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# Report and Accounts of the Coconut Research Scheme for 1937.

**MAY, 1938.**

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1938.

# ANNUAL REPORT OF THE BOARD OF MANAGEMENT FOR THE YEAR 1937.

(In terms of Section 8 (2) of Ordinance No. 29 of 1928.)

## Board of Management.

On January 1, 1937, 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. H. Collins, C.C.S.).
The Chairman of the Low-country Products Association of Ceylon (Dr. H. M. Peries, M.D.).

| | |
|---|---|
| Members of the State Council nominated by His Excellency the Governor : | Mr. S. O. Canagaretnam, M.S.C.<br>Mr. S. Samarakkody, M.S.C. |
| Representatives of the Low-country Products Association of Ceylon : | Mr. Wace de Niese.<br>Gate Mudaliyar A. E. Rajapakse, O.B.E., M.S.C. |
| Representatives of the Planters' Association of Ceylon : | Mr. O. B. M. Cheyne<br>Mr. A. Ekanayake |
| Representing the Smallholders, nominated by His Excellency the Governor : | Mr. G. Panditteseker, J.P., U.P.M.<br>Mr. D. D. Karunaratne, J.P. |

Mr. J. Tyagarajah, Ll.B., became an *ex officio* member of the Board upon succeeding Dr. H. M. Peries as Chairman of the Low-country Products Association of Ceylon in March, 1937.

The death of Gate Mudaliyar A. E. Rajapakse, O.B.E., M.S.C., in September, 1937, is recorded with great regret. The late Gate Mudaliyar was nominated a member of the original Board of Management on February 7, 1929, and was the only remaining foundation member of the Board ; he had also been a useful member of the Buildings Committee which in 1931–1933 dealt with all the buildings erected on Bandirippuwa estate.

Mr. L. J. M. Peiris was nominated by the Low-country Products Association in October, 1937, to fill the vacancy caused by the death of Gate Mudaliyar Rajapakse.

Mr. C. E. Jones, C.C.S., was nominated by the Financial Secretary as his representative on the Board in place of Mr. C. H. Collins, B.A., C.C.S., during the latter's absence on leave out of the Island.

Five meetings of the Board of Management were held during the year, on February 26, May 28, September 3, October 15, and December 10, respectively. The Director of Research acted as Secretary to the Board at all meetings.

## Committees.

*The Buildings Sub-Committee.*—Personnel : Mr. Graham Panditteseker (Chairman), Mr. O. B. M. Cheyne, and Mr. A. Ekanayake. Secretary-Convener, Dr. R. Child.

This Committee held eight meetings, on February 19, April 10, May 24, June 14, July 5, August 8, October 11 and 28.

*The Jungle Sub-Committee* did not meet in 1937.

## Staff.

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

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

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

Mr. T. Mylvaganam, B.Sc., was appointed Technical Assistant to the Technological Chemist from January 4, 1937. He left the service of the Scheme on March 21, and Mr. W. R. Nathanael, B.Sc., was appointed to fill the vacancy, taking up duties on July 19.

Mr. P. J. Nonis has held the post of Estate Superintendent throughout the year, and Mr. J. Duff-Tytler that of Senior Clerk.

The following additions to the staff were sanctioned by the Board of Management: (*a*) a second Field Assistant to the Department of Soil Chemistry, Mr. M. Nadaraja being appointed from March 1, 1937, and (*b*) an additional Junior Clerk, Mr. E. H. K. de Silva, who assumed duties on September 1.

The secretarial and accounting work has been carried out as usual at Bandirippuwa Estate under the supervision of the Director of Research.

## Technical Work.

1. *Technological Chemist.*—The absence of a technical assistant between April 1 and July 18 again hampered the work of this Department, and the services of the Technical Assistant to the Soil Chemist had to be called on occasionally during this period for copra analysis.

(i.) *Copra: Effect of Manuring on the Oil Content of Copra.*—Samples of copra have been analysed for moisture and oil content at each pick during the year from the sixteen plots of the Scheme's comprehensive manurial experiment to which fertilizers are applied in double doses. This study, which has involved duplicate analyses of 96 samples of copra, has constituted the main activity of the laboratory during the year.

The results of the 64 analyses which have been completed and checked at the time of writing show that the effect of manuring is insignificant. This comes out strikingly when the 64 figures are arranged in two sets with reference to the presence or absence of nitrogen, phosphoric acid or potash.

| | | Average Oil Per Cent. (Dry Weight). |
|---|---|---|
| 32 samples from plots receiving | no nitrogen | 69·3 |
| 32 " " " " | 2·0 lb. N. per palm | 69·1 |
| 32 " " " " | no phosphoric acid | 69·1 |
| 32 " " " " | 2·0 lb. $P_2O_5$ per palm | 69·3 |
| 32 " " " " | no potash | 69·2 |
| 32 " " " " | 1·5 $K_2O$ per palm | 69·2 |

This lack of effect of manuring on oil content is perhaps less surprising since analyses reported last year showed no significant differences for copra samples from different planting districts in Ceylon.

In view of the above results, it is not proposed to carry on the above series of analyses after the end of the year. It may, however, be of interest to return to the subject later, when the plots have been differentially manured for a longer period. It must be remembered that all plots had (presumably) received the same treatment up to 1935 and only differentially treated when fertilizers were applied in the present experiment in November, 1935.

The full details of the above study will appear elsewhere.

(ii.) *Fallen Nuts.*—After the first crop, 1937, had been harvested, a plot of 60 trees was subsequently left unpicked, and daily records of the number of nuts falling naturally have since been kept. These records should prove to be of some interest when the natural fall of ripe nuts is correlated with climatic conditions.

Every two months the nuts have been collected and converted either to copra or desiccated coconut simultaneously with an equal number of nuts picked in the usual way from trees on the same block. This will be continued for the first half of 1938. The results already appear to indicate that fallen nuts give a definitely better yield of copra or desiccated coconut. Analyses of all samples seem to show that the oil content is, however, lower.

(iii.) *Coconut Shell Charcoal.*—Considerable interest has been taken in this product during the year, prices and exports being unusually high until late in the year. Advice on preparation and standards of quality has been given to several enquirers.

In the laboratory a considerable number of samples from various local sources has been examined and among the Department's activities charcoal has assumed an importance second only to copra.

Specifications were obtained from various sources, mainly through the courtesy of the Imperial Institute, London, who have been most helpful in providing information on the importer's side of the business. The standards to which European importers expect charcoal to attain vary slightly between different firms, both in the limits adopted or allowed, and the methods of examination employed. The following limits, however, are usual :—

*Size.*—It is usually provided that not more than 5 per cent. shall pass a $\frac{1}{4}$" mesh sieve. In some cases a more stringent specification is adopted indicating what percentages shall pass or be retained on a series of graduated sieves.

*Ash Content.*—A limit of 2 per cent. is usually imposed.

*Moisture.*—Specifications vary from a minimum of 5 per cent. to one of 10 per cent.

*Volatile Matter.*—This is an arbitrary figure and depends largely on the method of determination used. By the method found most satisfactory for routine purposes here, a limit of 15 per cent. is imposed.

All of the above figures were determined on the samples referred to, using in turn all the methods on which information was available. The results (which will be reported in detail elsewhere) indicate that there should be no great difficulty in preparing locally a product to meet the usual specifications.

An ash content of over 2 per cent. indicates almost invariably contamination with sand or soil. Clean good charcoal averages about 1·8 per cent., which figure is in agreement with the figure of 0·61 per cent. ash found for coconut shell, on the basis that shells yield about a third of their weight of charcoal.

A content of volatile matter of over the specified limit indicates under burning, which is a common fault. Over-burning is likewise unsatisfactory as giving a thin brittle product.

Chloride estimations have also been carried out on all samples. One firm imposes a limit for chloride of 1.0 mgm. per gm. Only one sample came over this limit in the present series. A much higher figure would indicate contamination with sea water.

*Uses of Charcoal.*—It is commonly stated that the coconut charcoal exported to Great Britain and France finds ultimate use in gas masks. It may be remarked here that the adsorbent properties of "activated" charcoal are also taken advantage of in technical operations, such as recovery of industrial solvents, water purification, clarification of saccharine juice in sugar manufacture, &c.

It should also be emphasized that the crude charcoal as exported is useless for such purposes, having very slight adsorbing properties. The "activation" processes are technical operations not likely to be practicable locally for economic reasons, at least at the present stage of development.

(iv.) *Coconut Shells.*—Mention was made in last year's report of the analysis of coconut shells. A complete analysis of mature shells has been completed and submitted for publication. The results were very similar to those published during the year by L. C. Fleck, W. G. Van Beckum, and Geo. J. Ritter, from the Forest Products Laboratory of the U. S. Department of Agriculture, (*J. Amer. Chem. Soc.*, 59, 2279), and were of interest both in connection with charcoal (see above) and with the development study of the coconut.

(v.) *Development Study.*—The analytical methods found satisfactory with mature shells are be[illegible]pplied to samples of shells of nuts at different stages of maturity already colle[illegible] connection with this study (see last year's report).

(vi.) *Soap a[illegible]making oils.*—There has been little work to report in this connection and o[illegible] samples of soap were received for report. It seems likely that the local soap [illegible]nd it difficult to compete in the market when coconut

oil prices are high, particularly at levels over Rs. 400 per ton, which were reached at the beginning of the year. It is gratifying, however, to note that there has been some utilization of mee oil, on which information has been supplied to inquirers.

*Margosa Oil.*—A sample of Margosa oil was sent to the School of Agriculture, North Wales, to be examined for its possible efficacy as a preventive of blow-fly strike on sheep. The results will be awaited with interest, as similar trials have been made in Australia.

*Seeds Yielding Lauric Acid.*—An inquiry was received from the Forest Department on the possible utilization of the seeds of certain Ceylon species of *Lauraceae*, which were stated to be useful sources of lauric acid. Tentative arrangements have been made for an extended examination of these species to be made in England, since it is clear that the Coconut Research Scheme could not undertake a long study of a subject unrelated to the coconut industry. A preliminary examination, however, was made by the Technological Chemist, in his spare time, of the seeds of *Neolitsea involucrata* (Lamk.) Merr., and a note published in the Ceylon Trade Journal of the possible utilization of the seed fat as a raw material for the preparation of detergents of the type of Sulphonated Lorol, and of lauric acid. The fat is also of considerable academic interest as yielding by crystallization only a high percentage (60 approx.) of trilaurin.

(vii.) *Toddy Products.*—Tapping of one tree for daily record of yield was commenced in June, 1937, the collected toddy being employed for some preliminary experiments. It is proposed to extend this work in 1938, as soon as the copra analyses are completed.

(*a*) *Toddy Syrup.*—The preparation of syrup from sweet toddy by clarification and evaporation has been the subject of preliminary work. With a little trouble and the use of a filtering agent it is possible to obtain a most attrative product resembling Golden Syrup. The bottles were sold at 20 cents each and there would be no difficulty in disposing of considerable quantities at a higher price. It remains to adapt the laboratory procedure to domestic apparatus.

Some analyses of "sweet" toddy containing "Hal" bark (*Vateria acuminata*) do not indicate that fermentation is checked satisfactorily by this means. Lime is more effective. This agrees with the former findings of Browning & Symons (1916).

(*b*) *Vinegar.*—One sample has been examined by methods reported last year and found to be genuine. The clarification process mentioned last year has been demonstrated to visitors to the laboratory and also at exhibitions where the Scheme had a stall (see paragraph 6 below).

(viii.) *Advisory.*—Advisory correspondence included the provision to several inquirers of plans and specifications of copra kilns and barbecues, detailed description of copra curing methods, preparation of charcoal, soap-making, refining coconut oil, &c. Samples examined in connection with the above included copra, poonac, whole nuts, desiccated coconut, refined oil as well as soap, vinegar, and charcoal already referred to. Interesting samples of desiccated coconut and of whole nuts from New Guinea were analysed and further samples are being obtained.

One interesting inquiry may be worth recording. A firm packing desiccated coconut in aluminium foil packets found difficulty in attaching paper labels to the foil, the paper easily becoming detached when ordinary gum was used. A recommendation was made which seems to have had satisfactory results.

2. *Geneticist: (I) Jungle Land.*—The Annual Reports for the past three years, 1934–1936, have recorded the unsuccessful attempts made since 1931 to acquire an area of jungle land for carrying out investigations on selected strains and varieties of coconuts; and it has been continually remarked that owing to this fact the work of the Geneticist's Department has been partly held up. It has also been stated at various times that as Bandirippuwa estate was fully planted, it would be necessary to establish a Seed Farm stocked with selected strains derived from high-yielding parent types, in order to meet the increasing demand for planting material.

It is satisfactory to record, therefore, that negotiations have been completed for the purchase of an estate near Madampe of about 250 acres, of which 110 acres

are in jungle. This estate, which is suitably situated and easily accessible, will come into the possession of the Scheme early in 1938, and the experimental planting of the cleared jungle will be commenced during the North-East monsoon, which is the most suitable time of the year for transplantation in the north-western Province.

Since the amount of field work of the Geneticist's Department will be greatly increased on account of these experiments, the Board of Management have approved the appointment of a Field Assistant in 1938.

(ii.) *Yield Records.*—Other experimental work has continued on the lines outlined in previous reports. Careful yield recording and the selection and study of high-yielding palms have been continued on Bandirippuwa estate as well as on other estates, for all of which at least three years records on the original selections are now available. Since the reliability of the standards of selection adopted in 1931, (W. V. D. Pieris—Studies on the Coconut Palm, I. Tropical Agriculturist, 1934, Vol. LXXXII., No. 2, February), has been subsequently demonstrated, further selections were made on two of the outstanding estates in the Chilaw District. Addition to the number of original selections will be adopted in as many estates as possible; so that there may be a ready supply of proved planting material for disposal to those opening up new land or replanting old estates.

The number of original selections, made before 1934, was 357 (excluding certain subsequent rejections), and the new selections on the two estates mentioned above have amounted to 195 palms, making a total of 552 selected palms. Of this number, 500 may be considered as being of proved merit; which means that, taking the yield per selected palm at the low figure of 80 nuts per annum, it is possible at the present time to supply about 40,000 selected seed-nuts or 20,000 selected seedlings per annum (allowing for 50 per cent. rejections in the nurseries), equivalent to a planted area of approximately 360 acres.

(iii.) *Nursery Experiments.*—All the nursery experiments reported on in previous years have been repeated on a more extended scale in 1936 and 1937 for the purpose of confirming the results that have been obtained already. As the results of these experiments have an important bearing on nursery management and seedling selection, they will be analysed and published as a separate bulletin.

Owing to the uncertainty that prevails regarding the best age for the removal of seedlings from nurseries for transplantation, an experiment has been carried out on the rate of growth of seedlings in the nursery. 750 seed-nuts of equal ripeness were utilized for this purpose and put down in the nursery on the same date. In addition to germination records, observations on the following characters were made at fortnightly intervals :—

(*a*) Weight of seedling.
(*b*) Weight and length of shoot.
(*c*) Number of leaves.
(*d*) Number and length of roots.
(*e*) Emergence of roots through husk.
(*f*) Weights of shell, meat, apple, and water.

The analysis of the results of this experiment, which will be published later, will show the condition of the seedling at various stages of growth and its relative merits for the purpose of transplantation.

All studies made on seedlings in nurseries will be taken a stage further and continued on adult palms when investigations are commenced on the estate which is to be acquired shortly.

(iv.) *Co-operative Plantations.*—The five-acre experimental plantation on private land, mentioned in the reports for 1935 and 1936, has now completed its third year. In this instance, selection stopped with the isolation of the mother palms; and seed-nut and seedling selection was not carried out. The plants have had to contend with a severe drought in October-November, 1934, at the time of transplantation and another rainless period in January, 1935. Further, the attention given to the plantation by the estate to which it is attached was rather below average up to the middle of 1937, as a result of which the plants were partially smothered by weeds nearly all the year round, chiefly the spiny-seeded grass known as *Cenchrus echinatus*, L.

It is, therefore, satisfactory to record that in spite of these adverse circumstances the plants are in excellent condition and furnish a good demonstration of the value of selection of mother palms even without subsequent selection of seed-nuts and seedlings.

It is proposed that a further area of jungle attached to this five-acre block be opened up and planted with selected material in October-November, 1938.

Another co-operative experiment on similar lines, but on a larger scale, has been laid down on a neighbouring estate where a replanting programme has been commenced. The area available at present on this estate is about 75 acres, out of which some 32 acres, equal to 1,584 palms, have been carefully blocked out for a statistical experiment and inter-planted with first and second bunch nuts from selected and proved high-yielding palms. The remaining 42 acres, which did not lend themselves to such blocking, have also been planted with seedlings from another series of selections.

Planting, in this instance, had to be carried out on a commercial scale, so that in addition to the selection of mother palms, further selection was carried out on seed-nuts and seedlings. The selection of seedlings involves a 50 to 60 per cent. rejection in the nurseries.

The plants were put down under strict supervision in October, the weather being very favourable at the time, and the first leaf counts and height measurements were carried out in December.

(v.) *Seed-nuts and Seedlings.*—The sales of selected seed-nuts and seedlings continue to increase and the material available from Bandirippuwa Estate is not sufficient to meet the demand, which has to be supplemented from other estates where records are being kept. The number of seed-nuts and seedlings ordered in 1937, with similar figures for 1936, are given below :—

| | Seed-nuts. | Equal to. | Seedlings. | Equal to. |
|---|---|---|---|---|
| 1936 | .. 15,432 | .. 140 acres | .. 3,927 | .. 72 acres |
| 1937 | .. 29,909 | .. 272 „ | .. 3,721 | .. 66 „ |

The present prices charged by the Scheme are Rs. 10 per 100 seed-nuts and Rs. 20 per 100 seedlings.

It should be mentioned that it is cheaper in the long run and more satisfactory from the planter's point of view to purchase selected seedlings from the Scheme, since, as mentioned earlier, they are subjected to a rigorous selection. The seedlings supplied are, therefore, of the highest quality available. Experience has shown that in most instances seedlings selected by the Geneticist's Department are superior to those selected on private estate nurseries.

The Scheme has repeatedly urged the necessity for replanting old areas in good time. It will be apparent that, at any rate for some years to come, the supply of planting material from the Scheme's estates, even if it is supplemented from other properties where records are kept, will only be a fraction of what will be necessary if a progressive policy of replanting is generally adopted. It is, therefore, recommended once more that proprietors and superintendents should select high yielding palms on their estates in the manner described in the Scheme's Leaflet No. 1. The assistance of the Geneticist and his staff will always be available in such cases with advice on the keeping of records and other details.

The Scheme's material will then be more available to smallholders and others who have not the same opportunities as large estate owners to select their own seed material. In fact, there has already been some association between the Coconut Research Scheme and the various Colonization Schemes in this respect.

(vi.) *Bibiliography.*—The publication of the Bibliography of the Literature on Coconuts has been unavoidably delayed, but it is hoped that it will be in the hands of the printers early in 1938. The Subject Index up to the end of 1935, containing over 4,500 references and cross references, has been done on cards which will be filed in the Library at Bandirippuwa Estate. The Author Index is also nearing completion, but will not be available in card form for some time. Both sections will be published in the form of a handy work of reference, with indications in the text regarding those references that are available for consultation in the Scheme's Library.

(vii.) *Estate Visits and Advisory Correspondence.*—Seventy visits were paid to estates during 1937 by the Geneticist and his assistants in connection with yield recording, advisory work, &c. Twelve other visits were paid in connection with the transplanting operations on the 75-acre plantation mentioned above.

Advisory correspondence has increased considerably, a few inquiries having been received even from sources outside Ceylon. The availability of leaflets has lightened the burden of this correspondence considerably and it is hoped that in time stereotyped replies will be available for all the more usual subjects of inquiry.

3. *Soil Chemist:* (i.) *N. P. K. Experiment.*—With the October, 1937, pick on the Nitrogen-Phosphate-Potash experiment, three years' records were completed, one pre-manurial year and two years from the first application of fertilizers in November, 1935. The second application of fertilizers to the plots was made in November, 1937.

The complete three years' records have to be statistically analysed before definite conclusions can be drawn from them, and it is expected that a preliminary report will be ready later in 1938.

*Analytical work* in connection with this experiment has been mostly devoted to the utilization of potash. This constituent has been estimated in the nut water, ash of husks and of bunch stalks from the 16 plots receiving double doses of fertilizers. Interesting results have already been obtained, which will be reported elsewhere in detail. An example may, however, be given. As a result of 88 duplicate analyses on samples of nut water, it was found that the samples from potash-manured plots regularly contained more potash than those from plots receiving no potash.

| | Average Volume of Water per Nut in c.c. | Average Concentration of Potash in gms. per Litre. | Average Weight of Potash per Nut. gms. |
|---|---|---|---|
| 44 samples from plots receiving no potash .. | 130 | 1·652 | 0·215 |
| 44 samples from plots receiving 1·0 lb. $K_2O$ per palm .. .. .. | 135 | 2·143 | 0·290 |

The analysis for oil content of samples of copra from the same plots is mentioned in paragraph 1 (ii.) above. The extracted residues from these samples, i.e., the oil-free poonac, are being analysed for nitrogen and potash.

All of the fertilizers applied as stated above, were analysed in the laboratory previously.

(ii.) *Co-operative Manurial Experiments.*—A start has been made with the establishment of co-operative experiments both on manuring and cultivation on outside estates, since it is realized that the results of experiments on Bandirippuwa Estate will not necessarily be applicable in other districts. At the time of writing, a start has been made with laying out two experiments, one near Negombo on a sandy cinnamon soil type, and the other near Gampaha on a lateritic soil. A third experiment in the Southern Province is projected.

(iii.) *Cover Crop Experiments.*—(*a*) On the subject of green manuring, a large scale statistical experiment has been laid down on Bandirippuwa estate, and constitutes the second important field experiment laid down by the Department of Soil Chemistry. It is designed to compare the effects of six treatments: no cover crop, cover untreated, cover harrowed, cover dug in, cover manured (P. K. only) and dug in, cover manured (N. P. K.) and dug in. Yield records, similar to those kept on the N. P. K. experiment, commenced with the August, 1937, pick.

(*b*) The demonstration plots of various covers have been continued as described in paragraph 3 (iv.) (*a*) and (*b*) of last year's report.

(iv.) *Soil Moisture Studies.*—Related to the foregoing, samples of sub- and top-soils were taken from areas under different treatment, particularly comparing cover with no cover, and harrowing with no harrowing. In one series on Bandirippuwa 6 samples each of top- and sub-soil were taken in August from each of three areas, which had been disc-harrowed, untreated and under cover crop respectively, and moisture determined on all of the 36 samples. The same series was repeated in September and again after the rainy spell in October. Nitrogen and loss on ignition were also determined on six bulked samples from the August lot.

A further similar series was examined from a neighbouring estate.

The results are not reported here, since they need amplification by further work, but the preliminary study has been useful in that a rapid technique has been worked out for handling large numbers of samples. It is proposed that a series should be carried through monthly for one year, *i.e.*, through one year's weather cycle.

(v.) *Husks.*—Laboratory work on husks was concerned with a more critical examination of analytical methods, particularly on the influence of the presence of tannins on the determination of pentosan, lignin, and cellulose. Comparative determinations with and without previous alcohol extraction did not show any marked differences.

(vi.) *Tapering Disease.*—There is no progress to report regarding the effect of manuring and cultivation in this direction since last year's report.

(vii.) *Fodder Grass Trials.*—An area along the western side of the stream on Bandirippuwa Estate and a portion on the western side towards the northern end of the estate were planted up in October and November, 1936, with Guinea, Napier, and Guatemala grasses.

Records of periodical cuttings are being kept. The original planting was not very successful, only a low percentage of cuttings surviving. Supplying was carried out during 1937 and there is now a better stand on the plots.

(viii.) *Miscellaneous Laboratory Work.*—Among interesting samples examined were cotton-seed cake and mee-seed cake, salt sediment (for potash, which was low), cattle manure, and composts.

(ix.) *Advisory.*—Advisory correspondence showed a further big increase in 1937, the number of inquiries answered being double that in 1936. The publication of Leaflet No. 3 "Cover Crops Suitable for Coconuts" in December, 1936, and of the Soil Chemist's article "Economic Manuring and Cultivation of Coconuts" in October, 1937, aroused considerable interest which was reflected in an increase of correspondence.

Visits were paid to 56 estates, as against 26 in the previous year, and reference may be made to the Soil Chemist's useful circuit in the Southern Province in the early part of the year.

(x.) *Staff.*—The Soil Chemist's agreement was renewed from July 1, 1937. The appointment of a second Field Assistant to the Department of Soil Chemistry has been referred to.

The Technical Assistant to the Soil Chemist gave occasional assistance to the Technological Chemist between April 1 and July 18.

4. *Library.*—Important additions to the library by purchase during the year were a complete set of "Industrial and Engineering Chemistry" from Vol. I., 1909, to date, and the bulk of the numbers required to complete the set (referred to last year) of the "Bulletin of the Imperial Institute". This set is now complete except for Vols. I. and II., 1903 and 1904, and part 2 of Vol. XXIV., 1936. The courtesy of the Director, Imperial Institute, in supplying the majority of the numbers required for a nominal sum is gratefully acknowledged.

Reference may be made to the fact that the Scheme's set of "The Tropical Agriculturist (Ceylon)" lacks Vols. VIII. to XVIII. and XX. to XXV., and the Director of Research would be glad to hear of copies of these which may be available for sale.

On December 31, 1937, the library contained 387 books and 613 bound volumes of periodicals (the latter number including 88 volumes loaned by the Director of Research). Corresponding figures for previous years have been—

| | Books. | Bound Volumes of Periodicals. | Total. |
|---|---|---|---|
| December 31, 1934 .. | 203 .. | 149 .. | 352 |
| " 1935 .. | 244 .. | 321 .. | 565 |
| " 1936 .. | 312 .. | 503 .. | 815 |
| " 1937 .. | 387 .. | 613 .. | 1,000 |

The number of current periodicals received is seventy-four, including those loaned by members of the staff. The principal addition to this list during 1937 was the "Kew Bulletin of Miscellaneous Information" supplied by courtesy

of the Director, Kew Gardens. The library also receives, in addition, a large number of periodicals, reports, &c., from Government Departments, Research Institutions, and other bodies, both in Ceylon and overseas. These are acknowledged individually by post, but this opportunity is taken of making a general acknowledgment to all those who kindly supply their publications gratis.

5. *Publications.*—

R. Child: "Ceylon Estate Copra". Tropical Agriculturist, 1937, Vol. LXXXVIII., No. 3 (March), pp. 137–149.

R. Child: "The Cost of Production of Coconuts and Copra in Ceylon", Ceylon Trade Journal, 1937, Vol. II., No. 4 (April), pp. 115–119.

Report and Accounts of the Coconut Research Scheme for 1936. Government Sessional Paper X.—1937. April 21, 1937, pp. iv.–14.

W. V. D. Pieris and M. L. M. Salgado: "Experimental Error in Field Experiments with Coconuts", Tropical Agriculturist, 1937, Vol. LXXXIX., No. 2 (August), pp. 75–85.

R. Child: "Seeds Yielding Lauric Acid"—I. *Neolitsea involucrata* (Lamk.) Merr., Ceylon Trade Journal, 1937, Vol. II., No. 9 (September), pp. 270–280

R. Child: "Edible Coconut Oil", Tropical Agriculturist, 1937, Vol. LXXXIX., No. 5 (November), pp. 270–280.

W. V. D. Pieris' "Studies on the Coconut Palm I. and II.", which appeared respectively in the Tropical Agriculturist, 1934, Vol. LXXXII., pp. 75–97, and 1935, Vol. LXXXV., pp. 208–220, have been reprinted in one cover.

M. L. M. Salgado's article on "Economic Manuring and Cultivation of Coconuts in Ceylon" ("Ceylon Daily News" of October 15, 1937) has been reprinted in pamphlet form.

R. Child's lecture on "The Improvement of Coconut Cultivation" has been reprinted as a pamphlet (No. 36) by the Department of Co-operative Societies in English and Sinhalese, and the lecture on "Some Economic Aspects of the Coconut Industry" has been printed in the Tropical Agriculturist, 1937, Vol. LXXXIX., No. 4, (October) pp. 222–237, in "Young Ceylon" and in the "Quarterly Journal of the Ceylon Economic Society." An abstract by R. Child of Vol. 2, No. 2 of the New Guinea Agricultural Gazette was published under the title "The Coconut Industry in New Guinea" in the Tropical Agriculturist, 1937, Vol. LXXXVIII., No. 6 (June), pp. 384–388.

Notes on the work of the Scheme were also contributed to the "Year Book of the Planters' Association of Ceylon (Kandy)" for the year 1936, pp. 104–107 (1937), to the "Handbook of the All-Ceylon Exhibition, May, 1937, pages 3, and to the "Estate and Industries Supplement" of the "Times of Ceylon", January 28, 1937. An article entitled "Coconut Oil in the World's Markets" also appeared in the latter publication, off-prints being available.

The following articles written in 1937 have been accepted or sent for publication :—

W. V. D. Pieris—"An Improved Soil Borer",

M. L. M. Salgado—"Goat Manure",

both accepted for publication in the Tropical Agriculturist early in 1938.

R. Child and S. Ramanathan: "The Composition of Coconut Shells", sent to the "Journal of the American Chemical Society".

*Leaflets.*—No. 2 "Nursery Management and Selection of Seedlings", pp. 9, and No. 4 "Transplantation", pp. 4, both by W. V. D. Pieris, were published in March and April, 1937, respectively.

Sinhalese versions of Leaflets Nos. 1 to 4 were published between February and May, 1937.

Leaflets Nos. 1 to 3 were reproduced in the Tropical Agriculturist, 1937, Vol. LXXXV[illegible] No. 4 (April), pp. 216–227.

A Tam[illegible]sion in shortened form of Leaflet No. 2 appeared in the Kamat Tholil Velaikk[illegible]7, Vol. IX., No. 4 (July-September), pp. 15–19; and of Leaflet No. 4 in the [illegible]blication, Vol. X., No. 1 (October-December, 1937), pp. 4–6.

Arrangements are being made to issue Tamil versions of all leaflets.

6. *Lectures, Exhibitions, &c.*—The following public lectures were given by members of the staff in 1937 :—

(*a*) "The Coconut Research Scheme and its work" by the Director of Research, at Matale on July 31, in connection with the Agricultural Week-end organized by the Propaganda Division of the Department of Agriculture. The Scheme also arranged an exhibit which was on view during the two days of the show (see below).

(*b*) "Some Economic Aspects of the Coconut Industry" by the Director of Research, given to the Ceylon Economic Society in Colombo on August 23.

(*c*) "The Improvement of Coconut Cultivation" by the Director of Research, given to the Annual Training Class of the Department of Co-operative Societies at Kandy on August 25.

The last two lectures have been published as stated above.

(*d*) "Co-operative Agricultural Experiments" by the Geneticist, delivered at a meeting of the Coconut Planters Joint Committee held at Bandirippuwa on November 13, 1937.

The Director of Research also gave a short impromptu talk on manurial experiments at a meeting of the Kurunegala Planters' Association held on June 12, at Kurunegala.

The Scheme staged exhibits illustrating various aspects of its work at the following exhibitions and shows held during the year :—

Agricultural Field Day at Kuliyapitiya, February 20.
Agricultural Field Day at Mawanella, March 20.
Agricultural Week-end at Matale, July 30 and 31.
Agricultural, Industrial, and Health Show, Harispattu, August 14 and 15.

These were all shows organized by the Propaganda Division of the Department of Agriculture. This co-operation in propaganda work has been a most useful new departure and it is desired cordially to acknowledge the action of the Propaganda Officer in inviting the Scheme's participation and of the assistance he has always afforded.

A stall was taken for illustrating the Scheme's work at the All-Ceylon Exhibition held in Colombo from May 10 to 25.

Reference should be made particularly to the good work put in by Mr. T. B. Weerakoon, Director's Clerk, in connection with all of the above shows. Mr. Weerakoon was usually in charge of the Scheme's stall and was a most useful propagandist, especially with smallholders.

7. *Meetings.*—The Senior Officers of the Scheme have continued to be honorary members of the Chilaw and Kurunegala Planters' Association and of the Coconut Planters' Joint Committee and have attended the meetings of these bodies when possible.

The Director of Research attended five meetings of the Board of Management as Secretary, eight meetings of the Buildings Sub-Committee as Secretary-Convener, 2 meetings of the Central Board of Agriculture and 1 meeting of the Ceylon Coconut Board, by special invitation.

The Geneticist attended the meeting of the Central Board of Agriculture held on November 18 to represent the Director of Research, absent through illness.

By permission of the Board of Management, the Coconut Planters' Joint Committee held most of their meetings in the Library at Bandirippuwa estate. Three such meetings were held in 1937, on March 13, September 11, and November 13. Since this Committee represents various coconut interests, this co-operation has been useful to both the Committee and the Scheme.

The revenue from the estate accordingly, in two parts, was as follows :—

*Revenue from Estate Management.*

| | Rs. c. | Rs. c. |
|---|---|---|
| 5th crop, 1936— | | |
| Sale of balance husks .. | 56 21 | |
| Sale of copra from rejections .. | 20 2 | 76 23 |
| 6th crop, 1936— | | |
| Sale of nuts .. | 3,161 93 | |
| Sale of copra from rejections .. | 22 83 | |
| Sale of husks .. | 179 66 | 3,364 42 |
| Crops 1–5, 1937— | | |
| Sale of nuts .. | 6,304 13 | |
| Sale of copra .. | 8,909 86 | |
| Sale of copra from rejections .. | 27 76 | |
| Sale of husks and sundries | 807 75 | |
| Sale of desiccated nut | 146 73 | 16,196 23 |
| | | 19,636 88 |

*Revenue from Research Management.*

| | Rs. c. | Rs. c. |
|---|---|---|
| 5th crop, 1936— | | |
| Sale of copra from experiments .. | | 22 40 |
| 6th crop, 1936— | | |
| Sale of nuts .. | 51 67 | |
| Sale of copra (experiments) | 431 50 | |
| Sale of husks .. | 24 34 | 507 51 |
| Crops 1–5, 1937— | | |
| Sale of nuts .. | 310 42 | |
| Sale of copra from experiments .. | 2,607 75 | |
| Copra from rejections .. | 1 35 | |
| Other copra .. | 532 40 | |
| Husks and sundries .. | 52 62 | 3,504 54 |
| Sale of seed-nuts and seedlings | | 1,555 45 |
| | | 5,589 90 |

Total gross revenue was thus Rs. 25,226·78, which may be summarized as under :—

| | | Average price. |
|---|---|---|
| Sale of 250,755 nuts realizing | Rs. 9,828·15 | Rs. 39·19 per 1,000 |
| Sale of copra 74 tons 16 cwt. 65 lb. realizing | Rs. 12,575·87 | Rs. 42·02 per candy |
| Sale of 1,803 lb. desiccated coconut realizing | Rs. 146·73 | 8.14 cents per lb. |
| Sale of 377,125 husks realizing | Rs. 1,031·58 | Rs. 2·74 per 1,000 |
| Sale of 30,000 shells realizing | Rs. 87·00 | Rs. 2·90 per 1,000 |
| Sale of 10 bottles honey realizing | Rs. 2·00 | Rs. 0·20 per bottle |
| Sale of seed-nuts and seedlings | Rs. 1,555·45 | Seed-nuts 10 cents each<br>Seedlings 20 cents each |
| | Rs. 25,226·78 | |

The net income (revenue less expenditure) for the portion under Estate Management was Rs. 13,267·52 or Rs. 25·24 per 1,000 nuts. The net income for the portion under Research Management was Rs. 1,112·13 and the total income from the whole estate was thus Rs. 14,379·65. The net income per acre (estate area) was approximately Rs. 112.

## Sundry Debtors and Creditors Account.

At the time of the Annual Audit Inspection in January, 1938, there had accrued a sum of Rs. 1,300 on account of part proceeds of the sale of the sixth crop, 1937, and a sum of Rs. 200 on account of seed-nuts supplied in 1937.

A sum of Rs. 4·65 was paid in January, 1938, on account of Research I. vote for liability incurred in 1937.

The foregoing items have been included in the Statements of Accounts appended to this report. The Estate Working Account there accordingly shows the net revenue for the whole estate as Rs. 15,875.

## Meteorological Observations.

The usual observations have been made at Bandirippuwa and monthly abstracts of the records have been sent to the Colombo Observatory. The total rainfall during 1937 was 87·41 in. falling on 149 rainy days ; wet days, *i.e.*, those on which 0·04 in. or more of rain fell numbered 121. The corresponding figures for 1936 were 93·26 in. on 131 rainy days.

Distribution was fair. Dry conditions were experienced at the beginning of the year, with a short period of absolute drought from February 2 to 18. After fairly satisfactory rainfall in April and May, dry conditions recurred with a dry spell of

38 days from July 22 to August 28, and an absolute drought from August 31 to September 24. This gave place to heavy rain at the end of September, 15·88 in. falling in four days from the 26th to 29th. After moderate north-east monsoon rains in November, the year closed with a dry month, rain only falling on four days during December.

### Buildings, Roads, &c.

A new building, comprising two stores, office for the Estate Superintendent, and a room to house the new larger set of storage batteries was completed in August, 1937. The design of this building allows for extensions on the western side if it is decided to erect a small factory building later.

A short connecting road was laid out between the Fertilizer and Cover Crop experimental areas. All existing roads have been maintained and improved by metalling corners on steep slopes.

### Finance.

The audited Statement of Accounts will be found attached.

E. RODRIGO,
Director of Agriculture, and
Chairman, Board of Management,
Coconut Research Scheme.

January 26, 1937.

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Audit Office,
Colombo, January 28, 1938.

The Chairman, Board of Management, Coconut Research Scheme, Peradeniya.

Sir,—I have the honour to report that the audit of the accounts of the Coconut Research Scheme for the year 1937 has been completed and have pleasure in forwarding the following statements duly certified :—

(*a*) Statement of Receipts and Disbursements for the year 1937.
(*b*) Estate Working Account for 1936.
(*c*) Revenue, Nett Revenue, and Surplus and Deficit Accounts for 1936.
(*d*) Capital Account and General Balance Sheet as at December 31, 1937.

2. The Statement of Receipts and Disbursements based on actual receipts and payments during the year is furnished in compliance with the statutory requirement in section 8 (2) of Ordinance No. 29 of 1928. The accounts of the Scheme which were being kept on the "Receipt and Payment" system were changed over to the "Income and Expenditure" system following a decision of the Board of Management during the year 1937. The budget of the Scheme for the year under review had however been prepared and settled on the "Receipt and Payment" basis. Consequently, increases on the budgetted Revenue and Expenditure items are shown under certain items of Revenue and Expenditure.

### I.—Income.

3. The total income accrued during the year amounted to Rs. 106,075. It exceeded the estimate of Rs. 88,104 by Rs. 17,971 and the revenue of the previous year by Rs. 13,007.

4. *Grants.*—The annual grant of Rs. 30,000 payable by Government under section 6 (1) (*b*) of Ordinance No. 29 of 1928 has been duly received.

5. *Cess Collections.*—The amount accrued for the year was Rs. 53,088 inclusive of the collections made by the Principal Collector of Customs during December, 1937, but received in January, 1938. The amount shown in the Revenue Account under

this item of revenue is Rs. 54,876. The difference is due to the sum of Rs. 1,788 received during the year in respect of the cess collected during December, 1936, but not accounted for in that year.

6. *Interest.*—The amount accounted for during the year is Rs. 3,798. This amount includes in addition to the sum of Rs. 2,892 received as interest on fixed deposits in banks, on the investment in the Ceylon Government 3½ per cent. loan and on loan to the Director of Research, a sum of Rs. 600 being the difference between the face value of the Ceylon Government 3½ per cent. stock and the purchase price thereof and Rs. 306 being the interest accrued on the fixed deposit of Rs 20,000 and the Ceylon Government 3½ per cent. stock up to the close of the year under review.

7. *Profit from Estate.*—The total income earned from the estate and research block for the year under review was Rs. 26,727. The expenditure incurred on working the estate amounted to Rs. 10,852 leaving a profit of Rs. 15,875. This profit includes a sum of Rs. 3,837 realized in 1937 from sale of the 6th crop of 1936. The actual nett profit in respect of the year is therefore Rs. 12,038.

## II.—EXPENDITURE.

8. The total expenditure on Revenue Account exclusive of the amounts allowed for depreciation on capital assets amounted to Rs. 59,036. The details of this expenditure are fully set forth in the Revenue Account. The expenditure charged to Capital Account amounted to Rs. 13,798. This sum includes Rs. 11,799 spent on buildings, Rs. 1,568 on the laboratory and Rs. 430 on office furniture, accumulators, and the museum. The whole of this expenditure was checked with supporting vouchers.

9. The following is a comparison between the original estimate and the expenditure incurred :—

| Account. | Estimated. Rs. c. | Actual. Rs. c. | Excess. Rs. c. | Supplementary. Rs. c. |
|---|---|---|---|---|
| A.—*Capital :* | | | | |
| Buildings— | | | | |
| Battery room .. .. | — .. | 7,799 50 .. | 7,799 50 .. | 8,435 [illegible] |
| Extensions to bungalows .. | — .. | 4,000 0 .. | 4,000 0 .. | 8,450 [illegible] |
| Equipment of laboratory .. | 2,500 0 .. | 1,567 60 | — .. | — |
| Office furniture and equipment .. | — .. | 120 0 | 120 0 .. | 120 [illegible] |
| Museum .. .. | 1,000 0 .. | 274 85 | — .. | — |
| Accumulators, &c. .. | — .. | 36 0 .. | 36 0 .. | 1,[illegible] |
| B.—*Personal Emoluments :* | | | | |
| Salaries of senior staff .. | 28,922 0 .. | 29,711 29 .. | 789 29 .. | 960 [illegible] |
| Salaries of junior staff .. | 12,031 0 .. | 11,682 14 .. | — .. | 250 [illegible] |
| Provident fund contribution (for 1936) .. .. | 2,200 0 .. | 2,151 86 .. | — .. | — |
| Rent allowance .. .. | 340 0 .. | 288 43 .. | — .. | 12 [illegible] |
| C.—*Other Charges :* | | | | |
| Travelling expenses of staff .. | 2,500 0 .. | 3,012 4 .. | 512 4 .. | 450 [illegible] |
| Travelling expenses of Board Members .. .. | 750 0 .. | 645 65 .. | — .. | — |
| D.—*Office :* | | | | |
| Stationery .. .. | 750 0 .. | 851 36 .. | 101 36 .. | 150 [illegible] |
| Postages .. .. | 500 0 .. | 602 37 .. | 102 37 .. | — |
| Printing and advertising .. | 1,500 0 .. | 1,669 24 .. | 169 24 .. | 180 [illegible] |
| Incidental expenses .. | 800 0 .. | 947 84 .. | 147 84 .. | 250 [illegible] |
| Telephone .. .. | 460 0 .. | 503 80 .. | 43 80 .. | 43 80 |
| E.—*Laboratory :* | | | | |
| Upkeep, chemicals, &c. .. | 2,000 0 .. | 2,357 45 .. | 357 45 .. | 250 [illegible] |
| Scientific books and periodicals .. | 2,500 0 .. | 2,237 18 .. | — .. | — |

| Account. | Estimated. | Actual. | Excess. | Supplementary. |
|---|---|---|---|---|
| | Rs. c. | Rs. c. | Rs. c. | Rs. c. |
| *F.—Buildings :* | | | | |
| Upkeep of buildings .. | 1,000 0 .. | 1,051 46 .. | 51 46 .. | 50 0 |
| Insurance of buildings .. | 452 0 .. | 450 25 .. | — .. | — |
| Running expenses of electric plant | 2,000 0 .. | 2,325 0 .. | 325 0 .. | 350 0 |
| *G.—Estate :* | | | | |
| General charges .. .. | 2,250 0 .. | 2,281 76 .. | 31 76 .. | — |
| Upkeep .. .. | 1,500 0 .. | 1,298 91 .. | — .. | — |
| Cultivation .. .. | 1,000 0 .. | 378 48 .. | — .. | — |
| Collection .. .. | 600 0 .. | 520 21 .. | — .. | — |
| *H.—Research Account :* | | | | |
| General and nursery .. | 1,000 0 .. | 1,800 67 .. | 800 67 .. | 770 0 |
| Manurial experiments .. | 2,500 0 .. | 2,681 75 .. | 181 75 .. | 100 0 |
| *J.—Reserve for Depreciation* .. | 14,020 0 .. | 14,272 29 .. | 252 29 .. | — |
| *Government of Ceylon Loan Interest Account* .. .. | — .. | 438 35 .. | 438 35 .. | — |

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

| | Rs. c. |
|---|---|
| C.—Travelling expenses of staff .. .. .. | 62 4 |
| D.—Postages .. .. .. .. | 102 37 |
| D.—Printing and advertising .. .. .. | 9 24 |
| E.—Upkeep, chemicals, &c. .. .. .. | 107 45 |
| F.—Upkeep of buildings .. .. .. | 1 46 |
| G.—General charges .. .. .. | 31 76 |
| H.—General and nursery .. .. .. | 30 67 |
| H.—Manurial experiments .. .. .. | 81 75 |
| J.—Reserve for depreciation .. .. .. | 252 29 |
| Government of Ceylon Loan Interest account .. .. | 438 35 |

11. The omission to cause the statements of supplementary provision to be tabled in the State Council as required by section 8 (1) of Ordinance No. 29 of 1928 was pointed out in paragraph 9 of my report on the audit of the accounts of the Scheme for the year 1936. The Board decided to rectify this omission by causing the supplementary estimates to be tabled along with the estimates for the subsequent year in October, 1937. The minutes of the State Council meetings for 1937 do not however record that these statements have been so tabled.

## III.—Surplus.

12. The Scheme began the year with a surplus of Rs. 66,398. The result of the year's working showed a surplus of Rs. 32,767, of which a sum of Rs. 13,798 was utilized on capital works, leaving a nett surplus of Rs. 18,969 for the year under review. The accumulated surplus at the close of the year therefore stood at Rs. 85,367.

## IV.—Balance Sheet.

### (a) *Liabilities.*

13. *Contribution to Capital Outlay : Rs. 488,849.*—This sum represents the total amount of contributions made from revenue towards the capital outlay of the Scheme. The amount contributed during the year was Rs. 13,798.

14. *Passage Fund Reserve : 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.

15. *Provident Fund : Rs. 17,857.*—The balance to the credit of this fund at the beginning of the year was Rs. 13,729. The contributions made by the officers during the year amounted to Rs. 1,986. The contribution made from the funds of the Scheme amounted to Rs. 2,152 inclusive of the interest on the balance of the fund for 1936.

—J. N. 73877 (4/38)

16. *Reserve for Depreciation : Rs. 71,423.*—The balance on December 31, 1936, was Rs. 57,151. A sum of Rs. 14,272 was transferred from revenue to this account during the year under review. This amount has been arrived at as follows :—

| | | Rs. c. |
|---|---|---|
| Buildings at 5 per cent. on Rs. 156,153·71 | .. | 7,807 69 |
| Laboratory structures at 5 per cent. on Rs. 52,370·56 | .. | 2,618 53 |
| Laboratory equipment at 10 per cent. on Rs. 17,854·47 | .. | 1,785 45 |
| Gas plant at 10 per cent. on Rs. 2,254·91 .. | .. | 225 49 |
| Furniture for bungalows at 10 per cent. on Rs. 2,732·33 | .. | 273 23 |
| Office furniture and equipment at 10 per cent. on Rs. 1,136·22 | | 113 62 |
| Accumulators at 12½ per cent. on Rs. 11,366·27 | .. | 1,420 79 |
| Museum at 10 per cent. on Rs. 274·85 .. | .. | 27 49 |
| | | 14,272 29 |

17. *Loan from Ceylon Government : Rs. 50,000.*—This sum represents the amount of the loan obtained from the Government in October, 1937, for the purchase of the Ratmalgara estate. The purchase of the estate had not been effected by the close of the year and the whole of the loan was therefore unspent.

18. *Creditors : Rs. 894.*—Of this amount, a sum of Rs. 438 represents the interest accrued up to the close of the year on the loan of Rs. 50,000 obtained from the Government. So far as it can be ascertained all outstanding liabilities on December 31, 1937, have been brought to account with the exception of the cost of audit for 1937, amounting to Rs. 451·76.

(*b*) *Assets.*

19. *Capital Expenditure : Rs. 488,849.*—The details of this expenditure are set forth in the Capital Account. A sum of Rs. 71,423 which is about 14·6 per centum of the total capital expenditure has been provided for the depreciation of these assets.

20. *Debtors : Rs. 5,844.*—Of this amount a sum of Rs. 4,344 was due from the Deputy Financial Secretary on account of cess collections made during December, 1937. This sum was received from him during January, 1938. The balance Rs. 1,500 represents the amount realized from the sale of produce collected in 1937.

21. *Accrued Interest : Rs. 306.*—This amount represents the amount of interest accrued on the fixed deposit of Rs. 20,000 and on the sum of Rs. 60,000 invested in the Ceylon Government 3½ per cent. loan during the year under review.

22. *Loan to the Director of Research : Rs. 332.*—This amount represents the balance outstanding 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.

23. *Investments : Ceylon Government 3½ Loan, 1937-62 : Rs. 60,000.*—The stock certificate in support of this investment was seen at the inspection of the office in January, 1938. The actual cost of this stock was Rs. 59,400. Its present market value at Rs. 100½ is Rs. 60,075.

24. *Cash Balances : Rs. 163,045.*—The receipt in support of the fixed deposit of Rs. 20,000 in the National Bank of India, Limited, Colombo, was seen. 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, 1937, was not verified but a surprise verification of cash, &c., was made on January 24, 1938.

V.—GENERAL.

25. 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 Bandirippuwa 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,
O. E. GOONETILLEKE,
Auditor-General.

## COCONUT RESEARCH SCHEME.

Statement of Receipts and Disbursements for the year, 1937.

| Receipts. | Rs. c. | Rs. c. |
|---|---|---|
| *Revenue Account :* | | |
| Annual grant from Government. | 30,000 0 | |
| Cess collections .. | 50,531 91 | |
| Interest .. | 3,491 83 | |
| Income from Bandirippuwa estate | 25,226 78 | |
| Charges to staff for electricity .. | 980 94 | |
| Sundry receipts .. | 187 9 | |
| Sale of publications .. | 317 48 | |
| Charges for telephone .. | 40 0 | |
| | | 110,776 3 |
| *Advance Account :* | | |
| Repayment of loan to Director of Research .. .. | | 1,992 0 |
| *Deposit Account :* | | |
| Contractors tender deposits .. | 60 0 | |
| Provident Fund .. | 4,137 65 | |
| Depreciation reserve account .. | 14,272 29 | |
| | | 18,469 94 |
| Loan from the Government of Ceylon | | 50,000 0 |
| Balance at January 1, 1937 .. | | 138,939 88 |
| | | 320,177 85 |

| Disbursements. | Rs. c. | Rs. c. |
|---|---|---|
| *Expenditure Account* | | |
| Capital Account : | | |
| Buildings : Battery room ... | 7,799 50 | |
| Extension to bungalows | 4,000 0 | |
| Equipment of laboratory .. | 1,567 60 | |
| Office furniture and equipment .. | 120 0 | |
| Museum .. .. | 274 85 | |
| Accumulators .. .. | 36 0 | |
| | | 13,797 95 |
| Personal Emoluments. | | |
| Salaries of senior staff .. | 29,711 29 | |
| Salaries of junior staff .. | 11,682 14 | |
| Provident Fund contributions for 1936 and interest .. | 2,151 86 | |
| Rent allowance .. | 288 43 | |
| | | 43,833 72 |
| Other Charges : | | |
| Travelling expenses of staff .. | 2,873 44 | |
| Travelling expenses of Board Members .. .. | 645 65 | |
| | | 3,519 9 |
| Office expenses : | | |
| Stationery .. .. | 851 36 | |
| Postage .. .. | 592 97 | |
| Printing and advertising .. | 1,669 24 | |
| Incidental expenses .. | 947 84 | |
| Telephone .. .. | 503 80 | |
| | | 4,565 21 |
| Laboratory : | | |
| Upkeep, chemicals, &c. .. | 2,252 45 | |
| Scientific books and periodicals | 2,237 18 | |
| | | 4,489 63 |
| Buildings : | | |
| Upkeep of buildings .. | 1,054 46 | |
| Insurance of buildings .. | 450 25 | |
| Running expenses of electric plant .. .. | 2,127 8 | |
| | | 3,628 79 |
| Estate : | | |
| General charges .. | 2,251 76 | |
| Upkeep .. .. | 1,298 91 | |
| Cultivation .. .. | 378 48 | |
| Collection .. .. | 520 21 | |
| | | 4,479 36 |
| Research account : | | |
| General and nursery .. | 1,796 2 | |
| Manurial experiments .. | 2,681 75 | |
| | | 4,477 77 |
| Reserve for depreciation .. | | 14,272 29 |
| | | 97,063 81 |
| Deposit account : | | |
| Contractors' tender deposit .. | 60 0 | |
| Provident Fund : Refund of contributions .. | 9 51 | |
| | | 69 51 |
| Balance at December 31, 1937 : | | |
| Ceylon Government 3½ per cent loan stock .. .. | 60,000 0 | |
| On fixed deposit at bank .. | 20,000 0 | |
| On current account at bank .. | 142,541 43 | |
| Cash in hand .. .. | 503 10 | |
| | | 223,044 53 |
| | | 320,177 85 |

Audited and found correct :

G. E. GOONETILLEKE,
Auditor-General.

Audit Office,
Colombo, January 28, 1938.

E. RODRIGO,
Chairman, Board of Management, Coconut Research Scheme.

Peradeniya, January, 31 1938

Dr. Estate working account for the year ended December 31, 1937. Cr.

| Expenditure. | Rs. c. | Rs. c. |
|---|---|---|
| *To Estate Expenditure :* | | |
| Salary of Superintendent .. | 1,890 0 | |
| General charges .. | 2,251 76 | |
| Upkeep .. .. | 1,298 91 | |
| Cultivation .. .. | 378 48 | |
| Collection .. .. | 520 21 | |
| | | 6,369 36 |
| *Research Expenses I. :* | | |
| General and nursery .. | | 1 800 67 |
| *Research Expenses II. :* | | |
| Manurial experiments .. | | 2,681 75 |
| Balance carried forward .. | | 15,875 0 |
| | | 26,726 78 |

| Income. | Rs. c. | Rs. c. |
|---|---|---|
| *By Sale of Produce :* | | |
| (a) Estate : | Rs. c. | |
| Nuts .. | 10,766 6 | |
| Copra .. | 8,909 86 | |
| | 10,675 92 | |
| Copra from rejections .. | 70 61 | |
| Husks and sundries .. | 1,190 35 | |
| | | 20,936 88 |
| (b) Research : | | |
| Copra from experiments .. | 3,061 65 | |
| Other copra .. | 332 40 | |
| Seed nuts and seedlings .. | 1,755 45 | |
| Copra from rejections .. | 1 35 | |
| Husks and sundries .. | 439 5 | |
| | | 5,789 90 |
| | | 26,726 78 |

—J. N. 75677 (4/38)

## Revenue Account as at December 31, 1937.

| *Dr.* | Rs. c. | Rs. c. | | Rs. c. |
|---|---|---|---|---|
| *To Personal Emoluments :* | | | By Grant from Government | 30,000 0 |
| Salaries of senior staff .. | 29,711 29 | | Cess collections .. | 54,876 12 |
| Salaries of junior staff .. | 9,792 14 | | Interest .. | 3,798 9 |
| Provident Fund Contribution and interest for 1936 .. | 2,151 86 | | Charges to staff for electricity .. | 980 94 |
| Rent allowance .. | 288 43 | | Sale of publications .. .. | 317 48 |
| | | 41,943 72 | Charges for telephone .. .. | 49 5 |
| *Other Charges :* | | | Sundry receipts .. .. | 157 9 |
| Travelling expenses of staff | 3,012 4 | | Balance from Estate Working account .. | 15,375 9 |
| Travelling expenses of Board Members .. | 645 65 | | | |
| | | 3,657 69 | | |
| *Office :* | | | | |
| Stationery .. | 851 36 | | | |
| Postage .. .. | 602 37 | | | |
| Printing and advertising .. | 1,069 24 | | | |
| Incidental expenses .. | 947 84 | | | |
| Telephone charges .. | 503 80 | | | |
| | | 4,574 61 | | |
| *Laboratory :* | | | | |
| Upkeep, chemicals, apparatus, and instruments .. | 2,357 45 | | | |
| Scientific books and periodicals .. .. | 2,237 18 | | | |
| | | 4,594 63 | | |
| *Buildings :* | | | | |
| Upkeep .. .. | 1,051 46 | | | |
| Insurance .. | 450 25 | | | |
| Running expenses of electric plant .. | 2,325 0 | | | |
| | | 3,826 71 | | |
| Government of Ceylon Loan, Interest Account .. .. .. | | 438 35 | | |
| Depreciation Account .. .. | | 14,272 29 | | |
| Balance carried forward to net Revenue Account .. .. | | 32,766 93 | | |
| | | 106,074 93 | | 106,074 93 |

## Net Revenue Account.

| *Dr.* | Rs. c. | | Cr. Rs. c. |
|---|---|---|---|
| To Contribution to Capital outlay .. | 13,797 95 | By Balance brought forward from Revenue Account .. .. | 32,766 93 |
| Balance carried forward to Surplus and Deficit Account .. .. | 18,968 98 | | |
| | 32,766 93 | | 32,766 93 |

## Surplus and Deficit Account for 1937.

| | Rs. c. | | Rs. c. |
|---|---|---|---|
| To Balance .. .. | 85,366 89 | By Balance on December 31, 1936 .. | 66,397 91 |
| | | Amount brought forward from Net Revenue Account .. .. | 18,968 98 |
| | 85,366 89 | | 85,366 89 |

## Capital Account as at December 31, 1937.

| EXPENDITURE. | To December 31, 1936. | Additions 1937. | Total. | RECEIPTS. | Rs. c. |
|---|---|---|---|---|---|
| | Rs. c. | Rs. c. | Rs. c. | | |
| To Land Acquisition : | | | | By Revenue contributions to Capital Outlay | 458,843 81 |
| Purchase of Bandirippuwa estate .. | 187,554 68 | — | 187,554 68 | | |
| Buildings .. | 176,671 95 | 11,799 50 | 188,471 45 | | |
| Laboratory .. | 87,010 37 | 1,567 60 | 88,577 97 | | |
| Gas plant .. | 3,436 83 | — | 3,436 83 | | |
| Furniture for bungalows .. | 4,164 49 | — | 4,164 49 | | |
| Office furniture and equipment .. | 1,500 17 | 120 0 | 1,620 17 | | |
| Accumulators .. | 14,712 37 | 36 0 | 14,748 37 | | |
| Museum .. | — | 274 85 | 274 85 | | |
| | 475,050 86 | 13,797 95 | 488,848 81 | | 458,843 81 |

General Balance Sheet as at December 31, 1937.

| LIABILITIES. | | Rs. c. | | ASSETS. | | Rs. c. | |
|---|---|---|---|---|---|---|---|
| Contribution to capital outlay | | | 488,868 81 | Capital expenditure | | | 488,848 81 |
| Passage Fund reserve | | | 3,985 86 | *Debtors :* | | Rs. c. | |
| *Provident Fund :* | | Rs. c. | | Cess collection for December, 1937 | | 4,344 42 | |
| At December 31, 1936 | | 13,729 30 | | Estate Account | | 1,300 0 | |
| Receipts during 1937 | | 4,137 65 | | Research Account | | 200 0 | |
| | | 17,866 95 | | | | | 5,844 42 |
| *Less* Refunds during 1937 | | 9 51 | | *Accrued Interest :* | | | |
| | | | 17,857 44 | On fixed deposit | | 43 76 | |
| *Depreciation Reserve :* | | | | On Ceylon Government 3½ per cent. loan | | 262 50 | |
| At December 31, 1936 | | 57,150 81 | | | | | 306 26 |
| Reserved in 1937 | | 14,272 29 | | Loan to the Director of Research | | | 332 0 |
| | | | 71,423 10 | Investments—Ceylon Government 3½ per cent. loan | | | 60,000 0 |
| Loan from the Government of Ceylon | | | 50,000 0 | *Cash :* | | Rs. c. | |
| *Creditors :* | | Rs. c. | | At Bank on fixed deposit | | 20,000 0 | |
| Accrued interest on loan from Government | | 438 35 | | At Bank on Current account | | 142,541 43 | |
| Sundries | | 455 57 | | In hand | | 503 10 | |
| | | | 893 92 | | | | 163,044 53 |
| Surplus | | | 85,366 89 | | | | |
| | | | 718,376 2 | | | | 718,376 2 |

I hereby certify that subject to my report dated January 28, 1938, the above Balance Sheet correctly sets forth the position of the affairs of the Coconut Research Scheme, Ceylon, as shown by the books on December 31, 1937.

Audit Office,
Colombo, January 28, 1938.

O. E. GOONETILLEKE,
Auditor-General.