Report of the Work of The Rubber Research Board in 1943.

The present report is the thirteenth Annual Report of the Rubber Research Scheme (Ceylon) as constituted under the Rubber Research Ordinance (Chapter 302).

CHAIRMAN'S REPORT

Board Membership.—The three-year period of the following nominated members of the Board terminated during the year and appointments to fill the vacancies were made as indicated below :—

Mr. I. L. Cameron, 15th April. Mr. R. J. Hartley nominated.
Mr. L. M. M. Dias, 12th April. Mr. S. F. H. Perera nominated.
Mr. J. D. Farquharson, 25th June. Mr. R. C. L. Notley nominated.
The Hon'ble Mr. G. E. de Silva, 13th July. Renominated.

The following additional changes in the membership of the Board occurred during the year :—

Mr. E. Rodrigo resumed duties as Chairman of the Board from 2nd January.

Mr. E. C. Villiers resigned on 22nd May and Mr. G. R. Whitby, M.S.C. was nominated in his place from 5th August. Special reference was made to Mr. Villiers' long period of service, at the meeting held on 16th July.

The personnel of the Board at the end of 1943 was as follows :—

Ex-Officio Members.

The Director of Agriculture — (Mr. E. Rodrigo, C.C.S.)
Representing the Financial Secretary — The Deputy Financial Secretary (Mr. C. E. Jones, C.C.S.)

Unofficial Members of the State Council nominated by H. E. the Governor.

The Hon'ble Mr. G. E. de Silva, M.S.C.
Mr. R. C. Kannangara, M.S.C.
Mr. G. R. Whitby, M.S.C.

Members nominated by the Ceylon Estates Proprietary Association.

Mr. W. H. Attfield.
Mr. L. P. Gapp.

Members nominated by the Planters' Association of Ceylon.

Mr. F. H. Griffith, M.S.C.
Mr. R. C. L. Notley.

Members nominated by the Rubber Growers' Association.

Mr. R. J. Hartley.
Mr. E. W. Whitelaw.

Members nominated by the Low Country Products Association of Ceylon.

Mr. T. Amarasuriya, M.S.C.
Mr. W. N. Gunawardena, J.P.
Mr. J. L. D. Peiris.
Mr. S. F. H. Perera.

Members nominated by H. E. the Governor to represent smallholders.

Mr. W. P. H. Dias, J.P.
Mr. F. A. Obeyesekere.

Meetings.—Meetings of the Board were held in Colombo on 25th January, 24th May, 16th July, 18th October and 9th December. The Board is again indebted to the Ceylon Chamber of Commerce for the use of its Committee room for meetings.

Committees :—

Experimental Committee.—The membership of the Committee was increased to six, and Mr. S. F. H. Perera was nominated from 24th May. The personnel of the Committee at the end of the year was as follows :—

Mr. F. H. Griffith, M.S.C. (Chairman).
Mr. W. P. H. Dias, J.P.
Mr. R. C. Kannangara, M.S.C.
Mr. F. A. Obeyesekere.
Mr. S. F. H. Perera.
The Director (Convener).

Meetings of the Committee were held on 22nd February, 17th May, 6th September and 20th November.

Smallholdings Committee.—There were no changes in the personnel of the Committee which, at the end of the year, was as follows :—

Mr. W. P. H. Dias, J.P.
Mr. F. A. Obeyesekere.
The Smallholdings Propaganda Officer.
The Director (Chairman and Convener).

A meeting of the Committee was held on 6th September.

London Advisory Committee for Rubber Research (Ceylon and Malaya.)—The Board contributed equally with the Imperial Institute to the cost of research on the quality and utilisation of raw rubber carried out at the Imperial Institute under the control of the London Advisory Committee for Rubber Research (Ceylon and Malaya). Meetings of the Advisory Committee and of the Technical Sub-Committee were held on 24th September.

FINANCE

Income.—The Board's main income was derived from the cess of ¼ cent per pound on exports of rubber under Section 6(1)a of the Rubber Research Ordinance. Income from this source fell short of the estimate for the year.

Monthly cess collections were as follows :—

January	... Rs.	27,843	B/forward	... Rs.	132,228
February	... „	21,527	July	... „	16,661
March	... „	19,489	August	... „	24,204
April	... „	20,323	September	... „	30,172
May	... „	10,714	October	... „	29,690
June	... „	32,332	November	... „	18,202
C/over	... „	132,228	December	... „	22,401
				Rs.	273,558

A profit of Rs. 27,618 was derived from the normal working of Dartonfield Estate and Rs. 21,115 from Nivitigalakele.

Expenditure.—Current expenditure amounted to Rs. 249,839, leaving a surplus for the year of Rs. 86,498. Of this amount Rs. 42,558 has been transferred to the Reserve for Stabilisation of Income.

Capital expenditure amounting to Rs. 25,415 was incurred mainly in respect of Agricultural Development (Rs. 10,126), Construction of Labourers' cottages (Rs. 8,563), Furniture and Equipment (Rs. 2,381), Water and Power Supply (Rs. 1,756), and Survey of Hedigalla cart road (Rs. 1,604).

Accounts.—The accounts of the Scheme have been audited by the Auditor General and his report, together with a Balance Sheet and Income and Expenditure Account, are attached.

Technical Reports

The Director's report, which embodies the reports of the other officers, and the report of the London Advisory Committee for Rubber Research (Ceylon and Malaya) are attached.

(Sgd.) L. J. SENEVIRATNE,
Chairman of the Board,
Rubber Research Scheme (Ceylon).

DIRECTOR'S REPORT

During 1943 the Research Scheme continued to follow the wartime policy of maintaining the continuity of experimental work as far as possible, whilst giving every assistance to the Authorities on matters relating to the War Effort.

The present report, which has been condensed in view of paper scarcity, includes a short summary of the work of each department prepared by the officer concerned.

Staff

Director.—Mr. T. E. H. O'Brien was in charge of the work of the Scheme during the year. Mr. O'Brien's service agreement was renewed for 3 years and 8 months from 19th August, 1944.

Chemical Department.—Mr. M. W. Philpott, Chemist, was on duty during the year. Mr. Philpott's service agreement was extended for one year from 14th July.

Botanical Department.—Mr. C. C. T. Sharp, Temporary Botanist, was absent on local sick leave from October 14th, and was granted 8 months' overseas leave from December.

Dr. C. E. Ford, Geneticist, was on military service during the year.

Mr. C. A. de Silva, Assistant Botanist, was on duty during the year. Mr. De Silva's service agreement was renewed for 4 years and 3 months from 1st December.

Soils Department.—Dr. L. A. Whelan, Soil Chemist, was on duty during the year.

Smallholdings Department.—Mr. W. I. Pieris, Smallholdings Propaganda Officer, was absent on vacation leave for 3 months from 21st September. Mr. G. A. de Silva was in charge of the department during this period. Mr. Pieris' service agreement was renewed for 4 years and 3 months from 1st January, 1944.

Estate Department.—Mr. G. P. N. de Silva, Estate Superintendent, was on duty during the year.

Junior Staff.—Salary scales were again reviewed by the Board during the year, and improved incremental scales were adopted for all grades. The prospects open to junior employees of the Scheme now compare favourably with those of Government or commercial employees of similar standing.

The Medical Fund which was started during the year has proved very useful to the staff.

CHEMICAL DEPARTMENT

As most of the problems handled were related more or less directly to the prosecution of the war many of the department's activities are not referred to in this report. The small scale vulcanising equipment at Dartonfield was again freely used to manufacture special products for the military and other essential services.

The Chemist co-operated in an advisory capacity with the Eastern Group Supply Council, with the Ceylon Department of Transport and with private firms in Ceylon engaged in the retreading of tyres.

Maximum Production of Rubber.—The scope for augmenting Ceylon's output of rubber by exploiting new rubber-bearing plants appears to be small and nothing new or valuable resulted from the examination of a few non-Hevea rubbers that were received at the laboratories for testing.

A proposal to increase the productivity of rubber growing territories by planting Hevea seed at high density and harvesting the rubber after one or two years was examined experimentally by tapping 500 two-year-old nursery seedlings for a period of 9 months. The rubber was collected by stripping the dry exudate that formed after each tapping. The trial indicated that with a planting density of 20,000 plants per acre a monthly yield of about 50 lbs. of poor quality rubber might be expected; but that the labour requirements for tapping would be enormous.

Towards the end of 1942 a claim was made by a local producer that the output of rubber from Ceylon could be much increased by adding coconut milk to latex before coagulation, and that the product was not inferior to standard rubber. This suggestion was distinguished from others of a like nature chiefly by the publicity that it achieved and by the obvious danger that it might be put into practice on a large scale. A full report was therefore made in June describing a series of experiments which were carried out to test the claim, and strongly recommending that rubber-growers should reject all unofficial proposals to adulterate or in any other way modify their product.

In response to a suggestion from London, determinations were made of the rubber content of Hevea fruits. The quantities of rubber found were far too small to be of practical interest, being usually less than ½ gram per seed-pod.

Improvement of Hevea by Selection.—Rubbers from different trees are known to vary greatly in some of their characteristics, but how far the general properties of plantation rubber can be modified by selection and breeding is still a subject for speculation. Yet many technologists, believing that the economic future of natural rubber is closely linked with its technical properties, consider this to be one of the industry's most urgent scientific problems.

Towards the end of the year the Board decided that work on selection for special qualities should be given priority during 1944. At the end of the year a memorandum defining the technical implications of the enquiry was circulated to other scientific workers in this field, and two additional Laboratory Assistants were appointed to work on the collection and study of individual tree samples.

Meanwhile, in order to determine whether the characteristics of mother trees are transmitted to their vegetative progeny, budgrafts were taken from twenty trees some of which are known to yield very hard and some very soft rubbers. These trees which have maintained their plasticity characteristics over a period of at least two years provide valuable material for studying not only the relationships between parent and progeny, but also the association which may exist between plasticity and other properties.

Water-Soluble Acids of Latex.—Potassium phenylacetate, a known constituent of latex, has been shown to be either an accelerator of vulcanisation or an activator of other accelerators. It is also on record that the vulcanising properties of some slow curing rubbers can be artificially improved by the addition of sodium acetate. Since there is believed to be considerable variation in the amount of water-soluble acids in the aqueous phase of different latices it seems logical to enquire how much of the observed variation in curing properties of plantation rubber can be attributed to these acids alone.

Comparing the effects of the potassium salts of the normal fatty acid series (2 millimols per 100 grams of partially purified rubber) it was found that the most pronounced activation of mercaptobenzthiazole occurs with the C_6 or C_8 acids. It is noteworthy that, although potassium hydroxide also activates mercaptobenzthiazole, as do the free acids themselves (particularly in the absence of added stearic acid), the potassium or sodium salts are more effective than either. Another point of interest is that whereas the salts, (*e.g.*, sodium acetate) activate mercaptobenzthiazole they exert a contrary effect with diphenylguanidine. Thus if variability in rubbber is caused, in part, by differences in the content of water soluble acids or salts, the evaluation of a particular rubber might largely depend on the test mixing employed: a claim which was in fact made by Dinsmore and Zimmerman in 1926. It is hoped to give further attention to this subject during 1944.

Meteorological Observations

The weather summary for 1943 is shown below:—

	1943	1942
Rainfall (ins.) ...	176.58	179.71
Highest monthly rainfall (ins.) ...	28.03 (May)	24.28 (Oct.)
Highest daily rainfall (ins.) ...	5.19 (14-15 Oct.)	9.47 (23 April)
Highest shade temperature (day) ...	92.5° (25th Feb.)	94.1° (19th Feb.)
Lowest temperature (night) ...	66.5° (30th Nov.)	63.7° (25th Jan.)
Number of rainy days ...	245	253

BOTANICAL AND MYCOLOGICAL DEPARTMENT

The Government Plant Pathologist continued to deal with enquiries on mycological subjects on behalf of the Research Scheme during 1943. Twenty-one specimens of diseased plants were received for report; 16 were dealt with by the Botanical Staff, and the remainder forwarded to the Plant Pathologist at Peradeniya.

Diseases and Pests

Oidium.—An observer in the Matale district reported that the attack of Oidium in that district was the worst yet experienced, and continued in a virulent form until October. The disease was also severe in Uva and Moneragala.

In the wet low-country districts there was a sharp attack during the main refoliation season, leading to substantial loss of foliage on many estates. Late wintering clones were also severely attacked on some estates.

Several cases of *Diplodia* dieback of young budded trees, which had been been affected by Oidium, were investigated. In the low-country damage was of a minor nature but, on one estate at an elevation of 1,000-1,500 feet, 10 per cent of the trees were affected and 2 per cent had died down to the main stem. The outbreaks were attributed to weakening of the trees due to severe attack by Oidium.

Phytophthora.—Secondary leaf-fall caused by *Phytophthora palmivora* was less severe than in 1942, but led to loss of foliage on many low-country estates during the S. W. monsoon. Dieback of green shoots of young budded plants, caused by the same fungus, also occurred on some estates.

There can be no doubt that the annual losses of leaf from Oidium and Phytophthora in the main low-country districts, while less spectacular than the defoliation caused by Oidium at higher elevations, have a serious cumulative effect on the health of the trees.

Canker.—A severe outbreak of canker of the renewing bark of budded trees at Nivitigalakele showed the existence of marked differences in clonal susceptibility to this form of attack. Experiments to test the efficiency of different water soluble and waterproof disinfectants in the control of this disease have been set up. These have shown that regular application of the standard estate disinfectant at an increased concentration has prevented further serious damage. Further, the results to date indicate that once the disease has passed the initial stages of attack painting with disinfectants is unlikely to effect a cure and that excision of the damaged bark is necessary if further extension is to be prevented. A strain of Phytophthora has been isolated by the Government Plant Pathologist from bark of clone MK. 3/2 affected by this disease. Some inoculations have been made, but a comparison with type cultures has not yet been possible.

Pink Disease.—An attack of Pink Disease (*Corticium salmonicolor*) on 4-year-old buddings of clone Pilmoor B/84 was recorded on an estate in the low-country, some 20 per cent of the stand being affected. A past report from Java indicated the probability of a clonal susceptibility of Pilmoor B/84 to this disease.

Fomes.—A serious outbreak of *Fomes lignosus* in a young replanted area, interplanted with manioc, was investigated. Inspection showed that the infection had originated from old Rubber roots, and that the manioc had assisted the spread of the disease to the young trees. Reports of similar outbreaks were received from other estates.

Manioc is susceptible to attack by Fomes, and can be useful as an indicator of the presence of disease if the tubers are carefully inspected at the time of harvesting. If, however, the presence of disease is overlooked, successive plantings of manioc in infected ground can lead to an alarming increase in the rate of spread of the disease. An Advisory Circular on the subject has been issued.

Pests.—A few cases were reported of damage to young plants caused by bandicoots, porcupine, and cockchafer grubs. Control was difficult owing to shortages of suitable chemicals. There were several enquiries regarding substitutes for "meta," for the control of snails and slugs.

Planting Material

Studies of Clones and Seedling Families.—43 of the 45 local clones established in the 1935 clearing at Nivitigalakele were in test tapping in December, 1943. None has shown any real promise and 20 will be discarded in 1944.

Testing of the clones established from the plot of Prang Besar Isolation Garden seedlings at Nivitigalakele was continued. Yields continue at a satisfactory level though no outstanding increases have been recorded in 1944. Budwood from a preliminary selection of 10 of these clones is being multiplied in preparation for a large scale trial to be set up in 1945.

Individual tree yield recording of selected clones in the older Nivitigalakele clearings and of the plots of Prang Besar and Tjikadoe Isolation Garden seedlings has been maintained.

New Trials.—A small experiment occupying 5½ acres was set up at Hedigalla to compare the families of hand-pollinated seedlings raised in 1941 with buddings of WG. 6278. 431 seedling stumps representing 41 families were planted. A small scale trial occupying 5½ acres was set up in an adjoining block to test clones derived from these seedlings. 5-tree plots of 99 clones were planted as budded stumps in November, buddings of WG. 6,278 again being used as control. The planting of this area will be completed in 1944 with a further 201 clones.

A seven-acre block at Nivitigalakele cleared in 1941 for a density-of-planting experiment was replanted with 25-tree plots of 20 clones derived from mother-trees on Dartonfield producing exceptionally hard or soft rubber. A similar plot of clone PB. 186 was planted as a control.

Breeding.—Breeding work was resumed in 1943 with a small programme of hand pollinations on young trees of PB. 86. Although this clone is known to be a very fertile seed parent only 46 fruits were obtained from 3,391 pollinations (1.35 per cent). The poor results were due in part to inexperienced pollinators, but largely to a severe attack of Phytophthora pod-rot in June.

Seed Gardens.—Budding of the 8 experimental seed gardens established on estates was completed during the year. These gardens occupy a total area of 28 acres, and are planted with imported clones known to be good seed parents and certain of the local clones used as parents in the breeding programmes of 1939-41.

Arrangements have been made to supply planting material for, and advice on the layout of, a large seed garden which will be established by Government at Walpita State Farm in 1945.

Clone Museum.—No additions were made in 1943 to the 59 clones previously established in the Clone Museum at Kepitigalla. The object of this area is to study the reaction of individual clones to Oidium leaf disease. Growth is slow and it will be some time yet before a useful comparison can be made.

1936 Replanting Experiment, Dartonfield.—Among other treatments this experiment provided for the comparison of three methods of establishing budgrafts in the field. Girth measurements taken in May, 1942, and 1943, are given in Table I

The stumped buddings and budded stumps were taken into tapping in March, 1942, and December, 1942, respectively and the field buddings in December, 1943, based approximately on the same criterion of growth for commencement of tapping.

TABLE I

	Age May, 1943	Mean Girth in Inches		
		1942	1943	Increase
Stumped buddings ...	7 years	21·80	23·33	1·53
Budded stumps ...	7 ,,	19·74	21·93	2·19
Field buddings ...	6¾ ,,	15·29	17·87	2·58
Sig. diff. 19 to 1 odds ...		1·45	1·40	0·31

Stock-Scion Relationship.

(1) *1941.—Replanting Experiment, Dartonfield.*—Unselected seedlings and illegitimate seedlings of 5 clones were used as stocks for budding with five clones. Plots of unbudded trees of the same seedling families were included in the experiment. The first series of girth measurements were taken approximately at the end of the second year of growth. A summary of the results is given in Table II.

TABLE II

Mean girth in inches of unbudded seedlings and buddings made on the same families.

	AV. 163	TJ. 1	BD. 10	BS. 3	KM. 1/1	U/S	Mean	Significant Difference
Budded	6.03	5·92	5·65	5·88	5·99	6·07	5·92	—
Unbudded	8·44	7·83	7·34	7·08	6·91	6·56	7.36	(19:1) 0·75
								(99:1) 1·03

It will be noted that differences in the vigour of the seedling families are not reflected in the growth of the buddings, at this stage of the experiment.

(2) *Experiment on Mukalana Estate.*—About 200 trees budded with clones TJ. 16 and B.D. 5 at 3 feet from the ground have been tapped since March, 1940, on 2S/2, d/4, 100%, one cut being above and the other below the union. The partial correlations of the yields of stock and scion, independent of girth (1940, 1941), or the length of cut (1942), are given in Table III.

With the exception of clone TJ, 16 in 1940-41, the partial correlations are positive and significant, and show that the yield of the scion has been affected by the yield of the stock on which it is budded. A comparison between the yields of budded stocks and those of a limited number of unbudded seedlings in the same area shows that the scions have not improved the yields of the stocks on which they are budded.

TABLE III

Partial correlations of yield of stock and scion of high budded trees.

	1940-41	1941-42	1942-43
Clone TJ. 16 ...	+·0823*	+·2574	+·4444
Clone BD. 5 ...	+·5209	+·5447	+·5348

* Not significant

Tapping

Mature Seedling Rubber.—The sixth year of tapping in the experiment at Dartonfield was completed in February, and the results have been reported in the *Quarterly Circular*. One of the outstanding features of the experiment is the very satisfactory yield obtained from the double-three plots (2S/2, d/3, 133%), which show an increase in yield for the year, of 26.5 per cent, over the control, (S/2, d/2, 100%). The mean yield of the double-three system for the 6 years of the experiment shows an increase of 20 per cent over the control. The results fully justify the temporary adoption of this system at the present time, as a means of increasing production.

Intensive Tapping Experiment.—This experiment was briefly referred to in last year's report. 4 tapping systems have been replicated 20 times in 5 tasks. Two of these, the double-one and double-two, are regarded as slaughter tapping systems, while the double-three and double-four are used as controls. The yield results for 12 months tapping are given in Table IV.

TABLE IV

Intensive Tapping Experiment. December, 1942—November, 1943

Tapping System	Yield in lbs.		Yield as % of Control (Double 4)	Dry Rubber content % Jan. 1944
	Per plot 12 trees	Per acre 90 trees		
Double-1 2S/2, d/1, 400%	169.1	1,268	195	29·1
Double-2 2S/2, d/2, 200%	139.0	1,042	160	32·9
Double-3 2S/2, d/3, 133%	108·0	810	125	36·5
Double-4 2S/d, d/4, 100%	86·6	650	100	37·2
Sig. dif. 19 to 1 odds	14·3	107	16·5	2·3
„ „ 99 to 1 odds	19·3	145	22·3	3·2

The yields of the double-one and double-two systems showed a considerable decrease after the first few months, and it remains to be seen whether there will be a further decline in the second year of the experiment.

Winter Rest Experiment.—Half the tapping tasks at Dartonfield not included in field experiments were tapped during the winter rest period and the remainder were rested for approximately one month in February-March, according to the usual Ceylon custom. There were 27 tasks in each half. A comparison of the yields of tapped and rested tasks for the 12 months' tapping in 1943 showed a significant increase in yield of 6 per cent, representing an extra crop of 34 lbs. per acre, from the areas tapped during the winter rest period.

Original Suggestions for Increasing Rubber Production.—The Rubber Commissioner offered attractive cash prizes in a competition for original suggestions for increasing rubber production. The entries were judged by the Botanist, who examined nearly 2,000 suggestions submitted by 367 competitors. None of the practical suggestions was considered to be original, but the judge recommended the award of consolation prizes to several competitors whose suggestions, while not original, were considered to be worth bringing to the more general notice of producers. Many of the suggestions were classified as "moonbeams."

The suggestions included a number of proposals for rainguards to protect the tapping panels in wet weather. Twenty-one designers were invited to demonstrate their devices at Dartonfield, and 17 devices were set up by 12 exhibitors. The results of the demonstration were very disappointing; their chief value was to demonstrate the difficulties of designing an effective rainguard within the practical limits imposed by economic and other considerations. A note on the subject was included in the *Quarterly Circular*.

Several competitors suggested "upward tapping" (*i.e.*, a cut which progresses up the tree instead of down) as a means of increasing crop. The idea is not novel, having been the subject of trials in South India some years ago. It has also been patented in Ceylon. Upward tapping has been tried at Dartonfield, and is considered to be of value as a temporary device for obtaining crop from trees which cannot be tapped on the normal panel owing to Brown Bast or thin bark.

Young Budded Rubber.—In response to a questionnaire yield records were received in respect of over 2,000 acres of budded Rubber in commercial tapping on 38 estates. Results of the examination of the more important records, together with data regarding test-tapping at Nivitigalakele and elsewhere, were published in the *Quarterly Circular*.

The results for 1942-43 of a tapping experiment with young budded Rubber at Dartonfield (1934 replanted area) are summarised in Table V. The experiment is designed on a single tree plot basis, with 64 trees in each monoclonal block allocated to each of four different treatments. Wind damage in clone PB. 25 considerably reduced the number of comparisons in the block.

Clone Gl. 1 tapped at 67 per cent intensity responded better to third-daily tapping than to tapping on 1/3 circumference. The yield of 6.57 lbs. per tree on the S/2, d/2, system is satisfactory; and shows a moderate increase over the previous year's yield of 5.27 lbs. Clones AV. 256 and PB. 25 responded favourably to the 28/2, d/4 systems, and showed significant increases over the control.

TABLE V.

1934 Replanting Experiment.

Results for the second tapping year March, 1942 to February, 1943.

Tapping System	Glenshiel 1			AVROS. 256			Prang Besar 25		
	Yield in lbs. per tree	Per cent. of S/2, d/2.	Girth increase in inches	Yield in lbs. per tree	Per cent of S/2, d/2.	Girth increase in inches	Yield in lbs. per tree	Per cent. of S/2, d/2.	Girth increase in inches.
S/2, d/2, 100%	6·57	100	2·7	4·39	100	1·8	5·56	100	2·6
S/3, d/2, 67%	5·37	82	2·8	3·39	77	2·1	4·28	77	2·9
S/2. d/3, 67%	6·02	92	2·8	3·26	74	1·9	4·12	74	2·6
2S/2, d/4, 100%	6·30	96	2·5	4·96	113	1·8	6·00	108	2·3
Sig. dif. 19 to -1 odds	0 38	5·8	—	0·38	8.5	—	0·36	6·5	—

Miscellaneous

Natural Covers.—Observations were continued in the 20-acre block of 1910 Rubber at Dartonfield, where natural covers have been allowed to develop since 1936. After 7 years the condition of the undergrowth is not altogether satisfactory. The sub-erect cover, consisting mainly of rather woody shrubs, has facilitated the spread of various species of grass, particularly during the past year when labour was not available for regular control.

Observations were also made in the clearings opened at Nivitigalakele in 1940-1942, without a burn. Bamboo (*Octandra stridula*) tends to predominate, and shoots of jungle stumps, which previously formed a considerable part of the erect cover, have become sparse. Nevertheless, a number of desirable species were identified. Growth of the Rubber in the 1940 clearing was rather poor, probably because pruning of the covers was delayed for several months owing to lack of labour.

SOILS DEPARTMENT

As in previous years the Assistant Botanist supervised field trials laid down at Dartonfield before the Soils Department was formed. These duties are to be taken over by the Soils Department in 1944.

Manuring

(1) *Fertiliser Rationing.*—The unofficial rationing scheme formulated in 1942 for the following year's supplies is to be continued in 1944. The Rubber Research Scheme undertook to calculate the quotas for Rubber estates and up to 31st, December, 1,046 applications had been received. A minor alteration has been made in the allotment for young Rubber. Allocations are made according to the scale of Saphos phosphate application recommended in the Research Scheme's Advisory Circular on manuring, but up to half the amount can be replaced by the N. P. K. mixture R. 215 at the rate of 215 lbs. R. 215 for 100 lbs. Saphos. In the case of young Rubber areas in tapping the whole amount of Saphos can be replaced by R. 215.

Dartonfield Experiment on Mature Rubber.—In March, 1943, all manures were broadcast, since previous results had shown no difference between broadcasting and forking. In April the tapping system was changed from double-four to double-three. The mean yields for the year in kilograms of dry rubber per plot of 20 trees on the basis of one sample tapping per month were:—

	O	N	NP	NK	NPK
Actual yield	6.41	8.25	7.73	8.53	8.85
Adjusted yield*	7.11	8.20	7.81	8.23	8.42
Adjusted yield as percentage of control 1943		115	110	116	118
Adjusted yield as percentage of control 1942		117	105	120	109
*Standard error	.304.	Significant diff.		(odds. 19:1)	88

The manured plots, N, NK, and NPK show significant increases over the control, but, as in former years, the apparent response to NP is not significant.

Experiments on Immature Rubber.

(a) *Dartonfield Replanted Area, No. 2, 19½ Acres, 1938.*—The 1943 girth measurements for this and the following experiment (No. 3 area) were reported in an article in the *Quarterly Circular*. A highly significant response of 2.5 inches after 5 years' growth was obtained with P, but only small and non-significant responses with N and K. In December it was noticed that some trees had a "stag-head" appearance, perhaps an indication of early or partial wintering. A count of affected trees was made and the results indicate that the condition can be attributed to the application of potash without other nutrients. K, as a single treatment significantly increased the number of affected trees (control= 17 trees, K=28). The other 7 treatments showed a significant decrease over the control (mean of 7 manurial treatments=5 trees).

(b) *Dartonfield Replanted Area, No. 3, 9½ Acres, 1936.*—There were no significant growth differences between the platform, trench and pitted drain methods of opening. The inorganic manure plots showed a small 0.5 inch increase (significant 19:1) over the organic plots after 7 years' growth. There was no difference in yield between the organic and inorganic plots for the combined budded stump (1st year of tapping) and stumped budding (2nd year) blocks.

Other Experiments.—Comparisons on two estates between a proprietary organic manure and an inorganic mixture, applied in the planting hole (.45 oz. N. .64 oz. P_2O_5 . .33 oz. K_2O), showed no growth response to manure 2½ years after planting budded stumps. An experiment put down in 1939 involving larger doses (1.0 oz. P_2O_5 as Saphos and 1.0 oz. K_2O) gave a significant response of .70 in. (7 per cent over control) 4 years after planting. On two estates girth measurements taken 2½ years after planting showed no significant difference between surface soil and excavated soil as a filling. The experiments were sub-divided in order to determine the effect of different manures in the planting hole. Artificial manures showed no response on either estate. Compost, green manure and cow manure all gave significant responses (99:1) on one estate, a mean of .85 in. or 13 per cent over the control. On a steep gravelly replanted area at Dartonfield a response of approximately 40 per cent was found for both organic and inorganic manures (mean girth of 4-year-old manured budded stumps=12.9 inches.) This unusually good response may be attributable to the sparsity of the cover and the application of manures every other month during the early growth period.

Food Production

The Co-ordinating Advisory Committee for Food Production (Estates) was dissolved as from 9th April, 1943, subsequent to the transfer of the Food Production Officer (Estates) to other duties. The Research Institutes undertook to continue to advise estates on food production in the zones allocated last year.

Food Production by Rubber Research Scheme.—Two acres under mature Rubber were interplanted with manioc and sweet potatoes. Yields were extremely poor owing to shade and root competition, even where good soil preparation and manuring had been carried out. Manioc and sweet potatoes planted in the S. W. season on newly cleared land at Hedigalla gave somewhat disappointing yields, 860 lbs. and 880 lbs. per acre respectively, but a small area of sweet potatoes interplanted in the N. E. season with young Rubber on Dartonfield gave the moderate yield of 1,288 lbs. per acre after allowing for the area covered by the Rubber.

At Hedigalla 25 acres hill paddy interplanted with manioc in the S. W. season gave a yield of 7¼ bushels winnowed grain per acre. Cumbu and kurakkan planted in the 1942 N. W. season proved failures. Manuring with artificials gave small increases in yields, but more thorough cultivation by mamoty as compared with envelope-forking had no effect. The present estate policy is to interplant hill paddy and manioc after felling jungle and to follow this with root crops only. On young clearings manioc and sweet potatoes are interplanted with the Rubber.

Food Production on Estates.—Most of the estates now growing food crops on their own land have adopted the policy of growing only root crops. The common practice is to harvest the crop as required and to replant immediately. Hill paddy is grown to some extent — particularly in the Southern Province — but yields in the N. E. 1942 season were poor although growth was good. Legumes have been largely discontinued, except on a few estates where good results have been obtained with dhal. Some concern has been expressed as to the retarding effect of root crops on the growth of young Rubber. Our view is that, provided food crops are not planted too close to the Rubber, the competition is not likely to be serious until the third year. Later, when the growing of food crops is discontinued owing to the size of the Rubber, and the Rubber roots begin to exploit soil formerly occupied by food crops some retardation of growth may be experienced, but it should be possible to overcome this by increasing the rate of manuring. A note on Fomes in interplanted Rubber and manioc will be found elsewhere in the report.

SMALLHOLDINGS DEPARTMENT

The year was one of moderate prosperity for the Rubber smallowner, but general inflation and the purchase of rice in the "black market" by the non-paddy owner have largely counter-balanced the improved price of rubber. In accordance with the policy of the Board, a good deal of the Instructors' time was devoted to food production duties while necessary advisory services to Rubber smallholders were maintained as before. Tapping to the fullest extent possible without permanently damaging the trees was encouraged, and the smallholder has duly contributed his share to the crop harvested in Ceylon during 1943.

Staff.—The Department functioned at full strength, *i.e.*, seven Instructors and one Clerk-Translator. Mr. H. K. Wijeyesinghe, Rubber Instructor, Horana, resigned his post in September after 7 years' service with the Research Scheme. Mr. B. D. Pedrick, Rubber Instructor, Matugama, in addition to his own duties, attended to the work in the Horana range by periodic visits pending a new appointment.

Food Production.—Assistance was given by all Instructors to the Emergency Assistant Government Agents in their areas in connection with the food drive. In some cases as much as 50 per cent of their time was devoted to this work. Their services were mainly utilised in lining for drains or stone terraces against soil erosion large areas of allotments given to peasants for food cultivation. Although extensive areas were lined by Instructors, response by allottees in cutting the drains varied, most progress being made in areas where pressure was brought to bear by the A. G. A. Appreciation of the soil conservation work done by Instructors has been expressed by all Emergency A. G. A's for whom they worked, and their work was commended by the Minister for Agriculture during his visits on at least two occasions. A total of 754 acres of

Crown allotments and other holdings was lined by Instructors for drains and terraces, drains were cut on 850 acres (including some areas lined in 1942), and food crops were planted under Instructors' supervision on 302 acres. 4,409 allotments or holdings comprising 5,293 acres were visited for payment of grants, advice on cultivation and supervision.

Sheet-making and Smokehouses.—The policy of getting smallholders to make better sheets was continued by means of sheet-making demonstrations and by encouraging the construction of cheap but properly designed wattle-and-daub smokehouses. 60 sheet-making demonstrations were given. 15 demonstration and 33 private smokehouses were started, and 14 demonstration and 23 private ones completed during the year. The position regarding supplies of coagulants was satisfactory due to stocks being controlled and issued by the Rubber Controller.

Replanting.—The 7 demonstration replanted plots were maintained in good order. Annual girth measurements were taken and the average girths per tree were as follows :—

Block	Plant & Clone	Age	Average girth per plant at 3 feet
Horana range (Kahatapitya)	74 of TJ. 1	6 years	16·81″ (13·68″)
Horana range (Ratmalgoda)	115 of PB. 25	6 ,,	15·22″ (12·01″)
Matugama range	57 of GL. 1 / 20 of BD. 5	5½ ,,	14·24″ (11·13″)
Galle range	80 of PB. 86	5 ,,	17·25″ (14·06″)
Kandy range	88 of PB. 25	5 ,,	15·45″ (11·80″)
Ratnapura range	79 of TJ. 1	5 ,,	14·77″ (11·98″)
Kegalla range	58 of GL. 1	2 ,,	4·30″ —

(Figures in brackets indicate girths 12 months ago.)

Twenty-six trees in the PB. 86 block were brought into tapping on the S/2, d/2, system in September. At the request of the Botanical Department the Instructor supervises a monthly sample tapping of the trees, and the sheet prepared from the latex is forwarded to headquarters to be weighed. Early yields are very promising.

Owing to the need for maximum output of rubber, replanting by smallholders was discouraged except where trees were in a very bad condition. 6 acres of replanting lands were lined by Instructors for drains and replanting completed on 13½ acres.

New Planting.—Numerous applications for planting material (clonal seeds and budded stumps) were received from new planting permit holders. These were forwarded to New Rubber Planting Scheme for attention.

Co-operative Work.—The Hataraliadde Rubber Co-operative Society continued to make excellent sheet under the supervision of the Rubber Instructor, Katugastota, who inspected it at least once a month. The Society was inspected by the Director in May and the general standard of work done was highly commended by him.

The working of a similar society formed among the Rubber allottees at Goorookoya Estate, Nawalapitiya, was inspected by the writer at the request of the Co-operative Department, and a report submitted. A demonstration and instructions on sheet making were given by the Rubber Instructor and the sheet subsequently made has fetched top price.

The Coconut Co-operative Societies in the Marawila area were visited to study their *modus operandi* in comparison with the Rubber Co-operative Societies.

Competitions.—No competitions were conducted by the Department this year owing to prevailing difficulties of travelling, etc., but prizes were donated for the best smallholders' sheet in competitions held at the Morawaka-Deniyaya Industrial Exhibition and at the Raigam Korale (Horana) Agricultural Exhibition. Assistance was also given in judging the sheets.

Nurseries.—An average of four demonstration nurseries was maintained in each of the seven ranges, and new nurseries were opened in place of ones whose plants were budded and disposed of. 51 budding demonstrations were given. A total of 4,276 nursery plants were budded by Instructors and 1,946 budded stumps sold to smallholders. 342 yards of budwood were issued to Instructors for budding nurseries.

Issues to Smallholders.—In view of the prohibitive cost of metal pans, 100 "domba" latex pans were made from the vote provided for the purpose for free issue to smallholders who follow the recommendations of the department. The inclusive cost of each pan was Rs. 2-50. All joints were spliced and the pans were good value for the money. 57 pans and 14 sieves were issued free to small-owners. 105 sq. ft. of monel mesh for latex sieves was also sold at concession rates. There was a heavy demand for this mesh, and issues to each purchaser were restricted to what was sufficient for his sieve.

General.—Each range was visited on inspection on an average once a quarter. Advisory visits were paid to small estates during inspections and according to requests received.

57 tapping, 83 disease treatment and 208 other demonstrations were given by Instructors in addition to those already mentioned. 39 acres of mature Rubber holdings were lined for drains or terraces. 19 demonstration and 43 private compost pits were opened.

ESTATE DEPARTMENT

Dartonfield Estate

Acreage Statement

		A.	R.	P.
Rubber: mature areas	...	114	1	28
replanted areas	...	44	3	22
Buildings and roads	...	14	3	08
Scrub, etc.	...	2	2	19
Newly acquired land	...	2	1	22
Total	...	179	0	19

Rainfall :—176.58 inches.

Rainfall was about normal, and was rather more favourable for crop intake than in 1942. Details of rainfall for the past 3 years appear below :—

	1941	1942	1943
January ...	6.98 ins.	4.46 ins.	4.12 ins.
February ...	7.27 „	8.64 „	4.09 „
March ...	5.61 „	11.15 „	9.49 „
April ...	11.85 „	20.57 „	13.56 „
May ...	41.91 „	22.79 „	28.03 „
June ...	14.89 „	17.28 „	21.16 „
July ...	13.35 „	12.92 „	8.42 „
August ...	22.13 „	17.72 „	10.34 „
September ...	26.32 „	13.14 „	6.12 „
October ...	24.81 „	24.28 „	27.61 „
November ...	26.58 „	13.03 „	23.51 „
December ...	10.45 „	13.73 „	20.13 „
	212.15 ins.	179.71 ins.	176.58 ins.

Crop.—Crop for the year amounted to 89,278 lbs. compared with 77,746 lbs. in 1942. The increase is mainly attributed to the following :—

(a) Excellent proportion of tasks tapped — 99.6%
(b) Good response to double-three tapping.
(c) Increased crop from budded areas.

Yields records for individual fields are as follows :—

Field No.	Date of planting	Total crop lbs.	Acreage tapped	Yield per acre lbs.
1 ...	1910	19,567	28½	686.6
2. ...	1913	969	1	969.0
3 ...	1917	18,311	24	765.0
4 ...	1911	1,017	1½	678.0
5 ...	1934	5,666	7½	755.5
6 ...	1913	41,526	58½	709.8
7 ...	1936	2,222	6	370.3
	Total ...	89,278	127	703.0
	Percentage of estimate harvested ...			119.0

Tapping.—Tapping of commercial areas was on the 2S/2, d/3, system. Bark consumption averaged approximately 5 inches on each cut. Tapping of half the estate tasks and certain experimental tasks was stopped for one month from February 11th. Tapping of other tasks was continued during the wintering period.

Tapping of experimental areas was under the supervision of the Estate Superintendent.

Average daily intake per tapper was 7.2 lbs. compared with 8.4 lbs. in 1942.

Manufacture.—A summary of the grades prepared during the year is given below :—

Grade		lbs.	Per cent	Total
Smoked Sheet No. 1	...	25,199	28·23	28·48
,, ,, No. 2	...	224	·25	
Latex Crepe No. 1	...	32,523	36·43	40·29
,, ,, No. 2	...	2,008	2·24	
,, ,, No. 3	...	1,442	1·62	
Scrap Crepe No. 1	...	20,389	22·84	29·51*
,, ,, No. 2	...	3,345	3·75	
,, ,, No. 3	...	2,612	2·92	
Latex	...	1,536	1·72	1·72

* Includes biscuits from experimental areas
Normal scrap grades amounted to 12%

Machinery.—The 52-57 H.P. Ruston Hornsby engine was overhauled during the year. A small flour mill was installed in the factory. The "Guthrie Cadet" sheeting battery was returned to Messrs. Brown & Co., Ltd., from whom it had been on loan for several years.

The Consulting Engineers, Messrs. H. W. Hammond & Co., inspected the machinery and electrical equipment, and reported favourably on their condition.

Oidium.—A sharp attack of Oidium occurred in the latter part of February when the bulk of the trees were refoliating. Two rounds of sulphur dusting were carried out with good results; late wintering trees were, however, badly affected. In the immature areas late wintering clones were dusted several times, but many of the trees were partially defoliated.

Phytophthora.—Leaf and pod disease led to some loss of foliage, but was less severe than in 1942.

Bark Rot was active, and regular applications of waterproof and water-soluble disinfectants were made to the tapping panels during wet weather.

Root diseases.—Fifteen cases of *Fomes lignosus* were detected, mostly adjoining old disease patches. Three trees affected by *Ustulina zonata* were removed.

Wind Damage.—Twenty-four trees in the mature areas were uprooted by wind.

Grooming.—Trees in the mature area were scraped with coconut shells to a height of about 6 feet to remove scaly bark, lichens, etc. Trees in the 1934 and 1936 replanted areas were groomed twice during the year.

Manuring.—The whole of the mature commercial area was manured, using half quantities of the standard mixtures (R. 400 and R.340) available under the Rationing Scheme.

The 1936, 1939 (part), and 1941 replanted areas were manured with Saphos phosphate at the recommended rates. Backward plots in the 1939 area were manured twice with R.215 mixture.

Experimental areas were manured according to requirements.

Cover Crops.—Planting of cuttings of *Desmodium ovalifolium* was continued. Selective weeding was carried out as in previous years, but was in arrears owing to labour shortage.

Labour.—Labour was adequate for tapping, but there was a shortage for weeding and other works, especially during the paddy cultivation seasons. The health of the labourers was good.

Details of labourers on check-roll at the end of the year were as follows :—

	Resident	Non-Resident
Ceylonese ...	20	40
Non-Ceylonese ...	64	—
Average daily out-turn	77.	
Average daily pay	Rs. 1-03 (including dearness allowance).	

Buildings.—A quadruple labourers' cottage was constructed, complete with a four-compartment latrine, and a well.

Visiting Agent.—The Visiting Agent, Mr. P. R. May, inspected the estates twice during the year.

Nivitigalakele

Acreage statement

Rubber : mature areas (1926-1935)	...	88½ acres
clearings (1939-1942)	...	41 „
nurseries, etc.	...	19½ „
Food clearing 1942	...	5 „
Uncultivated	...	16 „
	Total	169½ acres

Rainfall : 159.06 inches. (1942, 163.97 inches).

Crop.—Crop for the year amounted to 59,773 lbs. compared with 39,443 lbs. in 1942. The increase is mainly attributed to payment of tappers by results, and the satisfactory response of the older budded areas to double-three tapping. The following is a summary of yield records for each field :—

Clearing		Acreage in tapping	Crop lbs.	Yield per acre lbs.
1926	...	12½	13,949	1,115 9
1927	...	16½	15,623	961.4
1928	...	31	20,850	672.6
1935	...	24½	9,351	385.6
Total	...	84	59,773	711.6

Tapping.—An area of 21 acres (parts of 1927 and 1928 clearings) scheduled for slaughter tapping under the Capital Compensation Scheme, was tapped on the 2S/2, d/2, system from August 1st. Other commercially tapped areas were tapped on the 2S/2, d/3, system. Test-tapping was on the S/2, d/2, system. Tapping was continued during the wintering period.

A statement of trees in commercial and test-tapping is given below :—

Clearing	Test-tapping	Commercial tapping	Immature	Total
1926 ...	29	1,086	5	1,120
1927 ...	73	1,479	7	1,559
1928 ...	186	2,310	73	2,569
	288	4,875	85	5,248
Part of Pinnagoda 1935 Clearing in T.T.	2,183	—	374	2,557
Total ...	2,471	4,875	459	7,805

Manufacture.—Crop from commercially tapped areas was manufactured in the form of smoked sheet. Test-tapping samples were milled at Dartonfield and sold mainly as scrap crepe. The distribution of grades is as follows :—

Grade	lbs.	Per cent	Total
Smoked Sheet No. 1 ...	37,053	61,99	
„ „ No. 2 ...	2,717	4.55	67.70
„ „ No. 3 ...	686	1.16	
Scrap Crepe No. 1 ...	15,853	26.52	
„ „ No. 2 ...	1,876	3.13	32.30
„ „ No. 3 ...	1,588	2.65	

Oidium.—A severe attack of Oidium developed in March, and late wintering clones were badly affected. Four partial rounds of sulphur dusting were done.

Phytophthora.—Leaf and pod disease caused only minor damage. The stems of a few young plants in the clearings were attacked by Phytophthora

Reference is made elsewhere in the report to damage to trees of MK. 3/2 and other clones by canker of the renewing bark. Routine applications of waterproof and water-soluble disinfectants were made during wet weather.

Ustulina.—Seven badly affected trees were removed.

Wind damage.—Seven trees were uprooted.

Grooming.—Two rounds of grooming were done.

Manuring.—Half the mature area was manured at the rates provided for in the Rationing Scheme. The manure was applied in two doses, the first (R. 400) early in the year and the second (R. 340) in December. The manure was broadcast between the platforms.

Immature Areas.—The 1939 clearing showed improved growth during the year. In the 1940 (no burn) clearing the rate of growth was rather poor, probably because of inadequate control of the under growth. Growth was satisfactory in the 1941 and 1942 clearings.

Two applications of R. 215 fertiliser mixture were made in the 1940, 1941, and 1942 clearings at the recommended rates.

In the 1939 clearing R 215 mixture was applied in 4 backward blocks, and Saphos phosphate in the other 16 blocks.

Part of the 1941 clearing, originally allocated for a density-of-planting experiment which was abandoned, was replanted in November with 460 budded stumps of 20 Dartonfield clones (from mother trees producing hard and soft rubber).

Nurseries.—Budwood nurseries were manured and pollarded according to requirements. Plots of 11 new clones were established. Vacant beds in the seedling nurseries were replanted as follows:—

(a) Manured with 10 tons cowdung per acre. 18,000 germinated seed (from Moneragalla) planted in March.

(b) Manured with 5 tons cowdung and 160 lbs. Saphos per acre. 32,000 germinated seed planted in August-September.

Growth in the nurseries is satisfactory.

573 yards of budwood and 9,030 budded stumps were issued during the year.

Labour.—Labour for tapping (mostly non-resident Ceylonese) was adequate except during the paddy harvests, but there was a shortage for weeding and other general work.

Hedigalla

A block of Crown forest situated in Hedigalla and Ingurudaluwa villages was taken over on lease from Government in 1942, to meet future requirements for experimental planting. The official survey has not yet been completed, but the area is expected to be approximately 1,000 acres.

33 acres were cleared for food production in 1942, and a further 14 acres in 1943. Approximately 5½ acres of the 1942 clearing were planted experimentally with hand pollinated Rubber seedlings in May, 1943. Planting distance was 30 feet by 12 feet. A further 5½ acres were planted in November with clones derived from the seedlings. In this area double sized holes were cut, and 3 stumps were planted per hole, in order to eliminate any need for supplying casualties.

Labour was very scarce during the year and all works were behind schedule.

A quadruple labourers' cottage, with mud walls and "Batakola" roof, was completed early in the year. Construction of a Conductor's bungalow is in progress, and foundations have been cut for another quadruple cottage.

A firm of Surveyors completed the survey of a cart road to and through the block of land. The distance from the Badureliya-Atweltota road to the boundary of the land is 1½ miles, and the total length of the trace is 7 miles. A footpath is being cut to mark the trace, and arrangements are being considered for constructing the first stage of the road. At present the land is approached through Baduragalla estate, whose Proprietors have kindly allowed their road to be used.

Food Production

Areas under cultivation for food crops were as follows:—

Dartonfield — 1941 replanted area, 6½ acres.
Nivitigalakele — 1942 clearing, 5 acres.
Hedigalla — 1942 and 1943 clearings, 47 acres.

Crops harvested during the year were:—

Paddy	... ...	181½ bushels
Miscellaneous grains and pulses	...	269 measures
Manioc	... ...	6,343 lbs
Sweet Potatoes	... ...	2,320 „

ADVISORY SERVICES, ETC.

Advisory correspondence during the year was on approximately the same scale as in 1942. There were numerous enquiries regarding sources of supply of clonal seed for new planting; many of them appeared to be from persons without previous planting experience who were not aware that the varieties of seed available in Ceylon are only recommended for small scale use. The Soil Chemist had considerable correspondence in connection with fertiliser quotas, but there were fewer general enquiries, concerning Rubber manuring. In the Chemical Department enquiries, other than those relating to vulcanised products, were mainly in connection with factory problems and equipment. A number of samples of acetic and formic acid were received for test.

An analysis of enquiries and estate visits is given below:—

	Enquiries	Estate Visits
Chemical Department	241	1
Botanical and Mycological Department ...	379	12
Soils Department: General	45	4
Food Production ...	19	28
Fertiliser Rationing ...	102	—

The Rubber Commissioner frequently called for advice on problems relating to maximum rubber production, etc., and advice on miscellaneous problems was given to several other Government and Service Departments.

A revised edition of the "Guide to the Preparation of Plantation Rubber in Ceylon" (originally compiled in 1929) was prepared during the year, and arrangements were made for printing. Several advisory circulars were revised.

MEETINGS, COMMITTEES, ETC.

The Director attended meetings of the Rubber Research Board by invitation, and served on the Experimental Committee and the Small-holdings Committee.

The Director also served on the Central Board of Agriculture (*ex-officio*), the Co-ordinating Advisory Committee for Food Production on Estates, the Maximum Rubber Production Advisory Committee, the Fertiliser Rationing Committee, and the Scientific Advisory Committee.

The Director attended the Annual General Meetings of the Planters' Association of Ceylon, the Low-Country Products Association, the Uva Planters' Association, and the Kurunegala Planters' Association; two general meetings of the Kalutara Planters' Association and one general meeting of the Sabaragamuwa Planters' Association.

CO-OPERATION WITH OTHER RESEARCH ASSOCIATIONS

Co-operation was maintained with the London Advisory Committee for Rubber Research (Ceylon and Malaya) by correspondence and the exchange of reports. We are much indebted to the staff for their assistance in arranging for the despatch of chemicals and equipment from U. K. Reports were exchanged with the British Rubber Producers' Research Association.

A small seed garden (2 acres) was established in an area at Ratmalagara Estate which was leased by the Coconut Research Board for 10 years at a peppercorn rental. The Board's practical co-operation is much appreciated, and we are also indebted to the staff for undertaking the planting and maintenance of the area.

There was close co-operation with the Tea Research Institute in connection with fertiliser rationing.

PUBLICATIONS

Publications of the Research Scheme are issued without charge to the Proprietors (resident in Ceylon), Superintendents and Local Agents of Rubber estates over 10 acres in extent, who apply for registration. Extra copies are supplied for the use of Assistants on large estates. Particulars of issues of publications are given below:—

	1942	1943
Estates and Agencies ...	847	875
Subscribers	56	56
Exchange List	62	56

Publications issued during the year were as follows:—

Report of the Work of the Rubber Research Board in 1942.

Combined Quarterly Circulars for 1943 (issue pending).

Advisory Circular No. 1—Notes on Budgrafting Procedure (Revised June, 1943).

" " No. 4—Contour Lining, Holing and Filling, Cutting of Platforms, Trenches and Drains. (Revised June, 1943).

" " No. 8—Planting and After-Care of Budded Stumps and Stumped Buddings. (Revised June, 1943).

" " No. 10—Root Disease in Replanted Areas. (Supplement).

" " No. 17—Tapping Young Budded Trees. (Supplement).

" " No. 20—Planting Material Recommended for Use in 1943.

" " No. 20—Supplement.

(Sgd.) T. E. H. O'BRIEN,
Director

Research Laboratories,
Dartonfield, Agalawatta.
10th March, 1944.

REPORT OF THE LONDON ADVISORY COMMITTEE FOR RUBBER RESEARCH (CEYLON AND MALAYA) FOR 1943

In previous years this Report has been divided into two sections containing a general account of the activities of the Committee and a technical appendix outlining in greater detail the progress made in the investigations of the technical staff. For reasons given in the last report, most attention has been given this year to urgent problems connected with the supply and treatment of wild rubber, details of which may not be of major interest to rubber producers in Ceylon. It is not intended, therefore, to include a technical appendix in this Report.

The Committee and Technical Sub-Committee each held one meeting during the year. There were also three meetings of a Special Conference and Sub-Committee on the preparation for the market of post-war plantation rubber.

The Committee regret to report that Mr. F. P. Jepson, M.A., representing the Government of Ceylon, and also Mr. H. N. Ridley, C.M.G., F.R.S., who for many years has rendered valuable assistance on the Technical Sub-Committee, have both resigned their membership. The Ceylon Government has appointed Mr. L. Lord, M.A., to serve on the Committee in place of Mr. Jepson. Sir John Russell has retired from his position as Director of the Rothamsted Experimental Station, Harpenden and his successor, Dr. W. G. Ogg, M.A., Ph.D., automatically succeeds him as a member of the Committee. Sir John Russell and his staff have, for many years, given valuable advice on soil and statistical problems.

FINANCE

The usual contribution of £875 was received from the Rubber Research Scheme (Ceylon). This is one quarter of the Committee's total income before the loss of Malaya. As a result of correspondence with the Imperial Institute, Ceylon agreed to increase their contribution to half the present cost of the Committee's activities and a further remittance amounting to £445 in respect of 1943 was received shortly after the close of the year. Expenditure during the year amounted to £2,773.13.10., leaving a deficit of £1,453.13.10., which has been provided by the Imperial Institute, in accordance with the guarantee referred to in last year's Report. The balance standing to the credit of the Committee amounted to £1,484.16.7, as at 31st December, 1943, which is slightly larger than last year.

CO-OPERATION WITH OTHER ORGANISATIONS

Close co-operation was maintained with other rubber research and trade organisations in Great Britain and also with Government Departments handling rubber questions. The staff attended various Ministry of Supply Technical Committee meetings and, at the end of the year,

were devoting much time to visiting factories with a view to advising on the best methods of using different types of rubber, particularly wild rubber.

In the meantime a pamphlet was prepared entitled "Guide to the Purchase and Utilisation of African Rubber," which has been widely circulated by the Ministry of Supply. In response to a request from the Ministry, the staff have undertaken to grade all consignments of unwashed Ceylon scrap in accordance with washing loss.

Members of the staff have also continued to assist the Institution of the Rubber Industry at meetings of the Council, Examinations Board and Papers Committee, and have held the offices of Chairman and Hon. Secretary of the London Section.

The Superintendent of Rubber Investigations read a paper on "Competitive Rubber Plants" to the Royal Society of Arts in December. The paper was published during 1944 and the bulk of it was subsequently reprinted in *Nature*.

WORK OF COMMITTEE AND STAFF

Immediate Activities.—The effect of post-war conditions on the market for natural rubber is difficult to assess. Much depends upon international relations and the relative advantages of rubber and synthetics. At the moment there is no need to take a pessimistic view, although plantation rubber has undoubtedly lost the privileged position which it occupied pre-war, when it was the only material which could be used on a very large scale for purposes requiring rubber-like elasticity.

When the Allied nations first regain control of the main rubber producing areas, the demand for natural rubber is likely to be such that it will be necessary to prepare it by any means available, perhaps without the usual coagulants and equipment. On the whole, there should be little difficulty in converting the bulk of the available latex into crude sheet, but it is desirable to make provision for the quick supply of some necessities which have to be imported and for which sufficient local substitutes are not available.

On native-owned areas of planted Rubber immediate production will not be so dependent upon equipment as upon the number of family workers. Therefore, organised control will not apply so much to the native owners as to the large units.

As there are likely to be many emergency problems connected with the treatment of trees and rubber preparation during the early days of reoccupation and as decisions will have to be made without delay, the Committee have called the attention of the Colonial Office to the need of the occupying authority for expert technical advice in Malaya.

The Committee are naturally giving careful considerations to the possibility of improvements in the technology of rubber production in a reorganised rubber industry. As a first step they have called a Conference of representatives from interested organisations to scrutinise the details of pre-war rubber preparation and to recommend what processing changes should be made when the industry is again established in Malaya.

After a preliminary discussion of the broad lines along which improvements might be possible, they decided to ascertain the views of British and American manufacturers and a Sub-Committee was appointed to work out details. At the end of the year the Sub-Committee was awaiting replies to their enquiries.

The principal proposals brought forward at the preliminary Conference were :—

(1) the establishment of central factories to treat latex on a very large scale;

(2) the preparation of rubber in these factories by a continuous process;

(3) packing rubber in smaller and more easily handled parcels;

(4) an improved and simplified system of grading for quality.

All these proposals are controversial and no recommendations can be made until the views of manufacturers have been received and thoroughly digested.

The preparation of rubber by a continuous process is by no means a new suggestion, but details have not been worked out, and the staff have been requested to study the possibilities of such a process and to report as quickly as possible.

Long Range Research.—The Committee appreciate that, under present conditions, priority must be given to problems connected with the maximum utilisation of such rubber resources as are available, irrespective of botanical and geographical origin, and they fully approve the amount of time which the staff have devoted to the examination of wild rubber. They also appreciate that no permanent danger to plantation interests is likely to arise from a temporary delay in studying *ad hoc* problems, such as the preparation of special types of rubber for which a market is expected after the war. As pointed out, however, in the last Report, they have been very concerned about the neglect of research which cannot be expected to reach practical conclusions for a number of years and which aims at improvements in quality likely to affect the relative technical values of plantation rubber and synthetic substitutes. They regarded the position as all the more serious because the staff in Ceylon also appeared to be largely occupied with war-time problems unlikely to be of importance under normal conditions.

Sir Harry Lindsay, Director of the Imperial Institute, suggested that an arrangement might be made with the Ministry of Supply to finance additional junior staff for this important long range work as some return for the part time services of the senior staff for which no charge was made. This suggestion was welcomed by the Committee and was subsequently approved by the Ministry of Supply, with the result that work on long range problems was recommenced at the end of the year.

The eventual object of this work is to select trees which give rubber with specific desirable properties and to develop from them clones yielding the same types of rubber. The problem obviously involves a considerable amount of investigation in the East, for which provision has now been made in Ceylon, but a preliminary step is to devise methods of measuring the desirable properties required. This in itself is a large

problem, embracing controversial issues to which attention is being given in London, in association with manufacturers.

Miscellaneous Types of Rubber.—One of the problems studied has been the extraction of wild rubber from bark by a mechanical process. It was found that the best results were given by a rod mill and a cheap one was constructed in wood to demonstrate the type of machine which might be used with advantage in African villages. In the course of the investigation samples of bark shavings were received from Ceylon and it was found that in this case also the rod mill was suitable for separating rubber from the bulk of the bark.

Wild rubber is not likely to be of great interest after the war, but the Russian dandelion, Kok-saghyz, has possibilities in some countries. It is now being grown on a small experimental scale in Great Britain under the general direction of the Royal Botanic Gardens, Kew, and the Committee have co-operated in studying the extraction of the rubber and its general quality. The rubber is not quite as good as Hevea and the yields are much too small at present for economic post-war production on a large scale in Great Britain.

(Sgd.) P. J. BURGESS,
Chairman.
(Sgd.) G. MARTIN,
Superintendent of Rubber Investigations.
(Sgd.) J. ENDCOX,
Acting Secretary.

Imperial Institute,
April, 1944.

ACTING AUDITOR-GENERAL'S REPORT FOR 1943

The Accounts of the Rubber Research Scheme (Ceylon) for the year ended December 31, 1934, have been duly audited and found correct.

The financial statements

(a) Dartonfield Estate Working Account;

(b) Nivitigalakele Experiment Station Working Account;

(c) Revenue Account, Capital Account and General Balance Sheet, and

(d) Provident Fund Working Account,

were compared with the books and accounts and found to agree. The statements are returned herewith duly certified.

I INCOME

2. The total income for the year amounted to Rs. 336,136. It fell short of the estimate by Rs. 47,049, and the income of the previous year by Rs. 30,822.

3. The following is a comparison between the estimate and the actual income under the different accounts; short notes of reasons for the excess or deficit are given under 'Remarks.'

Account	Estimate Rs.	Amount Received Rs.	Excess Rs	Deficit Rs.	Remarks
1. Cess Collections	336,000	273,558	—	62,442	Over-estimate
2. Interest	7,800	9,949	2,149	—	Increased investments & fixed deposits
3. Sale of Publications	300	254	—	46	
4. Profit from Dartonfield	25,735	27,618	1,883	—	Under-estimate of crop and selling price
5. Profit from Nivitigalakele	12,320	21,115	8,795	—	do
6. Sundry Receipts	1,030	3,643	2,613	—	Rent of bungalow at Dartonfield and profit from sale of vulcanised products not estimated for
	Rs. 383,185	336,137	15,440	62,488	

4. **Profit from Dartonfield Estate.**—The profit for the year under review was Rs. 27,618. It fell short of the profit for the previous year by Rs. 4,811.

5. **Profit from Nivitigalakele Experiment Station.**—The working of the experiment station for the year showed a profit of Rs. 21,415 as compared with Rs. 11,927 for the previous year.

II EXPENDITURE

6. **Revenue Expenditure.**—The total expenditure on revenue account exclusive of the amounts allowed for Depreciation of fixed assets, the Passage Fund and Audit Fee Reserves, amounted to Rs. 224,429 as compared with Rs. 193,043 for the previous year. The details of this expenditure are fully set forth in the Income and Expenditure Account. The whole of this expenditure was checked with supporting vouchers and accounts.

7. **Capital Expenditure.**—The expenditure incurred on fixed capital assets during the year amounted to Rs. 25,415 as compared with Rs. 34,234 for the previous year. The details of this expenditure are shown in the Capital Account.

8. A comparison between the original estimate and the expenditure incurred during the year is shown in Statement 'A' attached. The reasons for the major variations between the estimate and the actual expenditure, as furnished by the Director, are shown against the respective items in the Statement.

The excesses under the different items of expenditure have not yet been sanctioned by the Board.

III CAPITAL ACCOUNT

9. The capital expenditure incurred during the year being Rs. 25,415, the total cost on this account amounts to Rs. 786,233.

IV BALANCE SHEET

(a) Liabilities

10. **Creditors — Rs. 9,875.**—This amount represents the total amount due to creditors for goods purchased or services rendered during the year.

11. **Passage Fund Reserve — Rs. 17,958.**—The balance on December 31, 1942 was Rs. 9,661. The provision for the year was Rs. 6,000. A sum of Rs. 4,000 which had been placed in deposit with Messrs. Thos. Cook & Son, Ltd., during 1942 to meet travelling expenses of the families of some officers has been placed to the credit of the Fund during the year but payments to the extent of Rs. 1,703 have been made out of it for the same purpose during the year.

12. **Depreciation Reserve — Rs. 158,966.**— This sum represents the amount set apart for the depreciation of the fixed assets of the Scheme. The amount transferred from Revenue to this account during the year was Rs. 18,359 made up as follows :—

		Rs. cts.
Dartonfield :—		
Buildings at 3½% on Rs. 188,618.07	...	6,601.63
Furniture, fittings and office equipment at 7½% on Rs. 23,059.68	...	1,729.48
Water and Power Supply at 7½% on Rs. 25,481.73	...	1,911.13
Machinery and tools at 7½% on Rs. 62,800.96	...	4,710.07
Accumulators at 20% on Rs. 4,105.28	...	821.06
Nivitigalakele :—		
Buildings at 3½% on Rs. 33,398.94	...	1,168.96
Furniture, fittings and office equipment at 7½% on Rs. 3,139.82	...	235.48
Water and Power Supply at 7½% on Rs. 4,521.79	...	339.13
Machinery and Tools at 7½% on Rs. 260.60	...	19.54
Laboratory Apparatus at 7½% on Rs. 10,972.82	...	822.96
		Rs. 18,359.44

13. **Provident Fund Reserve — Rs. 101,505.**—The balance to the credit of the Fund at the end of 1942 was Rs. 79,720 and additions during the year under review amounted to Rs. 21,785. A sum of Rs. 1,690 was paid out to officers who retired during the year. It is observed that the Scheme is now paying interest to the Fund on the cash balances with it at 4½% under Rule 4 of the Fund whereas the investments of the Scheme do not earn interest anywhere approximating this rate.

14. **Audit Fee Reserve — Rs. 830.**—The amount to the credit of this account at the beginning of the year was Rs. 579 and that provided during the year Rs. 850. Payments during the year in respect of service for 1942 amounted to Rs. 599.

15. **Reserve for Stabilisation of Income — Rs. 124,925.**—The reserve for the previous year was Rs. 82,368 and for 1943 Rs. 42,558. This reserve has been calculated on the basis of the basic quota instead of on the standard production, as decided by the Board — *vide* Resolution 6 of the Board Meeting of November 2, 1942.

16. **Surplus Account — Rs. 318,920.**—This figure is arrived at by adding Rs. 86,498 the excess of income over expenditure to the balance at December 31, 1942, and deducting Rs. 25,415 the Contribution to Capital Outlay, and Rs. 42,558 the Reserve for Stabilisation of Income.

(b) Assets

17. **Debtors — Rs. 43,988.**—The sources of this asset are two, cess collections and sundries. The cess collection outstanding for December, 1943, amounted to Rs. 22,401 and the sundries which represent mostly credit sales to Rs. 21,586.

18. **Advance Accounts — Rs. 26,217.**—The details of this account are shown in the Balance Sheet. The major advance with the London Advisory Committee amounts to Rs. 23,242; this figure has been verified by reference to Statements of Account received recently at the office of the Scheme. The amount of Rs. 2,297 with Messrs. Thos. Cook & Son, Ltd., represents the unspent balance of the Rs. 4,000 remitted in 1942 for passage expenses; this money has been refunded to the Scheme in the current year. The advance of Rs. 160 to the Postmaster-General was to meet expenses of telephone calls.

19. **Accrued Interest on Investments — Rs. 1,680.**—This sum represents the amount of interest accrued for the year on the investments, but not received during the year. It is, however, observed that the interest accrued on the advance lying with the London Advisory Committee has not been included in this amount.

20. **Stocks — Rs. 17,922.**—The balances of the estate and rubber chemical stocks at the end of the year were Rs. 13,349 and Rs. 4,573 respectively. The balance of the estate stock was made up as follows:—

Dartonfield:—

Rice and Provisions	...	Rs. 2,099
Stores	...	„ 5,039
Stock Account	...	„ 3,623
	Carried over	Rs. 10,761

		Brought forward	Rs.	10,761
Nivitigalakele :—				
Rice and Provisions	...	„	436	
Manuring	...	„	61	
Latex	...	„	1,691	
Crumb Rubber	...	„	400	Rs. 13,349

These balances at the end of the year were not verified, but a test-verification of the stock in hand on June 19, 1944 was made during the audit inspection.

21. **Loans to Officers — Rs. 744.**—This sum represents the balance outstanding from officers in respect of loans for purchases of transport. The loans are being promptly repaid with interest in instalments.

22. **Loan to Hataraliyadde Co-operative Society — Rs. 2,700.**—Of the Rs. 3,000 outstanding at the beginning of the year a sum of Rs. 300 has been paid during the year.

23. **Investments in Ceylon Government Loans — Rs. 250,000.**—Details of this amount are shown in the Balance Sheet in terms of face value. The certificates in support of the investments have been seen.

24. **Cash Balances — Rs. 391,536.**—Details of this figure are shown in the Balance Sheet. The documents relative to the deposits have been seen. The balances in current accounts Nos. 1 and 2 have been verified by reference to the Bank Certificates and Reconciliation Statements. The balance of cash in hand at December 31, 1943, was not verified, but a surprise inspection of the cash in hand was made on June 16, 1944.

V. GENERAL

The accounts were received quarterly and audited in this office. The office of the Scheme at Dartonfield Estate was visited once in respect of the accounts for the year under review and the books and accounts kept were checked and the cash in hand verified.

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

Audit Office,
Wellawatte, 10th August, 1944.

ESTIMATES FOR 1944

(Adopted by the Board, October 18th, 1943)

INCOME

		Rs.
1.	Cess Collections	336,000
2.	Interest	11,000
3.	Sale of Publications	750
4.	Profit from Dartonfield ...	21,107
5.	Profit from Nivitigalakele	18,714
6.	Sundry Receipts	3,040
		Rs. 390,611

REVENUE EXPENDITURE

		Rs.	Rs.
1.	**Administration of the Board:**		
	Travelling Expenses of Members ...		2,000
2.	**Personal Emoluments:**		
	Senior Scientific Staff	74,787	
	Junior Scientific Staff	10,850	85,637
3.	**Library and Publications:**		
	Library	1,250	
	Publications	2,000	3,250
4.	**Smallholdings Work:**		
	Salaries and Allowances ...	20,515	
	Travelling and General Expenses ...	13,395	33,910
5.	**Laboratory:**		
	Equipment and Working Expenses ...	5,000	
	Furniture Replacements ...	50	5,050
6.	**Field and Factory Experiments:**		
	Field Experiments	6,835	
	Factory Experiments	5,548	
	Budding Instruction	—	12,383
7.	**Office:**		
	Salaries of Office Staff	12,273	
	Stationery and Office Equipment ...	4,500	
	Postage and Telegrams	2,000	
	Advertising	200	
	Telephone	1,000	
	Audit	850	20,823
8.	**Travelling Expenses of Staff:**		
	Officers' Expenses	4,000	4,000
9.	**Maintenance of Buildings, Water and Power Supply:**		
	Laboratories and Offices ...	250	
	Bungalows	1,000	
	Water and Power Supply	1,250	
	Furniture Replacements ...	250	2,750
10.	**Micellaneous Items Shared with Estate:**		
	Dartonfield General Charges ...	13,355	
	Nivitigalakele General Charges ...	7,032	
	Hedigalla General Charges ...	5,035	
	Upkeep of Roads and Grounds ...	570	
	Factory Upkeep	787	
	Power Supply	5,676	32,455
		Carried over	202,258

		Rs.	Rs.
	Brought forward		202,258
11.	**Contingencies:**		
	Contribution to London Advisory Committee	12,000	
	General Charges	750	
	Insurance Charges	2,500	
	Staff Provident Fund	15,250	
	Passages	—	
	Entertainment Allowance	150	
	War Allowances to Staff	11,800	
	Contribution to Medical Fund ...	1,400	43,850
12.	**Depreciation:**		18,500
13.	**Planting Food Crops — Hedigalla**		2,750
	...		Rs. 267,358

CAPITIAL EXPENDITURE

		Rs.	Rs.
Buildings:			
Dartonfield :—			
Well for Junior Staff		300	
Quadruple cottage for peons ...		4,000	4,300
Hedigalla :—			
Cart road (Token Vote)			100
Immature Areas:			
Dartonfield		1,634	
Nivitigalakele		3,398	
Hedigalla		7,448	12,480
			Rs. 16,880

SUMMARY

	Rs.	Rs.
Income		347,597
Expenditure:		
Revenue	258,640	
Capital	24,271	282,911
Excess of Income over Expenditure ...		Rs. 64,686

RUBBER RESEARCH SCHEME (CEYLON)

Dartonfield Estate

Working Account for the year ended 31st December, 1943

Dr. Cr.

	Rs. cts.	Rs. cts.		Rs. cts.	Rs. cts.
To Expenditure :—			By Sales :—		
General Charges ...	13,000 63		Manufactured rubber (89,278 lbs.) and 292 lbs. bark shavings	60,567 64	
Upkeep, Manufacture & Distribution ...	21,137 35	34,137 98			
,, Planting Food Crops	1,206 84		Preserved latex (Estate latex 12,803 lbs. Bought latex 3,204 lbs.)	15,115 81	75,683 36
Less: proceeds from sale of foodstuffs	204 84	1,002 00			
,, Bought Latex :—			,, Sundry Receipts :—		
Value of latex ...	11,380 99		Crepeing charges on outside rubber	410 30	
Incidental Expenses ...	2,024 03	13,405 02	Profit from Carting Account	69 19	479 49
,, Balance transferred to Revenue Account		27,617 84			
	Rs.	76,162 84		Rs.	76,162 84

Nivitigalakele Experiment Station

Working Account for the year ended 31st December, 1943

Dr. Cr.

	Rs. cts.	Rs. cts.		Rs. cts.	Rs. cts.
To Expenditure :—			By Sale of Produce:—		
General Charges	6,776 67		Rubber (59,773 lbs.) and 649 lbs. bark shavings	40,902 25	
Upkeep, Manufacture and Distribution	12,944 54	19,721 21			
,, Upkeep of Nurseries		2,628 97	Planting Material	3,307 41	
,, Handling and distribution of budwood and budded stumps ...		778 64	Food Crops Rs. 408 17 *Less* Expenditure ,, 369 22	33 95	44,243 61
,, Balance transferred to Revenue Account ...		21,114 79			
	Rs.	44,243 61		Rs.	44,243 61

RUBBER RESEARCH SCHEME (CEYLON)

Revenue Account for the year ended 31st December, 1943.

Dr. Cr.

	Rs. cts.	Rs. cts.		Rs. cts.	Rs. cts.
To Personal Emoluments :—			By Balances of Estate Working Accounts :—		
Senior Scientific Staff ...	72,965 75		Dartonfield	27,617 84	
Junior Scientific Staff ...	7,167 84		Nivitigalakele	21,114 79	48,732 63
Office Staff	11,629 86	91,763 45	,, Cess Collections ...		273,557 71
,, Library & Publications :—			,, Interest ...		9,948 06
Library	694 28		,, Sale of Publications ...		254 01
Publications	1,880 30	2,574 58	,, Sundry Receipts :—		
Smallholdings Work :—			General	3,121 06	
Salaries and Allowances	20,223 30		Sale of Vulcanised products Rs. 5,343 84		
Travelling and General Expenses	8,993 19	29,216 49	*Less*: expenditure ,, 4,821 84	522 00	3,643 06
,, Laboratory :—					
Equipment and Working Expenses	2,586 62				
Furniture Replacements	15 35	2,601 97			
,, Field and Factory Experiments :—					
Field Experiments	6,981 00				
Factory Experiments	3,142 60	10,123 60			
,, Office :—					
Stationery and Office Equipment	2,534 77				
Postages and Telegrams	1,707 43				
Advertising	279 69				
Telephones	995 00				
Audit	850 00	6,366 89			
,, Travelling :—					
Expenses of Board Members	1,867 60				
Expenses of Staff	5,035 32	6,902 92			
,, Maintenance of Buildings, Water and Power Supply :—					
Laboratories and Offices	31 37				
Bungalows	1,303 07				
Water and Power Supply	2,180 83				
Bungalow Furniture Replacements	131 70	3,646 97			
Miscellaneous Items shared with Estates :—					
Dartonfield General Charges	13,000 62				
Nivitigalakele General Charges	6,776 66				
Hedigalla General Charges	3,766 36				
Upkeep of Roads and Grounds	314 75				
Factory Upkeep	1,427 31				
Power Supply	5,024 33	30,310 03			
,, Contingencies :—					
Contribution to London Advisory Committee	11,707 32				
General Charges	1,137 93				
Insurances	2,440 19				
Staff Provident Fund	13,557 68				
Contribution to Passage Fund Reserve	6,000 00				
Entertainment Allowance	37 50				
War allowance to Staff	10,108 47				
Contribution to Medical Fund	1,056 00	46,045 09			
,, Planting Food Crops at Hedigalla		1,727 44			
,, Depreciation		18,359 44			
,, Balance, being excess of Income over Expenditure for the year, carried forward to Balance Sheet		86,497 60			
		Rs. 336,136 47			Rs. 336,136 47

RUBBER RESEARCH SCHEME (CEYLON)

Capital Account as at 31st December, 1943

EXPENDITURE	To December 31st. 1942 Rs. cts.	Transfers between Accounts Rs. cts.	Additions in 1943 Rs. cts.	Total Rs. cts.
To Land including Development :—				
Dartonfield ...	123,004 77		1,766 06	124,770 83
Nivitigalakele ...	129,607 64		2,337 39	131,945 03
Hedigalla ...	2,444 72		7,626 49	10,071 21
,, Buildings and Lines Dartonfield :—				
Estate ...	43,176 26		3,768 30	46,944 56
Headquarters ...	190,580 50		204 47	190,784 97
,, Nivitigalakele :—				
Estate ...	18,246 83		3,357 33	21,604 16
Headquarters ...	21,903 65		—	21,903 65
Hedigalla :—				
Estate ...			1,917 51	1,917 51
Headquarters ...			—	—
,, Furniture and Fixed Equipment :—				
Dartonfield ...	37,126 36		1,859 28	38,985 64
Nivitigalakele ...	5,164 90		—	5,164 90
,, Power & Water Supply :—				
Dartonfield ...	38,104 53		555 58	38,660 11
Nivitigalakele ...	6,025 61		—	6,025 61
,, Machinery & Tools :—				
Dartonfield ...	104,478 05		1,596 42	106,074 47
Nivitigalakele ...	311 54		—	311 54
,, Laboratory Apparatus ...	29,183 79		426 04	29,609 83
,, London Plant ...	11,333 34		—	11,333 34
,, Live Stock ...	125 75		—	125 75
	760,818 24		25,414 87	786,233 11

RECEIPTS	Rs. cts.
By Revenue applied for Capital purposes at December 31, 1942	760,818 24
In 1943	25,414 87
	Rs. 786,233 11

General Balance Sheet as at 31st December, 1943.

LIABILITIES	Rs. cts.	Rs. cts.
Sundry Creditors		9,874 73
Passage Fund Reserve :—		
At December 31, 1942	9,661 02	
Add.: Reserve for 1943	6,000 00	
Add:. Amount deposited with Thos. Cook & Son, Ltd. in 1942	4,000 00	
	19,661 02	
Less: Payments in 1943	1,702 93	17,958 09
Depreciation Reserve :—		
At December 31, 1942	142,000 10	
Add: Reserve for 1943	18,359 44	
	160,359 54	
Less: Cost of replacements	1,394 00	158,965 54
Provident Fund Reserve :—		
At December 31, 1942	79,720 18	
Additions during 1943	23,474 75	
	103,194 93	
Less: Payments in 1943	1,689 68	101,505 25
Medical Fund		1,812 34
Audit Fee Reserve :—		
At December 31, 1942	579 48	
Add: Reserve for 1943	850 00	
	1,429 48	
Less: Payments in 1943	599 20	830 28
Reserve for Stabilisation of Income :—		
At December 31, 1942	82,367 78	
Add: Reserve for 1943	42,557 71	124,925 49
Surplus Account :—		
At December 31, 1942	300,395 05	
Add: Reserve fot 1943	86,497 60	
	386,892 65	
Less: Contribution to Capital Outlay Rs. 25,414 87		
Transfer to Reserve for Stabilisation of Income ,, 42,557 71	67,972 58	318,920 07
		Rs. 734,791 79

ASSETS		Rs. cts.	Rs. cts.
Debtors :—			
Cess Collection for December, 1943 ...		22,401 34	
Sundries ...		21,586 37	43,987 71
Advance Accounts :—			
London Advisory Committee ...		23,241 60	
Estate Superintendent :—			
Dartonfield	Rs. 73 47		
Nivitigalakele	,, 56 88		
Hedigalla	,, 313 05	443 40	
Smallholdings Propaganda Officer ...		75 05	
Thos. Cook & Son, Ltd. ...		2,297 07	
Postmaster-General ...		160 00	26,217 12
Accrued interest on investments ...			1,680 20
Payments in advance ...			4 58
Stocks :—			
Estate Stocks ...		13,348 71	
Rubber Chemicals Stock ...		4,573 46	17,922 17
Loans to Officers ...			744 31
Loan to Hataraliyadda Co-operative Society at 31-12-42		3,000 00	
Less: amount repaid ...		300 00	2,700 00
Investments :—			
In Ceylon Government 3½% Loan 1957/62 ...		25,000 00	
,, ,, 3¼% ,, 1949/51 ...		110,000 00	
,, ,, 3 % War Loan 1956/60		20,000 00	
,, ,, 3¼% Home Defence Loan, 1952		65,000 00	
,, ,, 3½% National Loan 1964/69		30,000 00	250,000 00
Cash Balances :—			
At Ceylon Savings Bank ...		6,360 00	
On Fixed Doposit ...		165,000 00	
On Savings Deposit (Bank of Ceylon) ...		10,457 68	
In Current Account No. 1 ...		200,920 98	
In Current Account No. 2 ...		7,657 72	
In hand ...		1,139 32	391,535 70
			Rs. 734,791 79

In accordance with the provisions of Section 8 (2) of the Rubber Research Ordinance (Chapter 302), 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 31st December, 1943. My report dated 10th August, 1944, on the above Balance Sheet and Accounts is annexed herewith.

Audit Office,
Wellawatte, 10th August, 1944.

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

Provident Fund

Dr. **Working Account for the year ended 31st December, 1943.** **Cr.**

	Rs. cts.		Rs. cts
To payment to 1 deceased and 9 retiring officers	1,689 68	By Balance brought forward from 1942 ...	... 79,720 18
,, Balance carried forward	101,505 25	,, Board's Bonus for 1943 Rs. 9,775 57	
		,, Interest on officers' contributions ,, 1,554 65	
		,, Interest on Board's Bonus ,, 2,162 44	13,492 66
		,, Bonus and interest for 1943 paid to 1 deceased officer ,, 43 93	
		,, Interest for 1943 paid to 9 retiring officers ,, 21 09	65 02
		,, Members' contributions during 1943	9,917 07
	Rs. 103,194 93		Rs. 103,194 93

Audit Office,
Wellawatte, 10th August, 1944.

Audited and found correct :
(Sgd.) K. KANAGARATNAM,
Acting Auditor-General

STATEMENT "A"

Head of Estimate	ACCOUNT	Estimate	Expenditure Capital	Expenditure Revenue	Excess	Saving	Causes for Variation
		Rs.	Rs.	Rs.	Rs.	Rs.	
1.	**Administration of the Board :** Travelling expenses of Members ...	2,250	—	1,868	—	382	Fewer meetings held
2. A-F.	**Emoluments of Senior Scientific Staff** ...	76,600	—	72,966	—	3,634	One officer's military salary credited.
3. A-E.	**Emoluments of Junior Scientific Staff** ...	7,960	—	7,168	—	792	Changes in staff.
4.	**Library and Publications :**						
	A. Library ...	1,250	—	694	—	556	Binding of periodicals postponed.
	B. Publications ...	1,750	—	1,880	130	—	Increased printing costs.
5.	**Smallholdings Work :**						
	A-B. Salaries and rent allowances of Staff ...	20,190	—	20,223	33	—	
	C-D. Travelling and General Expenses	13,229	—	8,993	—	4,236	S. H. P. O. on leave for 3 months ; and less travelling done.
6.	**Laboratory :**						
	A. Equipment and Working Expenses ...	5,000	504	2,587	—	1,909	Chemicals ordered not received.
	B. Furniture Replacements ...	50	—	15	—	35	
7.	**Field and Factory Experiments :**						
	A. Field Experiments ...	9,217	—	6,981	—	2,236	Pollination work at Nivitigalakele not undertaken.
	B. Factory Experiments ...	3,313	—	3,143	—	170	
	C. Budding Instruction ...	100	—	—	—	100	No instruction given.
8.	**Office :**						
	A-C. Emoluments of Office Staff...	11,237	—	11,630	393	—	Increase in salary scales.
	D. Stationery and Office Equipment ...	3,000	—	2,535	—	465	Economies.
	E. Postages and Telegrams ...	2,000	—	1,707	—	293	Less postage on publications.
	F. Advertising ...	200	—	280	80	—	More vacancies advertised.
	G. Telephone ...	1,000	—	995	—	5	
	H. Audit ...	850	—	850	—	—	
9.	**Travelling Expenses of Staff**	4,000	—	5,035	1,035	—	More travelling done and higher rates paid.
10.	**Maintenance of Buildings, Water and Power Supply :**						
	A. Laboratories and Offices ...	250	—	31	—	219	Work postponed.
	B. Bungalows ...	1,000	—	1,303	303	—	Rent of Gallawatta bungalow and caretaker's wages.
	C. Water and Power Supply ...	750	—	2,181	1,431	—	Unexpected repairs to water pumps, motors and Nivitigalakele engine ; and higher repair charges.
	D. Bungalow Furniture Replacements ...	250	—	132	—	118	Over estimate.
11.	**Miscellaneous items shared with Estate :**						
	A. Dartonfield General Charges	11,654	—	13,001	1,347	—	Increased dearness allowance to labourers ; out-turn and output bonuses not estimated.
	B. Nivitigalakele General Charges	4,188	—	6,777	2,589	—	Increased dearness allowance to labourers ; out-turn and output bonuses not estimated ; and share of Superintendent's salary not provided.
	C. Hedigalla General Charges ...	4,273	—	3,766	—	57	Conductor not appointed.
	D. Upkeep of Roads and Grounds	570	—	315	—	255	Work in arrears owing to shortage of labour.
	E. Factory Upkeep ...	687	—	1,427	740	—	Unexpected repairs to Ruston engine.
	F. Power Supply ...	4,408	—	5,024	616	—	Higher cost of fuels and increased salaries of engine drivers.
12.	**Contingencies :**						
	A. Contribution to London Advisory Committee ...	12,000	—	11,707	—	223	Difference in exchange.
	B. General Charges ...	750	—	1,138	388	—	More legal charges on agreements, etc.
	C. Insurance Charges ...	2,000	—	2,440	440	—	Premium on personal accident policy not provided.
	D. Staff Provident Fund ...	13,600	—	13,558	—	2	
	E. Passages ...	6,000	—	6,000	—	—	
	F. Entertainment Allowance ...	300	—	38	—	262	Over estimate.
	G. War Allowance to Staff ...	8,294	—	10,108	1,814	—	Higher rate paid.
	H. Contribution to Medical Fund ...	1,650	—	1,056	—	594	Over estimate.
13.	**Depreciation**	19,000	—	18,359	—	641	Over estimate
14.	**Planting Food Crops, Hedigalla**	3,000	—	1,727	—	1,273	Proceeds from sales credited.
15.	**Capital Account :**						
	A. Upkeep of Dartonfield Immature Areas ...	1,952	1,766	—	—	186	Economies and less incidence of disease.
	B. Upkeep of Nivitigalakele Immatnre Areas ...	2,343	2,337	—	—	6	
	C. Dartonfield Carpenter's Shed	2,473	370	—	—	2,103	Work not completed.
	D. Hedigalla Conductor's Bungalow ...	3,000	110	—	—	2,890	do
	E. Hedigalla Ceylonese Labourers' Cottages ...	5,367	1,808	—	—	3,559	do
	F. Hedigalla Store and Cart Road (token vote) ...	100	1,604	—	1,504	—	
	G. Opening 40 acres Hedigalla ...	5,765	5,461	—	—	304	do
	H. Rack for Record Room ...	230	221	—	—	9	
	I. Water and Power Scheme (Dartonfield) ...	1,900	1,756	—	—	144	do
	J. Dartonfield Ceylonese Labourers' Cottages ...	3,406	3,398	—	—	8	
	K. Nivitigalakele Ceylonese Labourers' Cottages ...	3,619	3,357	—	—	262	do
	L. Latex Equipment ...	600	600	—	—	—	
	M. Hedigalla 1943 Clearing for Food Crops ...	2,520	562	—	—	1,958	Work incomplete owing to shortage of labour.
	N. Furniture and Office Equipment ...	1,432	1,560	—	128	—	Extra cost of typewriter, and furniture for additional staff.