leaves per palm for each treatment is given in the following table:—

	O	NK	NPK	Mean.
O ..	16·26	17·09	17·29	16·88
Cover	16·10	15·39	16·15	16·00
Mean..	16·18	16·24	16·90	16·44

A statistical analysis of the data shows that while none of the manurial treatments are significant, " no cover " *vs.* " cover " treatment is significant.

(iv.) *NPK Cultivation Experiment* (*Ratmalagara*).—One year's yield recording since the first manuring in 1943 was completed in June, 1944. It is too early to report any results from this experiment.

(v.) *Cover-crop Experiment: Bandirippuwa.*—The mean plot yields corresponding to each treatment statistically analysed and corrected by Sander's method were given in last year's report. These data expressed as pounds copra *per acre*, calculated up to the seventh year of the experiment (1943-44) are given below.

Treatment.	2nd Year 1938–39.	3rd Year 1939–40.	4th Year 1940–41.	5th Year 1941–42.	6th Year 1942–43.	7th Year 1943–44.
No Cover + NPK	1,406	1,185	1,369	1,406	1,974	1,674
Cover + K	1,207	624	1,266	1,185	1,875	1,417
,, + NK	1,200	782	1,340	1,164	1,894	1,453
,, + PK	1,193	631	1,218	1,072	1,813	1,442
,, + NP	1,233	738	1,127	1,145	1,618	1,303
,, + NPK	1,241	829	1,365	1,270	2,030	1,556
Standard Error	106·1	81·5	91·4	174·3	173·6	182·4
Significant Difference	126·2	96·9	109·0	207·0	206·3	216·9

(vi.) *Laboratory Investigations.*—The output of laboratory work was limited by the fact that the Technical Assistant was appointed only in March, 1944, and had to be trained in analytical methods.

(*a*) *Manurial Constituents in Pasture Samples of NPK Experiment.*—A calculation based on the analysis of pasture samples taken from the experimental plots showed that about 46 lb. per acre of nitrogen and 43 lb. potash were turned into the soil biennially when ploughed in.

(*b*) *Available Phosphoric Acid Studies.*—In the previous reports results of studies of available phosphoric acid of the soils of plots of the NPK experiment at Bandirippuwa Estate have been given.

During 1944 these data have been supplemented by studies of soil samples from the other manurial experiments. In the Ahangama experiment the available phosphoric acid had increased up to an average of 150 p.p.m. in the plots to which 2 biennial applications of 2 lb. Saphos phosphate per palm had been made. The plots to which no phosphoric acid had been applied showed barely 20 p.p.m. Similar results were obtained for the corresponding Siyane Korale experiment.

Determinations were also made in 54 soil samples of the Ratmalagara experiment.

(*c*) *Miscellaneous.*—Among various materials analysed in the course of advisory work, a sample of hoof and horn meal was of interest. It contained 12 per cent. Nitrogen.

5. (i.) Publications.—

Report and Accounts of the Coconut Research Scheme for 1942. Government Sessional Paper V., March, 1944. Government Record Office, Colombo, 35 cents.

Child, R., Coconut Shells as an Industrial Raw Material, II. Miscellaneous Uses. Fuel. *Current Science.* 1944, **13**, 4-6.

Child, R., III. Estimated World Production, *Ibid.*, 150-152.

Child, R., IV. Coconut Shell Charcoal, *Ibid.*, 245-250.

Child, R., Ceylon's Coconut Industry after the War. *Times of Ceylon.*, June 10, 1944.

Child, R., and Nathaniel, W. R. N., A Note on the Fatty Acids of Margosa (Neem) *Oil. J. Indian Chem. Soc.*, 1944, **21** 35-37.

Pieris, W. V. D., Observations on Food Production on Coconut Estates in 1942. Supplement to Government Sessional Paper V. of 1944, August, 1944, 25 cents.

Pieris, W. V. D., Experiments in Land Settlement. *Tropical Agriculturist*, Ceylon, 1944, **100**, No. 1, January-March, 4-8.

(ii.) *Library.*—On December 31, 1944, the library contained 617 books and 1,038 bound volumes of periodicals (including 122 loaned by the Director of Research). Acknowledgment is here made to those Government Departments and Research Institutes overseas who sent exchange publications.

Visitors are welcome to use the library on working days between 9 A.M. and 12 noon and 2 to 4 P.M. (Saturdays 9 A.M.-12 noon only).

6. (i.) Lectures.—

The Director of Research gave the following lectures during the year:—

June 9 to the Chilaw Planters' Association on "Ceylon's Coconut Industry after the War." (reported in the "Times of Ceylon").

July 29 to the Kurunegala Planters' Association an impromptu talk on the recent results of manurial experiments.

October 28 to the Chemical Society of Ceylon on "The Chemistry of Coconut Shells".

August 4 the Geneticist addressed the Chilaw Planters' Association on "Replantation: the Chief Problem facing the Coconut Industry".

(ii.) *Meetings.*—The Director of Research attended two meetings of the Central Board of Agriculture as an *ex-officio* member.

The senior officers attended where possible meetings of the Chilaw and Kurunegala Planters' Association, and the Low-Country Products Association.

The Estates.

7. Bandirippuwa Estate.—

The crops harvested in 1944 were as follows:—

Crop No.	Nuts from Blocks under Estate Management.	Nuts from Blocks under Research Management.	Total 1944.	Average for 13 years, 1931–1943.	1944. Above or Below Average Per Cent.
1 ..	51,070 ..	10,630 ..	61,700 ..	68,435 ..	— 9·8
2 ..	91,580 ..	21,789 ..	113,369 ..	110,179 ..	+ 2·9
3 ..	103,766 ..	28,303 ..	132,069 ..	132,887 ..	— 0·6
4 ..	114,981 ..	30,026 ..	145,007 ..	114,892 ..	+26·2
5 ..	65,028 ..	19,183 ..	84,211 ..	77,205 ..	+ 9·1
6 ..	75,438 ..	17,453 ..	92,891 ..	61,743 ..	+50·7
Total ..	501,863	127,384	629,247	565,341	+11·3

The average total crop for the four years 1941-1944 has been 619,027 or approximately 4,200 nuts per acre per annum.

The revenue from Bandirippuwa estate which actually accrued in 1944 was:—

Revenue from Estate Management.

	Rs. c.	Rs. c.
6th crop, 1943, nuts ..	2,338 35	
copra ..	179 52	
		2,517 87
Crops 1–4, 1944—		
Sale of copra ..	6,183 87	
Sale of nuts ..	13,005 27	
Sale of husks and shells ..	190 90	
Sundries ..	311 92	
		19,691 96
Sale of food crops ..	278 96	
Seednuts to nursery .	420 43	
		699 39
		22,909 22

Revenue from Research Management.

	Rs. c.	Rs. c.
6th crop, 1943, nuts ..	244 28	
copra ..	37 98	
		282 26
Crops 1–4, 1944—		
Sale of copra from experiments ..	3,206 79	
Sale of nuts ..	726 87	
		3,933 66
		4,215 92

Total gross revenue in 1944 was thus Rs. 27,125.14 realised as follows:—

	Rs. c.	Average Price.
Sale of 39 tons 14 cwt. 39 lb. copra realising ..	9,608 16	Rs. 60·49 per candy
Sale of 322,508 nuts realising	16,314 77	Rs. 50·58 per 1,000 nuts
Sale of 61,382 husks realising	148 40	Rs. 2·41 per 1,000 husks
Sale of 42,500 shells realising	42 50	Re. 1· 0 per 1,000 shells
Sundries	311 92	
Seednuts to nursery account	420 43	
Sale of food crops	278 96	
	27,125 14	

Expenditure for the year totalled Rs. 10,113.35 for the estate area, Rs. 4,375.82 for research area and Rs. 296.50 on food crops. The total receipts exceeded expenditure by Rs. 12,183.47.

Cost of production of nuts on the estate area (including copra curing, transport expenses, and depreciation on copra kiln) was Rs. 20.18 per 1,000 nuts.

Sundry Debtors and Creditors Account.

Of the income actually accruing in 1944 and included in the above statement, Rs. 2,800.13 from 1943 copra had been credited to the Estate Working Account in 1943 through Sundry Debtors Account. This amount is not included in the Estate Working Account for 1944.

The following amounts have been credited to the Estate Working Account on account of part 5th crop and 6th crop lying unsold at the end of the year:—

	Rs. c.
1944 5th (part) and 6th crop Estate	5,580 0
1944 5th (part) and 6th crop Research	975 0
	6,555 0

The Bandirippuwa Estate Working Account for 1944 thus shows a balance carried forward to revenue of Rs. 15,938.34.

Meteorological Observations at Bandirippuwa Estate.—The usual records have been kept, and daily telegrams and monthly abstracts sent to Colombo Observatory. Rainfall in 1944 totalled 91.47 inches falling on 191 rainy days; wet days (rainfall 0.04 inches or over) numbered 144. The corresponding figures for 1943 were 65.06 inches falling on 160 rainy days (wet days 130). Rainfall was well distributed and the total was above average, being the highest since 1934.

Roads and Estate Buildings were maintained with some difficulty owing to shortage of labour and materials. No new work was undertaken.

8. Ratmalagara Estate.—

Crops harvested in 1944 were as follows with 1938-1943 crops for comparison:—

Crop No.	1938.	1939.	1940.	1941.	1942.	1943.	1944.	Average 1938–43.
1 ..	30,896*	23,752..	22,302..	29,153..	21,718..	25,504..	33,163..	25,554
2 ..	28,130..	26,413..	16,391..	38,285..	26,478..	37,197..	52,912..	28,816
3 ..	37,413..	30,160..	28,233..	49,339..	39,218..	55,008..	64,634..	39,895
4 ..	44,180..	34,278..	25,704..	60,232..	44,584..	56,378..	58,152..	44,226
5 ..	34,573..	32,515..	37,000..	45,606..	39,205..	48,978..	52,719..	39,464
6 ..	20,945..	23,865..	20,800..	29,682..	22,958..	36,230..	29,066..	25,747
	196,137	170,983	150,430	252,297	194,161	259,295	290,646	203,884

* Harvested by previous owner.

The revenue actually accruing during the year was as follows:—

	Rs. c.	Rs. c.
On account of 1943 crops	1,647 18	
Sale of 28 tons 52 lb. copra (1944) crops 1–5 ..	6,985 73	
Sale of 170,980 nuts crops 1–5, 1944	7,262 93	
		15,895 84
Sale of food crops	1,352 51	
Sale of timber	4 0	
Sundries	382 49	
		1,739 0
		17,634 84

Expenditure totalled Rs. 8,794.80 on the mature estate area, Rs. 1,272.03 on food crops and Rs. 3,677.62 (excluding expenditure on Rubber Seed Garden and Citrus Nursery, Rs. 382.49). Cost of production per 1,000 nuts was Rs. 35.89 for estate area.

Receipts exceeded payments by Rs. 3,507.90.

Sundry Debtors and Creditors Account.

A sum of Rs. 1,647.18 accruing in 1944 on account of 1943 had been credited to the 1943 Ratmalagara Estate Working Account through the Sundry Debtors Account. Estate Working Account for 1944 does not include this amount.

For 1944 a sum of Rs. 1,456 has been credited to the Estate Working Account on account of 6th crop lying unsold. The balance carried forward to Revenue Account in 1944 is Rs. 3,316.72.

Weather Records.—Records of rainfall and of hours of bright sunshine continue to be kept at Ratmalagara Estate. Record cards from the Campbell-Stakes sunshine recorder (installed in January, 1941) are sent to the Colombo Observatory monthly, together with the rainfall records.

In 1944 rainfall totalled 62.63 inches on 123 rainy days compared with 55.29 inches on 94 rainy days in 1943. North-East Monsoon rains were favourable and totalled 33.30 inches from September to November inclusive.

Hours of bright sunshine averaged 6.9 daily.

9. **Visiting.—**

Mr. B. Parker, Visiting Agent, paid one visit in November, 1944, and the reports on both estates were circulated to the Board of Management.

10. **Finance.—**

The audited statements of accounts for 1944 are appended.

A. W. R. JOACHIM,
Acting Director of Agriculture and
Chairman, Board of Management,
Coconut Research Scheme.

October 7, 1947.

Statement of Receipts and Payments for the Year ended December 31, 1944.

RECEIPTS.	Rs.	c.
Balance at January 1, 1944	49,464	17
Revenue Account.		
Annual grant from Government	30,000	0
Cess collections, 1944	38,582	98
Interest	3,407	60
Income from Bandirippuwa Estate	23,904	58
Income from Ratmalagara Estate	15,950	63
Sale of planting material	7,245	52
Charges to staff for electricity	849	58
Sale of publications	16	60
Rental for telephone	40	0
Refund on board member's travelling	49	35
Sundry receipts	390	41
Advance Account:		
Repayments of loans by staff	535	87
Repayments of interest on above	9	47
Sugar	702	50
Rice	1,461	20
Chillies	46	52
Kerosene oil	24	48
Deposit Account:		
Staff contributions to Provident Fund	7,470	89
Scheme's bonus and interest	5,706	75
Sundry Debtors	9,698	12
	195,556	72

PAYMENTS.	Rs.	c.
Expenditure Account:		
New clearing, Ratmalagara Estate	1,041	3
Stove for Soil Chemist's bungalow	450	0
Laboratory equipment	27	22
Personal Emoluments:		
Salaries of senior staff	39,812	33
Salaries of junior staff	16,390	97
Provident Fund bonus for 1944	5,706	75
Rent allowance	731	11
War allowance	10,907	71
Other Charges:		
Travelling of staff	6,189	79
Travelling of Board Members	1,345	40
Office:		
Stationery	588	65
Postage	647	58
Printing and advertising	472	58
Incidental expenses	692	82
Telephone	355	0
Entertainment allowance	62	50
Workmen's Compensation Insurance	75	90
Maintenance of office equipment	240	26
Laboratory:		
Upkeep, chemicals, &c.	2,550	73
Scientific books and periodicals	920	74
Buildings:		
Upkeep	2,669	35
Insurance	539	37
Running expenses of electrical plant	2,984	64
Estate Account:		
Bandirippuwa:		
General charges	2,686	40
Upkeep	1,562	44
Cultivation	765	23
Collection	1,443	31
Ratmalagara:		
General charges	3,005	16
Upkeep	2,283	29
Cultivation	1,280	96
Collection	1,022	2
Advance Account:		
Rice	1,447	17
Sugar	640	59
Chillies	41	6
Kerosene oil	51	19
Loans to staff	490	0
General stores	2,218	27
Fertilizers	3,642	80
Research Payments:		
General	793	81
Genetical work	3,027	24
Soil Chemist's work	3,719	70
Purchase of planting material	5,034	0
Other Payments:		
Sundry creditors	220	25
Refund of Provident Fund contributions	187	53
Audit charges	516	60
Repayment of Government loan	20,000	0
Investments in Ceylon Savings Bank	5,675	58
Ceylon Savings Certificates appreciation	540	57
Excess payment on checkroll (contra entry)	3	88
Balance at December 31, 1944	37,855	24
	195,556	72

Audited and found correct.

(Sgd.) K. KANAGARATNAM,
Auditor-General.

Audit Office,
Wellawatta, August 22, 1945.

S. C. KAHAWITA,
Secretary-Accountant,
Coconut Research Scheme.

Lunuwila.

2——J. N. A 75737 (11/47)

Bandirippuwa Estate Working Account for the Year ended December 31, 1944.

Expenditure.	Rs. c.	Rs. c.	Income.	Rs. c.	Rs. c.
To Salaries :			By Estate :		
Superintendent, Conductor and Watchers including War and Rent Allowance and Conductor's Allowance ..		3,886 11	Sale of crops 1–4 ..	19,691 96	
General charges ..	2,042 30		Sale of crops 5 and 6 ..	5,580 0	
Manuring ..	1,023 39		Sale of seed-nuts ..	420 43	
Cultivation ..	215 83				25,692 39
Upkeep	1,116 55		Research :		
Copra curing and despatching	674 11		Sale of copra ..	3,206 79	
Collecting and picking ..	858 56		Sale of nuts ..	726 87	
		5,930 74	Sale of 5 and 6 crops ..	975 0	
Research :					4,908 66
General	312 85		Food crops		278 96
Genetical work ..	1,335 58				
Soil Chemist's work ..	2,727 39				
		4,375 82			
Food crops		452 50			
Depreciation on copra drier ..		296 50			
Balance carried forward to Revenue Account ..		15,938 34			
		30,880 1			30,880 1

Nursery Working Account for the Year ended December 31, 1944.

Expenditure.	Rs. c.	Rs. c.	Income.	Rs. c.	Rs. c.
To Purchase of seed-nuts ..		2,822 72	By Sale of Planting Material :		
Transport of seed-nuts and seedling ..		464 70	Seed-nuts	2,650 0	
Salary of 2 Nursery Attendants		1,074 70	Seedlings	4,236 85	
Travelling expenses of Nursery Attendants ..		749 18		6,886 85	
Nursery hut		48 12	Less amount refunded ..	480 0	
Advertising		175 50		6,406 85	
Working expenses of nurseries	759 43		Less amount accounted in 1943	20 0	
Less amount transferred from Res. II. ..	67 44				6,386 85
		691 99	Refund of transport expenses		358 67
Balance carried forward to Revenue Account		718 61			
		6,745 52			6,745 52

Ratmalagara Estate Working Account for the Year ended December 31, 1944.

Expenditure.	Rs. c.	Rs. c.	Income.	Rs. c.	Rs. c.
To Estate Expenses :			By Sale of Products :		
			(*a*) Estate :		
Salaries of Superintendent, Conductor and Watchers		3,393 36	Sale of nuts (1–5) ..	7,262 93	
General Charges ..	1,902 10		Copra ..	4,942 19	
Upkeep	1,177 36		6th crop ..	1,196 0	
Cultivation ..	1,108 22		Food crops ..		13,401 12
Manuring	172 74		Timber ..		1,352 51
Copra Curing and Despatch	437 18				4 0
Picking and Collection ..	603 84		(*b*) Research :		
		5,401 44	Sale of copra (1–5 crops) ..	2,043 54	
Food Crops : ..		1,272 3	6th crop	260 0	
					2,303 54
Research Expenses :			Refunds :		
General ..	304 6		Expenses of Citrus nurseries	97 16	
Geneticist's work ..	2,973 79		Lease-rental Rub-Seed Garden	285 33	
Soil Chemist's work ..	782 26				382 49
		4,060 11			
Balance carried forward to Revenue		3,316 72			
		17,443 66			17,443 66

Revenue Account as at December 31, 1944.

EXPENDITURE.	Rs. c.	Rs. c.	INCOME.	Rs. c.
Personal Emoluments :				
To Salaries of senior staff ..	39,812 33		By Government grant for 1944 ..	30,000 0
Salaries of junior staff ..	11,799 19		Cess collections for 1944 ..	45,734 43
Provident Fund Contribution and Interest for 1944 ..	5,706 75		Interest	4,280 44
Rent allowance for 1944 ..	522 62		Charges to staff for electricity ..	849 58
War allowance for 1944 ..	9,294 24		Sale of publications	16 60
		67,135 13	Telephone rental	40 0
Other Charges :			Sundry receipts	390 41
To Travelling staff ..	6,189 79		Balances from	
Travelling Board Members ..	1,296 5		Bandirippuwa estate working account ..	15,938 34
		7,485 84	Ratmalagara estate working account ..	3,316 72
Office :			Nursery	718 61
To Stationary	588 65		Transfer from Depreciation Fund account to replace store	300 0
Postage	647 58			
Printing and advetising ..	472 58			
Incidental expenses ..	692 82			
Telephone	355 0			
Entertainment allowance ..	62 50			
Workmen's Compensation Insurance ..	75 90			
Maintenance of office equipment ..	240 26			
		3,135 29		
Laboratory :				
To Upkeep, chemicals, &c. ..	2,550 73			
Scientific books and periodicals	920 74			
		3,471 47		
Buildings :				
To Upkeep	3,196 56			
Insurance	539 37			
Running expenses of electrical plant	2,984 64			
		6,720 57		
Research:				
To Research I.	185 49			
Research III. ..	1,932 34			
Audit	516 60			
		2,634 43		
Depreciation Reserve :				
To Buildings—1944 ..	6,023 26			
Accumulators—1944 ..	934 20			
Gas plant—1944 ..	107 85			
		7,065 31		
Passage fund ..		1,000 0		
Excess revenue over expenditure		2,937 9		
		101,585 13		101,585 13

Capital Expenditure Account during 1944.

	Rs. c.		Rs. c.
To New clearing, R. E.	1,041 3	By Balance brought forward from Revenue Account	2,937 9
Laboratory equipment	27 22		
New stove for S. C.'s bungalow ..	450 0		
Excess in 1944 carried forward to Balance Sheet	1,418 84		
	2,937 9		2,937 9

Balance Sheet as at December 31, 1944.

LIABILITIES.	Rs. c.	Rs. c.
Capital outlay :		
Previously ..	601,873 81	
In 1944 ..	1,518 25	
		603,392 6
Passage Fund Reserve :		
Previously ..	695 11	
In 1944 ..	1,000 0	
		1,695 11
Provident Fund :		
At December 31, 1943 ..	32,286 5	
In 1944 ..	13,177 14	
	45,463 19	
Less refunds in 1944 ..	187 53	
		45,275 66
Depreciation Reserve :		
At December 31, 1943 ..	105,188 51	
Less transferred to Revenue Account ..	300 0	
	104,888 51	
Added in 1944 ..	7,361 81	
		112,250 32
Sundry Creditors :		
Due for plucking of 6th crop ..	175 0	
		175 0
Surplus :		
Previously ..	31,352 3	
Excess in 1944 brought forward from Capital Expenditure Account ..	1,418 84	
		32,770 87
		795,559 2

ASSETS.	Rs. c.	Rs. c.
Buildings		203,874 3
Estates :		
Bandirippuwa ..		187,554 68
Ratmalagara ..		73,138 0
Improvements to estates :		
Previously ..	7,272 36	
In 1944	1,041 3	
		8,313 39
Buildings :		
Copra kiln B. E. ..		4,067 26
Copra kiln R. E. ..		1,432 91
Lab. Structure Equipment ..		64,297 31
Previously ..	31,932 46	
In 1944	27 22	
		31,959 68
Gas plant ..		3,436 83
Bungalow Furniture :		
Previously ..	4,948 44	
In 1944	450 0	
		5,398 44
Office furniture ..		2,139 72
Accumulators ..		17,503 61
Museum		276 20
Sundry Debtors :		
Cess due	7,151 45	
R. S. garden ..	69 10	
Citrus nurseries ..	50 88	
B. E. Working Account ..	6,555 0	
R. E. Working Account ..	1,456 0	
		15,282 43
Accrued Interest :		
Ceylon Government Loan	584 25	
B. C. S. Dep. Account ..	50 0	
		634 25
Advance Account :		
Fertilisers ..	1,580 25	
Rice, &c.. ..	530 75	
Transport loans ..	301 43	
Bulbs	72 65	
General stores ..	1,497 79	
		3,982 87
Investments :		
Ceylon Government Loan	59,400 0	
H. D. Loan ..	15,000 0	
New Loan ..	20,000 0	
		94,400 0
P. F. Investments :		
B. C. S. Dep. Account ..	10,000 0	
C. S. Certificates ..	18,090 80	
C. S. B.	11,921 37	
		40,012 17
Cash :		
Current Account ..	35,855 24	
In hand	2,000 0	
		37,855 24
		795,559 2

S. C. KAHAWITA,
Secretary-Accountant,
Coconut Research Scheme.

In accordance with the provisions of sections 8 (2) of the Coconut Research Scheme Ordinance (Cap. 303), I have examined the above Balance Sheet. I have obtained all the information and explanations that I have required and I certify, as the result of my audit, that in my opinion the above Balance Sheet correctly sets forth the state of affairs at December 31, 1944.

Audit Office,
Wellawatta, August 22, 1945.

(Sgd.) K. KANAGARATNAM,
Acting Auditor-General.